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PHÂN TÍCH ẢNH HƯỞNG CỦA YẾU TỐ NHÂN KHẨU HỌC VÀ KIẾN THỨC TÀI CHÍNH CỦA CÁN BỘ CẤP QUẢN LÝ TẠI VIỆT NAM ĐỐI VỚI CÁC QUYẾT ĐỊNH ĐẦU TƯ

Nguyễn Doãn Việt Hưng[1]
Sinh viên K56 Ngân hàng và Tài chính quốc tế – Khoa Tài chính ngân hàng
Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Kim Hương Trang
Giảng viên Khoa Tài chính ngân hàng
Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Tóm tắt

Nghiên cứu góp phần cung cấp thông tin về ảnh hưởng của yếu tố nhân khẩu học và kiến thức tài chính đến quá trình đưa ra quyết định đầu tư của các nhà quản lý tại Việt Nam. Từ mục tiêu trên, nghiên cứu đã thực hiện khảo sát trên 67 quản lý tại Việt Nam làm việc trong các lĩnh vực khác nhau trong xã hội, cùng với nền tảng kiến thức khác nhau liên quan đến tài chính, sản xuất, thương mại điện tử và các lĩnh vực khác. Kết quả chỉ ra rằng, các nhà quản lý nam có xu hướng chấp nhận mức độ rủi ro trong đầu tư cao hơn trong khi các quản lý có tỷ lệ tiết kiệm dưới 5% mỗi tháng sẽ có xu hướng thận trọng hơn đối với các quyết định đầu tư của họ. Bên cạnh đó, trình độ hiểu biết về tài chính ở mức cao cũng góp phần làm gia tăng mức độ chấp nhận rủi ro của các nhà quản lý. Dựa trên các kết quả thu được, nghiên cứu đã đưa ra các yếu tố giúp các nhà quản lý Việt Nam có thể cải thiện quá trình đưa ra quyết định đầu tư.

Từ khóa: Nhân khẩu học, kiến thức tài chính, quyết định đầu tư, mức độ chịu rủi ro, quản lý.

THE IMPACT OF VIETNAMESE MANAGER'S DEMOGRAPHIC CHARACTERISTICS AND FINANCIAL LITERACY ON INVESTMENT DECISIONS

Abstract

This study contributes to the current literature by scrutinizing the role of Vietnamese managers' demographic characteristics and financial literacy on the demand for making investment decisions. As such, we conduct a survey for a sample of 67 Vietnamese managers who work in different fields in society, with different knowledge aspects such as finance, manufacturing, e-commerce, etc. We find a strong evidence that male managers tend to accept a higher level of risk while managers who save less than 5% per month are substantially cautious about their investment decisions. Furthermore, it is identified that advanced financial literacy can greatly increase the risk tolerance

[1] Tác giả liên hệ, Email: hungdoan2603@gmail.com

level of Vietnamese managers. Regarding practical implications, by emphasizing the importance of financial literacy, these findings will be helpful for the managers to improve their investment decision-making process.

Keywords: Demographic characteristics, financial literacy, investment decisions, risk tolerance, managers.

1. Introduction

The process of making investment decisions is a complicated flow of actions through which individuals have to take into consideration various factors that exist. Year by year, with the development of financial markets, investing efficiently becomes harder and harder due to the emergence of newly promoted financial products and services. Although they help to facilitate the capital flow, they are undoubtedly complicated and hard to grasp, especially for fresh investors (van Rooij *et al.*, 2011). The process of making decisions would be smoothened in case that all relating variables are identified. By exploring and understanding all existing factors, investors can promote the strengths and limit the weaknesses.

During the investment decision-making process, individuals have to encounter both personal and situational factors (Trivedi *et al.*, 2003). Situational factors can affect the whole economy and are apparently hard to control. On the other hand, personal factors are factors that vary between individuals and can be controlled if individuals can identify and adapt to them.

Among those personal factors, investors' behaviors are greatly affected by demographic characteristics (Sadiq and Ishaq, 2014; Prasad, 2015). Demographic factors such as gender, age, education, marital status, family size, income level, and saving proportion per month have great impacts on the investment results and contribute to the success of the investment, especially in the Vietnamese context (Ton and Nguyen, 2014), they assume greater impacts because of Vietnamese culture and society.

Financial literacy should be taken into consideration due to its importance and impacts. Investing efficiently and having a good portfolio are absolutely challenging for individuals with little or even without knowledge of finance. Unfortunately, risky investments made by them can magnify the outcomes, from severe loss because of wrong investment decisions to incredibly high return because of luck or following advice of other investors. On the other hand, less risk investment can lead to minimal gain or unsatisfying results (Awais *et al.*, 2016).

There are many papers conducted to explore the impacts of demographic characteristics and financial literacy factors on investment decisions. However, the results vary from region to region and previous papers have shown the results for the investors in general. Therefore, we choose the topic "The Impacts of Vietnamese Managers' Demographic Characteristics and Financial Literacy on Investment Decisions" with the hope that some findings and recommendations from this study can prevail the picture of Vietnamese managers' investment decision-making process.

This study contributes to the current literature in the following ways. Firstly, by identifying various factors affecting the investment decision-making process, our empirical findings can help the Vietnamese managers understand the demographic characteristics that can influence their investment choices and the impact of financial literacy on their investment decisions. Secondly, the research emphasizes the important role of financial literacy in daily life, which may suggest

not only the Vietnamese people but also the education system being aware of this important field of knowledge. Finally, some findings in this research can be taken into consideration to develop suitable investment products by the financial intermediations and institutions.

Our main findings are summarized as follows. Firstly, the study reveals that 3 out of 7 demographic factors including gender, family size, and saving proportion associate with the risk tolerance of the Vietnamese managers when demographics factors are analyzed separately. Male managers and those who have only 1 or 2 member(s) in the family tend to take a higher level of risk while managers saving less than 5% per month are more risk-averse. Secondly, when adding financial literacy, the results show that family size factor loses its impact; gender and saving proportion still maintain a strong significance; and Vietnamese managers equipped with the advanced level of finance tend to accept a higher level of risk.

The rest of this study is structured as follows. Section 2 provides the literature relating to demographic characteristics and financial literacy and develops the hypotheses. In Section 3, we describe the survey design and the method of measuring the financial literacy and risk tolerance of the participants. Section 4 illustrates the data and discusses the results. Section 5 concludes and provides some recommendations.

2. Literature background

2.1. Studies on demographic characteristics

Gender

Among demographic factors, gender seems to be the first viable partitioning factor that needs to be concerned. There are plenty of previous studies proving that women, to some extent, tend to be more risk-averse than men, which leads to more conservative investment decisions.

Barber and Odean (2001) explain that male investors are more likely to trade excessively and magnify their outcomes because they are more confident than woman investors.The studies of Embrey and Fox (1997), Dash (2010), and Filippin (2016) indicate that gender factor alone does not seem to be a crucial determinant regarding investment choice and is not sufficient enough to be a basis of classification.Kellerman *et al.* (2021) take into consideration the total investment amount of banking clients based on their demographic characteristics. The paper indicates that the distributions between the male and female individuals are similar.

Hypothesis 1: There is a significant relationship between gender and the managers' investment decisions.

Age

According to the research of Morin and Suarez (1983), Bakshi and Chen (1994), there is a positive relationship between risk aversion and age with specific groups of individuals. In contrast, Riley and Chow (1992) explain that risk aversion decreases with age to the minimum level, and only increases dramatically after retirement.

Anbar and Eker (2010) indicate that there is no significant relationship between the age of the investors and risk tolerance.

Regarding the investment results, the paper of Korniotis and Kumar (2011) indicates that older investors' portfolios show not only their greater knowledge but also their lower investment skills due to the negative influences of cognitive aging. On the contrary, Senda *et al.* (2020) show that

the older age of an investor, the more profitable investment results he achieves due to a wiser attitude when determining the risk and return trade-off of the investment.

Hypothesis 2: There is a significant relationship between age group and the managers' investment decisions.

Education

According to the papers of Riley and Chow (1992), Sung and Hanna (1996), Bellante and Green (2004), Zeeshan *et al.* (2021), there is a positive link to risk tolerance because education can enlarge an individual's exposure to several investment avenues and options which are available to them. In addition to that, those who have a high level of education also manage the risk better by utilizing various techniques.

Hypothesis 3: There is a significant relationship between education and the managers' investment decisions

Marital status

Barber and Odean (2001), Hallahan *et al.* (2004) indicate that marital status is a significant determinant in financial risk tolerance levels because unmarried individuals hold more risky portfolios than those who are married.

Hawley and Fujii (1993-1994), Yao and Hanna (2005) show that husbands tend to be the ones who invest aggressively, compared to women who invest conservatively in most married households.

Hypothesis 4*:* There is a significant relationship between marital status and the managers' investment decisions.

Family size

Individuals' family size also affects their financial risk-taking behavior. Lewellen *et al.* (1997) have pointed out that those who have a small family size are more risk-taking while an increase in family size causes risk aversion.

According to the paper of Bogan (2013), having only female children can dramatically increase the probability of stock investment while respondents with only male offspring are the most risk-averse across subgroups.

Hypothesis 5: There is a significant relationship between family size and the managers' investment decisions.

Income level

The papers of Morin and Suarez (1983), MacCrimmon *et al.* (1988), Bernheim *et al.* (2001) explain that individuals with a higher income level tend to accept greater risk than those with a lower level of income because a higher level of income creates the ability to bear the losses.

In contrast, Hallahan *et al.* (2004) indicate that wealthy people may be more conservative with their funds, while individuals having lower levels of personal income may consider risky investments as a chance which is similar to lottery tickets, and tend to accept the risk associated with such payoffs

On the other hand, Strydom *et al.* (2009) show that income level has no relationship with financial risk tolerance.

Hypothesis 6: There is a significant relationship between income level per month and the managers' investment decisions.

Saving proportion

Saving is the act when individuals refrain from spending their income on consumption. Anju and Anuradha (2017) investigate specifically the saving and investment behavior of Information technology professionals and concludes that saving capital regularly, controlling finances, and following investment plan enable people to accept risk to attain their goals. Mathivannan and Selvakumar (2011) show that households are still conservative and willing to save money for the education of their children, daily activities, and retirement benefits.

Geetha and Ramesh (2011) have pointed out that there is no remarkable relationship between annual savings and investment avenues.

Hypothesis 7: There is a significant relationship between saving proportion per month and the managers' investment decisions.

2.2. Studies on financial literacy

Definition of Financial Literacy

Financial literacy is defined differently by different researchers and organizations across the globe.

According to The President's Advisory Council on Financial Literacy, financial literacy is the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being. Mason and Wilson (2000) define financial literacy as a "meaning-making process" which requires individuals to perform a set of knowledge, skills, and resources to acquire, consider and analyze information to make investment decisions. The paper of Sadalia (2012) indicates that financial literacy includes basic personal finance, credit and debt management, money management, and saving and investment management.

Strategies for Measuring Financial Literacy

Across several studies, there are also several measurement strategies and content domains, which include 3 main parts (saving, investment, and debt).

Volpe *et al.* (1996) measured financial literacy based on the investment domain by 10 multiple-choice items. Lusardi and Mitchell (2007a) measured financial literacy by using only three computational questions which cover only the investment domain. Lusardi and Mitchell (2008) relied on three multiple-choice questions and true-false items to test the saving and investment domains of individuals. Agnew and Szykman (2005) conducted a test that combined both self-rated investment knowledge on a 1-10 scale and a performance test of 10 multiple choice and true-false questions to measure the financial literacy of respondents.

Relation between Financial Literacy and Investment Decisions

Among elements that affect financial decision-making, financial literacy is one of the most necessary elements (Calcagno and Monticone, 2015) and should be enhanced to make successful investments (Agnew and Szykman, 2005).

According to the paper of Lusardi and Mitchell (2007a), there is a significant relationship between financial literacy and the ability to plan for retirement. On the other hand, those who are

financially illiterate will have fewer assets at the age of retirement due to their lower ability to invest in stocks and will borrow money at a higher interest rate (Lusardi and Tufano, 2009).

Senda *et al.* (2020) explain that the financial literacy of individuals does not have any effect on investment decisions because investors who have a higher level of financial literacy will not have the more profitable or unprofitable investment results.

Hypothesis 8a: There is a significant relationship between self-assessed financial literacy and the managers' investment decisions.

Hypothesis 8b: There is a significant relationship between basic financial literacy and the managers' investment decisions.

Hypothesis 8c: There is a significant relationship between advanced financial literacy and the managers' investment decisions.

3. Survey design, and financial literacy and risk tolerance measurement

3.1. Survey design

This paper aims to investigate the impacts of demographic factors and financial literacy of Vietnamese managers on the investment decision-making process. We apply the simple random sampling method with the hope that the sample generated by this method can effectively generalize the results.

Particularly, in May and June 2021, we conducted a survey following the questionnaires developed by van Rooij *et al*. (2011) and Grable and Lytton (1999b). The target population is the managers living in Vietnam, no matter which occupation they choose or what demographic factors they have, they will have an equal chance of being selected because the objective diversity makes the research much more significant. The estimated time to finish the questionnaire is less than 10 minutes, which is considered suitable for the target respondents. Before starting the experiment, a copy of drafts in Vietnamese had been given to a small group of 10 managers to make sure that all questions can be clearly understood.

The respondents had to finish a 3-part questionnaire, which was distributed via email, message, or social networks, etc. The contacts of the target populations were found in a list of contact of the firms or by the authors' networks. By randomly selecting the participants, the final sample yielded 67 respondents, who are the CEO, managers, heads of the department working in different fields in Vietnam, such as banking, manufacturing, e-commerce, finance,etc.The thing to note is that we chose the simple random sampling method not only because we could have a vivid sample of paticipants with different demographic characteristics including gender, age group, education, marital status, family size, income level, and saving proportion per month, but also we wanted to approach participants having a different level of financial literacy, from basic to advanced level. Therefore, the sample is considered to be representative of the population, which can minimize the sample bias and generate more objective results.

The questionnaire is categorized into three main sections:

- ***Section 1:*** Demographic characteristics section

In this section, we acquire some basic demographic information of respondents, such as gender, age group, education level, marital status, family size, income level, and the proportion of monthly savings.

- ***Section 2:*** Financial Literacy Section

There are three subsections in Section 2, including self-assessment, basic and advanced questions relating to finance topics.

- ***Section 3:*** Investment Decisions Section

In this section, we measure the risk tolerance to understand the investment decisions of the respondents. Appendix provides details instructions and the research questionnaire.

3.2. Financial literacy measurement

As mentioned in the previous part of this paper, there are many existing strategies to measure the financial literacy of individuals. However, we choose the measurement developed by van Rooij *et al.* (2011) due to its comprehensive and exact results, as well as the comfortability while in

progress. However, we only keep the structure of the questionnaire (self-assessment, basic and advanced part) and reduces the number of questions within each section. By doing this, we hope that the survey will end up with a large number of acceptable results and bring convenience to the respondents.

In the self-assessed literacy part, the respondents can grade their knowledge by themselves. The higher score means the higher confidence and knowledge that the respondents have. Regarding the two sets of basic and advanced financial literacy questions, the higher score means the greater knowledge of finance that one acquires.

Questions in the financial literacy section are illustrated in Appendix.

3.3. Risk tolerance measurement

For the questionnaire of Section 3, we develop from the Financial Risk Tolerance Assessment Instrument (Grable and Lytton, 1999b). Each question includes some options which represent different levels of risk tolerance, starting with 1 point for the most conservative option and higher points for the riskier options. The risk tolerance score is the sum of all points from the options that the participants choose. A higher score from this part means a higher risk tolerance level that the managers can accept.

Appendix provides details of measuring risk tolerance level.

The general model for this research is as below:

$$\mathbf{RISKSC = \beta 1 + \beta 2\ GENDER + \beta 3\ AGE + \beta 4\ EDU + \beta 5\ MARI + \beta 6\ FAMI + \beta 7\ INCOME + \beta 8\ SAV + \beta 9\ FINAN + \mu}$$

Table 1. Definitions of variables.

Variables	Measurement	Sources
Dependent Variables		
Risk tolerance of respondents	The total score of participants in Investment risk tolerance quiz	Financial risk tolerance assessment instrument (Grable, J. and Lytton, R., 1999b)
Independent Variables		
Gender	Dummy variable coded 1 if a respondent is male and 0 otherwise	Authors' construction
Age group	The age group of the respondents	Authors' construction
Education	The highest education level of the respondents	Authors' construction

Variables	Measurement	Sources
Marital status	Dummy variable coded 1 if a respondent is married and 0 otherwise	Authors' construction
Family size	The number of members in the respondents' family	Authors' construction
Income level	Monthly income of the respondents	Authors' construction
Saving proportion	Saving proportion of the respondents per month	Authors' construction
Self-assessed literacy	Score from 1-7. A higher score indicates higher self-assessed knowledge and confidence	Authors' construction
Basic financial literacy	Score from 0 to 5 based on the test, where 0 means a respondent answered all five questions wrongly, and 5 means he answered correctly all questions. A higher score refers to greater basic financial literacy	Questionnaire by van Rooij *et al.* (2011)
Advanced financial literacy	Score from 0 to 4 based on the test, where 0 means a respondent answered all four questions wrongly, and 4 means he answered correctly all questions. A higher score refers to greater advanced financial literacy	Questionnaire by van Rooij *et al.* (2011)

Note: Table 1 provides definitions of dependent variables and independent variables. The independent variables are constructed from responses of participants collected from the questionnaire, including gender, age group, education, marital status, family size, income level, saving proportion, self-assessed literacy, basic financial literacy and advanced financial literacy.

Source: The authors' research

4. Results analysis and discussion

4.1. Characteristics of the data

Demographic characteristics

In this part, various factors such as gender, age group, education level, marital status, income level per month, as well as saving proportion per month are investigated.

Table 2. Demographic Characteristics of Managers

Variables		No. of managers	Proportion
Gender	Male	32	47.76
	Female	35	52.24
	Total	**67**	**100**
Age group	Below 30	11	16.42

Variables		No. of managers	Proportion
	30-40	26	38.81
	40-50	24	35.82
	Above 50	6	8.96
	Total	**67**	**100**
Education	Under high school	0	0
	Highschool graduated	2	2.99
	Higher vocation	0	0
	Bachelor	50	74.63
	Master, Ph.D.	15	22.39
	Total	**67**	**100**
Marital status	Single	6	8.96
	Married	61	91.04
	Total	**67**	**100**
Family size	1-2 member(s)	3	4.48
	3 members	8	11.94
	4 members	37	55.22
	More than 4 members	19	28.36
	Total	**67**	**100**
Income level (per month)	Below VND 40m	32	47.76
	VND 40m – VND 80m	23	34.33
	VND 80m – VND 120m	5	7.46
	VND 120m – VND 160m	1	1.49
	VND 160m – VND 200m	1	1.49
	Above VND 200m	5	7.46
	Total	**67**	**100**

Variables		No. of managers	Proportion
Saving proportion	Below 5%	18	26.87
	5% - 15%	19	28.36
	15% - 25%	10	14.93
	Above 25%	20	29.85
	Total	**67**	**100**

Note: Table 2 illustrates summary statistics of the respondents' demographic profile

Source: Authors' calculation

In terms of gender, there is a balance between two groups of gender: male and female. The number of male managers taking part in this survey was 32 out of 67, which accounts for 47.76% of respondents.

About age group structure, the two groups 30-40 and 40-50 take up a vast majority of the whole sample with 38.81% and 35.82%, which equals nearly 75% of the respondents while the age group above 50 is the smallest group in the sample because there are only 8 respondents who belonged to this group.

Regarding the educational level, it is undoubted that most of the managers, who are the target population in this survey, have bachelor's degrees and master's, Ph.D. degrees. Specifically, these two groups of educational level take 97.02%, while only 2 respondents are high school graduated.

The results show that most of the respondents in this survey are married, which takes up 91.04%, while only 6 respondents are single. According to the results from the family size, more than half of the respondents have 4 members in their family with 55.22%, followed by more than 4 members group, group of 3 members, and group of 1-2 members in the family with 28.36%, 11.94%, and 4.48% respectively.

The two last demographic factors investigated in this survey are income level per month and saving proportion per month. The survey indicates that more than half of the respondents have an income which is greater than 40 million VND per month. In detail, 33.33% of the individuals earn 40 - 80 million VND per month, and 17.9% of respondents are able to earn from 80 million VND to above 200 million VND. In terms of saving proportion, most of the managers save more than 25% of their income per month, followed by savings from 5%-15% per month and savings below 5% with 28.36% and 26.87% respectively.

Financial Literacy

Figure 1 shows that more than 40% of the respondents marked themselves grade 4 in finance. In addition, 41.8% of people have grade 5 and grade 6, which are above the average. However, no one claims that they have sufficient knowledge of finance (grade 7). In contrast, 8.96% of respondents show that they have limited knowledge of finance.

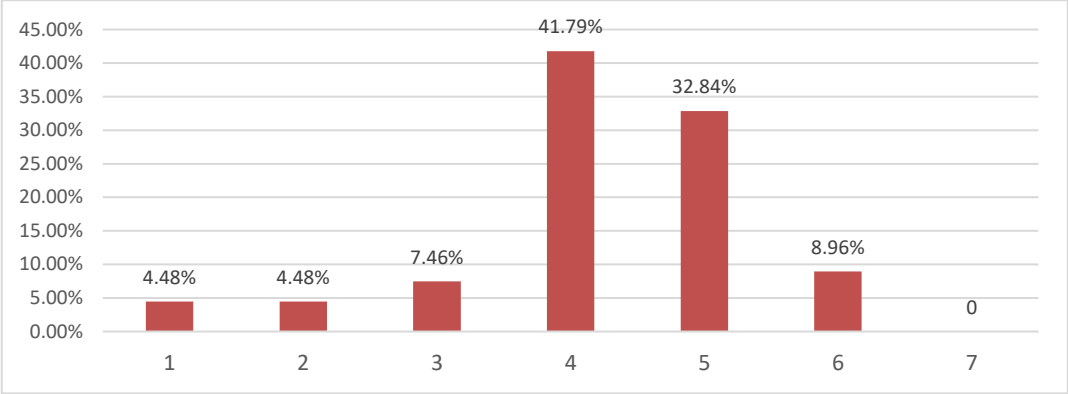


Figure 1. Self-Assessed Literacy of Respondents

Note: Figure 1 displays summary statistics of the participants' self-assessed financial literacy

Source: Authors' calculation

Figure 2 shows that the majority of respondents have the basic knowledge of numeracy, time value of money, and interest compounding with a quite high proportion of correct answers, with 79.10%, 65.67%, and 64.17% respectively. On the other hand, 56.72% of the respondents cannot find the exact answer to the question covering the money illusion field and more than 41% of people are unable to answer the inflation question correctly.

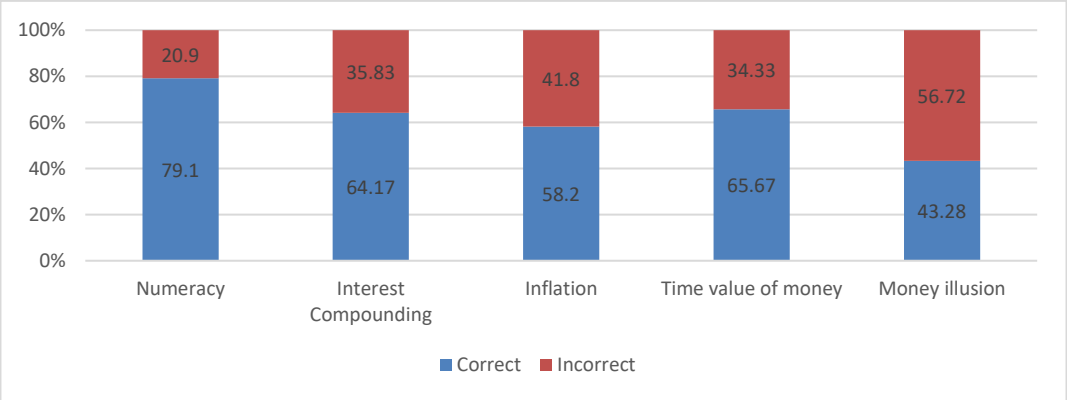


Figure 2. Weighted Percentage of Correct and Incorrect Answers (Basic Financial Literacy Part)

Note: Figure 2 displays weighted percentages of correct and incorrect answers in the basic financial literacy part, including numeracy, interest compounding, inflation, time value of money and money illusion (N = 67)

Source: Authors' calculation

In conclusion, it seems that respondents find it easy when they encounter problems relating to basic finance and normal activities. In contrast, it is hard for lots of people to deal with problems about money illusion and inflation, which are the combination of finance and economics.

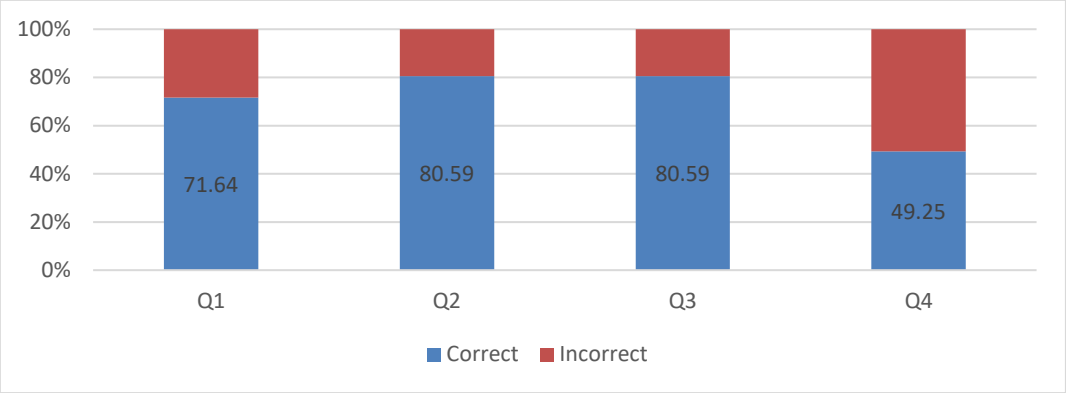
Table 3. Weighted Number of Correct and Incorrect Answers (Basic Financial Literacy Part)

	None	1	2	3	4	5
Correct	10.44%	10.44%	11.94%	16.41%	26.86%	23.88%
Incorrect	23.88%	26.86%	16.41%	11.94%	10.44%	10.44%

Note: Table 3 displays weighted number of correct and incorrect answers in the basic financial literacy part (N = 67)

Source: Authors' calculation

Figure 3. Weighted Percentage of Correct and Incorrect Answers (Advanced Financial Literacy Part)



Note: Figure 3 displays weighted percentages of correct and incorrect answers in the advanced financial literacy part (N = 67)

Source: Authors' calculation

Figure 3 also shows that respondents have sufficient knowledge of asset fluctuation and asset allocation with over 80% of respondents can answer these problems correctly. It can be supposed that these problems are quite close to their normal activities when they manage their asset portfolio. In contrast, the problem relating to the relationship between bond price and interest rate is hard with more than half of the respondents.

Table 4. Weighted Number of Correct and Incorrect Answers (Advanced Financial Literacy Part)

	None	**1**	**2**	**3**	**4**
Correct	7.46%	8.95%	19.40%	22.38%	41.79%
Incorrect	41.79%	22.38%	19.40%	8.95%	7.46%

Note: Table 4 displays weighted number of correct and incorrect answers in the advanced financial literacy part (N = 67)

Source: Authors' calculation

Table 4 indicates that the majority of respondents can finish this part with no or only 1 incorrect answer. Specifically, 41.79% of people have 4/4 correct answers and 22.38% of them had 3/4. However, 16.41% of the respondents find this test is hard and have no or only 1 correct answer.

4.2. Correlation matrix

In this part, we use the Pearson correlation matrix to explore the relationship between risk score and each of the demographic subgroups, and the relationship between risk score and financial literacy. By applying the correlation matrix, we will identify significant elements in each group and use them as the independent variables in the next step of implementing regression estimations.

Table 5. Correlation Matrix between Risk Score and Demographic Characteristics Subgroups

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
RISKSC (1)	1.000																							
D_Male (2)	0.271**	1.000																						
D_Ageunder30 (3)	0.105	-0.020	1.000																					
D_Age3040 (4)	0.035	-0.026	-0.353***	1.000																				
D_Age4050 (5)	-0.011	0.033	-0.331***	-0.595***	1.000																			
D_Ageabov50 (6)	-0.178	0.014	-0.139	-0.250**	-0.234*	1.000																		
D_EduHSch (7)	-0.111	0.008	-0.078	0.040	0.052	-0.055	1.000																	
D_EduBachelor (8)	0.094	0.214*	-0.112	0.112	0.006	-0.057	-0.301**	1.000																
D_EduMasPhD (9)	-0.053	-0.227*	0.149	-0.134	-0.028	0.082	-0.094	-0.921***	1.000															
D_Mari (10)	-0.190	0.091	-0.708***	0.250**	0.234*	0.098	0.055	0.057	-0.082	1.000														
D_Incunder40 (11)	-0.045	0.043	0.222*	0.220*	-0.340***	-0.091	0.183	0.146	-0.227*	-0.119	1.000													
D_Inc4080 (12)	0.015	-0.188	-0.151	0.005	0.247**	-0.227*	-0.127	-0.084	0.140	0.117	-0.691***	1.000												
D_Inc80120 (13)	0.031	0.183	-0.126	-0.226*	0.143	0.309**	-0.050	0.035	-0.016	0.089	-0.272**	-0.205*	1.000											
D_Inc120160 (14)	0.042	-0.118	-0.055	-0.098	-0.092	0.392***	-0.022	-0.211*	0.229*	0.039	-0.118	-0.089	-0.035	1.000										
D_Inc160200 (15)	0.042	-0.118	-0.055	-0.098	0.165	-0.039	-0.022	0.072	-0.066	0.039	-0.118	-0.089	-0.035	-0.015	1.000									
D_Income200 (16)	-0.013	0.183	0.027	-0.110	0.025	0.110	-0.050	-0.095	0.120	-0.110	-0.272**	-0.205*	-0.081	-0.035	-0.035	1.000								
D_Savunder05 (17)	-0.305**	-0.108	0.004	-0.068	0.039	0.046	-0.106	-0.033	0.078	0.190	0.229*	-0.084	-0.044	-0.075	-0.075	-0.172	1.000							
D_Sav0515 (18)	-0.081	-0.071	-0.011	-0.093	0.013	0.151	0.279**	0.062	-0.179	-0.151	0.194	-0.106	-0.053	-0.077	-0.077	-0.053	-0.381***	1.000						
D_Sav1525 (19)	0.161	0.019	-0.073	0.268**	-0.138	-0.131	-0.073	-0.237*	0.277**	-0.015	-0.149	0.226*	0.040	-0.052	-0.052	-0.119	-0.254**	-0.264**	1.000					
D_Savabov25 (20)	0.250**	0.160	0.063	-0.051	0.057	-0.090	-0.114	0.156	-0.116	-0.024	-0.297**	0.009	0.063	0.189	0.189	0.311**	-0.395***	-0.410***	-0.273**	1.000				
D_Fami1_2 (21)	0.216*	-0.063	0.294**	-0.024	-0.162	-0.068	-0.038	-0.040	0.057	-0.438***	0.226*	-0.157	-0.061	-0.027	-0.027	-0.061	0.032	0.024	-0.091	0.016	1.000			
D_Fami3 (22)	-0.179	-0.076	0.210*	-0.010	-0.083	-0.115	-0.065	0.003	0.023	0.115	0.109	-0.072	-0.105	-0.045	0.334***	-0.105	0.192	-0.130	-0.154	0.062	-0.080	1.000		
D_Fami4 (23)	-0.099	0.080	-0.330***	0.163	-0.078	0.282**	-0.018	0.027	-0.020	0.138	-0.100	0.082	-0.087	0.111	-0.137	0.141	0.004	0.100	0.040	-0.134	-0.240*	-0.409***	1.000	
D_Famiabov4 (24)	0.139	-0.005	0.079	-0.161	0.221*	-0.197*	0.084	-0.014	-0.020	-0.035	-0.071	0.033	0.199*	-0.077	-0.077	-0.053	-0.157	-0.029	0.108	0.096	-0.136	-0.232*	-0.699***	1.000

Note: Asterisks *, **, *** present significance at 10%, 5% and 1% level, respectively

Source: Authors' calculation

We find that there is a significant correlation between the level of risk tolerance and the gender of the managers. Specifically, male managers tend to be more risk lovers, compared to female managers with $r = 0.2712$, $p < 0.05$.

Several previous pieces of research indicate that family size plays an important role in a household's decision-making process. For instance, a family with more members living together tends to be more conservative when they encounter investment problems. The correlation matrix between the family size subgroups and the risk score is reported in Table 5 shows that a family with 1-2 member(s) and risk score have a positive correlation with $r = 0.2159$, $p < 0.1$, which means that this type of family tends to accept a higher level of risk.

We also find that there is a significant correlation between saving under 5%, together with saving above 25%, and risk score. Specifically, saving under 5% shows a negative correlation with risk score with $r = -0.3052$ and $p < 0.05$. On the other hand, there is a positive correlation between Saving above 25% and risk score. We can assume that individuals with a proportion of saving under 5% tend to be more risk-averse, compared to ones who save more than 25%.

Moreover, saving under 5% and saving above 25% are highly correlated at the lower 1% significant level ($r = -0.3954$, $p = 0.0009$). As a result, we will only select saving under 5% as the independent variable when applying a regression model.

Table 6. Correlation Matrix between Risk Score and Financial Subgroups

Variables	**(1)**	**(2)**	**(3)**	**(4)**
RISKSC (1)	1.000			
FINSELF (2)	0.289**	1.000		
FINBA (3)	0.204*	0.092	1.000	
FINADV (4)	0.260**	0.232*	0.604***	1.000

Note: Asterisks *, **, *** present significance at 10%, 5% and 1% level, respectively

Source: Authors' calculation

Table 6 illustrates the correlation matrix between risk score and three financial subgroups. As can be seen in the table, advanced financial literacy and self-assessed literacy are significantly correlated with risk tolerance score ($r = 0.260$, $p < 0.05$; $r = 0.289$, $p < 0.05$ respectively). In addition, there is also a significant correlation between basic financial literacy and risk score at a higher p-value ($r = 0.204$, $p < 0.1$). We can suppose that all three literacy factors have a positive correlation with risk tolerance score and the higher financial knowledge that individuals acquire, the higher level of risk that they can accept.

Finally, we investigate the correlation between basic financial literacy and advanced financial literacy. The table shows that they are highly correlated at the 1% significant level ($r = 0.604$, $p < 0.01$). Therefore, in the following step applying the regression model to analyze deeply the relationship between variables, we only use advanced financial literacy as the independent variable.

4.3. Regression results

In this section, we report the regression estimation using three different specifications: a set of only significantly correlated demographic characteristics, the second specification with only financial literacy elements, and the third specification is the combination of both demographic subgroups and financial literacy to have a full picture of all significantly correlated variables.

Effects of demographic characteristics on risk tolerance score

Our goal is to investigate whether these demographic factors and the risk score really have a relationship when applying a regression model instead of the correlation matrix. Regression results from Model 1 are reported in Table 7. The model specification is as follows:

$$\mathbf{RISKSC = \beta 1 + \beta 2\ D\_Male + \beta 3\ Fami1\_2 + \beta 4\ Savunder5 + \mu}$$

As can be seen in Table 7, factors relating to gender and family size have a significant effect on the risk tolerance score. Specifically, male managers tend to take a more 1.23 percentage point of risk compared to female managers ($\beta 2 = 1.237$, $p < 0.05$). This result seems to be suitable to several pieces of literature that support male individuals are willing to accept more risk in comparison with female individuals.

In terms of family size, we find a statistically significant relationship between family size with only 1 to 2 member(s) and risk tolerance score. The regression result shows that a small family size, in this situation it is the 1-2 - member family, prefers a much higher level of risk ($\beta 3 = 2.925$, $p < 0.05$). This result is in line with Lewellen *et al.* (1997)'s finding that households with fewer members living together can bear more risk because of lower expenditure and fewer dependent individuals.

Regarding the relationships between different levels of saving proportion per month and risk tolerance score, we also find some interesting results. Participants who save less than 5% per month tend to be more risk-averse. The regression results show a negative link between this level of saving and risk score ($\beta 4 = -1.643$, $p < 0.05$). It totally matches with previous assumptions that having less saving proportion can have a huge impact on the idle capital to invest and make individuals more risk-averse and conservative.

Table 7. Regression Models

	RISKSC (model 1)	**RISKSC (model 2)**	**RISKSC (model 3)**
	(1)	**(2)**	**(3)**
D_Male	1.306**		**1.129****
	(2.26)		**(2.02)**
D_Fami1_2	2.975**		**2.117**
	(2.14)		**(1.54)**
D_Savunder05	-1.643**		**-1.730*****
	(-2.53)		**(-2.76)**
FINSELF		0.540**	**0.399**
		(2.01)	**(1.58)**
FINADV		0.410*	**0.413***
		(1.69)	**(1.83)**

	RISKSC (model 1) (1)	RISKSC (model 2) (2)	RISKSC (model 3) (3)
Observations	67	67	**67**
R-squared	0.2084	0.1227	**0.2935**

Note: Table 7 reports the regression in which risk score is the dependent variable and gender, family with 1-2 member(s), saving under 5%, self-assessed financial literacy, and advanced financial literacy are independent variables. t-values are in parantheses. Asterisks *, **, *** present significance at 10%, 5% and 1% level, respectively. All definitions of variables are provided in Table 1.

Source: Authors' calculation

In conclusion, with the first specification which includes only significantly correlated demographic characteristics, we find that this group can have great contributions to the risk level of respondents with a very small p-value ($p < 0.05$). Male managers and small-sized families (1-2 member(s)) tend to accept a higher level of risk, compared to other subgroups while participants who save less than 5% of total income per month are more risk-averse.

Effects of financial literacy on risk tolerance score

Regression results from Model 2 are reported in Table 7. The model specification is as follows:

$$\mathbf{RISKSC = \beta 1 + \beta 2\ FINSELF + \beta 3\ FINADV + \mu}$$

In terms of self-assessed financial literacy, we observe that this variable can greatly impact the risk tolerance score. Specifically, there is a positive relationship between self-assessed financial literacy and risk score ($\beta 2 = 0.540$, $p < 0.05$). These regression results indicate that one standard deviation of self-assessed literacy score leads to a 0.540 percentage point higher risk tolerance level. For example, participants with higher self-assessed knowledge will tend to be more confident and take a greater level of risk. As a result, we concluded there is a significant effect of self-assessed financial literacy on risk tolerance during financial investment decisions.

Turning the analysis to advanced financial literacy, the story is quite similar to the result provided by the Pearson correlation matrix. According to regression results, advanced financial literacy still plays an important role in the participant's risk tolerance score with $\beta 3 = 0.410$, $p < 0.1$. This result indicates that one standard deviation of advanced financial literacy score leads to a 0.410 percentage point higher participants' risk tolerance. These results imply that a manager with a higher level of advanced financial knowledge will accept a greater level of risk. Therefore, we reject the H0 (null hypothesis) and concludes there is a significant relationship between advanced financial literacy and risk tolerance during financial investment decisions.

Effects of demographic characteristics and financial literacy on risk tolerance score

After analyzing these two groups of variables separately, we take a closer look at the relationship between the risk tolerance score and these two groups when combining them together. Our goal is to analyze the impacts of each variable in the combination of gender, family with 1-2 member(s), saving proportion per month, self-assessed financial literacy, and advanced financial

literacy. Regression results from Model 3 are reported in Table 7. The model specification is as follows:

$$\mathbf{RISKSC = \beta1 + \beta2\ D\_Male + \beta3\ D\_Fami1\_2 + \beta4\ D\_Savunder5 + \beta5\ FINSELF + \beta6\ FINADV + \mu}$$

In terms of demographic characteristics, we find some interesting results. First of all, the family with 1-2 members variable seems to have less impact on the risk score when combining all variables together ($p > 0.1$) even though this variable's p-value is lower than 0.05 when analyzing demographic factors separately. Among all demographic variables, only gender and saving proportion per month still maintain their influence on the dependent variables. Secondly, the regression results show that gender factors still have $p < 0.05$ but the coefficient value decreases to 1.129. On the other hand, saving less than 5% per month factor is considered to increase its strength dramatically. Specifically, this variable's coefficient value decreases to -1.730 with $p < 0.01$. As a result, saving proportion per month in general and saving under 5% per month in particular is the key factor that impacts the level of risk tolerance of the participants.

Regarding the financial literacy factors, the story is slightly different from the Pearson correlation matrix and the regression of financial literacy as the independent separately. Firstly, self-assessed financial literacy loses its impact on risk score ($p > 0.1$) while in regression Model 2, its p-value < 0.05. Secondly, advanced financial literacy is still a financial factor that affects the risk tolerance of the respondents. One standard deviation of an advanced financial literacy score leads to a 0.413 percentage point higher level of risk tolerance ($\beta6 = 0.413$, $p < 0.1$). The results of regression Model 3 report that among financial literacy factors, advanced financial literacy is the crucial factor contributing to the higher risk tolerance of the managers.

After combining all significantly correlated variables, we find that gender, saving proportion and advanced financial literacy still maintain their great impacts on risk tolerance score, especially with saving under 5% per month.

5. Conclusion

In this study, our main objective is to investigate the influence of demographic factors and financial literacy of Vietnamese managers on the investment decision-making process, in which we focus deeply on the risk tolerance of the participants.

By doing the descriptive analysis, we have a full picture of the demographic characteristics of 67 Vietnamese managers in terms of number and proportion. The results show the balance between male and female managers. The majority of the participants are over 30 and achieve bachelor's degrees, as well as master and Ph.D. degrees. In addition, most of them are married and have at least 4 members in their family with the average income level of the household per month varying from 40 million VND to more than 200 million VND. Last but not least, about 75% of the respondents have a saving habit and among them, more than 60% save more than 15% of their income per month.

In terms of results provided by the Pearson correlation matrix, we discover several interesting findings. First of all, among 7 demographic subgroups, there are only 3 subgroups, including gender, family size, and saving proportion per month having significant correlations to risk tolerance score. Regarding financial literacy, all of the financial literacy factors which are self-

assessed literacy, basic financial literacy, and advanced financial literacy are significantly correlated with a risk score. The results provide some important demographic factors and indicate that the financial literacy group plays an important role in identifying the risk tolerance of the managers.

Turning the analysis to the results provided by the regression model, we find some other important implications. First of all, all the demographic and financial literacy variables maintain their relationship with risk tolerance scores when they are analyzed separately (model 1 and model 2). However, when we combined all variables together, only gender, saving proportion, and advanced financial literacy are the three key factors that contribute to the score of the participants' risk tolerance. Specifically, managers who are male and have more advanced financial literacy tend to accept a higher level of risk while individuals who save less than 5% of their income per month are more risk-averse. It indicates that the risk tolerance of the managers depends on not only the demographic characteristics but also the financial literacy factors. Ton and Nguyen (2014) also investigate the impact of demographical factors on investment decisions in the Vietnam stock market. The paper has pointed out that gender, age, investment experience, and marital status influence the decision-making process of Vietnamese investors. In our research, we find that gender still maintains its impact on the process, but besides gender, saving proportion is the key factor that contributes to the level of risk tolerance of the investors. Additionally, we analyze not only demographic factors but also financial literacy to understand deeply the impact of this combination on Vietnamese managers' investment decisions.

Our findings contribute to the current literature by combining two important elements, which are demographic factors and financial literacy to investigate their impacts on Vietnamese managers' investment decisions. Firstly, among demographic factors, we find that managers with different gender and saving proportions tend to have different decisions in taking risks. Secondly, the level of risk tolerance of the Vietnamese managers is greatly influenced by financial literacy, especially with those who reach the advanced level of finance. Therefore, we suggest not only Vietnamese managers but also the Vietnamese education system improving this important field of knowledge.

Research in the future can add other demographic factors and measure financial literacy and risk tolerance by other methods to have other views of the topic. Moreover, other sophisticated models and tools should be applied to bring out more convincing results.

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