Retail Investors and Investment Fraud Victims: Is There a Connection?

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Abstract

This study analyzed specific characteristics of investment fraud victims. Logistic regressions on a national sample of retail investors revealed that overconfident and financially literate investors shared several characteristics with victims of investment fraud. While overconfident investors were the most comfortable with market regulation and making investment decisions that assumed high amounts of risk relative to investment returns, financially literate investors surpassed them in the frequency of annual trading and portfolio allocation to stocks. Surprisingly, overconfident investors favored due diligence via background checks on investment professionals, while financially literate investors did not. Overall, males and younger investors tended to share characteristics with investment fraud victims.

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Introduction

According to the Federal Trade Commission (2022), investment scams were among the top five types of fraud reported by 2.4 million consumers. Moreover, investment scams exacted the greatest financial cost to consumers: a loss of $3.8 billion—more than double the amount reported lost in 2021 and a staggering $4.6 billion in 2023 to investment scams, the highest fraud category that year (Federal Trade Commission, 2023). With a greater reliance on web-based systems and virtual account statements, consumers are more susceptible to this type of crime (Shadel & Pak, 2017).

Nevertheless, as a research focus, investment scams pose a challenge, which may be due to how the literature has defined fraud, the many different types of fraud, and the inconsistent reporting of fraud (Lee et al., 2019). According to the Federal Bureau of Investigation (FBI), investment fraud is defined as the illegal sale of financial products (Federal Bureau of Investigation [FBI], 2020). This illegal activity has taken many forms, such as market manipulation, pyramid or Ponzi schemes, pump-and-dump schemes, and affinity fraud targeting specific groups, to name a few (FBI, 2020). Furthermore, although Kieffer and Mottola (2016) predicted that one in ten investors would

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be affected by investment fraud at some point in their lives, the actual percentage of individuals defrauded remains unclear. For example, Deliema et al. (2017) found that 16.5% of study participants reported investment fraud, while nearly half of survey respondents reported being victimized by another type of fraud.

Interestingly, although Deliema et al.'s (2017) investment fraud research contradicted more conservative estimates, other studies have suggested that underreporting might account for the confusion surrounding the actual number of investment fraud cases. For example, Applied Research & Consulting LLC (2015) found that over two-thirds of victims told friends or family about their victimization, yet only 35% reported it to authorities. Almost half of those who did not report it to the authorities stated that it would not have made a difference, while 35% indicated that they wanted to put the occurrence behind them. Moreover, 29% reported feeling embarrassed by the experience, while nearly half stated that they felt responsible for being victimized. These factors may play a role in underreporting fraud occurrences (Applied Research & Consulting LLC, 2015).

Despite the lack of precision in defining and tracking instances of investment fraud, extensive research has been conducted on the demographic background of fraud victims. Typically, victims are older, married, and male, with many classified as unsophisticated investors (Deliema et al., 2020; Lokanan, 2014; Lokanan & Liu, 2021). Research has also shown that investment fraud victims' behaviors and attitudes are common. For example, victims take on more investment risk and are more impulsive than non-victims (Knutson & Samanez-Larkin, 2014; Shadel & Pak, 2017). Victims tend to be more trusting than non-victims when making investment decisions, which might account for a failure to exercise due diligence. Additionally, victims of investment fraud tend to regard wealth as a measure of success (Deliema et al., 2020; Lokanan, 2014; Shadel & Pak, 2017). Hence, further investigation is warranted regarding a possible connection between these characteristics and investment fraud vulnerability. While the aforementioned demographics, behaviors, and attitudes represent factors that may increase vulnerability to investment fraud, financial literacy, which is generally low in the United States, is assumed to safeguard against victimization.

Specifically, financial literacy is an understanding of financial concepts and behaviors necessary to effectively manage personal finances (Lusardi & Mitchell, 2014). However, the literature is mixed on the adequacy of financial literacy to protect consumers against investment fraud. For example, Engels et al. (2021) found that advanced financial knowledge was more effective than basic money management skills in detecting fraud. Therefore, one purpose of this study is to determine the role of financial literacy in mitigating attitudes and behaviors associated with investment fraud victims.

In addition to objective knowledge and skills, financial literacy is comprised of individuals' perceptions of competence in managing personal finances. For example, financially literate consumers and knowledgeable investors have sufficient investment knowledge and skills as well as a level of confidence proportionate to their abilities. In contrast, investors are considered overconfident when their self-perceptions exceed their actual abilities. According to the literature (e.g., Knutson & Samanez-Larkin, 2014; Kramer, 2014; Nussbaumer et al., 2009), overconfident investors engage in behavior that may render them vulnerable to investment fraud. As a result, another purpose of the present study is to explore the extent to which overconfidence predisposes investors to fraud.

Finally, investors differ in their experiences with the financial markets and the subsequent judgments they form about their capabilities to achieve their investment goals (Bandura, 2001; Chiu & Klassen, 2009). Consequently, this study also explores how gender and age differences in self-efficacy may impact susceptibility to investment fraud (Farrell et al., 2016; McAvay et al., 1996).

This study builds on the literature to identify characteristics of fraud victims, the purpose of which is twofold:

1. To determine the extent to which financially literate and overconfident investors share characteristics with victims of investment fraud;
2. To explore the extent to which gender and age render investors potentially vulnerable to victimization.

Literature Review

Investment fraud has continued to rise as fraudsters have learned new and innovative ways to take advantage of individuals (Shadel & Pak, 2017). The term "fraud" has been broadly defined and is likely partly why much fraud goes unreported in the United States. This study specifically investigates investment fraud and the potential impact of investors' knowledge and confidence on their susceptibility to victimization. Specifically, certain attitudes and behaviors are more associated with investment fraud victims than individuals who have not been defrauded. These characteristics are explored in detail following a discussion of investment fraud victim demographics, the possible role of financial literacy in investment fraud prevention, overconfidence in matters that pertain to money management, and how our experiences shape our beliefs in our abilities as investors.

Investment Fraud Victim Demographics

When Shadel and Pak (2017) studied the differences between fraud victims and the general public, they confirmed previous research that typical victims tended to be male, married, older, and had a higher incidence among veterans. Similarly, Deliema et al. (2020) found that victims were three times more likely to be male with a higher likelihood of victimization among older individuals, yet fraud was vastly unacknowledged regardless of the victim's age. Additionally, Lokanan (2014) found that many victims were classified as unsophisticated investors, retired or in management positions, lacked wealth, and knew their offender as either a family member, acquaintance, or friend.

In the context of investing, fraud victims tend to be more trusting than non-victims and fail to conduct background checks on investment advisors as a result. Compared to the general public, fraud victims trade at a higher frequency, assume greater risk in investments they believe will yield greater returns, and participate in non-regulated or novel investment opportunities (Deliema et al., 2020; Lokanan, 2014; Shadel & Pak, 2017). Additionally, victims of investment fraud have reduced impulse control (Knutson & Samanez-Larkin, 2014).

Financial Literacy

Lusardi and Mitchell (2014) provided a widely accepted definition of financial literacy as "the ability to process economic information and make informed decisions about financial planning, wealth accumulation, pensions, and debt." (p. 2). Other researchers have also contributed to the definition of financial literacy by including concepts such as financial marketplaces, financial products, and related services (e.g., Anderson et al.). Financial literacy encompasses money management behaviors associated with due diligence, such as checking financial statements for errors. Nevertheless, it is unclear whether financial literacy adequately protects against fraud.

For example, Engels et al. (2021) sampled 5,500 U.S. residents and found that prudent financial behaviors such as budgeting and paying bills on time were insufficient to detect fraud, which the researchers defined as unauthorized access to personal accounts (e.g., bank accounts, insurance accounts, and credit and debit cards). However, Engels et al. (2021) also found that the higher the individual's actual financial knowledge, the greater the ability to detect fraud. Moreover, Kasim et al. (2024) found evidence of a relationship between financial literacy and awareness of investment scams. Nevertheless, the National Association of Securities Dealers Investor Education Foundation (2006), which looked specifically at investment fraud, found that fraud victims had higher financial literacy scores than non-victims. Ironically, these findings contradicted their hypothesis going into the study. Consequently, the mixed results of prior studies warrant further investigation.

Overconfidence

Asaad (2020) defined overconfidence as individuals' perceptions of their abilities to be better than their performance on objective

measures. Importantly, studies have found that individuals who are overconfident in their abilities related to financial knowledge share many characteristics with victims of investment fraud. For example, Asaad (2020) found that overconfident investors were more likely to have riskier behaviors and beliefs than other knowledge groups. Specifically, the study found that overconfident participants took more risk in investing and were overoptimistic about market performance. Moreover, overconfident individuals were more likely to trust market regulations and more likely to invest in higher-risk strategies such as options or trading on margin. Overconfident individuals were also less likely to utilize a financial advisor.

Consistent with prior research, Kramer (2014) found overconfidence in investment decisions to be experienced differently by men versus women. This evidence indicated that women were less likely to reflect this overconfident behavior, which could reduce some of their risk factors for investment fraud.

Self-Efficacy Differences According to Gender and Age

Participation in financial markets requires a certain comfort level with the complex and dynamic nature of investing. Unlike general confidence, an investor's comfort level is shaped by experiences within the domain. Individuals' assessments of their personal capabilities of success (i.e., self-efficacy) are marked by the degree of assurance they have in their competence to perform at a level to satisfy specific goals (Bandura, 2001). Significantly, self-efficacy determines individuals' choices of goals, the degree of effort expended toward achieving them, and how long they persist, especially when a given task becomes challenging (Bandura, 1977).

Gender

Personal finance, generally, and in the investment industry, specifically, are dominated by male role models. For instance, approximately 80% of Chartered Financial Analysts (CFAs) and 70% of Certified Financial Planners (CFP®s) are male (Blayney, 2016; Fender et al., 2016). As such, considerably more males than females communicate financial information in the context of money management. Moreover, Schunk and DiBenedetto (2021) asserted that role models who share similar characteristics with observers can positively impact the observers' motivation to succeed in a given task. Furthermore, men typically assume the lead role in managing household finances, which undoubtedly bolsters their self-efficacy in handling money matters.

D'Acunto (2015) sought to determine if gender was a predictor of risk tolerance and the amount of money at risk in investing. Focusing on identity stereotypes, D'Acunto (2015) found that compared to women, men were more tolerant of risk and invested more often when their identity stereotype was primed, while women experienced no difference when primed compared to men. This outcome was also the case when the men were primed or had their identity threatened while acting as the agent of a principal (D'Acunto, 2015). Thus, in light of the historic leaning toward men as the primary actors in the world of finance, it stands to reason that males are motivated by a greater sense of agency in achieving financial goals than females.

Age

With the transition from traditional defined benefit pension plans to defined contribution plans like the 401(k), the baby boom generation has become responsible for managing large sums of money (Lusardi & Mitchell, 2014). However, as an individual's self-efficacy varies across domains, feelings associated with self-determination and mastery of a given area can also wax and wane with age. Specifically, McAvay et al. (1996) found that older adults experienced a steady decline in financial self-efficacy throughout a longitudinal study. Consistent with this age-based decline in financial self-efficacy, Shadel and Pak (2017) found that there were more investment fraud victims over the age of 70 compared to the public. Deliema et al. (2020) also reported a similar finding where investment fraud victimization was positively associated with age.

In contrast, other studies have found that younger age groups are more likely to be victims of fraud (Lee et al., 2019). As stated earlier, mixed results in financial fraud research may likely be due to

inconsistent definitions of fraud or a focus on financial products designed for specific age cohorts. Nevertheless, this study focused on investment fraud specific to individuals who own investments. Moreover, our research was based on the presumption that older investors are more likely to share characteristics with victims of investment fraud than younger investors due to a greater accumulation of financial assets.

Theoretical Framework

The Opportunity Model of Predatory Victimization

Deliema et al. (2020) utilized the opportunity model of predatory victimization in their research and posited that certain attitudes and behaviors that are common in fraud victims make them an attractive target for offenders. Similarly, this study argues that the characteristics associated with fraud victims are also present in overconfident investors while mostly absent in financially knowledgeable investors. Specifically, Cohen et al. (1981) argued that the risk of victimization increases with the following five factors: proximity to potential offenders, guardianship, target attractiveness, exposure, and definitional properties of specific crimes. In other words, individuals' routine activities and lifestyles may place them and their property at risk for victimization without due diligence, professional advice, self-restraint, and wisdom. Therefore, the current study explores the extent to which the following factors are associated with financially literate and overconfident investors while noting nuances by gender and age: target attractiveness, guardianship, exposure, and proximity.

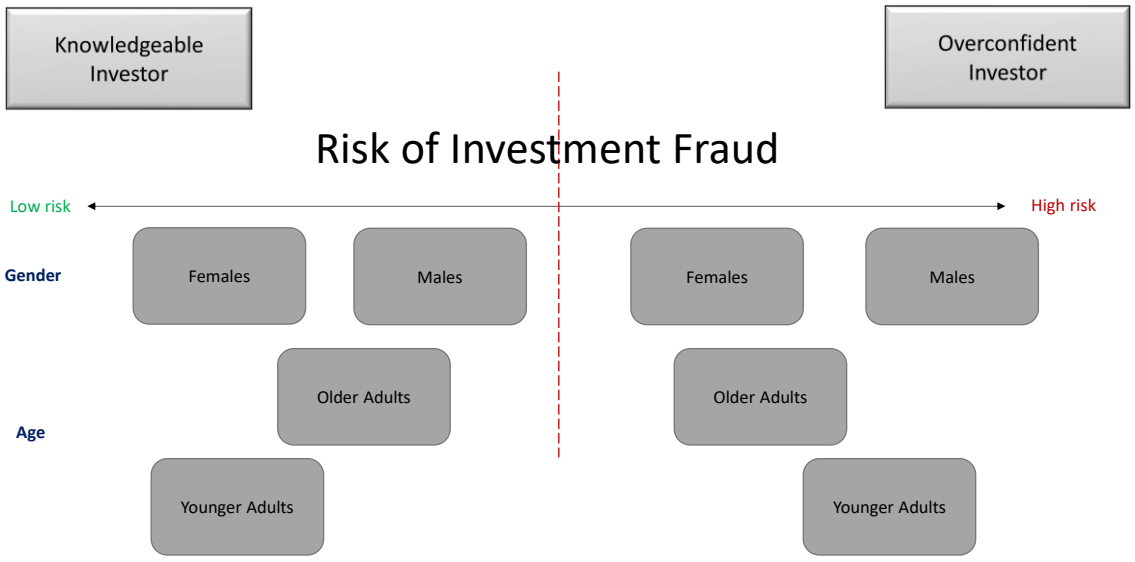
When the opportunity model of predatory victimization is applied to the current study, an investor with low financial knowledge and high confidence is likely to be an attractive target to fraudsters (Deliema et al., 2020). One reason for target attractiveness is that overconfident investors tend to utilize guardians less as their confidence level makes them believe they do not need someone looking out, aiding, or performing due diligence for them (Nussbaumer et al., 2009). In addition to target attractiveness, overconfident investors also tend to increase their exposure to fraudsters through behaviors like purchasing non-regulated investments, purchasing investments after attending a free dinner seminar, trading at a high frequency, allocating assets primarily to equities, or buying from a cold caller (Deliema et al., 2020; Odean, 1998; Trinugroho & Sembel, 2011). Moreover, the overconfident investor is likelier to miss cues that other investors may notice and reduce their proximity to criminals.

When investor age is considered in the context of the opportunity model of predatory victimization, both older and younger investors are posited to be at risk of investment fraud but to a lesser extent than overconfident investors. For example, such factors as a greater accumulation of assets coupled with social isolation and/or cognitive decline may increase the target attractiveness of elderly investors to fraudsters (Boyle et al., 2012; Burnes et al., 2017). In contrast, young investors are believed to have increased exposure to investment fraud opportunities because of higher trading frequency and a tendency to assume greater investment risk independent of experienced investors.

Concerning gender, females are posited to have lower target attractiveness to perpetrators of investment fraud because of lower perceived self-efficacy in the domain of personal finance and because they are less likely to make investment decisions compared to males. In contrast, males have increased target attractiveness due to their predominance in the financial markets, higher risk tolerance, greater self-efficacy in the personal finance domain, and probable susceptibility to gender priming.

When financially knowledgeable investors are added to the framework, Figure 1 illustrates that females are likely at the lowest end of the investment fraud risk spectrum, followed by financially knowledgeable men. These knowledgeable men are likely to take on more investment risk than women, but since their confidence level aligns with their abilities, the risk level remains on the lower end of the spectrum (D'Acunto, 2015; Kramer, 2014).

Figure 1. Theoretical Framework Visualization



Research Questions

This study explores the extent to which overconfident and financially literate investors possess attitudes and behaviors known to increase investment fraud vulnerability.

- Does financial literacy protect against investment fraud?
- Does overconfidence predispose investors to investment fraud?
- How do gender and age affect investor vulnerability to investment fraud?

These research questions are addressed through eight hypotheses, which examine areas of investor concern and confidence about fraud, investor attitude toward risk, investor risk level, and investors' information-seeking behaviors.

Hypotheses

This study posits the following hypotheses to address the research questions:

H_1: Worry about personal vulnerability to investment fraud – High-knowledge adults (independent of gender or age), followed by overconfident women and overconfident older adults, are more worried about personal vulnerability to investment fraud than overconfident men and overconfident younger adults.

H_2: Level of confidence in financial market regulation – High-knowledge adults (independent of gender or age), followed by overconfident females and overconfident older adults, have less confidence in financial market regulation than overconfident males and overconfident younger adults.

H_3: Comfort level in making investment decisions – High-knowledge adults (independent of age and gender) and overconfident women are less comfortable making investment decisions relative to overconfident men and overconfident adults of all ages.

H_4: Amount of investment risk assumed relative to expected return – High-knowledge investors (independent of age and gender), and overconfident women and overconfident older adults take on less investment risk than overconfident males and overconfident younger adults.

H_5: Annual trading frequency – High-knowledge adults (regardless of gender), high-knowledge older adults, overconfident women, and overconfident older adults, report trading less frequently than overconfident men and overconfident or high-knowledge younger adults.

H_6: Allocation to stocks in a portfolio – High-knowledge adults (regardless of gender), high-knowledge older adults, overconfident women, and overconfident older adults, report having a lower allocation to stocks than overconfident men and younger adults who are either in the overconfident or high-knowledge groups.

H_7: Using a financial advisor for information gathering – Both females and older adults with high investment knowledge report greater use of financial advisors for gathering information about investments relative to females and older adults in the overconfident group along with men and younger adults in the high investment knowledge group. Overconfident men and overconfident younger adults report using financial advisors the least.

H_8: Performance of a background check on a financial professional – Females and older adults with high investment knowledge report conducting higher numbers of background checks on a financial professional relative to overconfident females, overconfident older adults, men with high investment knowledge, and younger adults with high investment knowledge. Overconfident men and overconfident younger adults report the lowest background checks on financial professionals.

Methods

The investor survey of the FINRA Foundation's 2018 National Financial Capability Study was utilized to test the hypotheses. All respondents were investors in the United States. The 2018 National Financial Capability Study was the fourth wave, initially collected in 2009, with over 25,000 adults participating each time it was administered. The study's objective was to benchmark key indicators of individuals' financial capabilities and evaluate how their characteristics varied by financial literacy, demographics, attitudes, and behaviors (FINRA Investor Education Foundation, 2020).

Since the study focused on factors that could affect retail investors, such as vulnerability to investment fraud, the 2018 National Financial Capability Study Investor Study was uniquely qualified for the analysis. The participants all owned retail non-retirement investment accounts, with most also owning retirement accounts. The survey provided many questions concerning factors known to increase individuals' vulnerability to investment fraud with subjective and objective measures of financial knowledge. The objective and subjective questions allow the researcher to create overconfident and knowledgeable investor variables to test the hypotheses (FINRA Investor Education Foundation, 2020). At the time of the analysis, a more current survey with similar questions was completed. However, we decided to proceed with the 2018 survey since the 2021 survey was collected during the pandemic, and it was unclear what effect the pandemic would have on investors' survey responses.

In July 2018, ARC Research pulled from three online panels used by the state-by-state survey—EMI Online Research, Survey Sampling International, and Research Now—who sent 3,750 email invitations to participants of the 2018 state-by-state survey who identified as owning investments outside of retirement accounts. Notably, 2,763 individuals opened the survey link, 2,003 of whom met the final survey criteria and completed the survey (FINRA Investor Education Foundation, 2018b; NFCS Response Statistics, 2018).

Asaad (2020) used the 2015 National Financial Capability Study Investor Survey to research investor overconfidence. Asaad compared the five knowledge question answers of the national sample to their respective questions in the investor survey and noted that the investor survey participants correctly answered all five questions more often than the larger, more diverse sample. The comparison indicated that the investor survey participants had a higher level of financial literacy than the general population.

Variables

The study selected eight variables to analyze as dependent with one independent variable, as described below. The control variables were race, income, education level, and approximate total value of the investors' non-retirement accounts. Details for the variables are provided in Tables 1 and 2 below.

Independent Variable. The independent variable was coded into three categories based on knowledge and confidence level: overconfident, high-knowledge, and reference group. The variable coding is similar to Asaad's (2020) methodology, which employed four knowledge and confidence groups based on the methodology of Allgood and Walstad (2013), who used a broader dataset: the 2009 National Financial Capability Study.

The respondents were separated into groups based on their level of objective knowledge and subjective confidence. Next, the respondents were assessed based on their overall knowledge about investing on a scale from 1 to 7, with 1 = *very low knowledge* and 7 = *very high knowledge*. Respondents who did not know or preferred not to answer were excluded from the analysis. Their responses were then compared to the group mean. Those who scored higher than the mean were placed in the high-confidence group, while those below the mean were placed in the low-confidence group.

Table 1 below represents the placement of the investors into one of the three categories. "High-knowledge" referenced those with a high level of knowledge regardless of their confidence level. "Overconfident" were investors who had a low actual knowledge level but high confidence. The reference group represented investors with low actual knowledge and low investor confidence.

Table 1. Three Knowledge and Confidence Groups

<table>
<tr><td rowspan="2">Knowledge</td><td>High</td><td colspan="2">High Knowledge 1,093 (54.95%)</td></tr>
<tr><td>Low</td><td>Reference 406
(20.41%)</td><td>Overconfident 490
(24.64%)</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>Low</td><td>High</td></tr>
<tr><td colspan="2">Confidence</td></tr>
</table>

Dependent Variables. The dependent variables were divided into investor attitudes or investor behavior categories to address the research questions. The attitudes category consisted of the degree of worry about investment fraud vulnerability, the confidence level in financial market regulation, the comfort level in making investment decisions, and the amount of investment risk assumed relative to return. The behaviors category consisted of the frequency of trading, the allocation to stocks, using a financial advisor for information, and the risk-taking level. Table 2 below shows how dependent variables were used to test each hypothesis.

Table 2. Hypotheses Testing and Correlating Variables

Hypothesis	Question	Non-focus group responses	Focus Group responses
H_1	Degree of worry about investment fraud vulnerability	4-Jan	7-May
H_2	Level of confidence in financial market regulation	7-Jan	10-Aug
H_3	Comfort level in making investment decesions	7-Jan	10-Aug
H_4	Amount of investment risk assumed relative to return	Average risk and return or no risk	Willing to take above average risk for above average return
H_5	Trading Frequency	1-10 times per year	11 or more times per year
H_6	Allocation to stocks	Less than half of portfolio	More than half of portfolio
H_7	Use of Financial Advisor	No	Yes
H_8	Performed background check on finacial professional	No	Yes

Relationship Variables. This study investigated the effects of two relationship variables: age and gender. Most of the literature shows that older individuals are more likely to become fraud victims than those in younger age groups, with men more likely to be fraud victims than women (Shadel & Pak, 2017). This study sought a deeper understanding of the effects of age and gender on the dependent variables.

Direction of Effect. The study visualized the intended direction of effect as seen in Table 3 below:

Table 3. Direction of Effect Visualization

DEPENDENT VARIABLE - response variable by Theme	INDEPENDENT VARIABLE - explanatory variable							
	High Knowledge *[High Knowledge/ High and Low Confidence]*				Overconfident *[Low Knowledge/ High Confidence]*			
INTERACTION VARIABLES – GENDER & AGE	Male	Female	18-54	55+	Male	Female	18-54	55+
ATTITUDES ASSOCIATED WITH POTENTIAL VULNERABILITY TO INVESTMENT FRAUD								
Investor concern and confidence about fraud								
H1- Degree of worry about investment fraud vulnerability	High	High	High	High	Low	Moderate	Low	Moderate
H2- Level of confidence in financial market regulation	Low	Low	Low	Low	High	Moderate	High	Moderate
Investor attitude toward risk								
H3- Comfort level in making investment decisions	Low-Moderate	Low	Low-Moderate	Low	High	Moderate	High	High
H4- Amount of investment risk assumed relative to return	Low-Moderate	Low	Low-Moderate	Low	High	Low	High	Low
BEHAVIORS ASSOCIATED WITH POTENTIAL VULNERABILITY TO INVESTMENT FRAUD								
Investor risk Level								
H5- Frequency of Trading Annually	Low	Low	High	Low	High	Low	High	Low
H6- Portfolio Allocation to Stocks	Low	Low	High	Low	High	Low	High	Low
Investor information seeking								
H7- Use of Financial advisor for information	Moderate	High	Moderate	High	Low	Moderate	Low	Moderate
H8- Background check on financial professional	Moderate	High	Moderate	High	Low	Moderate	Low	Moderate

Scale: Low, Moderate, High

Results

Descriptive Statistics

Most individuals in the sample of respondents who graduated from college indicated white as their race, indicated male for gender, were older, and had a higher household income than the population in general. The survey results confirmed low investor knowledge in the United States, with only a little over one-third of the respondents accurately answering more than half of the ten survey questions. Investors were confused about the cost of their investments, with almost one-third believing that mutual funds did not have fees or expenses. Most investors believed they had access to appropriate information for decision-making, and they were more likely to overestimate than underestimate their investment performance, with men being more confident than women in their abilities. Table 4 lists the recoded variables selected from the 2018 investor survey to test the researchers' hypotheses.

Table 4. Summary Statistics

Characteristics	Percent	Number of Observations	Coded = 1	Coded = 0
Dependent Variables				
Worried about fraud victimization	32%	1,989	634	1,355
Confidence in regulation	30%	1,989	587	1,402
Comfort making investment decisions	42%	1,989	842	1,147
Risk willing to take	36%	1,960	699	1,261
Investment trading frequency	15%	1,989	287	1,702
Allocation to stocks	59%	1,777	1,041	736
Use of advisor for information gathering	60%	1,989	1,196	793
Background check on advisor	20%	1,989	393	1,596
Variables of Interest				
Overconfident investor	25%	1,989	490	1,499
High knowledge investor	55%	1,989	1,093	896
Reference group	20%	1,989	406	1,583
Overconfident male investor	13%	1,989	256	1,733
Overconfident female investor	12%	1,989	234	1,755
Overconfident age 55 and older investor	12%	1,989	246	1,743
Overconfident under 55 investor	12%	1,989	244	1,745
High-knowledge male investor	37%	1,989	730	1,259
High-knowledge female investor	18%	1,989	363	1,626
High-knowledge 55-and-older investor	38%	1,989	755	1,234
High-knowledge under-55 investor	17%	1,989	338	1,651
Interaction Variables				
Age 55 and older	63%	1,989	1,244	745
Males	57%	1,989	1,128	861
Control Variables				
Investors with $250,000+ investments	34%	1,989	676	1,313
Race = White alone	82%	1,989	1,627	362
College graduates	57%	1,989	1,125	864
Income $100,000/yr+	34%	1,989	673	1,316

Statistical Analysis

The study's empirical model employed logistic regression to examine the vulnerability of overconfident and high-knowledge investors to investment fraud while evaluating the interaction of gender and age and controlling for income, investment account value, race, and education. Since the independent variables in the study were categorical, the max re-scaled R^2 was utilized. Logistic regressions were run for the eight hypotheses, which presented mixed results. The study employed the max re-scaled R^2 statistic to measure the models' explanatory power. The following is a summary of the results for Hypotheses 1–8. Table 5 below shows the top three groups per model with statistical significance.

Table 5. Top Three Groups per Model with Statistical Significance

	Supportive of Hypothesis?	Model 1	Model 2	Model 3	Model 4	Model 5
H1 Worry about investment fraud	No support	Overconfident Nonwhite adults Younger adults	Overconfident Men Overconfident Women Nonwhite adults	Overconfident Younger Adults Nonwhite Adluts Overconfident Older Adults		
H2 Level of Confidence in markets	Full support	Overconfident High Knowledge Large Investment Account	Overconfident Men Overconfident Women High Knowledge	Overconfident Younger Adults Overconfident Older Adults High knowledge		
H3 Level of comfort in making	Full support	Overconfident High Knowledge Men	Overconfident Men Overconfident Women High Knowledge			
H4 Level of risk assumed relative to investment	Full support	Younger Adults Overconfident High Knowledge	Overconfident Men Younger Adults High Knowledge	Overconfident Younger Adults High Knowledge Men		
H5 Number of investment trades made	Partial support	High knowledge Younger Adults Large Investment Account	High knowledge Overconfident Men Younger Adults	High Knowledge Overconfident Younger Nonwhite Adults	High knowledge men High knowledge women Younger Adults	High knowledge younger High knowledge older Overconfident
H6 Allocation of stocks in portfolio	Partial support	High Knowledge Men College Graduate	High Knowledge Overconfident Men Large Investment Account	High knowledge Large Investment Account College Graduate	High knowledge men High knowledge women Large Investment Account	High knowledge younger High knowledge older Large Investment Account
H7 Use of financial advisor to gather info	No support	Large Investment Account Reference Group	Large Investment Account Reference Group	Large Investment Account Reference Group White Adults	Large Investment Account Reference Women Reference Men	Large Investment Account Reference Younger White Adults
H8 performance of background check on	No support	Overconfident Younger	Overconfident men Overconfident women Younger	Overconfident younger	Overconfident Younger High Knowledge Men	Overconfident High Knowledge Younger Nonwhite Adults

Note: Model 1 analyzes the impact of overconfidence, knowledge level, age, gender, and control variables; Model 2 subdivides overconfident investors by gender; Model 3 subdivides overconfident investors by age; Model 4 subdivides high knowledge investors by gender; Model 5 subdivides high knowledge investors by age.

Attitudes of Retail Investors

The results supported three of the four research hypotheses focusing on attitudes associated with investment fraud vulnerability. Consistent with one of the predictions, overconfident investors reflected a higher confidence level in the effectiveness of U.S. regulation of financial markets than other groups in the sample. This effect was evident in the overconfident group and when testing the interaction of investors' gender and age. Specifically, men (more than women) and younger (more than older) investors in the overconfident group felt that U.S. financial markets were effectively regulated. This sentiment supported the hypothesis that overconfident investors, especially male or younger investors, are potentially more vulnerable to investment fraud. In other words, compared to their high-knowledge counterparts, overconfident investors appeared to have an unwavering faith in the financial markets, which could blind them to signals of fraudulent activity.

Concerning investor comfort level in making investment decisions, regardless of age or gender, overconfident adults were more comfortable making investment decisions than other groups in the sample. Moreover, when testing gender interaction, overconfident men had the highest level of comfort in making investment decisions. Importantly, investors' confidence in their abilities to interpret the data related to investments without sufficient financial knowledge or outside assistance from an investment professional could place them at a higher risk of victimization.

Furthermore, the amount of investment risk investors assume based on the expected return could also render them vulnerable to investment fraud. Specifically, the study results indicated that younger investors were willing to take on the highest level of risks for high returns, followed by overconfident investors. This finding was consistent with existing literature, which found that younger investors were willing to assume more investment risk due to a longer time horizon for recovery from investment losses to achieve their goals.

Additionally, an interaction between gender and age was observed among overconfident investors. Overconfident men and overconfident younger adults were willing to take on the highest degrees of risk for return. While this finding was also consistent with predictions, the study results regarding investors' levels of worry about vulnerability to investment fraud were contrary to expectations. In fact, the opposite of the research hypothesis was found, with overconfident investors having the highest worry about investment fraud vulnerability. Moreover, when the interaction of age and gender was tested, overconfident men (more than women) and overconfident younger (more than older) investors had the highest degree of worry about investment fraud vulnerability.

Behaviors of Retail Investors

When the remaining four hypotheses associated with behaviors that may increase vulnerability to investment fraud were tested, the results indicated partial support for two of the four research hypotheses. Contrary to the hypothesis predicting that younger investors in the overconfident and high-knowledge groups and overconfident men would have the highest trading frequencies, high-knowledge investors, regardless of gender, had the highest trading frequencies, followed by overconfident men. When the analysis was modeled to evaluate the interactions of gender and age, the results suggested that men traded more than women, and younger investors traded more than older investors in the high-knowledge and overconfident groups. While the study results provided partial support for the trading frequency of overconfident males, the higher trading frequency of high-knowledge investors was unanticipated and is discussed in the next section.

Although allocating a significant portion of an investment portfolio to equities is common among overconfident investors, the results for Hypothesis 6 lacked statistical significance for most of the models related to the overconfident groups. Nevertheless, Model 2 had statistical significance for the overconfident group and partially supported Hypothesis 6. Specifically, overconfident men had higher stock allocations than the reference group. In the remainder of the models, the overconfident group results were higher than the reference group, except for Model 2 (overconfident women), but without statistical significance at the 0.05 level.

As with the Hypothesis 5 results, the high-knowledge group had the highest allocations to equities in portfolios, with high-knowledge men more than women and high-knowledge younger more than older investors. While this result was also unanticipated, the behaviors of overconfident men and high-knowledge younger investors were consistent with the hypothesis that the overconfident younger group allocated more investment portfolios to equities than overconfident older investors but without statistical significance. This combined evidence suggests that overconfident and high-knowledge male investors who are younger may be at a higher risk of investment fraud than other groups.

Finally, the study results did not support Hypothesis 7 (investor use of a financial advisor for information gathering) or Hypothesis 8 (investor performance of background checks). In both instances, high-knowledge investors who were

either female or older were predicted to use financial advisors and conduct background checks. However, those most likely to use a financial advisor for information gathering were investors with the largest investment accounts and investors who identified as White in two of the models. Surprisingly, the overconfident group was most likely to perform a background check on a professional, which was contrary to the hypothesis. In light of these findings, it is important to mention that the R^2 was very low for Hypotheses 7 and 8 and could only explain approximately 4–5% of the outcomes.

Conclusion

Investment fraud is becoming more prevalent, which results in significant financial loss and emotional trauma for consumers. This analysis aimed to examine the extent to which financially knowledgeable and overconfident investors shared characteristics with victims of investment fraud. Consistent with study predictions, overconfident investors shared the following three attitudes with victims of investment fraud: confidence in the regulation of markets, comfort with making investment decisions, and willingness to assume high risk for an investment return. In addition, males and younger investors tended to lead these results compared to females and older investors. However, contrary to predictions, overconfident investors were more worried about investment fraud vulnerability than financially knowledgeable investors. Moreover, overconfident investors were more likely to conduct background checks on financial professionals.

While some results were perplexing, overconfident investors may be beginning to heed messages concerning the potential pitfalls of investor hubris. In other words, although overconfident groups have a high level of confidence in market regulation and are willing to assume more risk due to their higher comfort level with investments, they may retain a level of concern. Overconfidence is portrayed negatively in the literature. While most research supports that overconfident individuals' attitudes put them at a higher risk for investment fraud, this evidence may indicate a change in their attitudes, which has added a level of worry.

Another factor could be the timing of the data collection. July 2018 was the middle of the first stock market pullback, with the eight previous years yielding positive U.S. market returns, six of which provided double-digit returns. Thus, the respondents' concerns could have been heightened due to the timing of the survey.

With many overconfident individuals unaware of their overconfidence, guardians may be best positioned to protect overconfident investors. Advisors, healthcare providers, family, and friends who can look out for investors may see fraud signals the overconfident investor would not notice. The evidence provided by Hypothesis 8 (i.e., overconfident investors are more likely to perform a background check on a professional) may be a step in the right direction for the overconfident group if the reason for performing the background check is to use a professional more often. The new FINRA (2018) rule allowing financial institutions to collect a trusted contact on investment accounts may also allow the guardian more options when they notice behavior likely to increase fraud risk.

With the research providing evidence of increased fraud risk for overconfident investors, financial advisors and planners should look for signs of overconfidence in the clients they serve. With this new knowledge, advisors should pay closer attention to their overconfident investors' accounts and actions to act as guardians to protect the interests of their investors. Indeed, these investors are likely unaware

that they are at an increased risk of fraud due to their overconfidence.

The findings that high-knowledge investors are also at an increased risk for investment fraud vulnerability may call for more research in this area. Current financial literacy research indicates that the solution to the lack of overall financial literacy is providing more education to increase literacy. However, additional education does not appear to solve the vulnerability of investment fraud. High-knowledge investors have behaviors and attitudes that place them at a higher risk of investment fraud vulnerability. Importantly, the likely solution is the type of education investors receive, not the frequency. Investors need to be better informed about the risks related to investment fraud to reduce exposure and avoid specific activities.

Fraud Theory

Notably, this research looked specifically at the extent to which financially literate and overconfident investors shared characteristics with victims of investment fraud, not the actual incidence of or likelihood of being targeted for actual fraud. Hence, individuals can be more vulnerable to being investment fraud victims based on their attitudes and/or behaviors common in investment fraud victims while not actually being targeted and victimized. Current fraud theory, like the opportunity model of predatory victimization, may not be adequate to fully explain investment fraud (Cohen et al., 1981).

Some of this research's models had outcomes that could be explained for different reasons. For example, high-knowledge investors were found to have the highest vulnerability to investment fraud based on their behavior of trading at a high frequency and having a higher allocation to stocks. Research shows that both behaviors are common in fraud victims but could also be interpreted as a way to earn a higher rate of return on portfolios (Shadel & Pak, 2017). A knowledgeable investor would know that investing a higher percentage of their portfolio in stocks, which could also require more trading throughout the year, historically presents a higher overall rate of return for a portfolio. Additional research should consider factors that may have a predictive ability for actual investment fraud incidence.

Limitations

The 2018 National Financial Capability Study Investor Survey was administered in July 2018 and represented participants' feelings at a specific point in time, which happened to fall in the middle of a down year for U.S. equities. Indeed, financial decisions can be about more than just money. Thus, some factors might not have been captured in the responses to the survey (Asaad, 2020). The investor survey subsample of the wider National Financial Capability Study state-by-state survey did not represent the U.S. population. Hence, individuals who did not own non-retirement accounts or were less wealthy might not have provided the same responses to the narrower data set analyzed (Asaad, 2020). Therefore, this context must be considered when generalizing this study to the broader U.S. population.

Future Research

The literature on fraud research continues to be limited. This study provides evidence that investor confidence influences behaviors and attitudes concerning vulnerability to fraud. However, the evidence is based on a small subset of the population at one point in time. An expansion of the analysis is warranted to continue to test the hypotheses and better evaluate the outcomes of Hypotheses 1, 7, and 8. A larger study design that focuses on more common attitudes and behaviors among fraud victims and asks questions about actual fraud incidence is warranted. Is there a correlation between an overconfident investor and the various types of fraud? Are they at a higher or lower risk of investment fraud than a scam? Why is current financial literacy education insufficient to reduce investment fraud vulnerability within the financially literate group of investors? The risk of

fraud continues to rise, and the cost, especially with the baby boomer generation aging, will likely rise as well. Therefore, more research in this area should be a priority for regulators and legislators (MetLife Study of Elder Financial Abuse, 2011; Shadel & Pak, 2017).

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