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## **Abstract**

This study analyzes the level of financial literacy among college students in Lynchburg VA area as well as the factors that impact the students' competency in the field. Furthermore, it examines how the level of financial knowledge influences students' opinions and decisions on personal finance matters. Past research indicates that non-business majors, women, students under age 30, with lower class ranks, and with little work experience have lower levels of financial knowledge. A major focus of this study is to test these hypotheses by administering a survey to college students in Lynchburg VA area and make inferences based on the collected data about the economic implications of the students' financial literacy levels on the local and neighboring regions' economies.

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- Author** Florentina Furtuna
- Affiliation** Randolph-Macon Woman’s College
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## **I. Introduction**

As the national financial system becomes increasingly complex, placing even more responsibility on individuals to manage the details of their finances, there is mounting evidence that the burden is too much for many individuals. Americans' poor financial habits have reached alarming proportions. A large percentage of people of all ages, incomes, and education levels lack the basic financial knowledge and skills to ensure long-term stability for themselves and their families. Researchers predict that in the future 96% of Americans will be financially dependent on government services, family or charities to cover the costs of retirement (U.S. Dept. of Health & Human Services). The current consumer debt stands at almost \$2 trillion, which averages to more than \$18,500 per household, not including mortgage debt (Khan). In addition, it is estimated that 43% of U.S. families spend more than they earn (Khan, MSN Money) and an average household with one or more credit cards holds \$9,200 on those cards, up from \$4,300 in 1994, which represents an 114% increase in ten years (Consumer Credit Counseling Services, 2004). In this context, in a speech before the National Press Club, David Walker, Comptroller General of the U.S., stated "We must come to grips with the daunting fiscal realities that threaten our nation's, children's and grandchildren's future" (Walker, 2003).

The lack of financial planning among various social strata indicates a growing trend in the level of personal bankruptcies and a sudden decrease in the savings rates. Financial problems are one of the primary reasons for divorce and why the number of elderly living in poverty has never been higher (Mason, 2000). Various studies (KPMG, 1995; PSRA, 1996, 1997; Vanguard Group/Money Magazine, 1997; Bianco & Bosco 2000) indicate that the main reason why Americans make poor financial decisions is because they have not received a sound personal finance education. Many individuals lack a basic understanding of how to control debt, how to save and how to plan a solid financial future.

Currently, college students represent a considerable part of the U.S. population and their level of financial literacy will soon impact the overall economy. It is estimated that more than 16 million students

were enrolled in U.S. postsecondary education in 2005. In addition, both high-school graduates and college enrollments are expected to increase until at least 2014 (Hawkins & Clinedinst 2006). Since college students are expected to have higher earnings after graduation, they are also expected to be financially literate or at least more literate as a part of their preparation for a career.

This study will analyze the level of financial literacy among college students in Lynchburg as well as the factors that impact the students' competency in the field. In addition, it will examine how the level of financial knowledge influences students' opinions and decisions on personal finance matters. The paper will be organized as follows. Section II reviews related literature to the financial literacy topic. Section III discusses the research design and methodology including three subsections: the *Plan for Data Collection*, the *Sampling Plan*, and the *Plan for Statistical Analysis and Data Processing*. Section IV states the results. Section V presents the limitations of the project and indicates ideas for future research. Section VI represents an appendix that includes the data collection tool.

## **II. Literature Review**

Most of the previous studies have been conducted by practitioners in the financial services industry. Many surveys have tested the level of financial literacy of adults. Results suggested that the majority of adults were not financially literate. For instance, in 1997 the Princeton Survey Research Associates surveyed 1,770 households nationwide on their financial knowledge. The 42% average correct score on the survey indicated that households did not possess a good understanding of basic financial concepts. Another study conducted by KPMG in 1995 that surveyed 1,183 employers indicated that employees did not contribute a sufficient amount of their income to 401(K) plans, thus failing to maximize their benefits by insuring a financially secure retirement. A more recent study conducted by the Employee Benefit Research Institute in 2006 provided additional evidence that while a large majority of Americans expect to enjoy a comfortable retirement, many

have not taken actions needed to turn their aspirations into reality and face the prospect of having to work far longer than they expect.

Studies have indicated that even active investors are not necessarily financially literate. A 2001 John Hancock study of eight hundred 401(K) investors indicated that only 21% of investors considered themselves relatively knowledgeable about investments typically found in 401(K) plans (John Hancock, 2001). A Money Magazine/Vanguard Mutual Fund Literacy test administered every two years to fund investors revealed that less than 20% of the 1,555 investors polled scored 70% or better and the average score was just 49%. In addition, American Century Investments surveyed 750 investors about their knowledge of bond markets. The results were disappointing since 73% of investors failed to answer at least half of the 10 questions correctly (Reuters 2001). In 2002 Ronald P. Volpe, Joseph E. Kotel and Haiyang Chen surveyed 530 online investors examining their investment literacy. The findings that investors correctly answered only 50% of the questions indicated a deficiency in the knowledge of investing concepts, despite the large amount of educational information and research available to online investors.

Prior studies of high school students consistently showed that students were not receiving a good education in personal finance. A research conducted by The Securities and Exchange Commission in 1999 indicated that 66 % of high school seniors taking a basic economic literacy test failed. The results were even worse in 2000 and 2001 respectively. The National Endowment for Financial Education stated that 70% of high school graduates were “illiterate consumers” (Miller, 1998). However, the Jump\$tart Coalition for Personal Financial Literacy nationwide survey conducted in 2004 revealed for the first time since 1997 that high school students were reversing declining scores and were demonstrating increased aptitude and ability to manage financial resources such as credit cards, insurance, and savings accounts.

Few studies have examined the financial literacy levels among college students. Volpe, Chen, and Pavlicko (1996) surveyed 454 students from a state university in the Midwest with the primary purpose of

measuring the students' financial knowledge of investment. The results indicated a 44% average score, a fact clearly suggesting that students at that university had a low level of financial investment knowledge. In addition, the study revealed that male students were more knowledgeable than female students, and business majors were more knowledgeable than non-business majors.

Another study conducted by Haiyang Chen and Ronald P. Volpe in 1998 surveyed 924 college students examining their personal financial literacy and the relationship between the literacy and students' characteristics as well as the impact of literacy on students' opinions and decisions. Their findings indicated a low level of financial knowledge since participants in the survey answered about 53% of questions correctly. Non-business majors, women, students in the lower class ranks, under age 30, and with little work experience had lower levels of financial knowledge. In addition, the study indicated that less knowledgeable students tended to hold wrong opinions and made inappropriate decisions. Thus, the authors concluded that the low level of students' financial knowledge would limit their ability to make informed decisions in the future.

One of the recent studies that examined students' financial literacy was conducted by Bianco and Bosco. They surveyed 574 students at an undergraduate university in New England in December, 1999 and January, 2000. Their results were consistent with prior studies on adults and students indicating a poor understanding of personal finance of the participants in the survey. The authors emphasized the need for financial education among students because of the amount of debt most of them incur while they are in school. As of 2004, the average indebted senior was \$17,600 in debt on graduation day (Boushey, 2005). Thus, the high levels of debt have implications for how students think about post-college jobs and life-choices. Highly indebted graduates may have little flexibility in the kinds of jobs that they must take in order to afford their debts and may choose to postpone marriage, buying a house, or starting a family while they pay off their loans (Boushey, 2005).

The impact of a growing student enrollment within a region extends beyond the educational

institutions to the local community itself. Likewise, a college or university which is successful in attracting a diverse college student body enhances not only its own reputation but also has an important impact on the local community in question (Steahr & Schmid, 1972). With the increase in the number of colleges and universities in the USA, trends of student migration across state boundaries to obtain the various benefits of a college education have also developed. Thus, students migrate across states in search of an “optimal bundle” of educational benefits offered by a university education (Mixon, 1992). During the years spent as students and residents of local communities, students develop specific networks and contacts, and perhaps their tastes change as well. After graduation, these students may be more likely to reside in the locality or region in which they have been educated. Evidence suggests that the university is important in attracting human capital to the local area and in stimulating entrepreneurial talent in the region (Huffman & Quigley, 2002). In this context, the financial literacy levels of students within the region where they are located will have important regional public policy implications due to the short term as well as long-run consequences students’ financial education will have on the local markets.

Prior research on financial literacy levels has provided evidence that a vast majority of individuals from different social strata, including college students lack the basic financial knowledge and skills to ensure long-term stability for themselves and their families. Most of the studies indicate the low levels of financial literacy among college students partly addressing the factors that influence the individuals’ knowledge and the impacts on their decisions regarding personal financial issues. In my study I intend to analyze the financial literacy levels among college students and their opinions and decision regarding financial matters. In addition, I will attempt to make inferences based on the data that I will have collected about the economic implications of the students’ financial literacy levels on the local and neighboring regions’ economies.



### **III. Research Design and Methodology**

#### ***Plan for Data Collection***

The primary data collection instrument for my study was a survey. The main function of the questionnaire was to translate the defined research objective, namely to identify the level of financial literacy of college students and probe their attitudes, opinions and decisions regarding pertinent financial matters. In designing the survey I took into consideration the fact that most students had busy schedules and most probably would not be willing to spend an extended amount of time to finish a lengthy survey. Accordingly, in line with previous research, specifically, Haiyang Chen and Ronald Volpe's survey, my questionnaire, although not as comprehensive, included financial literacy questions on general knowledge, savings and borrowings, insurance, and investments.

For cost saving considerations I made the survey self-administered and undisguised. I clearly disclosed the purpose of the study at the beginning of the questionnaire in order to assure respondents' anonymity and achieve greater truthfulness and objectivity. The survey was conducted in person and the respondents were explained the objectives and the contents of the research. In addition, clarifications were made when necessary concerning various questions on the survey.

I divided the survey in three parts. With the questions from the first part of my questionnaire I attempted to probe opinions and attitudes, namely by identifying students' attitudes and opinions regarding money management skills: spending, investing, acquiring insurance. With the second set of questions I tried to measure students' level of financial literacy by assigning a percentage score according to the number of the correct responses that the participants provided. In the last part of the survey I collected demographic and other relevant data on the respondents which allowed me to test the relationship between the students' levels of financial literacy and their academic discipline, gender, class rank, work experience, age, and whether a student wanted to work after graduation in the proximity of Lynchburg area or not.

## ***Sampling Plan***

The population that I found relevant for my research project is the Lynchburg VA area college student population, specifically due to the fact that the region has a fairly large student population that can be easily identified. In order to draw the units for the sample I used a non-probability sampling method with which the selection of the members of the population is not based on probability. Therefore, I was not able to calculate the probability of any one person in the population being selected into the sample. However, the non-probability method, in particular the convenience sampling method that I used, strived to draw a representative sample since it included features of a systematic, probability based sampling method. Specifically, due to the easily identified population in the region I was able to calculate the “skip interval” as a part of the sampling technique. Thus, I computed it by dividing the college students in the Lynchburg area population size to the chosen sample size. The chosen sampling methodology tried to ensure sufficient randomness and it attempted to be as representative as possible of the student college population in Lynchburg area.

The sample frame for my research consisted of students in Lynchburg that are currently enrolled in a graduate or undergraduate program. It included two representative colleges: Randolph- Macon Woman’s College and Lynchburg College campus locations. Since all students pursuing a college degree usually live on campus the incidence rate for my study was relatively high. That is, the sample units drawn from that frame fitted the qualifications of those people I intended to survey.

I determined the sample size by using a confidence interval approach which applies the concepts of variability, confidence interval, sampling distribution, and standard error percentage to create a valid sample. Furthermore, in addition to applying the theoretically most correct method, I took into consideration the budget and time constraints when deciding on the desired sample size. The college student population in Lynchburg is approximately 18,000 students where Lynchburg College with a population of 2,428 students represents 14 % and Randolph-Macon Woman’s College with a population of 730 students represents 4 %. I calculated the

sample size for my survey by considering three factors: the amount of variability believed to be in the population, the desired level of accuracy, and the desired level of confidence required in my sample estimates of the population values.

Thus, I used the formula:

$$n = \frac{z^2 \times (pq)}{e^2}$$

where,

n = the sample size

z = standard error associated with the level of confidence

p = estimated variability in the population

q = (100 - p)

e = acceptable error

Due to the uncertainty in the variability of the defined population I chose the case of greatest variability with 50-50 percentage approach (“worst case”), I decided to use a 95 percent level of confidence, and I wanted the results to be accurate  $\pm 5$  percent.

Thus, the computations were the following:

$$n = \frac{1.96^2 (50 \times 50)}{5^2} = \frac{3.84 \times 2500}{25} = 384$$

Hence, I intended to survey 384 students to obtain  $\pm 5$  percent accurate results at the 95 percent confidence level. At this point I was able to establish the skip interval to ensure sufficient randomness of the convenience sampling method that I applied. Thus, I calculated the “skip interval” by dividing the population size to the desired sample size.

$$\text{SkipInterval} = \frac{\text{PopulationSize}}{\text{SampleSize}} = \frac{18,000}{384} = 46.8$$

Since the skip interval was approximately 47 students, for time and cost saving considerations, I divided the interval to a randomly chosen number 9, thus, minimizing it to 5 students. Since my sample consists of two representative institutions in Lynchburg, I split the sample proportionally in accordance with the subpopulation

sizes of these institutions. Thus, I intended to survey 264 students from Lynchburg College and 120 students from RMWC. Furthermore, since I projected the sample results to the entire Lynchburg area college student population I used the same skip interval for both institutions.

### ***Plan for Statistical Analysis and Data Processing***

In order to analyze the data collected, I started with a descriptive analysis so that I would portray the “typical” respondent as well as reveal the general pattern of responses. The descriptive measures became a foundation for subsequent predictive statistical analysis. Hence, I tried to identify different groups of students according to their financial literacy level through a regression analysis.

Previous research has indicated that the level of financial literacy varies in accordance with students’ major, experience, age, gender, nationality, and race. Studies indicate that non-business majors, women, students in the lower class ranks, under age 30, and with little work experience have lower levels of knowledge and tend to hold wrong opinions and make incorrect decisions (Chen & Volpe, 1998). Taking into consideration the previous research theoretical considerations I created an econometric model by analyzing the financial literacy of students as a function of age group, field of study, gender, work experience, if a student had taken a class in personal finance, and finally if the participant would prefer working after graduation in the proximity of the Lynchburg VA area or not. The coefficients of the selected independent variables represented the effect of each subgroup compared with an arbitrarily selected reference group. For instance, the academic Major was coded as “1” if a participant in survey is a Business/Economics major and “0” otherwise. In order to assess, the financial literacy of students I used Haiyang Chen and Ronald Volpe’s technique by calculating the mean and the median percentage of correct scores for each question in section II on the designed survey and then grouping the overall scores into two categories in accordance with the median percentage of correct scores of all participants of the survey. Therefore, I created a dichotomous financial literacy dependent variable including two categories with scores equal to or below the median, and scores above the average. Students with scores

higher than the sample median were classified as those with relatively more financial knowledge, while respondents with scores equal to or below the median were classified as students with relatively less knowledge.

The *Econometric Model* takes on the following form:

$$\ln[\rho/(1-\rho)] = \beta_0 + \beta_1(\text{FieldStudy}) + \beta_2(\text{ClassFinance}) + \beta_3(\text{Gender}) + \beta_4(\text{Age}_1) + \beta_5(\text{Age}_2) + \beta_6(\text{ClassRank}_1) + \beta_7(\text{ClassRank}_2) + \beta_8(\text{ClassRank}_3) + \beta_9(\text{ClassRank}_4) + \beta_{10}(\text{Experience}_1) + \beta_{11}(\text{Experience}_2) + \beta_{12}(\text{Experience}_3) + \beta_{13}(\text{Experience}_4) + \beta_{14}(\text{WorkAfterGrad})$$

where,

$\rho$  = the probability of a student with relatively more knowledge about personal finance.

*FieldStudy* = 1 if a participant is a Business/Economics Major, 0 otherwise.

*ClassFinance* = 1 if a student has taken a class in Personal Finance, 0 otherwise.

*Gender* = 1 if a participant is a female, 0 otherwise.

*Age1* = 1 if a participant is in the age group of 18-20, 0 otherwise.

*Age2* = 1 if a participant is in the age group of 21-25, 0 otherwise.

*ClassRank1* = 1 if a participant is a freshman, 0 otherwise.

*ClassRank2* = 1 if a participant is a sophomore, 0 otherwise.

*ClassRank3* = 1 if a participant is a junior, 0 otherwise.

*ClassRank4* = 1 if a participant is a senior, 0 otherwise.

*Experience1* = 1 if a participant has no experience, 0 otherwise.

*Experience2* = 1 if a participant has more than 0 to less than 2 years of experience, 0 otherwise.

*Experience3* = 1 if a participant has 2 to less than 4 years of experience, 0 otherwise.

*Experience4* = 1 if a participant has 4 or more years of experience, 0 otherwise.

*WorkAfterGrad* = 1 if the participant wants to work in the proximity of Lynchburg area, 0 otherwise.

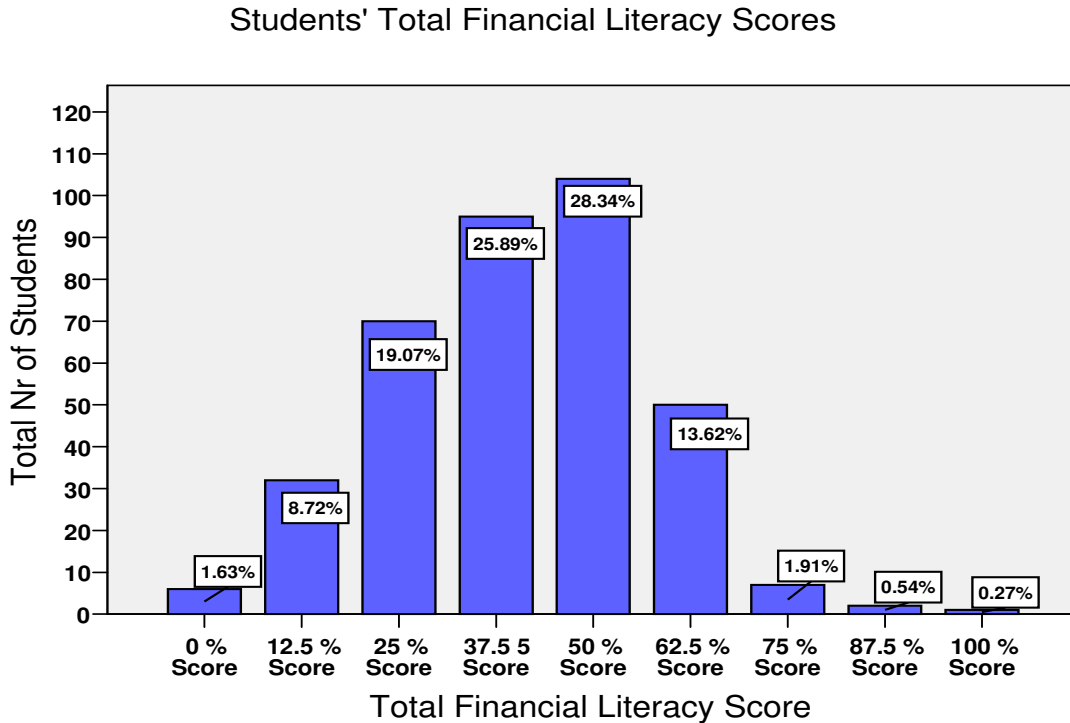
#### **IV. Results & Analysis**

Three hundred and sixty seven students participated in the survey. Initially, the desired sample size was of 384 students so that I would be able to project my findings towards the defined population at a  $\pm 5$  percent significance level. The response rate, however, was very high of approximately 96 %. In addition, due to the convenience sampling technique that I used which is not based on probability where I am not able to calculate the probability of each respondent in my sample, a difference of 4 % in the initially defined sample size had a minor impact on the obtained results, thus, it didn't affect the sampling inferences and predictions projected towards the entire Lynchburg college student population. For future considerations, however, in order to obtain more reliable results and make better inferences about the defined population, a random sampling technique should be considered.

The sample characteristics were the following. In terms of education 36.5 % of the respondents were freshman, 25.3 % sophomores, 22.1 % juniors, 15 % seniors, and 3 students had already graduated. 42.5 % were majoring in Human and Other Social Sciences, 22.6 % were Science majors, 18.8 % were majoring in Fine Arts, and finally only 16.1 % indicated that they were Business Administration/Economics majors. 87.5 % of the students surveyed hadn't taken a class in Personal Finance before and only 12.5 % indicated that they had taken such a class before. In terms of demographic background, most of the respondents were from 18 to 20 years of age, specifically 70.8 %, the rest of the students, 27.8 % were aged between 21 and 25 years, and only 5 students indicated that they belonged to the 26- 40 age group. Female participants represented about 75 % of the sample due to the sampling frame that was chosen which included a single sex institution. 35.1 % had more than four years of work experience, 28.3 % had between two and four years of experience, and approximately the same percentage of students, 27.2 % had less than two years of work experience. Most of the participants were U.S. citizens, 84 % of the sample, and 38 % indicated that they were VA residents.

## Overall Survey Results

**Graph 1: Students' Total Financial Literacy Scores**



Graph 1 indicates that on average participants answered 40 % of the questions correctly. Considering that the survey included only eight questions that tested basic knowledge in investments, borrowings, savings, and general personal finance, answering less than half of the questions correctly suggests that Lynchburg college students' financial knowledge is relatively low. One possible explanation offered by previous research is that most of the higher education institutions do not take into account the students' personal finance knowledge (Danes & Hira, 1987, Bianco & Bosco, 2000), and even business schools do not require students to take a Personal Finance Management course (Bialaszewski, Pencek, & Zietlow, 1993).

Another reason for the low level of financial knowledge could be attributed to the fact that most of the participants in the survey were very young; approximately 75% of students belonged to the 18-20 years old group, thus, they were still at an initial stage in their financial planning life cycle; this explanation is consistent with past research findings (Volpe, Chen & Pavlicko). In addition, the largest percent of students,

42.5 %, indicated that their primary major was in the field of Human and other Social Sciences and only 16.1 % indicated that they were Business Administration/Economics majors. Usually, Business Administration/Economics students are much more exposed to issues in accounting, finance and marketing as a part of their curriculum requirements, thus, they tend to be more knowledgeable in finance matters than other students. This disproportional distribution among business and non business students could have also affected their low knowledge about personal finance matters.

Students were asked in Question 2 on the financial literacy test to identify instruments which are usually not associated with spending. As indicated in Table 1, 82.6% answered this question correctly, which represents the highest score out of all the questions on the second part of the survey. This occurrence could be explained by the fact that most of the students at this age spend their income on consumption, thus, they are aware of the main spending instruments at their disposal.

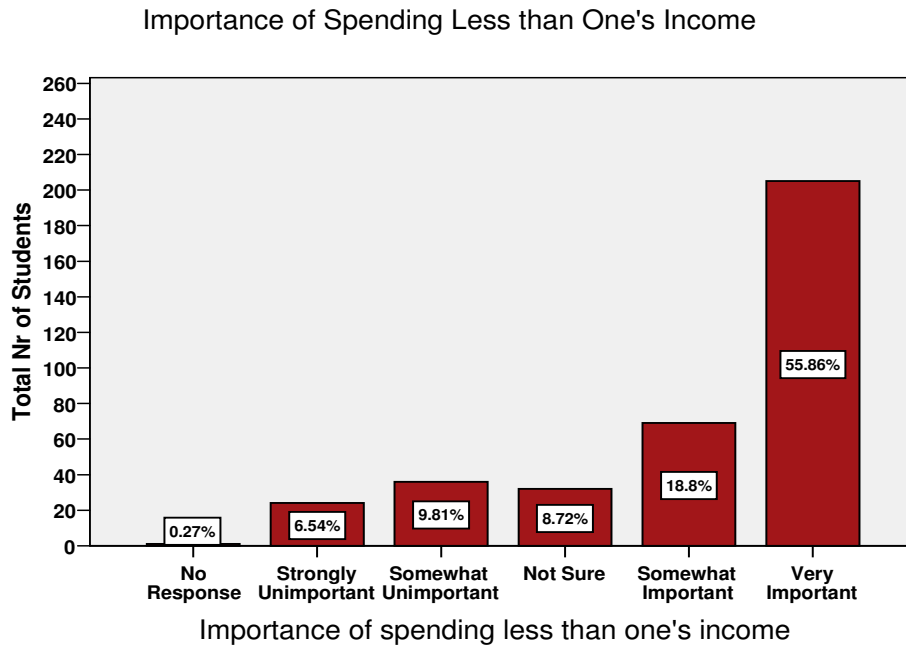
**Table 1. Instruments usually not associated with spending**

Students' Scores on Question 2	Frequency	Percent	Cumulative Percent
0% Scored	64	17.4	17.4
12.5 % Scored	303	82.6	100.0
Total	367	100.0	

In addition, as indicated on Graph 2 when asked to rank on the first part of the survey the importance of spending less than one's income on a 5 dimension Likert scale ranging from Strongly Unimportant to Very Important, most of the students, 56 % indicated that this issue is very important. Therefore, this explains the fact that college students at this stage of their financial experience cycle are active consumers and they are extensively aware of the importance of their spending patterns, hence their financial knowledge concerning this aspect of their personal finance education is considerably high.



**Graph 2: Importance of Spending Less than One's Income**



On Question 4 which analyzes students' knowledge about borrowings, specifically focusing on the meaning of APR, respondents have scored the lowest out of all the questions on the entire financial literacy test. 83 % of the students as indicated in Table 2 have answered this question incorrectly. In this regard, it would have been interesting to add another question on the survey asking students how many credit cards they possess, thus, gain more insight about the reasons for such a low knowledge about the APR. However, since the APR is a confusing term in ways that it is calculated by different lenders, this could serve as a possible explanation why students are not really familiar with its meaning when comparing loan costs, even though, most of them possess at least one credit card.

**Table 2. Annual Percentage Rate (APR)**

Students' Scores on Question 4	Frequency	Percent	Cumulative Percent
0 % Scored	305	83.1	83.1
12.5 % Scored	62	16.9	100.0
Total	367	100.0	

On the last questions that tested students' investments knowledge scores were relatively low. Respondents' scores are indicated in Tables 3 and 4 respectively. A possible reason for this occurrence is that at this stage in their lives students are exposed to a limited amount of financial securities and most of their income is spent on consumption rather than investment. Therefore, they are less knowledgeable about these topics and do not attribute importance to these issues.

**Table 3. Interest Rate Price of a Treasury bond inverse relationship**

Students' Scores on Question 7	Frequency	Percent	Cumulative Percent
0 % Scored	276	75.2	75.2
12.5 % Scored	91	24.8	100.0
Total	367	100.0	

**Table 4. High-Risk & High Return Investment Strategy**

Students' Scores on Question 8	Frequency	Percent	Cumulative Percent
0 % Scored	196	53.4	53.4
12.5 % Scored	171	46.6	100.0
Total	367	100.0	

### **Predictive Analysis - Logistic Regression Output**

For the predictive analysis I used a logistic regression model. This econometric model is constructed by an iterative maximum likelihood procedure. The predicted variable, the financial literacy of students, is a dichotomous variable. Specifically, it is a function of the probability that a respondent will be more or less financially literate. In order to assess the explanatory power of the listed independent variables and test the proposed hypotheses I ran the regression for the entire financial literacy score on the financial literacy test. The regression output is included in the Appendix B. I coded the predicted probability of a student being more financially knowledgeable (scoring higher than the median score of 37.5%) with 1 and less financially literate (with a score lower than 37.5%) with 0. That

is,  $\ln(ODDS) = \left( \ln \frac{\rho}{1-\rho} \right)$ , where  $\rho$  is the predicted probability of a student being more financially

knowledgeable, thus, scoring higher on the test which is coded with 1, and  $1 - \rho$  is the predicted probability of the respondent being less financially knowledgeable, coded with 0. Under the *Variables in the Equation (Table 3. Appendix B)*, the intercept-only model is  $\ln(\text{odds}) = -.213$ . Since 164 of the students scored higher than the median score, and 203 had an equal or lower score to the 37.5% median score, the predicted odds of a student being more financially knowledgeable, scoring higher than the median score is .807 (164/203) (*Table 2. Appendix B*). The *Omnibus Tests of Model Coefficients (Table 5. Appendix B)* indicates a relatively high Chi-Square of 28.740 on 14 degrees of freedom, significant beyond .011. However, the overall fit of the model given by -2 Log Likelihood statistic of 475.878 (*Table 6. Appendix B*) is not highly significant (the smaller the statistic the better the model). I used the Hosmer-Lemeshow to test the null hypothesis about the existence of a linear relationship between the predictor variables and the log odds, thus, detect any problem of multicollinearity. This test computes the expected frequencies based on the assumption that there is a linear relationship between the weighted combination of the predictor variables and the log odds of the dependent variable, and ultimately, it compares them with the actual observed frequencies. The chi-square statistic, which compares the observed frequencies with those expected under the linear model, has a nonsignificant value of only 5.027 at a .755 significance level (*Table 7. Appendix B*), fact which indicates that the data fit the model well. The *Variables in the Equation (Table 9. Appendix B)* output indicates the following regression equation:

$$\ln[\rho/(1-\rho)] = -.335 + .779(\text{FieldStudy}) - .869(\text{ClassFinance}) + .325(\text{Gender}) - .545(\text{Age}_1) - .420(\text{Age}_2) + 20.947(\text{ClassRank}_1) + 21.141(\text{ClassRank}_2) + 21.1(\text{ClassRank}_3) + 21.63(\text{ClassRank}_4) - 22.071(\text{Experience}_1) - 21.859(\text{Experience}_2) - 21.639(\text{Experience}_3) - 21.366(\text{Experience}_4) - .279(\text{WorkAfterGrad})$$

In order to predict the odds that a student of a given gender, field of study, age, work experience, preference of working after graduation and whether the person has taken a class in personal finance will score higher on the financial literacy test I used the odds prediction equation  $ODDS = e^{a+bx}$ , where  $a$  is the constant in the equation,  $b$  is the coefficient of the

explanatory variable and finally  $x$  is whether 1 or 0, depending on the groups codes. For the first explanatory variable, the Field of Study that a student pursues, if the respondent is a Business/Economics major ( $FieldStudy = 1$ ), then the  $ODDS = e^{-.335+.779 \times (1)} = e^{.444} = 1.556$ . That is, an Economics/Business major is 1.556 times more likely to score higher on the financial literacy test. If the respondent is a non Business/Economics major ( $FieldStudy = 0$ ), then the  $ODDS = e^{-.335+.779 \times (0)} = e^{-.335} = 0.716$ . Thus, a non business major is only .716 as likely to score higher than the median score on the financial literacy test. By converting the odds to probabilities, for the Business/Economics majors  $\rho = \frac{ODDS}{1 + ODDS} = \frac{1.556}{2.556} = 0.608$  and for the non Business/Economics majors  $\rho = \frac{ODDS}{1 + ODDS} = \frac{0.716}{1.716} = 0.417$ , hence, the model predicts that 60% of the students majoring in Business/Economics will score higher on the financial literacy test versus 41% of students majoring in other fields.

For the *Class in Personal Finance* variable, if a respondent has taken a class in personal finance before, then the  $ODDS = e^{-.335-.869 \times (1)} = e^{-1.204} = 0.301$ . At the same time if a student hasn't taken such a class before the  $ODDS = e^{-.335-.869 \times (0)} = e^{-.335} = 0.716$ . By converting the odds to probabilities for the students who have taken a class in personal finance  $\rho = 0.23$  and for those who haven't  $\rho = 0.41$ . Paradoxically, the probability of scoring higher than the median score on the financial literacy test is much higher for the students who haven't taken a class in personal finance before (41%) rather than for the respondents who have taken one (23%).

For the Gender variable, if a respondent is a female, then the  $ODDS = e^{-.335+..325 \times (1)} = e^{-0.01} = 0.99$ . If, on the other hand, the subject is a male the  $ODDS = e^{-.335+..325 \times (0)} = e^{-.335} = 0.71$ . Thus, the probability of scoring higher on the financial literacy test is 49% for women versus 41% for men. For Age1 variable the probability of scoring higher on the financial literacy test if the respondent belongs to the 18-20 age

group is of 55% while for Age2 variable, if a student is between 21-25 years old the probability is relatively lower of 52%. For the Class Rank and Experience variables the coefficients are statistically insignificant, thus, the probabilities of the student scoring higher on the financial literacy test whether he or she belongs to one experience group versus another or an upper or lower class rank are also insignificant. Ultimately, for the Work after Graduation variable, if a student indicated as a primary preference working in the neighboring labor markets after graduation, the probability of him or her scoring higher on the financial literacy test is only 35%. In addition, the Exp(B) in the *Variables in the Equation (Table 9. Appendix B)* output indicates the odds ratio predicted by the model (natural log to the  $b$  power, where  $b$  is the coefficient of the independent variable). For instance, it predicts that the odds of scoring higher on the financial literacy test are 2.179 higher for Business/Economics majors than for non Business majors, as well as 1.385 higher for female versus male respondents.

The *Classification Table(a) (Table 8. Appendix B)* indicates 49% (80.7/164) of the students where the predicted event of scoring higher than the median financial literacy score was observed. This is known as the sensitivity of prediction P which represents the percentage of occurrences correctly predicted. The classification of the students where the predicted event was not observed is 71% (144/203). It is known as the specificity of prediction P and it calculates the percentage of nonoccurrences correctly predicted. Overall the predictions were correct 224 out of 367 times, for an overall success rate of 61%.

Table A and Table B present the summarized results of the Logistic Regression. As shown in Table A, the Field of Study has the highest percentage support. Thus, the fact that a student majors in Business or Economics predicts a higher score than the median one on the financial literacy test, hence, a higher level of financial knowledge among these students. In addition, the percentage support for Gender, Age1 and Age2 groups are relatively high, however, the difference between the two Age groups is not significant and it is in the reverse order than the expected one, specifically, the fact that with age the financial literacy of students

increases. Considering the Gender variable, the logistic regression indicates that females are more likely to score higher than males, however, the difference is not statistically significant. Ultimately, the percentage support for the students' market preferences concerning employment opportunities in the future and the students' overall rate of financial literacy is one of the lowest compared to the other explanatory variables.

Table A: *Effect of Scenario on % of Students Scoring Higher than the Median Score on the Financial Literacy Test*

Scenario	Percentage Support
Field Study (Business/Economics)	60
Gender (Female)	49
ClassFinance	23
Age1	55
Age2	52
WorkAfterGrad	35

Table B: *Logistic Regression Predicting Score from Field of Study, Gender, Class Finance, Age1, Age2, Work After Graduation*

Predictor	<i>B</i>	Wald $\chi^2$	<i>p</i>	Odds Ratio
FieldStudy	.779	5.815	.01	1.556
Gender	.325	1.422	.233	0.99
ClassFinance	-.869	5.638	.01	0.301
Age1	.545	.199	.656	1.23
Age2	.420	.117	.733	1.088
WorkAfterGrad	-.279	1.581	.209	0.54

Table B indicates the logistic regression coefficients for the significant variables in the logistic regression model. In addition, the Wald Chi-Square  $\chi^2$  statistic tests the unique contribution of each predictor, in the context of the other predictors, by holding constant the other predictors, thus, eliminating an overlap between them. The Wald statistic is significant at a conventional .05 significance level only for two variables, the field of study that a student pursues and whether the student has taken

or not a class in personal finance. The odds ratio for the field of study indicates that when holding all the other variables constant, a Business/Economics student is 1.556 times more likely to score above the median score on the financial literacy test than a student who pursues a major different than Economics or Business. The Class Finance variable has an unexpected negative sign that is statistically significant, fact which indicates that a student is more likely to score higher on the financial literacy test, .716 if he or she hasn't taken a personal finance class before. The Age groups are highly insignificant at a .05 significance level as well as the gender and work after graduation variables, thus, their explanatory power is really low.

The predictive analysis for the overall financial literacy scores offers support for the hypothesis that students 'financial literacy levels will be influenced by their major. It doesn't provide support, however, for the theories that men are more financially literate than women or that age is a good predictor of the personal financial knowledge level among students. In addition, class rank and experience are statistically very insignificant variables, thus, the constructed model as well as the chosen sample do not offer enough insight and support for the two theories implying that with an increase in work experience or class rank there is an expected higher level of financial literacy.

### ***Limitations & Ideas for Future Research***

My research faced several limitations including sampling and non-sampling errors. The sampling error was partly controlled by the designed sampling plan which included a relatively large sample size. Another obvious limitation was the sampling method chosen, specifically, a non-probability convenience sampling method where the probability of each surveyed respondent can't be calculated, thus, the correctness of results decreases. In the future in order to project more accurately the sample findings towards the entire Lynchburg VA area college student population a simple random or systematic sampling technique should be considered.

In addition, another downside of the research due to cost and time constraints was the fact that it was targeted towards a small defined population of college students only in Lynchburg area, thus, no inferences and predictions from the chosen sample could have been projected towards a much larger student body that included the surrounding areas as well. However, for future research purposes, considering the cost and time variables the study can be extended by administering the survey to college students from other cities, counties, or even other states, thus, comparing the results and drawing inferences for a much larger student college population. Throughout the research I tried to minimize the non-sampling errors, however, every research holds great potential for non-sampling errors. Thus, some of the limitations included: intentional and unintentional errors on the parts of both interviewers and respondents. Some of the unintentional field worker errors included: personal characteristics and fatigue. The unintentional respondents' errors, on the other hand, were reflected by the misunderstanding of certain questions or specific meaning of various financial terms, (for instance financial securities), loss of attention, boredom, interruptions and distractions. The intentional respondents' errors included: misrepresentation of certain information, and non-response or refusal to answer certain questions. Hence, whenever future research is conducted on a similar subject, it should attempt to minimize the previously encountered limitations. Ultimately, for future research purposes, a similar analysis of the Lynchburg college students' market or the surrounding areas could be expanded by applying a more extensive survey or designing a questionnaire tailored towards one specific topic, for instance, analyzing the spending or savings behavior of the young college student consumers and relating it to their personal financial literacy knowledge. Hence, as I mentioned previously, this research could be improved in various ways, primarily by defining a larger population, designing a different sample plan, using a different sampling technique, and finally choosing a different sampling frame.



## ***Conclusions and Recommendations***

This study analyzed the level of financial literacy among college students in Lynchburg VA as well as the factors that impact the students' competency in the field. It surveyed 367 students from two representative institutions in Lynchburg, in particular, Lynchburg College and Randolph-Macon Woman's College. The research examined how the level of financial knowledge influences students' opinions and decisions on personal finance matters. It also analyzed the relationship between the financial literacy and the respondents' demographic data, characteristics such as: gender, academic discipline, age, work experience, nationality, preferences to work after graduation, and whether a student has taken a class in personal finance previously or not. In addition, the research attempted to make inferences based on the data that was collected about the economic implications of the students' financial literacy levels, specifically the external consequences as well as the spillover effects on the local and neighboring regions' economies. Taking into consideration previous research, after graduation students were more likely to reside in the locality or region in which they have been educated (Huffman & Quigley, 2002). Thus, the financial education of students will have important public policy implications due to the short term as well as long-run consequences students' financial literacy levels will have on the local markets.

The results suggest that college students in Lynchburg area have a very low level of personal finance knowledge since the median score on a relatively simple financial literacy test was only of 37.5% that is much lower than the average 53% score indicated by previous research (Volpe, Chen & Pavlicenko 1997) which, on the other hand, used a much more comprehensive survey. In line with the previous studies' findings one of the weakest areas where students score the lowest are the questions related to investment decisions and borrowings. Students, however, seem to be more knowledgeable about spending and insurance subjects. The regression analysis indicates different levels of financial knowledge among subgroups. Specifically, lower levels of financial knowledge are found among non

Business/Economics majors, students who have actually taken a class in personal finance previously and male versus female students (although, the difference in the means of financial literacy scores grouped by gender is not highly statistically significant). In addition, since most of the respondents belong to the first two age groups, there is no significant difference in the financial literacy scores among these two age groups. The work experience and the class rank of the respondents have a very low statistical significance, thus, the level of financial literacy does not differ among the subgroups identified for these two variables.

Considering the last hypothesis about the labor market implications most students indicated that they preferred finding employment in Lynchburg or in the neighboring markets, however, these students' scores were the lowest among the other groups of students. Their lack of financial education could have for the time being a negative impact only at a personal level, however, in the long run, which is less than four years, the financial illiteracy will result in costly consequences. If these students will not be able to manage their own finances in the future this will lead to a lower productivity in their workplaces (CHRG 1995) as well as much deeper social problems due to an elevated level of anxiety of individuals who are not able to keep track of their financial transactions. In addition, it will exacerbate the well functioning of a good market economy due to the already existing highly financially illiterate American public, thus, elevate even more the immense burden of the financial illiteracy cost on the U.S. economy.

It is highly important to address this challenging issue in the future. Higher education institutions in Lynchburg VA area should consider including a personal financial planning class for students from different academic disciplines. Hence, enhance their knowledge about personal finance issues, specifically, in the areas of borrowings and investments where students seem to be completely financially oblivious. In addition, the class could be organized in a very interactive way, on a Pass/Fail basis so that it is appealing to students from various academic backgrounds. General education classes in various areas including: science,

history, math, arts, English are mandatory for obtaining a BA degree. Therefore, since college graduates are expected to be more educated and they are expected to have higher earnings after graduation, they are also expected to be financially literate and contribute in an efficient way to the overall economic growth within the labor markets they will be operating. Thus, as part of the preparation for their careers, a general education requirement including a class in personal financial planning would serve as a good personal finance foundation for college and university students, from which they will obviously benefit in the future. In this context, it is highly important to emphasize the fact that most of the respondents indicated that they have actually taken a personal finance class before, probably at a high school level, however, their scores on the financial literacy test were even lower than the scores of the students who haven't taken such a class before. The logistic regression coefficient for the ClassFiance variable was statistically significant, fact which indicates that the quality or the requirements for the class were really low, hence it hasn't contributed towards the personal finance enlightenment of these students. At a college or university level the quality of education is considerably higher, thus, a personal finance class at this level is expected to have an effective impact on increasing the students' personal finance knowledge, and contribute towards educating informed consumers and knowledgeable investors in the future.

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## Appendix A - Questionnaire

### Personal Financial Literacy Survey

This study is a part of a senior research project being conducted by a student at Randolph-Macon Woman's College. The survey intends to examine students' personal financial literacy and the impact financial literacy has on students' opinions and decisions. In no way will your response be used to identify you, the respondent. The survey is completely anonymous. We are interested only in your honest responses, opinions and attitudes. Thank you so much for participating in the survey!

I. Please circle the response that you find most applicable to you

#### 1. Do you maintain financial records?

Please circle the most applicable answer:

- A. Maintain very detailed records
- B. Maintain minimal records
- C. Maintain no records

#### 2. How important it is for you to maintain adequate auto-insurance coverage?

Circle the most applicable answer:

Strongly Unimportant	Somewhat Unimportant	Not Sure	Somewhat Important	Very Important
1	2	3	4	5

#### 3. Is it important for you to spend less than your income?

Circle the most applicable answer:

Strongly Unimportant	Somewhat Unimportant	Not Sure	Somewhat Important	Very Important
1	2	3	4	5

#### 4. What are the factors you consider most important when choosing to invest in financial securities?

Place "1" by your first choice, "2" by your second choice, and so on:

Return on investment	1	2	3	4	5
Price	1	2	3	4	5
Risk	1	2	3	4	5
Professional Financial Advice	1	2	3	4	5

#### 5. "Planning and implementing a regular investment program is a highly important issue that should be considered by all college students."

Circle the response that you find most applicable to you:

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

II. Please for questions 6-13 circle the most applicable answer

**6. Personal financial planning involves**

- A. Developing a sound yearly budget of expenses and income.
- B. Minimizing taxes and insurance expenses.
- C. Preparing plans for future financial needs and goals.
- D. Examining your investment portfolios to maximize returns.

**7. Which of the following instruments is NOT typically associated with spending**

- A. Cash
- B. Credit card
- C. Debit card
- D. Certificate of deposit

**8. Many savings programs are protected by the Federal government against loss. Which of the following is NOT**

- A. A bond issued by one of the 50 States
- B. A U.S. Treasury Bond
- C. A U.S. Savings Bond
- D. A certificate of deposit at the bank

**9. Which of the following statements is TRUE about the annual percentage rate (APR)?**

- A. APR is the actual rate of interest paid over the life of the loan
- B. APR is a good measure of comparing loan costs
- C. APR takes into account all loan fees
- D. All of the above

**10. The main reason to purchase insurance is to**

- A. Protect you from a loss recently incurred
- B. Provide you with excellent investment returns
- C. Protect you from a catastrophic loss
- D. Protect you from small incidental losses

**11. Which of the following statements is FALSE?**

- A. You receive no benefits when your term insurance policy expires
- B. A term insurance policy is the least expensive form of life insurance
- C. A decreasing-term policy reduces coverage over time
- D. A level-term policy guarantees a fixed-premium over the life of the contract

**12. If interest rates rise, the price of a Treasury bond will**

- A. Increase
- B. Decrease
- C. Remain the same
- D. Trade at a premium

**13. A high-risk and high-return investment strategy would be most suitable for**

- A. An elderly retired couple living on a fixed income
- B. A middle-aged couple needing funds for their children's education in two years
- C. A young married couple without children
- D. All of the above because they all need high return

III.

**14. What is your primary field of study?**

*Please check one of the answers below:*

- Business Administration/Economics       Sciences  
 Human and Other Social Sciences       Fine Arts

**15. Have you taken a course in personal finance?**

*Please check one of the answers below:*

- Yes       No

**16. If you haven't, would you consider enrolling in one?**

*Check one of the answers below:*

- Yes       No

**17. What is your gender?**

*Please check one of the answers below:*

- Male       Female

**18. What is your age group?**

*Please check one of the answers below:*

- 18 – 20       21 – 25       26 – 30       31 – 40       41 or older

**19. What is your class rank?**

- Freshman       Sophomore       Junior       Senior

**20. How many years of working experience do you have? Include full-or part-time experience, internship, co-op, summer jobs, etc.**

*Check the response that you find most applicable to you:*

- None       Two to less than 4 years  
 Less than 2 years       Four years or more

**21. Are you a foreign student?**

*Please check one answer:*

- Yes       No

**22. Are you a Virginia resident?**

*Please check one of the answers below:*

- Yes       No

**23. Do you have specific preferences where you want to work after graduation?**

*Place "1" by your first choice, "2" by your second choice, and so on:*

- |                    |   |   |   |   |   |
|--------------------|---|---|---|---|---|
| VA, DC, MD, WV, NC | 1 | 2 | 3 | 4 | 5 |
| NY, NJ, MA, NH     | 1 | 2 | 3 | 4 | 5 |
| Foreign Country    | 1 | 2 | 3 | 4 | 5 |
| Other/Undecided    | 1 | 2 | 3 | 4 | 5 |

**Appendix B - Total Financial Literacy Score Logistic Regression**

**Table 1. Dependent Variable Encoding**

Original Value	Internal Value
Student scored <b>below</b> 37.5 %	0
Student scored <b>above</b> 37.5 %	1

**Table 2. Classification Table(a,b)**

	Observed		Predicted		
	Students' Total Financial Literacy		Percentage Correct		
	Student scored below 37.5 %	Student scored above 37.5 %			
Step 0	Students' Total Financial Literacy	Student scored below 37.5 %	<b>203</b>	0	100.0
		Student scored above 37.5 %	<b>164</b>	0	.0

**Table 3. Variables in the Equation- (intercept model only)**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	<b>-.213</b>	.105	4.129	1	.042	.808

**Table 4. Variables not in the Equation**

	Score	df	Sig.
Step 0 Variables			
FieldStudy1	2.594	1	.107
ClassFinance	5.741	1	.017
Age1	.935	1	.334
Age2	1.613	1	.204
ClassRank1	2.251	1	.134
ClassRank2	.121	1	.728
ClassRank3	.041	1	.839
ClassRank4	3.569	1	.059
Experience1	1.891	1	.169
Experience2	.756	1	.385
Experience3	.332	1	.564
Experience4	4.232	1	.040
WorkAfterGrad1	1.640	1	.200
Gender	.381	1	.537

**Table 5. Omnibus Tests of Model Coefficients**

	Chi-square	df	Sig.
Step 1 Step	28.740	14	.011
Block	28.740	14	.011
Model	28.740	14	.011

**Table 6. Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	475.878(a)	.075	.101

**Table 7. Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	5.027	8	.755

**Table 8. Classification Table(a)**

	Observed		Predicted		
	Students' Total Financial Literacy		Percentage Correct		
	Student scored below 37.5 %	Student scored above 37.5 %			
Step 1	Students' Total Financial Literacy	Student scored below 37.5 %	154	49	75.9
		Student scored above 37.5 %	93	71	43.3

**Table 9. Variables in the Equation**

		B	S.E.	Wald Chi-Square $\chi^2$	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
S1	FieldStudy1	.779	.323	5.815	1	.016	2.179	1.157	4.105
	ClassFinance	-.869	.366	5.638	1	.018	.419	.205	.859
	Age1	.545	1.221	.199	1	.656	1.724	.158	18.856
	Age2	.420	1.231	.117	1	.733	1.522	.136	16.988
	ClassRank1	20.947	19778.095	.000	1	.999	1250820507.334	.000	.
	ClassRank2	21.141	19778.095	.000	1	.999	1518715972.978	.000	.
	ClassRank3	21.100	19778.095	.000	1	.999	1456792917.519	.000	.
	ClassRank4	21.630	19778.095	.000	1	.999	2476033556.847	.000	.
	Experience1	-22.071	40194.923	.000	1	1.000	.000	.000	.
	Experience2	-21.859	40194.923	.000	1	1.000	.000	.000	.
	Experience3	-21.639	40194.923	.000	1	1.000	.000	.000	.
	Experience4	-21.366	40194.923	.000	1	1.000	.000	.000	.
	WorkAfterGrad1	-.279	.222	1.581	1	.209	.757	.490	1.169
	Gender	.325	.273	1.422	1	.233	1.385	.811	2.364
	Constant	-.335	44798.529	.000	1	1.000	.715		

a Variable(s) entered on step 1: FieldStudy1, ClassFinance, Age1, Age2, ClassRank1, ClassRank2, ClassRank3, ClassRank4, Experience1, Experience2, Experience3, Experience4, WorkAfterGrad1, Gender.



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