Financial Risk Tolerance Before and After a Stock Market Shock: Testing the Recency Bias Hypothesis

Abed G. Rabbani,[1] John E. Grable,[2] Barbara O'Neill,[3] Frances Lawrence,[4] and Zheying Yao[5]

Is there an association between a household financial decision maker's risk tolerance and the performance of the stock market? Some researchers argue that financial market events have little association with the financial risk tolerance (FRT) of household financial decision makers, while others argue that FRT among individuals can vary in relation to significant market fluctuations. The applicability of either argument may depend on the length of the period before and after a major market event. The purpose of this study was to evaluate aggregate changes in FRT around a major stock market event for different anchor time periods and to test the recency bias hypothesis. The analyses were designed to explore the FRT of Americans during a volatile multimonth period of stock market performance in 2018–2019. Several univariate, bivariate, and multivariate tests were used to compare FRT assessment scores pre- and post-October 3rd, 2018 (i.e., the market high in 2018). A decrease in FRT from the market high was noted across the sample; however, the decrease was exhibited most acutely by younger, nonmarried respondents with few investable assets. A noteworthy finding from this study is that financial counselors and financial planners likely serve a "buffering" role when household financial decision makers experience stock market shocks.

Keywords: financial planning, investment, portfolio, recency bias, risk tolerance, stock market

As has been widely noted in the household finance literature, investing in the stock market involves some degree of risk. There is no guarantee that an investor will make money. In fact, the only guarantee associated with investing is the certainty that an investor will experience price volatility over time. This volatility, in turn, helps shape investors' perceptions of, and preference for, different investment products. Investment products that exhibit little price volatility are likely to appeal to risk-averse investors, whereas investment products that demonstrate historical patterns of high price volatility are likely to attract risk-seeking investors (Jones et al., 2016).

Among periods in recent memory, the 13 months beginning January 1, 2018 provides a unique insight into the way stock market volatility and the financial risk tolerance (FRT) are related. The U.S. stock market performance resembled a roller coaster during this time frame with several periods exhibiting extreme volatility. Although investors always experience some degree of stock market volatility, the year 2018 was fraught with price variability, characterized by record highs and sharp reversals (Imbert, 2019a). Stock market indices started the year on a high note. The Dow Jones Industrial Average (DJIA) index closed at 24,824.01 on the first trading day of the year, whereas the Standard & Poor's 500 (S&P 500) index hit a then-record closing high

[1] *Assistant Professor, Department of Personal Financial Planning, University of Missouri, 239 E Stanley Hall, Columbia, MO 65211. E-mail: rabbania@missouri.edu*
[2] *Professor, Department of Financial Planning, Housing and Consumer Economics, University of Georgia, 124 Barrow Hall, 115 DW Brooks Dr., Athens, GA 30602. E-mail: grable@uga.edu*
[3] *Owner/CEO, Money Talk: Financial Planning Seminars and Publications, Ocala, FL. E-mail: moneytalk1@juno.com*
[4] *JFCP Former Editor, Senior Financial Consultant, Elwood & Goetz Wealth Advisory Group, 687 S. Milledge Avenue, Athens, Georgia 30605. E-mail: fran@elwoodgoetz.com*
[5] *Assistant Professor, School of Finance, Zhejiang Gongshang University, No.18, Xuezheng Street, Qiantang Xinqu, Xiasha, Hangzhou, Zhejiang 310018, China. E-mail: yzy@mail.hzic.edu.cn*

http://dx.doi.org/10.1891/JFCP-19-00025

of 2,695.79 (Imbert & Gibbs, 2018). Steady market gains were chronicled in the first three quarters of the year. The S&P 500 closed above 2,900 for the first time on August 29, 2018, whereas the DJIA recorded its highest value of 26,828.39 on October 3, 2018 (Amadeo, 2019). Amazon and Apple both reached $1 trillion valuations during the summer of 2018 (Streitfeld, 2018), while Fidelity became the first investment company to amass $2 trillion in retirement plan assets (Lacuri, 2018). These milestones were a direct result of surging U.S. stock markets. However, these market highpoints were followed by extreme downward volatility during the final 3 months of 2018 and the first full month of 2019. During this time period, when the nation's stock markets closed on December 31st, the DJIA and S&P 500 stood at 23,327.46 and 2,506.85, respectively, which represented the worst annual performance for these indices since 2008 (Chang & Watts, 2018). December 2018 was also the worst December on Wall Street since 1931 (Jay, 2018; Owusu, 2018). Treasury bills—a cash equivalent asset—was the only major asset class to post a gain (1.8% increase) for the year (Picerno, 2019). By January 31, 2019, however, stocks had rallied and closed sharply higher tallying their best January performance since 1987 (Imbert, 2019b). Closing values for the DJIA and S&P 500 indexes at the end of January 2019, respectively, were 25,014.86 and 2,681.05 (Zacks Equity Research, 2019).

Within the financial counseling and planning practitioner community, and among many household finance researchers, there has been an ongoing and active debate about the stability of FRT assessed at the individual level. Some researchers have argued that stock market activity has little association with the FRT of individuals (e.g., Ehm et al., 2014; Gerrans et al., 2015), while others have argued that risk tolerance fluctuates and moves in line with stock market variations (e.g., Hatch et al., 2018; Schooley & Worden, 2016; Shin & Hanna, 2015). The applicability of either argument may depend on the length of the period before and after a major market event. It is possible that short-term events have a more profound impact on risk attitudes, whereas, over longer periods of time, variability is diminished. This possibility stems from the realization that decision makers tend to weigh more heavily information and events that come to mind more easily. This cognitive phenomenon is known as recency bias (Baker & Puttonen, 2017).

Loewenstein et al. (2003) noted that recency bias, like many other cognitive predispositions exhibited by decision makers, occurs because a person's current emotional state forms an anchor point that creates a platform for subsequent thoughts, feelings, and behaviors. Recency bias research hints at a possible association between current stock market events and changes in FRT. FRT is likely to vary with anchor points before and after a significant market event. It is possible, for example, that in 2018. media reports of volatile investment performance and fears of an impending bear market (Rooney, 2018) might have triggered strong investor emotional responses, as revealed by exuberance and fear.

The purpose of this study was to test this possibility by evaluating aggregate changes in FRT around a major stock market event for different anchor time periods. Based on the recency bias phenomenon, it was hypothesized that a shorter anchor period would have a stronger association with FRT compared to a longer anchor period. Specifically, it was hypothesized that the anchor point 7 days before or after October 3, 2018 would be associated with a more profound change in FRT compared to an anchor point that was 14, 21, or 28 days before or after October 3, 2018. This research adds to the existing literature by documenting evidence of the recency bias in explaining the association between aggregate levels of FRT and stock market performance. A key finding to emerge from this study is that the association between FRT and stock market performance may depend on the length of anchor points and that changes in FRT are exhibited most profoundly by young and less financially experienced individuals.

Literature Review

Financial Risk Tolerance

FRT can be conceptualized as a household financial decision maker's willingness to incur investment losses resulting from various risk factors (Grable & Joo, 2004). Another way to think about FRT is the degree of variability in investment returns that someone is willing to accept when allocating assets among investment products (Barsky et al., 1997). FRT can be viewed on a continuum ranging from conservative or risk avoiding (willing to accept little to no investment portfolio volatility) to aggressive or risk seeking (willing to purchase highly volatile securities) (Twin, 2020).

The accurate assessment of FRT is an important factor in helping a household financial decision maker select investment products that match the decision maker's comfort level (Bailey & Kinerson, 2005; Guillemette et al., 2015; Irandoust, 2017; Jones et al., 2016; Schooley & Worden, 2016). The potential costs associated with choosing a mix of investment products that mismatches a decision maker's FRT can be quite large. If a household takes on too much risk, those in the household might panic when faced with a loss and sell at a loss at the wrong time (Twin, 2020). On the other hand, a financial decision maker who allocates assets too conservatively runs the genuine risk of failing to meet preestablished financial goal(s). There is no "right" or "wrong" risk-tolerance level, as individuals have different resources (e.g., cash flow, assets, and pensions), goal time horizons, earning capacity, previous investing and investment loss experience, and mindsets about risk-taking in general (e.g., attitudes toward gambling). As such, it is essential to accurately assess and evaluate FRT rather than rely on heuristic models to gain insights into someone's willingness to take financial risk.

Market Events and FRT

While there is some evidence showing that FRT is similar to a trait attribute, prospect theory suggests that risk tolerance is not fixed (Kahneman & Tversky, 1979). Household financial decision makers tend to exhibit low-risk tolerance (high-risk aversion) when a choice is presented in the domain of gains, and high-risk tolerance (low-risk aversion) when the same choice is presented in the loss domain. Episodes of financial turmoil are known to often coincide with anecdotal evidence of abrupt shifts in market sentiment from risk seeking to risk avoidance (Tarashev et al., 2003). Since intense emotions are associated with the way household financial decision makers conceptualize their FRT (Loewenstein et al., 2003), it is not surprising that decision makers often feel (a) emboldened to buy risky investment products when stock market indexes are climbing and (b) more cautious during declining market cycles. This behavioral tendency often leads to holding losing investments too long and selling winning investments too early (Shefrin & Statman, 1985).

Some researchers have argued that FRT changes in response to variations in market conditions (e.g., Chiang & Xiao, 2017; Grable & Heo, 2016; Grable & Rabbani, 2017; Grable et al., 2004; Hatch et al., 2018; Hoffmann et al., 2013; Malmendier & Nagel, 2011; Pan & Statman, 2012; Schooley & Worden, 2016; Shin & Kim, 2018; Sokolowska & Makowiec, 2017; Yao & Curl, 2011; Yao et al., 2004). Grable et al. (2004), for example, found that stock market price changes helped to explain investor risk attitudes in the early 2000s. When market indexes went up or down, FRT the following week reflected the trend. Yao et al. (2004) found that FRT tends to increase when stock returns surge and decrease when stock returns decline. Chiang and Xiao (2017) found that households exhibited lower FRT from 2007 through 2009 (i.e., a period of financial crisis). During this period, households reported a lowered willingness to take financial risk and to hold fewer equity assets.

Since expectations of future outcomes are thought to be associated with current behavior (Ajzen, 1991), household financial decision makers who change their FRT to match market trends are apt to invest in risky investment products when prices are high and sell when prices are low. In this regard, Yao and Curl (2011) encouraged financial advisors to help their clients overcome the recency effect (i.e., when recent observations have a larger impact on an individual's memory and perceptions of events) by pointing out the negative effects associated with overweighting recent news of market performance.

Malmendier and Nagel (2011) reported evidence supporting the recency bias and found that individuals who experienced low stock market returns throughout their lives reported a lower willingness to take financial risk. The effect was most profound for younger investors. In the same study, those who experienced low bond market returns were less likely to own bonds. Conversely, individuals who experienced high stock market returns reported a higher tolerance for financial risk. Those with elevated levels of FRT were also more likely to participate in the stock market and allocate a higher proportion of household investment assets to stocks.

The global financial crisis that began in 2008 has become a focal point of research related to the recency bias. Hoffmann et al. (2013), for example, found that investor perceptions fluctuated significantly during the crisis. During the worst months of the crisis, investors' FRT decreased. Toward the end of the crisis, investors' FRT recovered to precrisis levels. Schooley and Worden (2016) also examined changes in perceived and actualized risk tolerance after the 2008 global financial crisis. They reported that households

that perceived more risk in the markets were more likely to have reduced their portfolio risk (PR).

Following this line of research, some researchers have attempted to determine the persistence of FRT across time. For example, Grable et al. (2016) conducted a test–retest reliability study of FRT. They reported that FRT tends to be relatively stable on average. In a report of mutual fund ownership patterns, the Investment Company Institute (2017) noted that fund shareholders' willingness to take investment risk has remained subdued since the 2007–2009 global financial crisis, reflecting the reduced risk tolerance of households owning mutual funds.

While some research does show the FRT varies across time and market environments, some researchers have argued that any such changes are small and temporary. This argument stems from the hypothesis that FRT is less of an attitudinal factor and more of a personality trait characteristic. As such, many researchers contend that FRT is fixed and unlikely to change in response to market conditions(Ehm et al., 2014; Gerrans et al., 2015; Guillemette & Finke, 2014; Nosić & Weber, 2010; Roszkowski & Davey, 2010; Van de Venter et al., 2012). For example, Roszkowski and Davey (2010) reported a decline in FRT between the period prior to and immediately after the global financial crisis; however, they noted that the change was relatively small and likely not meaningful in terms of portfolio allocation choices. This conclusion has found support in subsequent research (e.g., Guillemette & Finke, 2014; Rabbani et al., 2017). Those who believe FRT is a trait factor make the case that what appears to be a change in FRT is, in actuality, a change in the public's perception of the risk inherent in investing (Roszkowski & Davey, 2010; Van de Venter et al., 2012).

Summary

Several takeaways emerge from this review of the literature. First, it appears that an association between FRT and stock market events may be present, but the degree to which variation occurs may be modest. Second, some observed variability is likely attributable to a recency bias among household financial decision makers. Generally, the association is more pronounced when the anchor points surrounding the assessment of FRT are shorter. Conversely, the association appears to weaken when the anchor points are longer. Third, changes in FRT, while statistically significant, may not always represent meaningful deviations. The remainder of this article is structured as follows. The next section describes the methodology used to test for changes in FRT. This is followed by a presentation of results. The article concludes with a discussion of the findings.

Methods

Data

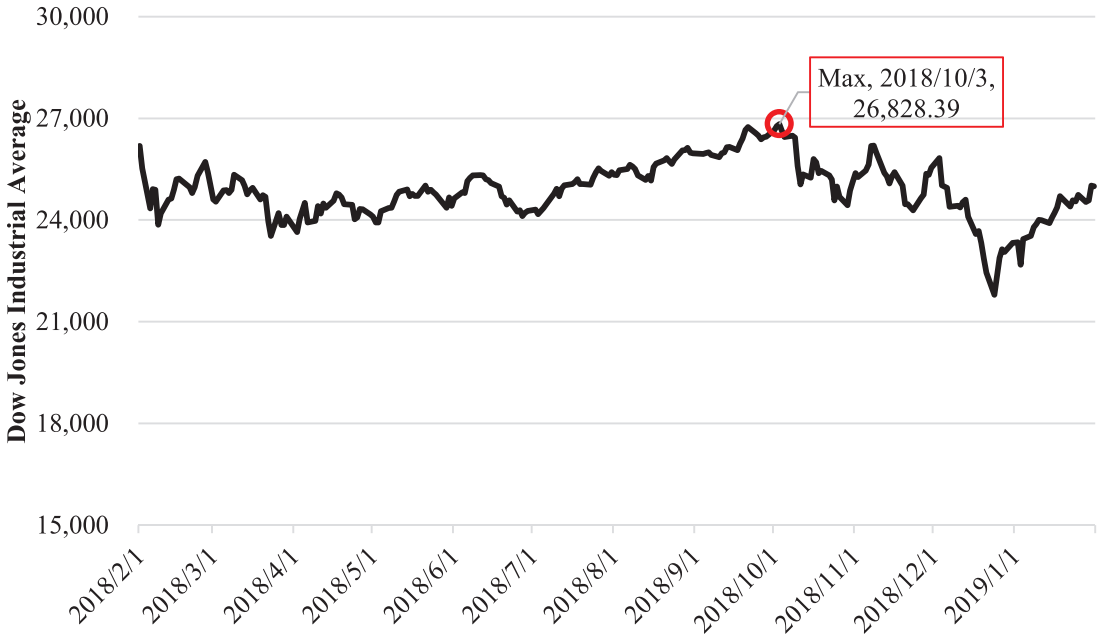
Data for this project were obtained from 37,953 individuals who completed an online survey from January 2018 through January 2019. Cross-sectional data were collected from those who responded to an online survey, which was part of a multiyear proprietary data collection project sponsored by the University of Missouri (see Rabbani et al., 2018). The survey was open to anyone with internet access (such as individual investors, students, consumers, educators, financial counseling and planning practitioners, researchers). The Internet site was publicized through Cooperative Extension Service publications, references in trade publications, textbooks, and through word-of-mouth. The survey was designed to assess responses to 13 FRT questions, which were summed into a scale called the Investment Risk Tolerance Assessment (IRTA) (see Grable & Lytton, 1999). Scale scores were indicative of a respondent's FRT. In this study, respondents with incomplete survey data were removed from the data analysis.

Measures

Anchor Points. The association between aggregate changes in FRT and a major stock market event was examined using different anchor points around October 3, 2018. Market data from the DJIA was used in this study to establish the anchor points. As shown in Figure 1, the DJIA reached its at-the-time historical high on October 3, 2018. Shortly after October 3rd, the U.S. stock markets experienced dramatic losses. Four anchor points were used in this study: 7-, 14-, 21-, and 28-day periods.

Financial Risk Tolerance. FRT was used as both an outcome variable and as an independent variable in this study. The IRTA was used as an indicator of FRT. Numerous studies have used the IRTA as both a descriptor of behavior and an outcome measure (e.g.,Grable & Rabbani, 2017; Grable et al., 2016; Rabbani et al., 2017). Overall, the statistical validity and reliability of the IRTA have been well documented (Grable & Lytton, 2001; Kuzniak et al., 2015).

Figure 1. Dow jones industrial average from February 1, 2018, to January 31, 2019.



FRT was calculated for each respondent by summing answers to the 13 items. Scores on the IRTA can range from 13 to 47. Higher scores are descriptive of increased FRT. Traditionally, scores have been interpreted as follows: scores from 13 to 18 indicate a low tolerance for risk; scores from 19 to 22 indicate a below-average tolerance for risk; scores from 23 to 28 indicate an average/moderate tolerance for risk; scores from 29 to 32 indicate an above-average tolerance for risk; and scores from 33 to 47 indicate a high tolerance for risk. The mean score in this study was 27.14 (*SD* = 5.48).

Portfolio Allocations. The survey also included the following question that asked each respondent to describe their current portfolio allocation: "Thinking about your current financial situation, approximately what percentage of your personal and retirement savings and investments are in the following categories?" Four categories were provided: (a) cash, such as savings accounts, CDs, or money market mutual funds; (b) fixed income investments, such as corporate bonds, government bonds, or bond mutual funds; (c) equities, such as stocks, stock mutual funds, direct business ownership, or investment real estate (not your personal residence); and (d) other, such as gold or collectibles. Table 1 shows descriptive data based on answers to the portfolio allocation question. Respondents indicated holding a large portion of investable assets in cash.

Investment Advice. The survey also asked about investment decision-making and the source of investment advice used by respondents. Respondents were asked to indicate if (a) they make their own investment decisions, (b) they rely on a professional when making investment decisions, or (c) they do not have assets. Each response category was separated into a variable and coded dichotomously. The modal response was "make their own investment decisions."

Other Independent Variables. The following demographic characteristics were used as control variables in this study: gender, age, household income, educational status, and marital status. Gender was coded 1 = female and 0 = male. Females comprised approximately 45% of the sample. Age was measured with the following seven age categories: (1) under age 25, (2) 25–34, (3) 35–44, (4) 45–54, (5) 55–64, (6) 65–74, and (7) 75 or older. The modal category was under age 25. Marital status was assessed using the

TABLE 1. Portfolio Allocation Descriptive Statistics

Variable	Number of Observation	Mean	Standard Deviation	Min	Max
a) Cash, such as savings accounts, CDs, or money market mutual funds	25,069	55.32%	36.08%	0	100
b) Fixed income investments, such as corporate bonds, government bonds, or bond mutual funds	24,977	13.40%	17.45%	0	100
c) Equities, such as stocks, stock mutual funds, direct business ownership, or investment real estate	25,028	24.08%	27.95%	0	100
d) Other, such as gold or collectibles	25,009	7.44%	13.93%	0	100

following six marital classifications: (a) never married, (b) living with significant other, (c) married, (d) separated/divorced, (e) widowed, and (f) shared living arrangement. In the analyses, each marital category was considered a unique variable and coded dichotomously. The modal category was never married. Attained educational level was measured using the following six categories: (a) some high school, (b) high school, (c) some college, (d) Associate's degree, (e) Bachelor's degree, and (f) graduate or professional degree. The modal category was some high school. Household income was evaluated using the following five income classifications: (a) less than $25,000, (b) $25,000 to $49,999, (c) $50,000 to $74,999, (d) $75,000 to $99,999, and (e) $100,000 or more. The modal category was less than $25,000, although household income was distributed broadly across categories.

Methods of Analysis

Student t tests. Student *t* tests were conducted in this study to compare FRT scores pre- and post-October 3, 2018 (i.e., the market high in 2018). Two-tailed *t* tests for the full sample were used to determine if FRT scores increased, fell, or remained the same, pre- and post-October 3rd, based on four anchor points: 7-, 14-, 21-, and 28-day periods. Tests were made, for example, comparing average FRT scores 7 days prior to October 3rd to average FRT scores 7 days after October 3rd. Similar tests were conducted using 14-, 21-, and 28-day comparisons. Results from these tests are shown in Table 2.

Regression Analyses. Portfolio allocation data were used to conduct a robustness check in this study. A normal probability plot showed that PR data exhibited a linear pattern. Skewness was 0.4997935, whereas Kurtosis was 2.144475. Specifically, portfolio allocation data were used as indicators of PR, which was then used to calibrate FRT scores to each respondent's risk-taking behavior. PR was estimated using a procedure proposed by Corter and Chen (2006). Their approach requires that the following riskiness weights be assigned to portfolio holdings: (a) cash = 0.00, (b) fixed income = 0.12, (c) equities = 0.20, and (d) other assets = 0.12. This method incorporates the varying level of riskiness associated with different asset classes when calculating an overall PR score. In this study, each category's risk weighting was multiplied by the percentage of each respondent's assets invested in a given category, as follows:

$$PR = \sum r_i p_i \ldots (1),$$

where PR is the overall PR score for a household financial decision maker, r_i is the risk weighting of the asset category, and p_i is the percentage of the household financial decision maker's assets invested in an asset category. A series of regression analyses were performed to assess the association between PR (outcome variable) and FRT using the pre- and post-October 3, 2018[d] data subsets for respondents with assets and without assets. Also, regressions that incorporated a pooled model technique were performed adding an indicator variable that took two values: 1 if a response was recorded after October 3, 2018 otherwise 0. This indicator variable was used to conduct Chow tests to determine whether the coefficients of FRT before and after October 3rd were statistically different. A Chow test is used to determine if the coefficients from two separate linear regression models are equal (Lee et al., 2017). The

test can be used to check whether data can be pooled. If the null hypothesis is rejected, the two groups are determined to have different slopes and intercepts, and as such, data cannot be pooled. It was hypothesized that the coefficients associated with FRT scores would not differ before or after October 3.

Results

Those in the sample were relatively young (approximately 72% were under 25 years of age) and never married (74%). The sample was comprised of more men (55%) than women (45%), with men exhibiting higher average FRT (28.16) than women (25.88). The average FRT score was the lowest among the youngest respondents (26.78) and those who reported being never married (26.90). The relationship between FRT and education and FRT and household income was positive, with those reporting the highest levels of educational attainment and household income also exhibiting the highest nominal FRT scores. Among the education level categories, respondents with a graduate or professional degree (11%) were observed to have the highest average FRT (28.58). Similarly, respondents earning $100,000 or more (24%) had the highest average FRT (28.18). Among those in the sample, only 12% relied on a financial professional when making an investment decision. These respondents, however, exhibited the highest FRT (28.35). Respondent without assets (42%) had the lowest FRT scores (16.35).

The univariate *t* tests for significant differences in FRT using anchor points at 7-, 14-, 21-, and 28-days are presented in Table 2. For the full sample, FRT was significantly lower after October 3rd across all anchor points. Differences across anchor points, based on respondents' demographic characteristics, were more nuanced. FRT scores for males were lower after October 3rd across all anchor points. Females exhibited a decrease in FRT at the 21-day and 28-day comparisons.

The youngest respondents exhibited the most significant decrease in FRT across the four anchor points. Those who were 25–34 years of age showed a decline in FRT at 14- and 28-days. Respondents between the age of 35 and 44 years exhibited a decline in FRT at the 28-day point. Those who were age 75 years or older reported an increase in FRT at the 21-day and 28-day comparison points.

Marital status was weakly associated with changes in FRT. Those who were living with a significant other exhibited a decrease in FRT at the 14-day comparison. FRT scores for widows was higher at the same point in time. Declines in FRT for those having some high school level of education or less or an Associate's degree were noted at the 21- and 28-day comparison points. Those holding a graduate or professional degree exhibited a decline in FRT at the 28-day comparison.

Changes in FRT were also found in relation to household income. Respondents with incomes between $25,000 and $49,999 exhibited lower FRT across all comparison points. Those with less than $25,000 in income and those with incomes between $75,000 and $99,999 exhibited decreased FRT at the 14-, 21-, and 28-day comparison points.

Finally, investment decision-making was related to changes in FRT. Respondents who reported that they relied on the advice of a professional when making financial and investment decisions exhibited no significant change in FRT at any period of comparison. On the other hand, those who made their own financial and investment decisions exhibited declines in FRT across all four comparison points. Respondents with no assets also exhibited declines in FRT across all comparison points.

Results shown in Table 2 indicate that FRT was consistently lower post-October 3rd across the 7-, 14-, 21-, and 28-day anchoring points. From a practicality point-of-view, these results are only relevant if FRT was found to be statistically associated with the level of risk taken by respondents when making investment allocation choices, and there was no structural change in the association before or after October 3rd. A robustness check was made to ensure that FRT was significantly associated with the portfolio holdings of respondents. The relationship between FRT and PR was tested using an OLS regression methodology (Tables 3 and 4), controlling for respondent demographic characteristics with investment assets and without investment assets.

Structural changes in the relationship between FRT and PR before and after October 3rd were tested using Chow tests for pooled models for respondents with or without assets. As shown in Tables 4 and 5, FRT for respondents with investment assets and without investment assets were positively associated with PR as epitomized by respondents' portfolios

TABLE 2. Pre-October 3rd and Post-October 3rd Comparisons of FRT at Different Anchor Points Using Independent Sample *t* Tests

Variable	7 Day			14 Day		
	Pre	Post	*p*-value	Pre	Post	*p*-value
Full sample	27.42	26.59	.0085***	27.34	26.77	.003***
Gender						
Male	28.67	27.48	.0024***	28.30	27.79	.03**
Female	25.91	25.94	.95	26.18	25.89	.28
Age						
Under 25	27.46	26.47	.0044***	27.36	26.72	.0017***
25–34	28.55	27.37	.12	28.17	27.17	.0562*
35–44	27.42	28.80	.29	27.88	27.82	.95
45–54	27.77	27.96	.88	28.25	28.98	.43
55–64	27.46	26.78	.63	27.13	27.28	.90
65–74	23.00	25.88		29.17	26.90	.51
75 or older	8.00	27.00	.16	14.00	26.33	.16
Marital status						
Never married	27.33	26.51	.0172**	27.31	26.74	.0045***
Living w/sig. other	27.97	27.27	.67	28.60	26.87	.0436**
Married	28.20	28.04	.81	28.01	28.10	.86
Separated/Divorced	28.79	26.67	.19	28.59	27.31	.32
Widowed	24.00	25.00		22.00	26.17	.0899*
Shared living arrangement	30.33	26.67	.60	27.60	26.58	.64
Education						
Some high school	26.93	26.07	.08	26.88	26.46	.25
High school	27.92	27.02	.24	27.18	26.71	.29
Some college	27.79	26.71	.16	27.19	26.89	.42
Associate's Degree	27.66	27.53	.90	28.14	26.88	.03
Bachelor's degree	27.66	27.00	.36	28.28	27.69	.20
Graduate/Professional	28.95	28.09	.36	28.68	28.26	.52
Income						
Less than $25,000	27.28	26.50	.15	27.42	26.47	.0053***
$25,000 to $49,999	28.04	26.49	.0209**	27.48	26.43	.0127**
$50,000 to $74,999	26.77	26.50	.70	26.80	26.66	.75
$75,000 to $99,999	27.45	26.14	.11	28.04	26.88	.0262**
$100,000 or more	28.41	27.78	.31	27.84	28.24	.26
Decision making						
Make own decisions	27.98	27.24	.0753*	27.98	27.43	.0363**
Rely on professional	28.53	27.83	.44	28.05	28.22	.74
Have no assets	26.95	25.97	.0295**	26.85	26.10	.0056***

(*Continued*)

TABLE 2. Pre-October 3rd and Post-October 3rd Comparisons of FRT at Different Anchor Points Using Independent Sample *t* Tests (*Continued*)

Variable	21 Day			28 Day		
	Pre	Post	*p*-value	Pre	Post	*p*-value
Full sample	26.91	26.52	.0053***	26.90	26.62	.0262**
Gender						
Male	28.21	27.76	.0076***	28.28	27.81	.002***
Female	26.12	25.62	.005***	26.19	25.77	.0093***
Age						
Under 25	27.12	26.44	0***	27.09	26.62	.0003***
25–34	28.13	27.66	.20	28.20	27.58	.0494**
35–44	28.36	27.51	.15	28.38	27.29	.0228**
45–54	27.81	28.46	.35	28.29	27.93	.55
55–64	27.27	28.05	.37	27.04	27.90	.24
65–74	30.75	27.58	.17	27.13	27.23	.96
75 or older	21.00	31.70	.0464**	22.18	31.33	.0394**
Marital status						
Never married	27.20	26.50	.00***	27.23	26.64	.00***
Living w/sig. other	27.89	27.13	.22	27.82	27.21	.22
Married	27.94	28.04	.76	28.00	27.67	.27
Separated/Divorced	27.93	27.35	.56	27.84	27.68	.85
Widowed	25.36	27.25	.33	25.94	27.42	.37
Shared living arrangement	27.78	28.59	.60	27.09	29.28	.13
Education						
Some high school	27.16	26.25	.0004***	27.17	26.42	.0023**
High school	26.88	26.65	.39	26.83	26.96	.60
Some college	27.00	26.71	.31	27.03	26.71	.21
Associate's degree	27.76	26.41	.0026***	27.39	26.26	.0081***
Bachelor's degree	27.89	27.79	.77	28.04	27.67	.21
Graduate/Professional	28.77	28.22	.21	28.75	28.11	.0725**
Income						
Less than $25,000	27.07	26.41	.0042***	27.08	26.57	.0195**
$25,000 to $49,999	27.15	26.30	.003***	27.23	26.36	.0008***
$50,000 to $74,999	26.93	26.48	.16	26.88	26.65	.43
$75,000 to $99,999	27.65	26.67	.0071***	27.87	26.63	.0002***
$100,000 or more	27.81	27.99	.49	27.81	28.06	.26
Decision-making						
Make own decisions	27.99	27.20	.000***	28.01	27.29	.000***
Rely on professional	27.84	28.00	.66	27.93	28.23	.36
Have no assets	26.51	26.00	.0055***	26.52	26.05	.0055***

*$p < 10\%$. ** $p < 5\%$. *** $p < 1\%$.

TABLE 3. Ordinary Least Square Regression Analysis of Portfolio Risk for Respondents With Investment Asset

	Model 1 Pre-October 3		Model 2 Post-October 3		Model 3 Pooled	
Portfolio Risk	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
October 3rd (pre = 0; post = 1					0.005#	.323
FRT	0.003	.000***	0.003	.000***	0.0029	.000***
FRT X October 3rd					−0.0002	.199
Gender (Ref. Male)						
Female	−0.014	.000***	−0.012	.000***	−0.13	.000***
Age (Ref. Under 25)						
25–34	0.011	.000***	0.009	.000***	0.010	.000***
3544	0.026	.000***	0.023	.000***	0.025	.000***
45–54	0.033	.000***	0.035	.000***	0.034	.000***
55–64	0.042	.000***	0.038	.000***	0.040	.000***
65–74	0.037	.000***	0.042	.000***	0.038	.000***
75 or older	0.037	.000***	0.015	.158	0.030	.000***
Marital Status (Ref. Never Married)						
Living w/sig. other	0.005	.026**	−0.00008	.979	0.003	.062*
Married	0.004	.022**	0.005	.067*	0.004	.003***
	0.007	.018**	−0.007	.119	0.003	.215
Separated/Divorced						
Widowed	−0.002	.807	−0.012	.169	−0.005	.323
Shared living arrangement	−0.006	.267	0.010	.220	−0.001	.862
Education (Ref. Some High School)						
High school	0.002	.354	0.006	.018**	0.003	.035**
Some college	−0.0004	.829	0.004	.080*	0.001	.390
Associate's degree	−0.0003	.905	0.010	.006***	0.003	.134
Bachelor's degree	0.016	.000***	0.018	.000***	0.016	.000
Graduate/ Professional	0.015	.000***	0.017	.000***	0.016	.000
Income (Ref. Less than $25,000)						
$25,000 to $49,999	0.0007	.660	−0.0001	.955	0.0003	.779

(*Continued*)

TABLE 3. Ordinary Least Square Regression Analysis of Portfolio Risk for Respondents With Investment Asset (*Continued*)

	Model 1 Pre-October 3		Model 2 Post-October 3		Model 3 Pooled	
$50,000 to $74,999	0.0002	.916	0.0041	.083*	0.001	.296
$75,000 to $99,999	0.006	.001***	0.003	.275	0.005	.001***
$100,000 or more	0.012	.000***	0.011	.000***	0.012	.000***
Decision-Making (Ref. Make Own Decisions)						
Rely on professional	0.009	.000***	0.001	.453	0.006	.000***
Constant	−0.019	.000***	−0.018	.000***	−0.021	.000***
Observation	10,686		5,263		15,949	
Pseudo R^2	0.2627		0.2343		0.2531	

*p < 10%%. ** p < 5%. *** p < 1%.
Chow test: F(2, 15923) = 1.95, p-value = .1424

pre- and post-October 3rd, 2018. Additionally, the association between FRT and PR showed no structural changes in the pre- and post-October 3rd samples; thus, the null hypothesis that the coefficients before and after October 3rd were not significantly different was accepted.

However, variability was better explained for respondents with assets (Pseudo R^2 = 0.2531) than without assets (Pseudo R^2 = 0.097). These results suggest that the FRT of respondents with assets shifted, which was likely attributable to these respondents paying more attention to stock market events.

Some of the relationships between respondent demographic characteristics and PR were also noteworthy. As shown in Tables 4 and 5, females with and without investment assets took less PR than males over the two periods. The age of a respondent was also significantly associated with asset ownership. Prior to October 3, 2018, older respondents with assets took more PR compared to those under age 25 (Model 1). After October 3rd, no difference in PR was noted between those age 75 or older and those under age 25 (Model 2). Marital status was not a significant variable in Models 4, 5, and 6 for respondents without investment assets (Table 4).

The relationship between educational status and PR for respondents with assets across the two periods was mixed. As shown in Table 3, prior to October 3rd, those holding a Bachelor's degree or above level of education took more PR than those with a some high school level of education (Model 1). After October 3rd, those who were high school graduates or above took more PR than those with only some high school education (Model 2). Respondents without assets who had completed high school held assets with significantly lower PR prior to October 3rd (Model 4, Table 4).

Household income, in general, was not associated with PR across the two periods for respondents without investable assets (Table 4). However, as shown in Table 3, findings for respondents with investable assets, prior to October 3rd, showed that the PR of those with incomes greater than $75,000 was higher than the PR for those with income less than $25,000 (Model 1). After October 3rd, this relationship shifted so that only the PR of those with incomes greater than $100,000 was more than those with income less than $25,000 (Model 2).

As noted in Table 3, prior to October 3rd, respondents with assets who relied on a professional when making financial and investment decisions took more PR than those who made their own decisions (Model 1) (the "have no assets" variable was omitted from the analysis). After October 3rd, however, PR differences between those who relied on a

TABLE 4. Ordinary Least Square Regression Analysis of Portfolio Risk for Respondents Without Investment Asset

	Model 4 Pre Oct. 3		Model 5 Post Oct. 3		Model 6 Pooled	
Portfolio Risk	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
October 3rd (pre = 0; post = 1					−0.0005[a]	.930
FRT	0.002	.000***	0.002	.000***	0.002	.000***
FRT X October 3rd					0.00008	.668
Gender (Ref. Male)						
Female	−0.007	.000***	−0.004	.008***	−0.006	.000***
Age (Ref. Under 25)						
25–34	−0.007	.003	−0.010	.003***	−0.008	.000***
35–44	−0.003	.453	−0.001	.813	−0.002	.594
45–54	−0.005	.366	−0.015	.076*	−0.008	.100
55–64	0.014	.109	−0.0008	.946	0.009	.160
65–74	−0.005	.761	0.028	.097	0.012	.296
75 or older	0.044	.013	0.0.51	.017	0.049	.000
Marital status (Ref. never married)						
Living w/Sig. Other	0.000	.976	0.006	.080	0.002	.360
Married	0.000	.988	0.006	.160	0.002	.490
	−0.001	.861	−0.001	.894	−0.001	.870
Separated/Divorced						
Widowed	0.000	.947	0.017	.279	0.006	.538
Shared living arrangement	−0.004	.510	0.012	.330	−0.001	.885
Education (Ref. Some High School)						
High school	−0.010	.000***	−0.0006	.774	−0.007	.000***
Some college	−0.027	.000***	−0.019	.000***	−0.024	.000***
Associate's degree	−0.027	.000***	−0.021	.000***	−0.025	.000***
Bachelor's degree	−0.025	.000***	−0.010	.001	−0.020	.000***
Graduate/ Professional	−0.013	.000***	−0.006	.142	−0.011	.000***
Income (Ref. Less than $25,000)						
$25,000 to $49,999	−0.0002	.879	0.002	.412	0.0004	.764
$50,000 to $74,999	0.0006	.724	0.001	.652	0.001	.666

(*Continued*)

TABLE 4. Ordinary Least Square Regression Analysis of Portfolio Risk for Respondents Without Investment Asset (*Continued*)

	Model 4 Pre Oct. 3		Model 5 Post Oct. 3		Model 6 Pooled	
$75,000 to $99,999	−0.003	.121	0.0006	.826	−0.002	.229
$100,000 or more	0.001	.578	0.003	.302	0.002	.275
Constant	0.012	.001***	0.002	.712	0.009	.010**
Observation	5,830		3,011		8,841	
Pseudo R^2	0.1098		0.0762		0.0970	

*$p < 10\%$. ** $p < 5\%$. *** $p < 1\%$.
[a] Chow test: $F(2, 8816) = 1.70$, p-value = .1829

professional for help and those who made their own decisions disappeared (Model 2).

DISCUSSIONS, IMPLICATIONS, AND LIMITATIONS

This study was designed to assess the FRT of a large sample of individuals living in the United States during a very volatile multimonth period in the U.S. stock markets. The results from this study provide support for the hypothesis that the relationship between stock market variability and the FRT of household financial decision makers does appear to vary by the length of the anchor point, but also that the relationship may not be as meaningful as is sometimes thought. October 3, 2018 marked a milestone in the history of U.S. stock prices. It was on this day that the DJIA market index reached an at-the-time record high. Shortly after October 3rd, the U.S. stock markets experienced dramatic reversals. The FRT of respondents tracked very closely to the shift from a bull market environment to a bear market scenario. Among the four anchor points, the peak stock market valuation was most closely represented by the 7-day anchor point before October 3, 2018 when the average FRT was the highest among the four anchor points tested.

A decrease in aggregate FRT from the market high of October 3rd was noted across the sample; however, this phenomenon was exhibited most acutely by younger, nonmarried respondents with little in terms of investable assets. This insight provides some evidence that among certain groups of people, FRT can be significantly impacted by stock market performance, particularly when an extended period of negative stock market performance (and news) becomes apparent to household financial decision makers (i.e., decreasing stock values after 28 days of market volatility versus only 7 days). This study adds confirmatory insight into the findings reported in previous studies (e.g., Guillemette & Finke, 2014; Roszkowski & Davey, 2010) that showed financial decision makers assess their personal FRT in light of current market conditions and expectations for future returns (Huang et al., 2016).

Changes in FRT became more pronounced as evidence of negative stock market returns accumulated (i.e., 16 significantly different comparisons after 28 days versus seven comparisons after 7 days). It appears that household financial decision makers may need time to "absorb" a continuing stream of negative news about stock market performance before the news affects their degree of FRT. Thus, financial counselors and financial planners may hear more from clients a month after a downturn begins rather than at the beginning of an extended market downturn.

Gender differences showed an interesting pattern of FRT adjustment. Women appeared to take longer to "process" negative market performance data before the event resulted in a meaningful change in aggregate FRT, whereas men showed declines in all four time periods. These results support findings from prior studies showing that women tend to be more patient investors. This patience often leads to earning higher returns compared to men because women engage in less trading (Low, 2018). A clear implication for financial counselors and financial planners is to pay close attention to the FRT of male clients and proactively reach out to male clients during market declines to mitigate panic selling.

Age, income, and marital status differences in FRT between the two time periods were also apparent. FRT differences

were significant in all four time periods for respondents under 25 years of age, but score differences were generally not significant for older respondents. This could reflect the fact that the youngest respondents in this study were very young during the global financial crisis and lacked, at that time of the study, experience with stock market cycles. Respondents with incomes below $50,000 and those who were never married also exhibited significant decreases in FRT after October 3rd. This provides insight into a financial counseling and planning best practice: when a household financial decision maker has limited capital to invest, special attention must be paid to explaining and managing market risk and preserving capital.

As noted above, those respondents who reported working with a financial advisor exhibited no significant difference in FRT before and after October 3rd. This finding shows an added benefit associated with working with a financial counselor or financial planner. Not only do financial counselors and financial planners manage investments and develop plans to help clients achieve financial goals, but these professionals also help educate their clients about investment risks and serve as a sounding board during times of market turmoil. Stated another way, findings from this study indicate that financial counselors and financial planners—as well as other financial advisors—likely play a key "buffering" role in managing recency bias by educating clients about investment characteristics and market performance history and calming clients during periods of extreme market volatility. As noted by Tumataroa and O'Hare (2019), financial counseling interventions may lead to broader cognitive benefits that help people escape further financial hardship. This finding provides support to a claim made by Lei and Yao (2016) that consumers who use financial planners demonstrate better portfolio performance. This also hints at the following insight: perhaps there is no better time to get a "true" reading about a household financial decision maker's FRT than to administer a risk-assessment test during a market downturn. How someone feels about investment risk when stock values are declining can provide valuable insights into the person's ability to keep calm and ride out inevitable market downturns. The ability to recognize unique characteristics and background factors of financial decision makers that can be used to anticipate financial preferences is a skill all financial professionals should possess (Moreland, 2018).

While the findings from this study are noteworthy, several limitations should be considered when evaluating the results. Most notably, the number of demographic control variables used in the models was limited to those available in the dataset. It is possible that omitted variables may have had an effect on results. Second, data were obtained from an open-access Internet survey. It is possible that response bias was present in the data and that respondents did not represent the typical household financial decision maker or general consumer of financial and investment products. This is particularly true in relation to the large number of young single respondents in the sample. Future studies should consider omitting those under the age of 25 as a way to gain a clearer picture of those most likely to make investments, although doing so may mask insights that can be used to help young people navigate volatile markets. It is also possible that a self-selection bias existed in relation to those who completed the survey. It is worth remembering that the sample, although large and diverse, was not representative of the United States as a whole. A nationally representative replication of this study would be quite valuable in adding to the existing literature. Finally, it is possible that the change in FRT exhibited by those in the sample actually reflects a change in perceptions of risk. This implies that what is being observed in this and previous studies may be measurement error; future research should assess this possibility. One outcome associated with the present study is to add more current evidence on this topic.

REFERENCES

Ajzen, I. (1991). The theory of planner behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211.

Amadeo, K. (2019). *Dow highest closing records: Its top highs and lows since 1929*. The Balance. https://www.thebalance.com/dow-jones-closing-history-top-highs-and-lows-since-1929-3306174

Bailey, J. J., & Kinerson, C. (2005). Regret avoidance and risk tolerance. *Journal of Financial Counseling & Planning*, *16*(1), 23–28.

Baker, H. K., & Puttonen, V. (2017). *Investment traps exposed: Navigating investor mistakes and behavioral biases*. Emerald Publishing Limited.

Barsky, R. B., Juster, F. T., Kimball, M. S., & Shapiro, M. D. (1997). Preference parameters and behavioral heterogeneity: An experimental approach in the health and

retirement study. *The Quarterly Journal of Economics*, *112*(2), 537–579.

Chang, S., & Watts, W. (2018, December). *U.S. stocks log worst year since 2008*. MarketWatch . https://www.marketwatch.com/story/us-stock-futures-climb-over-trade-deal-hopes-in-last-session-of-2018-2018-12-31

Chiang, T. F., & Xiao, J. J. (2017). Household characteristics and the change of financial risk tolerance during the financial crisis in the United States. *International Journal of Consumer Studies*, *41*(5), 484–493.

Corter, J. E., & Chen, Y. J. (2006). Do investment risk tolerance attitudes predict portfolio risk? *Journal of Business & Psychology*, *20*(3), 369.

Ehm, C., Kaufmann, C., & Weber, M. (2014). Volatility inadaptability: Investors care about risk, but cannot cope with volatility. *Review of Finance*, *18*(4), 1387–1423.

Gerrans, P., Faff, R., & Hartnett, N. (2015). Individual financial risk tolerance and the global financial crisis. *Accounting & Finance*, *55*(1), 165–185.

Grable, J. E., & Heo, W. (2016). Risk tolerance and changes in equity ownership. *Journal of Financial Service Professionals*, *70*(3), 20–22.

Grable, J. E., & Joo, S. H. (2004). Environmental and biophysical factors associated with financial risk tolerance. *Journal of Financial Counseling & Planning*, *15*(1), 73–82.

Grable, J. E., & Lytton, R. H. (1999). Financial risk tolerance revisited: The development of a risk assessment instrument. *Financial Services Review*, *8*(3), 163–181.

Grable, J. E., & Lytton, R. H. (2001). Assessing the concurrent validity of the SCF risk tolerance question. *Journal of Financial Counseling & Planning*, *12*(2), 43–53.

Grable, J. E., & Rabbani, A. (2017). Does engagement in the stock market shape willingness to take financial risk? *Journal of Financial Service Professionals*, *71*(5), 17–20.

Grable, J. E., Heo, W., & Kruger, M. (2016). The intertemporal persistence of risk tolerance scores. *Journal of Financial Planning*, *29*(8), 42–51.

Grable, J., Lytton, R., & O'Neill, B. (2004). Projection bias and financial risk tolerance. *The Journal of Behavioral Finance*, *5*(3), 142–147.

Guillemette, M., & Finke, M. (2014). Do large swings in equity values change risk tolerance? *Journal of Financial Planning*, *27*(6), 44–50.

Guillemette, M. A., Yao, R., James, R. N., & III. (2015). An analysis of risk assessment questions based on loss-averse preferences. *Journal of Financial Counseling & Planning*, *26*(1), 17–29.

Hatch, C. D., Carlson, K., & Droms, W. G. (2018). Effects of market returns and market volatility on investor risk tolerance. *Journal of Financial Services Marketing*, *23*(2), 77–90.

Hoffmann, A., Post, T., & Pennings, J. (2013). Individual investor perceptions and behavior during the financial crisis. *Journal of Banking & Finance*, *37*(1), 60–74.

Huang, J., Xu, X., & Chiang, T. (2016). Household expectations for future economy and risk-taking attitudes. *Journal of Financial Counseling & Planning*, *27*(1), 109–121.

Imbert, F. (2019a, January). *U.S. stocks post worst year in a decade as the S&P 500 falls more than 6% in 2018*. CNBC. https://www.cnbc.com/2018/12/31/stock-market-wall-street-stocks-eye-us-china-trade-talks.html.

Imbert, F. (2019b, January). *S&P 500 rises on strong earnings, closing out the best January since 1987*. CNBC. https://www.cnbc.com/2019/01/31/stock-market-investors-focus-on-fed-rate-decision.html.

Imbert, F., & Gibbs, A. (2018). January 2). *S&P 500 and NASDAQ rise to records on first trading day of 2018*. CNBC. https://www.cnbc.com/2018/01/02/us-stock-futures-data-dow-tax-politics-on-the-agenda.html

Investment Company Institute. (2017). *Ownership of mutual funds, shareholder sentiment, and use of the internet, 2017*. ICI Research Perspective. https://www.ici.org/pdf/per23-07.pdf

Irandoust, M. (2017). Factors associated with financial risk tolerance based on proportional odds model: Evidence from Sweden. *Journal of Financial Counseling & Planning*, *28*(1), 155–164.

Jay, M. (2018). *Worst December on Wall Street since the great depression* . Associated Press. https://www.heraldnet.com/business/worst-december-on-wall-street-since-the-great-depression/

Jones, T. L., Fraser, S. P., & Finch, J. H. (2016). Volatility and targeted portfolio returns. *Journal of Financial Counseling & Planning*, *27*(1), 122–129.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–291.

Kuzniak, S., Rabbani, A., Heo, W., Ruiz-Menjivar, J., & Grable, J. E. (2015). The Grable and Lytton risk-tolerance scale: A 15-year retrospective. *Financial Services Review*, *24*(2), 177–192.

Lacuri, G. (2018, August). Fidelity breaks through $2 trillion in retirement assets. *Investment News*. https://www.investmentnews.com/article/20180828/FREE/180829922/fidelity-breaks-through-2-trillion-in-retirement-assets

Lee, K. Y., Lee, S. M., Jeong, S. Y., & Heo, T. Y. (2017). A stability test of the regression coefficients for the linear models using chow test. *The Journal of the Korea Institute of Intelligent Transport Systems*, *16*(2), 73–82.

Lei, S., & Yao, R. (2016). Use of financial planners and portfolio performance. *Journal of Financial Counseling & Planning*, *27*(1), 92–108.

Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Projection bias in predicting future utility. *The Quarterly Journal of Economics*, *118*(4), 1209–1248.

Low, E. (2018, July). *Are women better investors than men? Here's what the studies say*. Investor's Business Daily. https://www.investors.com/news/women-investing-stocks-outperform-men-studies/

Malmendier, U., & Nagel, S. (2011). Depression babies: Do macroeconomic experiences affect risk taking? *The Quarterly Journal of Economics*, *126*(1), 373–416.

Moreland, K. A. (2018). Seeking financial advice and other desirable financial behaviors. *Journal of Financial Counseling & Planning*, *29*(2), 198–207.

Nosić, A., & Weber, M. (2010). How riskily do I invest? The role of risk attitudes, risk perceptions, and overconfidence. *Decision Analysis*, *7*(3), 282–301.

Owusu, T. (2018, December). *Dow gains on last day of worst December since the Depression*. TheStreet . https://www.thestreet.com/markets/stocks-rise-monday-on-hopes-for-united-states-and-china-trade-talks-14821901.

Pan, C. H., & Statman, M. (2012). Questionnaires of risk tolerance, regret, overconfidence, and other investor propensities. *Journal of Investment Consulting*, *13*(1), 54–63.

Picerno, J. (2019, January). Major asset classes December 2018 performance review . Seeking Alpha. https://seekingalpha.com/article/4231057-major-asset-classes-december-2018-performance-review

Rabbani, A. G., Grable, J. E., Heo, W., Nobre, L., & Kuzniak, S. (2017). Stock market volatility and changes in financial risk tolerance during the Great Recession. *Journal of Financial Counseling & Planning*, *28*(1), 140–154.

Rabbani, A., O'Neill, B., Lawrence, F., & Grable, J. (2018). The investment risk tolerance assessment: A resource for extension educators. *Journal of Extension*, *56*,(7), 7–74.

Rooney, K. (2018, December). *We are now in a bear market-here's what that means*. CNBC. https://www.cnbc.com/2018/12/24/whats-a-bear-market-and-how-long-do-they-usually-last-.html

Roszkowski, M. J., & Davey, G. (2010). Risk perception and risk tolerance changes attributable to the 2008 economic crisis: A subtle but critical difference. *Journal of Financial Service Professionals*, *64*(4), 42–53.

Schooley, D. K., & Worden, D. D. (2016). Perceived and realized risk tolerance: Changes during the 2008 financial crisis. *Journal of Financial Counseling & Planning*, *27*(2), 265–276.

Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. *The Journal of Finance*, *40*(3), 777–790.

Shin, S. H., & Hanna, S. D. (2015). Decomposition analyses of Racial/Ethnic differences in high return investment ownership after the great recession. *Journal of Financial Counseling & Planning*, *26*(1), 43–62.

Shin, S. H., & Kim, K. T. (2018). Income uncertainty and household stock ownership during the great recession. *Journal of Financial Counseling & Planning*, *29*(2), 383–395.

Sokolowska, J., & Makowiec, P. (2017). Risk preferences of individual investors: The role of dispositional tendencies and market trends. *Journal of Behavioral & Experimental Economics*, *71*, 67–78.

Streitfeld, D. (2018). Amazon hits $1,000,000,000,000 in value, following Apple. *The New York Times*. https://www.nytimes.com/2018/09/04/technology/amazon-stock-price-1-trillion-value.html

Tarashev, N., Tsatsaronis, K., & Karampatos, D. (2003, June). Investors' attitude towards risk: What can we learn from options? *BIS Quarterly Review*, 6 57–65.

Tumataroa, S., & O'Hare, D. (2019). Improving self-control through financial counseling: A randomized controlled trial. *Journal of Financial Counseling & Planning*, *30*(2), 304–312.

Twin, A. (2020, May). *Portfolio construction: Risk tolerance definition*. Investopedia .

https://www.investopedia.com/terms/r/risktolerance.asp

Van de, Venter., G, Michayluk., D, & Davey, G. (2012). A longitudinal study of financial risk tolerance. *Journal of Economic Psychology*, *33*(4), 794–800.

Yao, R., & Curl, A. L. (2011). Do market returns influence risk tolerance? Evidence from panel data. *Journal of Family & Economic Issues*, *32*(3), 532–544.

Yao, R., Hanna, S., & Lindamood, S. (2004). Changes in financial risk tolerance, 1983-2001. *Financial Services Review*, *13*(4), 249–266.

Zacks Equity Research. (2019, January). *Stock Market News for Jan 31, 2019*. Zacks. https://www.zacks.com/stock/news/351118/stock-market-news-for-jan-31-2019

Disclosure. The authors have no relevant financial interest or affiliations with any commercial interests related to the subjects discussed within this article.

Funding. The author(s) received no specific grant or financial support for the research, authorship, and/or publication of this article.