OPEN ACCESS Asian Journal of Scientific Research

ISSN 1992-1454
DOI: 10.3923/ajsr.2018.522.531

Research Article
Avoidance of Risk, Ambiguity and Uncertainty in Investment Choices

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Abstract

Background and Objectives: Risk avoidance (RA), Ambiguity avoidance (AA) and uncertainty avoidance (UA) lie at the heart of finance theory and are among the key elements involving handling risk, ambiguity and uncertainty. However, there are no studies on the scales that elucidate the distinction between RA, AA and UA. Also, few studies relate to these aspects in the emerging stock market, Vietnam. The objectives of this study, therefore, develop the scales of risk avoidance, ambiguity avoidance and uncertainty avoidance and investigate the relationships between RA, AA, UA and demographics and investment choices. **Materials and Methods:** The mix method (qualitative and quantitative) included four phases as follows: In-depth interviews (10 investors), development of the scales of RA, AA and UA, a pilot test (50 investors) and web-based and paper-based surveys (400 investors). **Results:** (1) High avoidance of, ranked in descending order, was as follows: uncertainty (68% of total investors), ambiguity (42%) and risk (36%). (2) Female investors were more likely to avoid risk, ambiguity and uncertainty than male investors. (3) The more participation in investment courses, the higher avoidance of risk, ambiguity and uncertainty and the more the safer investments were chosen. (4) Investors who were prone to risk, ambiguity, uncertainty-avoiding were more likely to choose safe investments. **Conclusion:** The distinctive scales between RA, AA and UA have been explored. In addition, there were strong effects of RA, AA and UA on investment choices of individual investors in the emerging stock market, Vietnam.

Key words: Ambiguity avoidance, investment choices, risk avoidance, uncertainty avoidance

Received: February 25, 2018 Accepted: July 20, 2018 Published: September 15, 2018

Citation: Nguyen HuuTho, Phung Thai Minh Trang and Nguyen Van Hoa, 2018. Avoidance of risk, ambiguity and uncertainty in investment choices. Asian J. Sci. Res., 11: 522-531.

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

The traditional finance literature assumes that stocks always trade at their fair value with available information and decision makers always behave rationally[1]. In contrast, behavioral researchers argue that people are not always rational in the approach to their decisions[2]. In particular, decision makers often face risk, uncertainty or ambiguity in the decision-making process that may lead them to cognitive illusions[3] or systematic errors[4]. Risk, uncertainty and ambiguity are different. Risk relates to unknown outcomes and known probability distributions, whereas, uncertainty is involved in unknown outcomes and probability distributions[5]. Ambiguity is the term applied to perceived insufficiency of information regarding a uncertain context[5,6]. In other words, risk relates to measurable uncertainty, uncertainty adhere to unmeasurable ones[5] and ambiguity only appears when there is a lack of information.

Risk avoidance (RA), ambiguity avoidance (AA) and uncertainty avoidance (UA) are among the key factors relating to handling risk, ambiguity and uncertainty[7,8]. The levels of responses to risk, uncertainty and ambiguity also vary from individual to individual. Investors, in general, respond to uncertain situations rather than simply ignore them[9].

Risk avoidance is not similar to risk aversion. Risk avoidance underlines a decision on engaging in or avoiding an uncertain circumstance[10], whereas, risk aversion is described as a decreasing preference for an increasing risk[11,12]. Low risk avoidance relates to risk taking and high risk avoidance is relative to risk aversion. For example, when making decisions on a choice between the sure thing and uncertain situations with high probability to gain, risk-averse or high risk-avoiding investors prefer the former to the later even when expected value of the later is greater than the former[13]. When faced with a single uncertain situation, low risk-avoiding (or risk-taking) people are likely to involve, whereas, high risk-avoiding (or risk-averse) people are not[13].

Views of concepts between ambiguity avoidance and uncertainty avoidance are various. Some scholars view that the concepts of AA and UA are similar[6,14]. The AA is "a consequence of a more general attitude of uncertainty avoidance"[9] and defined as "the extent to which people feel threatened by ambiguous situations and have created beliefs and institutions that try to avoid these"[15]. In contrast, other researchers[14,16] argue that the AA differs from the UA. The AA is depicted as a person's reaction to a present ambiguous situation, whereas the UA as one's reaction to the uncertainty of the future[14]. Simply, the AA connects with people's responses to current ambiguity, while the UA is involved in their responses to future uncertainty. This distinction between AA and UA seems unclear because it is difficult to define what uncertainty will be occurring.

Prior scholars[6,3,17-20] explore the relationships between RA, AA and UA and decision making. However, the extant scales of AA and UA[8,21] seem inappropriate to the financial field because they emphasize only how to solve the problems (e.g., when facing an uncertain situation, I tend to prepare as much as possible and then hope for the best). There are no studies on the scales that elucidate the distinction between RA, AA and UA. Also, several studies relate to investors' risk judgment in Vietnam[19,20]. The objectives of this study, therefore, develop the scales of risk avoidance, uncertainty avoidance and ambiguity avoidance (Appendix A) and then investigate the relationship between RA, AA, UA and investment choices.

There are a large number of studies on personal characteristics such as gender, age, marital status, educational levels and financial knowledge affecting decision making. (1) Gender: A number of scholars argue that males take more risk than females[22-24], but some researchers[25,26] debate that there is no evidence supporting the impact of gender on risk-taking behavior. (2) Marital status: Single people take more risk than married ones[27-29] while others contend that married individuals take more risk than single ones[30-32]. There is, on the other hand, no relationship between marital status and risk taking[24,33,34]. (3) Age: Older people take less risk[27,34]. Other researchers[30,35] discover that older people take more risks, but some scholars[24,26,33] argue that there is no association between age and risk-taking behavior. (4) Education and investment courses: People with higher education, financial knowledge or higher income also take more risks[27,30,36-38]. In contrast, other scholars[39-42] contend that participation in a financial education increases contributions to saving plans (pension plans, or retirement planning behaviors). Another scholar[34] does not find any effects of education levels on risk taking.

Appendix A: Please rate the levels of your agreement about the following situations

1: I would avoid investing in a stock if I had only 50% (or below 50%) of probability to make a profit from this stock				
Strongly agree	Agree	Moderate	Disagree	Strongly disagree
2: I would avoid investing in a stock if I felt ambiguous about its information				
Strongly agree	Agree	Moderate	Disagree	Strongly disagree
3: I would avoid investing in a stock if I was entirely uncertain about making a profit from this stock				
Strongly agree	Agree	Moderate	Disagree	Strongly disagree

Currently, there are few studies on AA, UA[6,21,43,44] and the relationships between RA, AA, UA and demographics of individual investors. The limited literature motivates the following hypotheses:

- **H1 (H1.1-H1.3):** Females are more likely to avoid risk, uncertainty and ambiguity than males
- **H2 (H2.1-H2.3):** Single investors are more likely to avoid risk, uncertainty and ambiguity than married investors, respectively
- **H3 (H3.1-H3.3):** Avoidance of risk increases when age, education, participation in investment courses increases, respectively
- **H4 (H4.1-H4.3):** Avoidance of uncertainty increases when age, education, participation in investment courses increases, respectively
- **H5 (H5.1-H5.3):** Avoidance of ambiguity increases when age, education, participation in investment courses increases, respectively

Investors avoid risk in the high probability of gain and hope to avoid risk in the high probability of loss[13]. They avoid risk because they prefer certain gains to the high probability of gains. For example, between two choices: Being sure to get $9,450 versus 95% chance to get $10,000, people tend to choose certain gains (e.g., $9,450) because of fear of disappointment. In contrast, they take risk hoping to avoid loss. For instance, between two options: Being sure to lose $9,450 versus 95% chance to lose $10,000, people tend to choose the high probability of loss (95% chance to lose $10,000) because they do not accept the actual loss[13].

In addition, investors tend to avoid risk by holding investments in a loss position longer and sell investments in a gain position quickly[13,45]. This is because they hope their return will rebound to breakeven (when facing a loss position) and they are worried that their profit will erode (when having a gain position). Investors who lost money early also tend to avoid risk because they do not want to experience failure again; this action is similar to situations where losers are affected by risk aversion or snakebite[46]. The snakebite effect describes people become more cautious when a snake appears although snakes, in general, do not often bite people. Investors prefer choosing safe stocks (e.g., blue chip, VN30 indexed) to choosing risky stocks (e.g., warned, controlled or suspended trading) because they perceive high risk of investing in these risky stocks[20]. This also explains that investors who are prone to risk-avoiding tend to invest in safe investments. Thus, the following hypothesis is:

- **H6:** Choices of safe investments increase when risk avoidance increases

Investors prefer situations that contain substantial important relevant information to situations having little important relevant information. This means investors tend to avoid ambiguity. For example, entertain two options: An investment A with important information that indicates its success rate to be 50% and an investment B with little information underlying the investors' best guess that its chance of success is 50%. Most investors prefer A to B, exhibiting ambiguity avoidance[9].

Ambiguity avoiding correlates with risk-averse while ambiguity seeking associates with risk-taking[9]. The results are consistent with that of McLain[6] where people with high tolerance of ambiguity tend to be risk-taking. Nevertheless, those with low tolerance of ambiguity are likely to react aversely to ambiguous situations, leading them to have difficulty in evaluating risk and correctly making a decision[6]. Ambiguity is also avoided when the results at stake are of significance[47]. Some scholars also find risk perception increases when people feel uncertain because they have little available information on the situation or when they feel less confident to assess the situation[48,49]. In addition, individuals with low UA affect negatively their investment results[38]. Uncertain people are likely to require a higher expected rate of return than they will if they are certain about the risk-return tradeoff of an investment. To illustrate this, when investors felt uncertain about stocks' returns, they would require a higher equity premium as compensation for the ambiguity in the probability distribution that they perceived[17]. The UA is likely to associate with expectations of the future[18]. Investors who perceive high uncertainty when investing in risky stocks are more likely to be satisfied with their investment performance[19]. So, it is possible that people who are prone to ambiguity avoiding or uncertainty avoiding may prefer selecting safe investment. The study hypothesizes as follows:

- **H7:** Choices of safe investments increase when uncertainty avoidance increases
- **H8:** Choices of safe investments increase when ambiguity avoidance increases

Given the gaps in literature, the study proposes eight hypotheses on the associations between RA, AA, UA, demographics (gender, age, marital status, education and investment courses) and investment choices. The materials and methods used to test these relationships are as below.

MATERIALS AND METHODS

The authors applied the mixed method for the study focusing on strengths of both qualitative and quantitative research[50]. The mixed method includes four stages:

First stage

In-depth interviews: The authors initially interviewed ten investors who have over 10 years experience in financial investment. The interview lasted approximately 1 h and ten interviews were finished within 1 month. These interviews aimed at understanding how investors responded to risk, ambiguous and uncertain situations. Most interviewees overall avoid investing in stocks when they feel uncertain. The levels of reaction to risk, ambiguity and uncertainty-avoiding are different. Most interviewees were most likely to avoid uncertainty followed by risk and then ambiguity. These views were in line with those of prior scholars[8,21].

Second stage

Development of the scales of RA, AA and UA: These scales are based on the concepts of risk, uncertainty and ambiguity[5,13]. Avoidance of risk focuses on unknown outcomes but known probability of outcomes (e.g., I would avoid investing in a stock if I had only 50% (or below 50%) of probability to make a profit from that stock). Uncertainty avoidance emphasizes unknown outcomes and probability of outcomes (e.g., I would avoid investing in a stock if I did not completely know the probability of making a profit from this stock). Avoidance of ambiguity underlines unknown outcomes and information (e.g., I would avoid investing in a stock if I did not know about this stock's information). Given investors' responses, they are identified as low, neutral or high risk, ambiguity or uncertainty-avoiding.

Third stage

A pilot test: A pilot survey was conducted on 50 investors. This test aims to test the appropriateness of the scales of RA, AA, UA and investment choices (DEC)[51]. In addition, through this pilot test (based on data from 50 investors), the relationships between RA, AA, UA and DEC were predicted as linear. The study, thus, used the multiple linear regressions to test the relationships in the model.

Last stage

Web-based and paper-based surveys: The questionnaires were sent to 450 individual investors and 407 valid returns were received (rounded to 400). The collection of data lasted 6 months from August in 2016 to January in 2017. The purpose of these surveys is to investigate the relationships between RA, AA, UA, demographics and investment choices.

Measure of variables: The scales of investment choices are derived by Pasewark and Riley[51]. The scales of RA, AA and UA are developed by the authors. Table 1 presents a measure of risk avoidance, ambiguity avoidance, uncertainty avoidance and investment choices.

Statistical data: This study used STATA software to test the relationships of the RA, UA and AA with demographics and investment choices. Every equation (hypothesis) was analyzed under two cases: With and without control variables (e.g., gender, ages, marital status, education, investment courses). Using control variables to test the hypotheses aims at showing the importance of risk avoidance, ambiguity avoidance and uncertainty avoidance in investment choices. When gender, ages, marital status and education are controlled, avoidance of risk, ambiguity and uncertainty still strongly affect investment choices.

Table 1: A summary of a measure of risk avoidance, ambiguity avoidance, uncertainty avoidance and investment choices

A measure of ambiguity avoidance	A measure of risk avoidance
$AA = \sum_{i=1}^{n}(AA_i)$	$RA = \sum_{i=1}^{n}(RA_i)$
AA: Ambiguity avoidance	RA: Risk avoidance
AA_i: Score of ambiguity avoidance of the i^{th} investor	RA_i: Score of risk avoidance of the i^{th} investor
n = 400 investors	n = 400 investors
A measure of uncertainty avoidance	**A measure of investment choices**
$UA = \sum_{i=1}^{n}(UA_i)$	$DEC_i = \frac{1}{t}\sum_{s=1}^{t}(DEC_s)$
UA: Uncertainty avoidance	DEC_i: Investment choices of the i^{th} investor
UA_i: Score of uncertainty avoidance of the i^{th} investor	DEC_s: Score of the s^{th} item
n = 400 investors	t: The number of items of the DEC scales (t = 6)

Statistical analysis: The sample size is computed by the following formula by Zikmund *et al*.[52]:

$$n = \frac{z^2 pq}{E^2}$$

Where:

- n = Total numbers of investors
- Z^2 = Square of the confidence interval in standard error units
- p = Estimate the proportion of success
- q: (1-p) = Estimate the proportion of failures
- E^2 = Square of the maximum allowance for error between the true proportion and sample proportion

With Z = 1.96, p = 85%, E = 0.035, the sample requirement (n) equals to 384. Given this sample required, 450 questionnaires were sent (online and paper) to individual investors and then obtained 407 (around 400) valid responses.

RESULTS

Investor classification via the scales of RA, AA, UA and DEC: Investors are identified as risk avoidance, uncertainty avoidance or ambiguity avoidance in accordance with their scores (from strongly agree (5 points) to strongly disagree (1 points): Low RA, AA or UA when the scores are below three, neutral RA, AA or UA when the scores equal to three and high RA, AA or UA when the scores are above three. As Table 2 demonstrates, in terms of three kinds of avoidance, uncertainty avoidance had the highest percentage (68%), followed by ambiguity avoidance (42%) and risk avoidance (36%). This result indicates that investors were most likely to avoid investing in stocks that they were completely uncertain about making profits from these stocks. Interestingly, 36% avoided risks: that is, 64% probably bought stocks that they knew only 50% of likelihood of earning profits from these stocks. Also, 42% were prone to ambiguity avoidance, indicating that 58% were likely to buy stocks that they felt ambiguous about these stocks' information. Regarding investment choices, on average, 71% preferred investing in safe stocks.

Test of correlation in the model: The correlation coefficient from +1 to -1 in which it reveals a positive/(negative) correlation between the two variables when the coefficient is positive/(negative), but no relations when the coefficient equals to zero. Table 3 showed that most variables (risk avoidance, ambiguity avoidance, uncertainty avoidance and investment choices) had a positive correlation with each other in the range from 0.121-0.206. Specifically, the RA, UA and AA positively correlated with DEC at significance levels. In relation to demographics: Investment courses positively correlated with DEC, RA, AA and UA. This reveals that participation in investment courses had positive correlations with investment choices, avoidance of risk, ambiguity and uncertainty. Education and gender associated with DEC and marital status associated with RA. In summary, RA, UA, AA, education, investment courses, female investors are positively correlated with DEC.

Table 2: Classification of individual investors (risk avoidance, ambiguity avoidance, uncertainty avoidance and investment choices)

Characteristics	Number of investors	Proportion (%)
Risk avoidance (RA)		
Low RA	79	19.80
Moderate RA	177	44.20
High RA	144	36.00
Total	400	100.00
Uncertainty avoidance (UA)		
Low UA	31	7.80
Moderate UA	97	24.20
High UA	272	68.00
Total	400	100.00
Ambiguity avoidance (AA)		
Low AA	78	19.50
Moderate AA	154	38.50
High AA	168	42.00
Total	400	100.00
Investment choices (DEC)		
Low DEC	96	24.00
Moderate DEC	19	4.75
High DEC	285	71.25
Total	400	100.00

Table 3: Pearson correlation coefficient of risk avoidance, ambiguity avoidance, uncertainty avoidance and investment choices

Parameters	DEC	RA	UA	AA	Gender	Age	Marital status	Education	Investment courses
DEC	1.000								
RA	0.179***	1.000							
UA	0.206***	0.121**	1.000						
AA	0.147**	0.189***	0.042	1.000					
Gender	-0.103*	0.024	0.048	0.067	1.000				
Age	-0.005	0.042	0.025	-0.003	-0.120*	1.000			
Marital status	-0.030	0.088*	-0.054	0.015	0.070**	0.587***	1.000		
Education	0.087*	-0.005	0.052	-0.069	-0.039*	-0.008	-0.117**	1.000	
Investment courses	0.134**	0.119**	0.130*	0.098*	0.012	-0.003	0.037	0.229***	1.000

DEC: Investment choices, RA: Risk avoidance, UA: Uncertainty avoidance, AA: Ambiguity avoidance, ***p<0.001, **p<0.01, *p<0.05)

Table 4: Individual investor characteristics (Gender, age, marital status, education, income, investment courses)

Characteristics	Percentage
Gender	
Male	50.5
Female	49.5
Age (year)	
18-25	30.0
26-35	50.2
36-55	16.8
>55	3.0
Education	
High school	3.5
College or university	87.1
Master to up	9.4
Income (month)	
<300 USD	28.0
300-<600 USD	48.5
600-1000 USD	15.8
>1000 USD	7.7
Marital status	
Single	48.0
Married	46.5
Divorced	5.5
Investment courses	
Yes	60.8
No	39.2

Findings of investor characteristics: Table 4 indicates the following characteristics of investors: The number of male and female seems to be equal. Most investors were aged from 18-35. The number of single over married investors was largely similar. Most of the investors achieved college or university degree and had income per month from below 300 USD to below 600 USD. Only over a half of total investors attended the investment courses. In general, most individual investors were young, educated and had low income.

Findings of regression relationship: The findings of Eq. 1 below rendered that among investors characteristics, only investment courses (TRAIN) positively influenced risk avoidance (RA) at standardized coefficient (β) of 0.121. This means that risk avoidance increased when participation in investment courses increased. Similarly, Eq. 2 reveals that an increase in attending investment courses led to a rise in ambiguity avoidance at 0.118:

$$RA = 0.121TRAIN^{*} \ (^{*}p<0.05) \quad (1)$$

$$AA = 0.119\ TRAIN^{*} \ (^{*}p<0.05) \quad (2)$$

Equation 3 indicated below that UA had a positive relationship with TRAIN at 0.132 and a negative relationship with MARI at 0.126. These findings explain that married investors were less likely to avoid uncertainty than single ones. Moreover, TRAIN plays a vital role in uncertainty avoidance where a rise in participation in investment courses led to a rise in uncertainty avoidance:

$$UA = -0.126MARI^{*}+0.132TRAIN^{*} \ (^{*}p<0.05) \quad (3)$$

Equation 4 (with control variables) and (4) (no control variables) below showed that DEC had a positive association with RA and TRAIN and a negative association with GEN. With control variables added, risk avoidance affected strongly investment choices. Moreover, Eq. 4 reported that not only RA, but also TRAIN and GEN influenced investment choices. Female investors were more likely to select safe investment than males and the more investors attended investment courses the more they tended to choose safe investment:

$$DEC = 0.173RA^{**}+0.103TRAIN^{*}-0.105GEN^{*}$$
$$DEC = 0.179RA^{***} \ (^{***}p<0.001, \ ^{**}p<0.01, \ ^{*}p<0.05) \quad (4)$$

Equation 5 (with control variables) and (5) (no control variables) below presented that UA positively affected DEC at 0.198 (Eq. 5) and at 0.206 (Eq. 5). The GEN negatively affected DEC at 0.116, in which male investors were more likely to select risky investment than females. Equation 5 indicated that the relationship between uncertainty avoidance and investment choices is strongly significant ($p<0.001$), even after more control variables such as gender, age, marital status, education and investment courses are added:

$$DEC = 0.198UA^{***} -0.116GEN^{*}$$
$$DEC = 0.206\ UA^{***} \ (^{***}p<0.001, \ ^{**}p<0.01, \ ^{*}p<0.05) \quad (5)$$

Equation 6 (with control variables) and Eq. 6 (no control variables) below displayed that DEC had a negative relationship with GEN at 0.112, a positive relationship with TRAIN at 0.106 and AA at 0.149 (Eq. 6) and at 0.147 (Eq. 6). Female investors were more likely to choose safe investment than males. Like RA and UA, AA also had a significant impact on DEC with additive control variables:

$$DEC = 0.149AA^{**}+0.106TRAIN^{*}-0.112GEN^{*}$$
$$DEC = 0.147AA^{**} \ (^{***}p<0.001, \ ^{**}p<0.01, \ ^{*}p<0.05) \quad (6)$$

More importantly, the author tested all independent variables (RA, AA and UA and five control variables: gender, age, marital status, education and investment courses) and dependent variable (DEC) in the model. The results showed that RA, AA and UA influenced strongly DEC. As Eq. 7

Table 5: A summary of coefficients of the model of avoidance of risk, ambiguity, uncertainty and investment choices

Model	Unstandardized coefficients	Std. error	Standardized coefficients (β)	t	Significant (p-value)
Constant	2.301	0.250		9.195	
Risk avoidance (RA)	0.083	0.031	0.131	2.656	0.008
Uncertainty avoidance (UA)	0.134	0.037	0.179	3.668	0.000
Ambiguity avoidance (AA)	0.078	0.032	0.121	2.460	0.014
Gender	-0.139	0.055	-0.124	-2.523	0.012
Age	-0.020	0.047	-0.025	-0.414	0.679
Marital status	-0.005	0.061	-0.005	-0.089	0.929
Education	0.006	0.046	0.065	1.306	0.192
Investment courses	0.085	0.061	0.070	1.388	0.166

Dependent variable: Investment choices (DEC), R = 0.326, R square = 0.106, adjusted R^2= 0.08, F(5.818, 391), p<0.001

(with control variables) below, DEC had a positive relationship with RA at 0.131, UA at 0.179 and 0.121 and a negative relationship with GEN at 0.124. In Eq. 7 (no control variables), RA, UA and AA positively influenced DEC at 0.135, 0.138 and 0.114, respectively. Gender also played an important role in investment choices where female investors were more likely to select safe investment than male investors:

$$DEC = 0.131RA^{**}+0.179UA^{**}+0.121AA^{*}-0.124GEN^{*}$$
$$DEC = 0.135RA^{**}+0.138UA^{***}+0.114AA^{*}$$
$$(^{***}p<0.001, ^{**}p<0.01, ^{*}p<0.05) \quad (7)$$

To summarize, Table 5 shows that the model of RA, AA, UA and DEC with age, gender, marital status, education and investment courses as control variables is assessed as a fit model with high significance levels (p-value<0.001). Statistically, the value (R^2 = 0.106) is interpreted as approximately 10% of the variance in the dependent variable (DEC) that the independent variables explain collectively. Notably, low R^2 does not mean that the results of the model are less important because some scholars[53,54] argue that nothing in the classical regression model requires that R^2 be high, therefore, a high R^2 is not evidence in favor of the model and a low R^2 is not evidence against it.

DISCUSSION

This study examined the relationships between RA, AA, UA and demographics and investment choices. In terms of demographics: The findings supported hypotheses on the relationships between gender, marital status and investment courses, RA, AA, UA and DEC, but do not find any significant relationships between age, education, RA, AA, UA and DEC.

- Gender was found to have significant impact on investment choices. Female investors tend to select safer investment than male investors. This result is like those of prior researchers[22-24], who found that females take less risk than males. This exploration debates results of previous researchers[25,26,55,56], who showed that there was no evidence supporting the impact of gender on risk-taking behavior
- Marital status had significant associations with RA, AA and UA. This study, therefore, argue with consequences of prior studies[24,33,34,57], who reported that there were no relationships between marital status and risk-taking behavior. Married investors were less likely to avoid uncertainty than single investors. This means that married investors take more risk than single investors. This finding is similar to those of prior scholars[30-32], but opposite to those of previous studies[27-29,55], who discovered that single people took more risk than married people
- Investment courses were found to have a positive impact on RA, AA, UA and DEC. This can be interpreted as the more investors attend investment courses, the more they avoid ambiguous situations and the more they prefer investing in safe investments. This result is consistent with prior researchers[39-42], where a rise in attending financial courses led to an increase in saving plans. That is, participants of investment courses are unlikely to take risk
- Age and education did not affect RA, AA, UA and DEC. These findings are in line with some scholars[24,26,33,34,55], who did not find any effects of age and education on risk taking. However, these results are inconsistent with scholars who explored that older people take less/more risk[27,30,34,35] and people with higher education take more risks[27,30,36-38]

In relation to RA, AA and UA, the findings also support the strong impacts of avoidance of risk, ambiguity and uncertainty on investment choices. The number of investors with high avoidance of risk, ambiguity and uncertainty was around 48% and those with low avoidance of risk, ambiguity and uncertainty was 15% (neutral levels were 37%) (Table 1). This figure indicates that approximately 48% of total investors are risk-averse. In general, the more investors avoid risk, ambiguity

and uncertainty, the more they choose safe investments (e.g., investments with a high degree of safety or lower risk than the market). These results seem in line with those of prior researchers[6,9,13,18-20,45], who contend that the higher the risk perception, the more avoidance of investing in risky stocks[20], the higher the perceived uncertainty, the more satisfactory the investment results are[19], ambiguity avoiding is associated with risk-averse[58], people with low tolerance of ambiguity tend to be risk-averse[6] and the UA is associated with future expectations[18], risk-averse investors incline towards choosing certainty (certain gains)[13,45].

The development of the scales of RA, AA and UA and exploration of the strong relationships between RA, AA, UA and DEC are the contributions of this study. However, this study has the following limitations. (1) The mixed method: Each method has advantages and disadvantages and no single method is best[59]. The study used the mixed method because it capitalizes on the strengths of each to reflect the theoretical basis of the research question[59]. However, data were collected mainly from web-based or paper-based surveys, exhibiting that the quality of data entirely depends on respondents. Thus, wrong or fake answers may occur. To deal with this issue, further research is well advised to use face-to-face surveys. (2) The research scope: Although Vietnamese investors may represent investors in the emerging markets, it is recommended to apply these scales to overseas investors and then compare differing levels of RA, AA and UA between Vietnamese investors and overseas investors. (3) The research themes: Apart from avoidance of risk, ambiguity and uncertainty, tolerance of ambiguity and tolerance of uncertainty may also affect investment choices. Additional research is recommended to investigate the effects of tolerance of ambiguity and uncertainty on investment decisions.

CONCLUSION

In conclusion, the limited literature on the RA, AA and UA motivated this research. The study applied the mix method to expand the scales of avoidance of risk, uncertainty and ambiguity and investigate the relationships between RA, AA, UA and investment choices. The key findings were that (1) Investors were mostly likely to avoid uncertainty, followed by avoid ambiguity and then avoid risk. (2) Female investors were more likely to avoid risk, ambiguity and uncertainty than male investors. (3) The more participation in investment courses, the higher avoidance of risk, ambiguity and uncertainty and the more the safer investments were chosen. (4) Investors who were prone to risk, ambiguity, uncertainty-avoiding were more likely to choose safe investment. The results also met the objectives of this study: (1) developed the scales of avoidance of risk, ambiguity and uncertainty, (2) explored the strong effects of avoidance of risk, ambiguity and uncertainty on investment choices, even after gender, age, marital status, education and investment courses were added.

SIGNIFICANCE STATEMENT

The results showing the strong impact of avoidance of risk, ambiguity and uncertainty on investment choices in the financial markets will be helpful to investors, listed and unlisted companies, brokerage firms and stakeholders. Moreover, these findings and the distinctive scales of avoidance of risk, ambiguity and uncertainty can be useful sources for academic researchers.

ACKNOWLEDGMENT

This research is funded by University of Economics Ho Chi Minh City, Vietnam.

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