# A Survey Of Investment Literacy Among Online Investors

**Ronald P. Volpe[1], Joseph E. Kotel[2] and Haiyang Chen[3]**

*This study surveyed 530 online investors to examine their investment literacy and the relationship between the literacy and online investor characteristics. Online investors answered about 50% of questions correctly. Investors 50 years of age or older were more knowledgeable than those who are younger. Women had lower levels of investment knowledge than men. Investors with graduate degrees were more knowledgeable than those with some high school or college education. Those who traded online were more knowledgeable. The results of this survey indicate that online investors should improve their knowledge about basic investment concepts and tools.*
Keywords: *Investment literacy, Investing, Internet, Financial literacy*

## Introduction

E-finance has made tremendous inroads to the delivery of traditional financial services such as mortgage processing, credit card payments, electronic tax filing, internet checking and saving accounts, and online investing. The advent of online investing has significantly impacted an investor's decision-making process by providing instant access to a vast amount of financial information, lower transaction costs, and quick order execution. However, the benefits brought by new technology may not automatically insure investors a greater profit. Only informed decisions based on a solid understanding of investment concepts and tools will offer investors a better chance of success. Although the Internet has changed the investment decision-making process, the importance of evaluating the investment merits of a common stock by the company's fundamentals remains unchanged. In fact, given the present level of corporate fraud and accounting misinformation, it is more important than ever that investors appropriately evaluate their investment decisions.

Low (2001) cited many examples of inaccurate and fraudulent information on the web sites followed by online investors. The Internet is a fount of financial misinformation, and investors are largely on their own. Matthew Nestor, a Massachusetts state securities regulator, promotes investor education as the most effective protection against the fraudulent and misleading information from online sources (Low, 2001). Investor complaints to the Securities and Exchange Commission (SEC) concerning online investing misinformation and fraud have risen dramatically, and the SEC is concerned about the level of online investor education and the use of the Internet to trade online. The SEC has brought 240 Internet related cases since 1995. Jay Revlman, the former deputy chief of the SEC's Internet enforcement division stated that people need to educate themselves to prevent them from being victims (Low, 2001).

This study surveyed online investors to determine if they are knowledgeable about basic investing concepts and tools. Specifically, we investigated the following questions: What is the level of online investors' knowledge about investing? What is the relationship between their knowledge and investing experience, education, gender, and other factors?

## Literature Review

The great bull market of the 1990's saw the public interest in investments rise to an all time record. The outsized stock market gains of the late 1990's gave do-it-yourself investors a false sense of security with their limited financial knowledge. Irrespective of the investment topics examined, numerous studies have demonstrated that investors do not possess a sufficient understanding of basic investing concepts to make informed investment decisions. A 2001 John Hancock study of eight hundred 401(K) investors indicated that

[1]. Ronald P. Volpe, Professor of Finance, The Williamson College of Business Administration, Youngstown State University, Youngstown, Ohio 44555.
Phone: 330-742-3084. Fax: 330-742-1459. E-mail: ronvolpe@attbi.com

[2]. Joseph E. Kotel, Staff Accountant, Falcon Transport, Youngstown, Ohio 44501. E-mail: j_kotel@hotmail.com.

[3]. Haiyang Chen, Professor of Finance, Director of E*TRADE Financial Learning Center, Christos M. Cotsakos College of Business, William Paterson University, Wayne, New Jersey 07470. E-mail: chenh@wpunj.edu

only 21% of investors considered themselves relatively knowledgeable about investments typically found in 401(k) plans (John Hancock, 2001). A survey of 933 adult investors developed by the Securities Investor Protection Corporation and the National Association of Investors Corporation revealed that four out of five investors did not know the basics of how investing works (Gordon, 2001).

The declining stock market of the past two years has driven many investors to bond investments. American Century Investments surveyed 750 investors about their knowledge of bond markets. A disappointing 73% of investors failed to answer at least half of the 10 questions correctly (Reuters, 2001). Surveying 1,001 investors, the Princeton Survey Research Associates and Investor Protection Trust found only 18% of them were financially knowledgeable. Most were not knowledgeable and could become easy targets for fraud (PSRA/IPT, 1996). Scores on the latest Vanguard/Money's "Investor Literacy Test" dropped to 37% from 52% in 1997 and 49% in 1995. Online investors did a little better than investors in other categories with a score of 47% (Farrell, 2000). Despite the extensive availability of investment resources from online sources, a wide array of financial books and magazines, and the advent of financial television programs, the investment IQ of American investors remains low.

While prior research has provided evidence of investors' financial knowledge and improved our understanding of the issue, it suffers from several weaknesses. Few studies have focused on why investors have a low level of knowledge in personal finance. Further in-depth study of the determinants of their financial literacy is warranted. Few surveys have focused attention to the online investors' knowledge. As discussed earlier, online investors should have more knowledge to succeed in the fast changing security markets, as they are more likely to be surrounded by financial misinformation and fall victims to investment fraud. Another weakness of prior research is that many studies cover selected areas in finance, neglecting others. The arbitrary selection of survey questions makes the validity of the survey questionable. In this study, we fill some of the gaps in the literature.

## Methodology

*Survey Development and Procedure*

To determine the survey's coverage of investment topics, we reviewed 35 financial websites that offer educational information on investing. They include 20 online brokers' websites, such as E*TRADE, Ameritrade, and Datek Online; 10 financial content websites such as Yahoo Finance, CBS Market Watch, and the Street.com; and five investor education websites, such as the Investor Online Resource Center and Investoreducation.org. Online investors can obtain various investing information and education through these 35 websites. Many sites also provide links to other sources of investor education and message board services. A list of these websites and topics they cover is in Appendix 1. To ensure that this survey covered important investment topics, we narrowed down the topics to those that are covered most frequently by the websites.

In designing the survey, we also considered the fact that investors have very busy schedules and might not be willing to spend a large amount of time to finish a lengthy survey. We assumed that they would at most devote about 15 minutes to an online survey. Therefore, we attempted to strike a balance between the investment topics to be covered in the survey and the time investors are willing to spend to answer questions. The final survey instrument included questions on the following investment concepts: (1) effect of a distribution from a mutual fund on its net asset value (NAV); (2) blue chip stock terminology; (3) compounding of interest; (4) beta as a volatility measure; (5) capital gain tax rate; (6) portfolio diversification; (7) stock splits; (8) financial ratio analysis; (9) appropriate asset allocation strategies; and (10) the relationship between interest rates and bond prices. The survey also includes questions about the participants' demographic data such as income, age, gender, education, and their experience in online trading. These selected topics are most frequently covered by the online investment education websites, and they are also similar to the topics covered in the published literature (Volpe, Chen & Pavlicko, 1996; Chen & Volpe, 1998). The survey is provided in Appendix 2.

The survey was conducted online. This approach opens the possibility of reaching investors outside of one geographical region. We developed a web page that contains the survey and allows survey participates to mail the results to an e-mail account specifically for the project. To attract investors to participate, we sent a letter describing the survey to selected businesses, posted it on investment-related message boards, attempted to enlist help from online brokers, sought assistance from websites devoted to investor education, and asked investment club members to participate in the survey.[a]

## Variables and Analysis

Prior research has shown that the level of financial literacy varies with people's education, experience, age, and gender. For example, women experience more problems in managing their finances than men (Martinez, 1994; Genasci, 1995; Lewin, 1995), and female students are less knowledgeable in some areas of personal finances (Bakken, 1967; Danes & Hira, 1987; HSR, 1993; Volpe et al., 1996; Chen & Volpe, 1998). The literature has also shown that financial education or the lack of it has a significant impact on one's knowledge about financial basics (Bakken, 1967; Langrehr, 1979; Connor, 1992; Hira, 1993; HSR, 1993; O'Neill, 1993; Volpe, et al., 1996; Chen & Volpe, 1998). In this study, we use age, income, gender, and education as the independent variables to determine the differences in investment knowledge among various groups of participants. An additional independent variable used in this study is online trading activities. Since the majority of online investors are do-it-yourselfers and the quality of information plays such an important role in online investing, we define anyone who uses online information for investment education and trading purposes as an online investor. Previous results of Vanguard/Money's "Investor Literacy Test" showed that online investors had a relatively higher level of knowledge than investors who did not invest online (Farrell, 2000).

The survey responses from each participant were used to calculate the mean and median percentage of correct scores for each question and the entire survey. The overall scores were grouped into two categories according to the median percentage of correct scores of all participants of the survey. The first category included those scores equal to or below the median (relatively low level of knowledge), and the second above the average (relatively high level of knowledge). This dichotomous investment literacy was used as the dependent variable for overall knowledge.[b]

We first provide a descriptive analysis by classifying the questions according to the length of question, level of difficulty, and content of the question. We then use analysis of variance (ANOVA) to determine the differences in investment knowledge among participants. We further analyze how various factors impact investors' level of knowledge using logistic regressions. As suggested by previous studies (Danes & Hira, 1987; Volpe et al., 1996; Chen & Volpe, 1998), the independent variables used in the logistic analysis include education, experience based variables and other demographic variables such as age, annual income, and gender. The coefficients represent the effect of each subgroup compared with a reference group, which is arbitrarily selected. For example, gender is coded as "1" if a participant is a male participant, "0" otherwise. The reference group is female participants. If the logistic coefficient of the variable is positive and statistically significant, then it indicates that compared with female participants, male participants are more likely to be more knowledgeable. For the age variables, the reference group is participants who are 50 or older. For the income variables, the reference group is participants with an annual income of $75,000 or more. For the education variable, the reference category is participants with graduate degrees. For online trading , the reference group is participants who have traded online.

The logistic model takes on the following functional form:

$$\log [p/(1-p)] = B_0 + B_1(AGE_1) + B_2(AGE_2) + B_3(AGE_3) + B_4(INCOME_1) + B_5(INCOME_2) + B_6(INCOME_3) + B_7(GENDER) + B_8(EDUCATION_1) + B_9(EDUCATION_2) + B_{10}(EDUCATION_3) + B_{11}(TRADE) + e_i \quad (1)$$

where

p = the probability of a participant with relatively more knowledge about investments,

$AGE_1$ = 1 if a participant is in the age group of under 30, 0 otherwise,

$AGE_2$ = 1 if a participant is in the age group of 30-39, 0 otherwise,

$AGE_3$ = 1 if a participant is in the age group of 40-49, 0 otherwise,

$INCOME_1$ = 1 if a participant earns less than $20,000 annually, 0 otherwise,

$INCOME_2$ = 1 if a participant earns $20,000-$39,999 annually, 0 otherwise,

$INCOME_3$ = 1 if a participant earns $40,000-$74,999 annually, 0 otherwise,

GENDER = 1 if a participant is a male participant, 0 otherwise,

$EDUCATION_1$ = 1 if a participant has high school education, 0 otherwise,

$EDUCATION_2$ = 1 if a participant has college education, 0 otherwise,

$EDUCATION_3$ = 1 if a participant has college degree, 0 otherwise, and

TRADE = 1 if a participant has traded online, 0 otherwise.

## Results

 

Five hundred and thirty investors participated in the online survey. The sample characteristics are presented in Table 1. The majority of participants (63%) were young investors under 30. About 60% were male and 40% female. In terms of education, 61% had some college education and 30% had bachelor or graduate degrees. Their annual income was moderate; 47% earned less than $20,000, 43% between $20,000 and $75,000, and the rest (11%) $75,000 or more. About 27% participants had actually traded online, others just used online information for investment decisions and education.

**Table 1**.
Characteristics of the Sample

| Age | Number of Participants | Percentage |
|---|---|---|
| Under 30 | 336 | 63.4% |
| 30 to 39 | 82 | 15.5% |
| 40 to 49 | 60 | 11.3% |
| 50 and over | 52 | 9.8% |
| Annual Income | | |
| Under $20,000 247 | 46.6% | |
| $20,000 to $39,999 | 108 | 20.4% |
| $40,000 to $74,999 | 119 | 22.5% |
| $75,000 or more | 56 | 10.6% |
| Gender | | |
| Male | 317 | 59.8% |
| Female | 213 | 40.2% |
| Education | | |
| High School | 52 | 9.8% |
| College | 321 | 60.6% |
| Bachelor degree | 113 | 21.3% |
| Graduate degree | 44 | 8.3% |
| Trade Online | | |
| Yes 145 | 27.4% | |
| No | 385 | 72.6% |

Table 2 shows that on average participants answered 49.6% of questions correctly. Considering that the questions are basic and simple, answering about half of the questions correctly suggests that investors' knowledge about investments is inadequate. The following presents detailed explanation of each question, its correct answer, and the average participants' score.

Question 1 focuses on an important but less publicized aspect of mutual funds; the impact of a fund distribution on net asset value (NAV). The NAV is reduced by the entire distribution of capital gains and dividends that a mutual fund makes. Only 24% of participants answered this question correctly, the lowest on the survey.

Investors were asked in Question 2 to identify a blue chip stock. IBM, the classic example of a company with a good record of stable earnings, price and dividends, is the correct answer. About 53% participants answered this correctly.

Most participants (72%) answered Question 3 correctly. An investment of $1,000 growing at 10% a year will be worth more than $2,000 at the end of $10^{th}$ year. The

results suggest that investors know about the effect of compounding interest well.

Question 4 attempts to evaluate the investor's knowledge about beta, a measure stock price volatility relative to the market. A beta of 1.5 (-1.5) indicates that a stock tends to move 50% higher (lower) than the market in the same direction. In the question, a stock with a negative beta of -1.10 will move in the opposite direction of the market and by greater magnitude of change than the market. The Purple Company is the correct answer, which was selected by 46% of the participants.

Question 5 evaluates investor's knowledge about the tax rate on capital gains. A lower capital gains tax rate is applied to investments held longer than 12 months. Choice "A" is the correct answer. Only 34% of the participants answered this question correctly.

Question 6 evaluates investors' knowledge about diversification. Diversification can protect a portfolio against unsystematic risk. Studies, however, have shown that diversification can be achieved through an investment in as few as 10 to 20 carefully selected securities in different industries. About 57% of participants answered this question correctly.

Question 7 attempts to evaluate investors' knowledge about a 2-for-1 stock split. The split will result in the investor's ownership percentage and value of their total investment remaining the same. The price of the stock will be half of its value before the split. About half of participants selected the correct choice.

Question 8 examines investors' knowledge about the debt to equity ratio and financial leverage risk. The correct answer is "D". A long-term debt-equity ratio of 3.5 has a much greater financial leverage risk than the other three choices of 0.09, 0.6, and 1.5. Fifty-two percent of participants answered this question correctly.

Question 9 evaluates investors' knowledge about asset allocation strategy for retirement. In the question, the individual has a long time frame until retirement and has no dependents to support. Therefore, this individual can afford to take a higher risk to achieve a higher return in the long run by investing a higher proportion in stocks. Approximately 56% of investors answered this question correctly.

Question 10 asks investors the relationship between interest rates and bond prices. A bond provides a fixed rate of interest that reflects market conditions at the time of issuing the bond. If market conditions change that result in a higher interest rate, the above-mentioned bond's price will fall. Investors on average scored about 52% for Question 10.

**Table 2**.
Mean Percentage of Correct Responses to Each Survey Question and the Entire Survey

| Question # and Summary of the Question | Length of Question | Level of Difficulty | Content of Question | Level of Investment Literacy | |
|---|---|---|---|---|---|
| | | | | Below Average | Above Average |
| 1. Effect of a Distribution on NAV | Medium | Difficult | Fund Specifics | 24.20% | |
| 2. Blue Chip Stock Terminology | Short | Easy | Basic Terminology | | 52.64% |
| 3. Compounding of Interest | Medium | Easy | Basic Concept | | 72.45% |
| 4. Beta as a Volatility Measure | Medium | Difficult | Advanced Concept | 46.23% | |
| 5. Capital Gain Tax Rates | Long | Difficult | Tax Specifics | 34.53% | |
| 6. Portfolio Diversification | Medium | Difficult | Advanced Concept | | 56.79% |
| 7. Stock Splits | Long | Medium | Basic Concept | | 49.62% |
| 8. Financial Ratio Analysis | Short | Medium | Advanced Concept | | 51.89% |
| 9. Appropriate Asset Allocation Strategy | Long | Difficult | Advanced Concept | | 56.23% |
| 10. Bond Price and Interest Rates | Short | Medium | Basic Concept | | 51.89% |
| Mean Correct Responses for the Entire Survey | | | | | 49.60% |
| Median Correct Responses for the Entire Survey | | | | | 50.00% |

For individual questions, the percentages are the percent answering the question correctly, and the column indicates whether that percentage is above or below the overall average percent correct.

Comparatively speaking, the participants know compound interest rate (Question 3), diversification (Question 6), and asset allocation (Question 9) better. The fact that investors earned the highest score (72.45%) on Question 3 is not surprising. The question is a simple arithmetic problem. On average, investors scored higher on diversification and asset allocation questions. It suggests that investors know these concepts well. When it came to the specifics such as mutual fund distributions (Question 1) and tax code (Question 5), investors did not do well. This finding is consistent with the results reported by Danes and Hira (1987) when they surveyed college students on financial literacy that participants knew general facts better but lacked knowledge in specifics. An exploratory analysis shows that the content of questions has an impact on investors' average scores (results not shown). For example, a more advanced concept is more likely to be answered incorrectly. The length of questions does not seem to have any impact on scores.

Table 3 shows the mean percentage of correct responses for each question and the entire survey by various groups of participants and results of analysis of variance. As shown in the Age Section of Table 3, the mean percentages of correct answers of the older participants are higher than the younger participants. The difference is most evident between participants who are 50 and over and those who are less than 50 years old. Participants between 30 and 39, and 40 and 49 are more knowledgeable than those less than 29 years of age. The F statistics suggest that the differences are statistically significant in 9 out of 10 questions and for the entire sample. The only exception is Question 4, Beta as a measure of risk, for which the percentage answering correctly was 50% or less for participants of all ages. The findings that older participants are generally more knowledgeable about investing are consistent with those found in prior research (Chen & Volpe, 1998).

The ANOVA result for the entire sample suggests that participants with a higher annual income answered more questions correctly than those with a lower income. For the individual questions, the findings show that participants with more than $40,000 income know more

than those with less than $40,000 income, except for Question 3 and 4.

**Table 3**.
Mean Percentage of Correct Responses to Each Question by Characteristics of Sample and Results of ANOVA

| | Effect of Distribution on NAV | Blue Chip Stock | Compound Interest | Beta as a Measure of Risk | Capital Gain Tax Rates | Portfolio Diversification |
|---|---|---|---|---|---|---|
| Age | | | | | | |
| Under 30 | 19% | 40% | 67% | 49% | 27% | 52% |
| 30 to 39 | 29% | 66% | 80% | 39% | 33% | 65% |
| 40 to 49 | 35% | 75% | 78% | 40% | 55% | 60% |
| 50 and over | 38% | 87% | 87% | 50% | 60% | 69% |
| F Statistic | (5.70)† | (23.51)† | (4.55)† | (1.22) | (11.75)† | (2.77)* |
| Income | | | | | | |
| Under $20,000 | 16% | 35% | 69% | 48% | 27% | 50% |
| $20,000 to $39,999 | 31% | 62% | 69% | 48% | 30% | 56% |
| $40,000 to $74,999 | 26% | 73% | 80% | 43% | 45% | 64% |
| $75,000 or more | 45% | 68% | 75% | 43% | 55% | 71% |
| F Statistic | (7.80)† | (23.14)† | (1.86) | (0.40) | (8.01)† | (3.96)† |
| Gender | | | | | | |
| Male | 26% | 58% | 77% | 43% | 36% | 62% |
| Female | 21% | 45% | 66% | 52% | 33% | 49% |
| F Statistic | (1.70) | (8.29)† | (7.05)† | (4.22)† | (0.44) | (7.24)† |
| Education | | | | | | |
| High School | 25% | 58% | 65% | 44% | 35% | 60% |
| College | 21% | 40% | 69% | 45% | 30% | 52% |
| Bachelor degree | 30% | 73% | 81% | 49% | 41% | 59% |
| Graduate degree | 34% | 84% | 89% | 48% | 52% | 84% |
| F Statistic | (2.35) | (21.37)† | (4.49)† | (0.15) | (3.74)* | (5.88)† |
| Trade Online | | | | | | |
| Yes | 34% | 76% | 84% | 40% | 49% | 68% |
| No | 21% | 44% | 68% | 49% | 29% | 52% |
| F Statistic | (10.60)† | (46.82)† | (13.96)† | (3.12) | (19.00)† | (10.91)† |

(continued on following page)

 

**Table 3**. (continued)
Mean Percentage of Correct Responses to Each Question by Characteristics of Sample and Results of ANOVA

| | Stock Split | Financial Leverage & Risk | Appropriate Asset Allocation | Bond Price & Interest Rates | % High For the Entire Survey |
|---|---|---|---|---|---|
| Age | | | | | |
| Under 30 | 42% | 48% | 46% | 47% | 44% |
| 30 to 39 | 61% | 65% | 73% | 60% | 57% |
| 40 to 49 | 60% | 47% | 65% | 58% | 57% |
| 50 and over | 69% | 63% | 87% | 65% | 68% |
| F Statistic | (7.84)† | (3.68)* | (16.51)† | (3.51)* | (26.01)† |
| Income | | | | | |
| Under $20,000 | 40% | 47% | 42% | 45% | 42% |
| $20,000 to $39,999 | 46% | 46% | 57% | 51% | 50% |
| $40,000 to $74,999 | 61% | 62% | 77% | 60% | 59% |
| $75,000 or more | 71% | 63% | 71% | 66% | 63% |
| F Statistic | (9.96)† | (3.83)† | (16.99)† | (4.56)† | (25.43)† |
| Gender | | | | | |
| Male | 55% | 58% | 61% | 58% | 53% |
| Female | 41% | 43% | 49% | 43% | 44% |
| F Statistic | (9.98)† | (10.97)† | (8.01)† | (10.97)† | (24.04)† |
| Education | | | | | |
| High School | 44% | 46% | 60% | 48% | 48% |
| College | 44% | 46% | 45% | 46% | 44% |
| Bachelor degree | 61% | 67% | 81% | 66% | 61% |
| Graduate degree | 70% | 64% | 70% | 61% | 66% |
| F Statistic | (6.45)† | (6.37)† | (17.03)† | (5.35)† | (26.24)† |
| Trade Online | | | | | |
| Yes | 72% | 64% | 78% | 63% | 63% |
| No | 41% | 47% | 48% | 48% | 45% |
| F Statistic | (44.83)† | (12.23)† | (41.02)† | (10.87)† | (74.74)† |

* $p < 0.05$ † $p < 0.01$
For the overall score, a total score above the median was categorized as high, and otherwise the score was low.

Consistent with previous studies, the percentages of correct answers from female participants are much lower than those from male participants. In 7 out of 10 questions, the differences are statistically significant. Female participants scored higher in only one question (Question 4). For the entire survey, the average score of female participants was 44% compared with 53% for male participants. Again, the F statistic shows that the difference is statistically significant at the 0.01 level.

Participants with more education had a greater knowledge of investing than those with less education. Specifically, those with college or graduate degrees scored better than those with some college education and a high school diploma. The ANOVA results indicate that the differences are statistically significant.

We also compared knowledge between those who have traded online and those who have not. The results show

that the percentages of correct answers from participants trading online are higher than those who have not for 9 out of 10 questions. For the entire survey, the former answered 63% of questions correctly, while the latter only 45%. The difference is statistically significant at the 0.01 level.

Before conducting the logistic analysis, we calculated the sample correlations between the independent variables. The correlation coefficients were fairly low and no collinearity problems were detected (results not shown). Logistic regression results are shown in Table 4. For the entire survey, the logistic model exhibits high explanatory power. The overall Chi-square is statistically significant at the 0.01 level. Using another measure of the overall fit of the model, we find that the model can classify almost 70% of the observations correctly, whereas the chance classification is only 51%. Similar results are found in each individual question where the correct classification is always higher than the chance classification.

The effects of the demographic variables and whether the respondent engaged in online trading for the entire survey were mostly as expected. The following discussion is based on the logistic regression for the entire survey (Table 4). Older participants (50 and over) are more likely to correctly score above the median level than younger participants. Male participants are more knowledgeable about investing than otherwise similar female participants. Participants with a graduate degree are more knowledgeable than those with some college education or a high school diploma. The difference between participants with a graduate degree and those with undergraduate degree is not statistically significant. Those who have traded online are more knowledgeable than those who have not. While income affects the level of knowledge in a one-way ANOVA, it does not have a significant impact on the overall score being high when other variables are controlled in the logistic model.

## Conclusion

The findings that investors correctly answered only 50% of the questions seems to indicate a deficiency in the knowledge of investing concepts, despite the large amount of educational information and research available to online investors. Generally, the scores improve as the participants' age and education level increases. Female participants score lower than the male participants except for the question on capital gain tax. Participants trading online performed better those who have not.

Given the weight of evidence, we conclude that online investors' knowledge of investments is insufficient and needs to be improved in the future. Online investors who decide their own investment decisions need to understand and be able to evaluate the appropriateness of their investments. Investors who receive guidance from brokers also need to be able to evaluate whether the recommended investments are suitable for them. As discussed previously the problem may be in the presentation of educational information. At online broker websites, educational information, if any, is located in a separate and distinct section of the website. The investor must make an effort to find the needed information. The SEC (1999) suggests one possible way to better educate investors is through the use of popup screens that contain educational information on the specific activity the investor is performing. At that point investors may elect to either use the educational information or indicate that they do not wish to use it. While solutions have proven difficult to find, this problem needs to be addressed for the financial health of both individual investors and society as a whole. An educated investor is a better investor, and contributes to a more efficient and effective capital market.

 

 

**Table 4**.
Logistic Regression Results of the Impact of Participants' Age, Income, Gender, Education, and Online Trading on Their Knowledge

| | Effect of Distribution on NAV | Blue Chip Stock | Compound Interest | Beta as a Measure of Risk | Capital Gain Tax Rates | Portfolio Diversification |
|---|---|---|---|---|---|---|
| Age Under 30 | -0.6729 | -1.9780† | -1.5135† | -0.0651 | -1.0786† | -0.3813 |
| Age 30 to 39 | -0.4306 | -1.6306† | -0.8111 | -0.5136 | -1.1294† | -0.1133 |
| Age 40 to 49 | -0.1674 | -0.9916 | -0.8145 | -0.4160 | -0.1733 | -0.3896 |
| Income < $20,000 | -0.7602 | 0.2926 | 1.0421* | 0.0950 | -0.3681 | -0.3646 |
| Income $20,000-39,999 | -0.1541 | 0.9084* | 0.6211 | 0.1684 | -0.5561 | -0.2799 |
| Income $40,000-74,999 | -0.6762 | 0.6769 | 0.5602 | 0.0657 | -0.2138 | -0.3150 |
| Male respondent | 0.1831 | 0.3456 | 0.4408* | -0.3217 | -0.0387 | 0.3830* |
| Education = high school | -0.3080 | -1.6222† | -1.8274† | -0.2511 | -0.7200 | -1.2366* |
| Education = college | -0.1775 | -1.3972† | -1.0744* | -0.3477 | -0.3877 | -1.3042† |
| Education = college degree | -0.0787 | -0.4206 | -0.6298 | 0.0335 | -0.2772 | -1.3021† |
| Has traded online | 0.3729 | 0.8710† | 0.7213 | -0.2599 | 0.5488* | 0.3315 |
| Constant | -0.2181 | 1.997† | 2.0251† | 0.4106 | 0.7699 | 1.7782† |
| -2 log Likelihood | 555.654 | 608.169 | 582.399 | 720.088 | 636.416 | 692.769 |
| Chi-square | 29.775† | 125.087† | 41.544† | 11.626 | 46.730† | 32.156† |
| Adjusted R-square | 0.082 | 0.281 | 0.109 | 0.029 | 0.116 | 0.079 |
| Correct Classification | 76.37% | 72.08% | 73.58% | 56.98% | 70.00% | 59.43% |
| Chance Classification | 63.32% | 50.14% | 60.08% | 50.28% | 54.79% | 50.92% |

| | Stock Split | Financial Leverage & Risk | Appropriate Asset Allocation | Bond Price & Interest Rates | For the Entire Survey |
|---|---|---|---|---|---|
| Age < 30 | -0.8525* | -0.4363 | -1.7175† | -0.5464 | -1.8351† |
| Age 30 to 39 | -0.4812 | -0.1023 | -1.3105† | -0.3726 | -1.5730† |
| Age 40-49 | -0.5127 | -0.7011 | -1.4774† | -0.2755 | -1.2208† |
| Income < $20,000 | -0.4187 | 0.1019 | 0.1849 | -0.2407 | 0.2722 |
| Income $20,000-$39,999 | -0.4574 | -0.1211 | 0.3952 | -0.2025 | 0.3801 |
| Income $40,000-74,999 | -0.3318 | 0.1689 | 0.7703 | -0.1937 | 0.6277 |
| Male respondent | 0.3429 | 0.4511* | 0.2501 | 0.4985† | 0.3695* |
| Education = high school | -1.0846* | -0.7699 | -0.5820 | -0.5296 | -1.7455† |
| Education = college | -0.4852 | -0.4988 | -0.3137 | -0.2846 | -0.8540* |
| Education = college degree | -0.3002 | 0.1578 | 0.8420 | 0.2835 | 0.1450 |
| Has traded online | 1.0217† | 0.4139 | 0.9261† | 0.2890 | 0.9218† |
| Constant | 1.0280 | 0.3611 | 1.1524 | 0.5050 | 1.7399† |
| -2 log Likelihood | 669.501 | 696.326 | 625.921 | 701.369 | 627.789 |
| Chi-square | 65.205† | 37.656† | 100.576† | 32.612† | 98.040† |
| Adjusted R-square | 0.154 | 0.091 | 0.232 | 0.080 | 0.227 |
| Correct Classification | 63.77% | 59.25% | 69.25% | 69.25% | 69.57% |
| Chance Classification | 50.00% | 50.07% | 49.93% | 50.07% | 50.71% |

* p< 0.05 † p< 0.01

For the logistic regression for the overall score, a total score above the median was categorized as high, and otherwise the score was low.

## Appendix 1

### Financial Website and the Financial Topics They Cover

| Website | Effect of Distribution on NAV | Blue Chip Stock | Compound Interest | Beta as a Volatility Measure | Capital Gain Tax Rates | Portfolio Diversification |
|---|---|---|---|---|---|---|
| **Online Broker Sites** | | | | | | |
| Access Broker | No | No | No | No | No | No |
| E*TRADE | Yes | Yes | Yes | Yes | Yes | Yes |
| TD Waterhouse | Yes | No | No | Yes | Yes | No |
| A.B. Watley | No | No | No | No | No | No |
| Natl. Discount Brokers | Yes | Yes | Yes | Yes | Yes | Yes |
| American Express | No | No | No | No | No | Yes |
| Muriel Siebert Co. | Yes | Yes | Yes | Yes | No | Yes |
| Mydiscountbroker.com | Yes | Yes | Yes | Yes | Yes | Yes |
| Dreyfus Brokerage Service | Yes | Yes | Yes | Yes | No | Yes |
| Scottrade | No | No | No | No | No | No |
| Quick & Reilly | Yes | Yes | Yes | Yes | Yes | Yes |
| Merrill Lynch | No | Yes | Yes | No | No | Yes |
| Fidelity | Yes | Yes | Yes | Yes | Yes | Yes |
| Suretrade | No | No | No | Yes | No | No |
| Ameritrade | Yes | Yes | Yes | Yes | Yes | Yes |
| Datek Online | Yes | Yes | Yes | Yes | Yes | Yes |
| Charles Schwab | Yes | Yes | Yes | Yes | Yes | Yes |
| DLJ Direct | Yes | Yes | Yes | Yes | No | Yes |
| Morgan Stanley | Yes | Yes | No | Yes | Yes | Yes |
| Benson York Group, Inc. | No | No | No | No | No | No |
| **Commentary-Based Sites** | | | | | | |
| CBS Market Watch | Yes | No | No | Yes | Yes | Yes |
| Morningstar | Yes | No | No | Yes | Yes | Yes |
| TheStreet.com | Yes | No | No | No | Yes | No |
| The Motley Fool | Yes | No | No | No | Yes | Yes |
| Yahoo Finance | Yes | Yes | Yes | Yes | Yes | Yes |
| Smartmoney Interactive | Yes | Yes | Yes | Yes | Yes | Yes |
| Bloomberg Financial | Yes | No | No | No | No | Yes |
| MSN Money Central | Yes | No | No | Yes | Yes | Yes |
| Quicken | No | No | No | No | Yes | No |
| Wall Street City | Yes | No | No | Yes | Yes | Yes |
| **Investor Education Sites** | | | | | | |
| LA Times | Yes | No | No | No | Yes | Yes |
| Investoreducation.org | No | No | No | No | No | No |
| Moolera.com | Yes | Yes | Yes | Yes | Yes | Yes |
| Investor Online Resource Center | No | No | No | No | No | Yes |
| Investor Protection Trust | Yes | Yes | Yes | Yes | Yes | Yes |

## **Appendix 1** (continued)

| Website | Stock Splits | Financial Ratio Analysis | Appropriate Investment Strategy | Bond Price/ Interest Rates |
|---|---|---|---|---|
| **Online Broker Sites** | | | | |
| Access Broker | No | No | No | No |
| E*TRADE | Yes | Yes | Yes | Yes |
| TD Waterhouse | No | Yes | Yes | Yes |
| A.B. Watley | No | No | No | No |
| Natl. Discount Brokers | Yes | Yes | Yes | Yes |
| American Express | No | No | No | No |
| Muriel Siebert Co. | Yes | Yes | No | No |
| Mydiscountbroker.com | Yes | Yes | Yes | Yes |
| Dreyfus Brokerage Service | No | Yes | No | No |
| Scottrade | No | No | No | No |
| Quick & Reilly | Yes | Yes | Yes | Yes |
| Merrill Lynch | No | No | Yes | Yes |
| Fidelity | Yes | Yes | Yes | Yes |
| Suretrade | No | No | No | No |
| Ameritrade | Yes | Yes | Yes | Yes |
| Datek Online | Yes | Yes | Yes | Yes |
| Charles Schwab | Yes | Yes | Yes | Yes |
| DLJ Direct | Yes | Yes | Yes | Yes |
| Morgan Stanley | Yes | No | Yes | Yes |
| Benson York Group, Inc. | No | No | No | No |
| **Commentary-Based Sites** | | | | |
| CBS Market Watch | Yes | Yes | Yes | Yes |
| Morningstar | Yes | Yes | Yes | Yes |
| TheStreet.com | Yes | Yes | No | Yes |
| The Motley Fool | Yes | Yes | Yes | Yes |
| Yahoo Finance | Yes | Yes | Yes | Yes |
| Smartmoney Interactive | Yes | Yes | Yes | Yes |
| Bloomberg Financial | No | No | Yes | Yes |
| MSN Money Central | Yes | Yes | Yes | Yes |
| Quicken | No | No | Yes | No |
| Wall Street City | Yes | Yes | No | No |
| **Investor Education Sites** | | | | |
| LA Times | No | Yes | Yes | Yes |
| Investoreducation.org | No | No | No | No |
| Moolera.com | Yes | No | Yes | Yes |
| Investor Online Resource Center | No | No | Yes | No |
| Investor Protection Trust | Yes | Yes | Yes | Yes |

## Appendix 2
## Survey of Investment Literacy among Online Investors

1) A distribution from a mutual fund reduces its net asset value (NAV) by:
A) the entire amount of the distribution
B) the amount of the distribution less capital gain
C) the amount of the distribution less capital inflows
D) a distribution does not reduce the NAV

2) An example of a blue-chip stock is:
A) Amazon.com
B) IBM
C) Microsoft
D) GLH Industries

3) An investment of $1000 compounded annually at an interest rate of 10 % for 10 years will be worth:
A) more than $2000 at the end of the 10 years
B) less than $2000 at the end of the 10 years
C) exactly $2000 at the end of the 10 years
D) It cannot be determined using this information

4) Consider the following companies and their betas. Which stock will underperform the others when the stock market rises by 10%:
A) Blue Company Beta = 0.85
B) Orange Company Beta = 1.05
C) Purple Company Beta = -1.10
D) Gold Company Beta = -0.95

5) Solely in regards to income taxes, if you are considering selling a stock that you have held for 11 months and that has appreciated in price you must:
A) hold the stock for at least one more month to get a lower tax rate on the sale
B) hold the stock for at least seven more months to get a lower tax rate on the sale
C) sell the stock now to get a lower tax rate on the sale
D) The proceeds of the sale will be taxed at the same rate whenever you sell it

6) Diversifying your portfolio to protect it against unsystematic risk:
A) can be achieved only through ownership of a mutual fund
B) requires an ownership of at least one stock in every industry
C) requires an ownership of at least 100 stocks in different industries
D) requires an ownership of at least 10 to 20 stocks in different industries

7) A company declares a 2-for-1 stock split. You now own more shares. Which of the following is also true?
A) the price of the stock, your ownership percentage, and the value of your total investment stay the same
B) the value of your total investment stays the same, while the price of the stock and your ownership percentage both change
C) the value of your total investment and your ownership percentage both stay the same, while the price of the stock changes
D) the price of the stock and your ownership percentage both stay the same, while the value of your total investment changes

8) A long-term debt-equity ratio that might signal a greater financial leverage risk is:
A) 0.09
B) 0.6
C) 1.5
D) 3.5

9) A single 25 year-old with no dependents who is just beginning to invest for retirement should adopt an investment strategy of:
A) 20 % in CDs, 60 % in money-market funds, and 20 % in bonds
B) 80 % in stocks, and 20 % in bonds
C) 33.33 % in stocks, 33.33 % in bonds, and 33.33 % in Treasury Bills
D) 50 % in bonds, and 50 % in Treasury Bills

10) As interest rates rise, the price of bond prices:
A) rise
B) fall
C) stay the same
D) it cannot be determined using this information

Background Section

11) Age range
A) Less than 20-29
B) 30-39
C) 40-49
D) 50-over 50

12) Income range
A) Less than $20,000
B) $20,001-39,999
C) $40,000-74,999
D) $75,000-more than $75,000

13) Gender
A) Male
B) Female

14) Education
A) High school education
B) College education
C) Bachelor degree
D) Graduate degree

15) Do you trade online?
A) Yes
B) No

## Endnotes

a. *We were permitted to post to message boards on several websites such as www.talkstock.com, www.investorville.com, and the BullBoards section of www.stockhouse.com. We also sent emails to investment clubs encouraging the participation of club members. To obtain the clubs' email addresses, we sought out the section on America Online devoted to personal web pages (approximately 500 sites) and located email addresses listed on the website. We sent out emails asking for participation.*

b. *We also used the mean to separate those with high and low levels of knowledge. The results are similar to those reported in the paper.*

## References

Bakken, M. R., (1967). Money management understandings of tenth grade students. *National Business Education Quarterly*, *36*, 6.

 

Chen, H. & Volpe, R. (1998). An analysis of personal financial literacy among college students. *Financial Services Review*, *7*(2), 107-128.

Connor, J. (1992, January/February). Financial education for consumers. *Credit World*, 21-24.

Danes, S. M. & Hira, T. K. (1987). Money management knowledge of college students. *Journal of Student Financial Aid*, *17*(1), 4-16.

Farrell, P. B. (2000, September 5). Are investors really getting dumber? Available: http://aol.marketwatch.com /source/blq/aol/archive/20000905/news/current/ superstar.asp.

Genasci, L. (1995, September 18). Woman and retirement: An unpleasant surprise: You're retired and broke. *The Vindicator*, B5.

Gordon, M. (2001, August 5). 4 out of 5 investor don't know basics, survey says. Available: http://detnews.com/ 2001/business/0108/06/c04-261321.htm [2001, November 13].

Harris/Scholastic Research (HSR). (1993). Liberty Financial Young Investor Survey, New York, NY: Harris/Scholastic Research.

Hira, T. (1993). Financial management knowledge and practices: Implications for financial health. Paper presented at the Personal Economic Summit '93, Washington, D.C.

John Hancock. 2001. Insight into participant investment knowledge & behavior, seventh. Boston, MA: John Hancock.

Langrehr, F. W. (1979) Consumer education: Does it change students' competencies and attitudes? *Journal of Consumer Affairs*, *13*, 41-53.

Lewin, T. (1995, April 20). Income gap for sexes is seen wider in retirement. *New York Times*, A19.

Low, C. B. (2001, June 11). Surfer, beware. *Wall Street Journal*, R9.

Martinez, M. N. (1994). Why women should save and plan more. *HRMagazine* (November), 104-105.

O'Neill, B. (1993). Assessing America's financial IQ: Reality, consequences, and potential for change. A paper presented at the Personal Economic Summit '93, Washington, D.C.

Princeton Survey Research Associates (PSRA) and Investor Protection Trust (IPT). (1996, April). Investor knowledge survey. Arlington, VA.

Reuters. (2001, November 26). Americans flunk bond market IQ test. Available: http://dailynews.netscape.com/ mynsnews/story.tmpl?table=table=n&cat=50580&id=20 0111251[2001, November 26].

Securities and Exchange Commission. (1999, November 22). Special study: Online brokerage: Keeping apace of cyberspace. Available: http://www.sec.gov/ news/studies/cybrtrnd.htm [2000, November 6].

Volpe, R. P., Chen, H. & Pavlicko, J. J. (1996). Personal investment literacy among college students: A survey. *Financial Practice and Education*, *6*(2), 86-94.

Note: page numbers do not match printed version. Please cite as:

Volpe, R. P., Kotel, J. E. & Chen, H. (2002). A survey of investment literacy among online investors, *Financial Counseling and Planning*, *13*(1), 1-13.

 