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The role of financial literacy in retirement investment choice

Abstract

Research background: Preparation for retirement is a major concern for the people in the workforce as they have to encounter considerable difficulties in making the right investment decisions for their retirement.

Purpose of the article: This research extends the literature on personal finance by investigating the impact of both financial literacy levels and pension knowledge on employees' investment choice decision for their retirement, while in previous literature the role of these factors has mainly been explored separately.

Methods: To conduct the research, a survey questionnaire was applied to collect data in three main regions of Vietnam comprising Northern, Central and Southern Vietnam. Data collection was made in 2018, in which 427 valid questionnaires were used for data analysis from 700 questionnaires. Two estimation methods are employed for analysis in this study, including a linear probability model (LPM) and two-stage least squares (2SLS) model. The findings of this research remain significant after the Two-Stage Least Squares (2SLS) regression model is used as an estimation technique to eliminate potential bias caused by endogenous problems.

Finding & Value added: The results show that basic financial literacy level and pension knowledge are principal factors which significantly increase the probability of exercising retirement investment choice of employees, while advanced financial literacy level factor has a signifi-

cant effect on choosing growth investing options for their retirement. Further, this research finds that there is no correlation between employees' financial risk tolerance and their retirement investment choice. Furthermore, the study proposes and offers new evidence that pension knowledge is a decisive factor providing employees with encouragement to exercise retirement investment choice and those who consult with financial advisors tend to take part in growth investing option.

Introduction

Over two decades, the 1990s and 2000s, many countries made public pension benefits more actuarially equitable and more closely connected to working histories. At the same time, when the pension reform process shifts defined-benefit (DB) to defined-contribution (DC) plan, it requires individuals to take more responsibility for their financial well-being. Specifically, in these extensive changes, individuals have to take financial decisions such as savings, investment, and wealth accumulation by themselves. Indeed, the reforms have brought some advantages to both the government and individuals. The government may reduce the burden of funding social benefits, while individuals have more obligations to make plans and decisions for their retirement, depending on their specific circumstances. However, the reforms have also led to less liberal future pensions and caused more difficulties for individuals to understand. Therefore, in order to prepare for their retirement, working people have to encounter increasing difficulties in choosing the most efficient ways to make the right decisions and considering the most suitable decisions for their specific situation.

Considering financial literacy is an underlying determinant of making investment decisions and accumulating wealth (Lusardi *et al*., 2013), higher level of financial literacy makes a major contribution to financial well-being (Lusardi & Mitchell, 2011a; Lusardi & Tufano, 2015; Ključnikov, 2016). Nonetheless, most research has focused on the relationship between this factor and savings, as well as retirement intentions. In addition, prior research also concentrated on the correlation between financial literacy and other factors such as participation in stock market (van Rooij *et al*., 2011), participation in derivative market (Hsiao & Tsai, 2018), retirement planning (Boisclair *et al*., 2015; Nguyen & Rozsa, 2019), individual savings (Mahdzan & Tabiani, 2013; Pan, 2016; Belás & Ključnikov, 2016). Other research studied the association between financial literacy and other determining factors of financial behaviour and household savings (Belás *et al*. 2014; Agarwal *et al*. 2015; Belás & Gabčová 2016; Pan, 2016). Very little research explored and identified the determinants of retirement investment choice decision-making or the effects of financial literacy on this decision-

making process. Accordingly, there should be far more research on this correlation.

Vietnam is a typical case to explore the effects of financial literacy on retirement investment choice decisions owing to its economic and social conditions. Firstly, Vietnam is a transition and fast-growing economy with an expanding financial market. Established in the early 2000s, the capitalization of the stock market grew rapidly and reached 40.4% of GDP in 2017. Regarding the capital market, government bonds contributed 31% to GDP in 2016 (World Bank, 2018). The banking industry consists of a variety of financial institutions, including state commercial banks, international banks and private banks. Consequently, major cities including Ho Chi Minh and Ha Noi provide valuable and professional consumer finance services thanks to the presence of many bank branches, financial companies and other financial institutions such as mutual funds and securities companies. Also, people who would like to invest for their retirement can have a large number of options of financial products and financial instruments namely long-term deposits, stock markets, private pension funds and mutual funds, government bonds and corporate bonds, and investment trusts. However, at the same time, in order to confidently break into this fast-growing market, people need to acquire a certain level of financial knowledge to reach wise decisions on progressively complicated products and the capacity for assessing the performance of these products. Further, according to the World Bank (2012), social security system of developing countries, especially the one of Vietnam, is ineffective due to low coverage rate, inequitable contributions and benefits, and financial instability. Considering that people in these countries cannot afford basic needs in their retirement, because of low pension income and marginal benefits, it is essential for working people to invest for their retirement by taking investment choice decisions.

Accordingly, in this context the first question is posed to ask if Vietnamese people currently in the workforce have prepared for their retirement by making retirement investment choice or not. In addition, the question of how the levels of financial literacy influence people to make retirement investment choice is also considered. Furthermore, in the context of the pension system in Vietnam, whether employees have enough pension knowledge to recognize and perceive the pension income that they receive in retirement stage. Consequently, the main objective of the present work is to make contributions to the growing body of literature on encouraging people currently in the workforce to take investment choice decisions in preparation for their retirement by making three major contributions. First, in this research a conceptual framework is established to make decisions on

retirement investment choice in order to recognize its determinants. Second, unlike previous research, which only dominated the effects of financial literacy on investment decisions, this research explores the role of pension knowledge, which is considered a key factor in decisions on retirement investment choice. Finally, to motivate individuals to invest for their retirement, in this research pension knowledge and financial literacy are defined as determining factors of decisions on retirement investment choice.

This paper is organized as follows: After an introduction, a brief literature review and hypothesis development are presented. Then, the following section develops a conceptual framework and describes the research methodology in detail with data collection method, measurement of variables and the estimation technique, which employs the Two-Stage Least Squares (2SLS) regression model. Finally, the results and discussion section and conclusion are presented in the last section of this paper.

Literature review and hypothesis development

Financial literacy and financial decision-marking

It is proved that financial knowledge has a close relationship with financial decision-making. Particularly, individuals with a higher level of financial knowledge are more likely to participate in stock market (van Rooij *et al.,* 2011; Yoong, 2011), save more for their retirement and have varied portfolios and considerable wealth accumulation (Lusardi *et al*., 2013). Regarding bounded rationality and bounded self-control theories (Thaler & Shefrin, 1981) in behavioural economics, these researchers suggest and explain some reasons why individuals do not involve in making decisions about the savings for their retirement. Firstly, they usually apply their heuristics or 'rules of thumb' to address information and then make decisions, so this leads to constraints on rational choice. Secondly, individuals often do not take the initiative and are not self-motivated to execute their purposes even if they have planned for that. For example, when individuals face a complex and choice overload of retirement investment decisions, they have a propensity to procrastinate or walk away from exercising investment choice decisions (Fear, 2008; Sy, 2011). Likewise, it is indicated that if the perceived benefits of making investment choice are more significant than the costs individuals pay for collecting adequate information to exercise informed choice, they will tend to choose the former option (Brown *et al.,* 2002). Accordingly, more financially literate individuals have a propensity

to make pension choice decisions as they spend less on the information than those with lower financial literacy.

In fact, it has been proved in previous research that there is a relationship between financial literacy and a variety of financial behaviours. As an illustration of this, when conducting research on joining in the stock market in the Netherlands, van Rooij *et al.* (2011) indicate that individuals who do not have a good understanding of equities and bonds, and how financial markets work are less likely to invest in share market. Furthermore, in another research on retirement savings, van Rooij and Teppa (2008) also prove that more financially literate individuals are more likely to take part in optional pension savings programs. Likewise, Dvorak and Hanley (2010) and Clark *et al*. (2015) find in their research in the US that the more financially literate individuals are, the stronger possibility for them to join in defined contribution plans.

Briefly, it can be assumed that people with a greater understanding of financial knowledge tend to exercise financial decisions. In particular, they are more likely to join in the stock market (Clark *et al.,* 2015; van Rooij *et al.,* 2011), choose optional pension savings programs (van Rooij & Teppa, 2008), or join in defined contribution plans (Dvorak & Hanley, 2010). As a consequence, people with a higher level of financial literacy have a propensity to take pension savings decisions so that they tend to make an investment choice. Hence, the following hypotheses are posed:

Hypothesis 1A: *There is a positive correlation between financial literacy level and the propensity to make retirement investment choice.*

Hypothesis 1B: *There is a positive correlation between financial literacy level and the propensity to choose growth investing options instead of conservative investing options.*

Pension knowledge and retirement investment choice decisions

In a preponderance of research on investment decision-making, financial knowledge is considered a major indicator of this decision-making process. In this research, nonetheless, a framework is proposed so that other factors especially pension knowledge are also taken into consideration in order to examine and indicate which ones are the drivers of working people's choice of retirement investment. Indeed, pension knowledge has been investigated in a small number of studies only. In order to measure this factor, many features such as contribution, defined contribution pension, defined benefit pension, and benefit information are applied. To evaluate

the level of individuals' pension knowledge, individuals are asked to answer a set of questions in relation to how defined-benefit pension system work. This questionnaire is comprised of age, voluntary, eligibility conditions, contribution formula and benefit formula (Luchak *et al*., 2000).

Gustman and Steinmeier (2005); Gustman *et al*., (2012) hypothesized that with pension knowledge individuals can clearly understand why they need to save for their retirement. This research supports this hypothesis since when people comprehend and perceive the prospective benefits and the policies of their social welfare system, they recognize what contribution they should make and the rate they would receive when they retire. Hence pension knowledge could drive people to invest or make savings for their retirement. In other words, pension knowledge might have a significant correlation with wealth accumulation and pension income in retirement stage. Therefore, in the context of developing countries, particularly the pension system in Vietnam with the undeveloped and uncompleted social security benefits system, along with participation in social insurance working people also need to invest for their retirement. This is because when they have knowledge of pension, they could realize that their pension income in the future cannot afford to ensure their living standard when they retire. Thus, it is possible to suggest that people are more likely to invest for their retirement when they have a higher level of pension knowledge. Therefore, it can be hypothesized that:

Hypothesis 2: *There is a positive correlation between the level of pension knowledge and the propensity to make retirement investment choice.*

Other factors influencing retirement investment choice decisions financial risk tolerance

It is believed that those working in pension fund and in charge of defined contribution plans have profound economic knowledge, effective rational action and potential capability to maximize its contributions. Nonetheless, when people have to take risk, or when they have to face something unpredictable, they do not always take up suggestions the economic theory developed (Kahneman & Tversky, 1979). Further, according to Davey and Resnik (2008), risk tolerance is defined as the amount of risk an investor is willing to take to produce a positive financial outcome.

To understand the relationship between risks and investment products, investors need to acquire a certain amount of knowledge and experience. Therefore, knowledge plays a crucial role in financial decision-making, especially long-term investment decisions. According to Benjamin *et al.*

(2013) and Dohmen *et al*. (2010), there is a relationship between a lower level of cognitive abilities and financial risk tolerance. In addition, it is proved that people's opinions and their awareness of financial risks are closely related to financial decisions (van Rooij *et al.* 2011). Benjamin *et al.* (2013) and Dohmen *et al.* (2010) also suggest that there may be a relationship between knowledge and cognitive ability and preferences, for example, risk aversion, which could have an impact on financial choice decisions. This means individuals with conservative characteristics prefer fixed income investing for their investment portfolios, so it also affects their investment choice. For instance, conservative investors usually select savings account, certificates of deposit (CDs) or bonds for long-term investment. Conversely, individuals among a group of aggressive investors typically observe the volatile market and deeply understand this market. As a result, they prefer jointing in the stock market and selecting highly volatile financial instruments as aggressive investors tend to maximize profits and are also willing to take the maximum risk. Hence, financial risk tolerance could have a correlation with decisions on retirement investment choice. Therefore, the following hypothesis is posed:

Hypothesis 3: *There is a positive correlation between financial risk tolerance level and the propensity to make retirement investment choice.*

Financial advice

Financial advice can support investors strongly in many different ways. Financial advisors can provide investors with detailed information, help them avoid elementary mistakes, provide explanations and propose solutions to unexpected problems. According to Stigler (1961), individual investors are likely to refuse to consult with financial advisors when there is no difference between the marginal cost and marginal benefit. This is because these investors believe that it is more beneficial to use financial consultancies than to search information by themselves since they think the former option is cheaper than the latter one.

Based on the literature, in order to make informed financial decisions, a number of social factors are taken into account in this decision-making process. Specifically, individual investors might seek information or ask for advice from several channels before reaching any financial decisions. According to a model examining the impacts of social interactions on people's attitudes suggested by Glaeser and Scheinkman (2000), it is proposed that there is a relationship between these interactions and individuals' financial decisions.

Some research works consider the role of advisor in assisting individuals to make decisions. Haslem (2008) declares that financial advisors can assist customers to control their feeling of lack of confidence or vulnerability. In addition, this study also suggests the role of advice for individuals in helping them revise their past decisions. Because of the deficiency of studies in this area, the literature does not indicate whether individuals seek advice in order to compensate for the lack of financial literacy or look for sophisticated financial knowledge to make informed decisions. However, the result of the research of Hackethal *et al*. (2012) points out that advice has a significant positive relationship with wealth accumulation.

Although the role of advice in the decision-making process is not clearly mentioned, this research still supports the idea that advisors are necessary for decisions which require advanced or sophisticated financial knowledge to support individual investors in building confidence to make informed choice decisions for their investment, particularly retirement investment. To support this idea, Calcagno and Monticone (2015) propose a stylized model of demand for financial advice. They comment on the fact that advice experts often search for and provide valuable information to sophisticated investors only. Accordingly, it is believed that seeking advice from financial experts is one of the options to support individuals to be able to make informed decisions, since this information and knowledge can increase their confidence when making financial decisions. It is crucial in the context of emerging markets in which financial instruments and products are developed rapidly, but other facilities such as policies and asymmetric information status are incomparable. Therefore, in this research, it is also expected that those consulting with financial advisors or using financial consultancies tend to make retirement investment choice actively. Hence, the following hypothesis is posed:

Hypothesis 4: *Employees who seek advice from financial experts are likely to make retirement investment choice.*

Conceptual framework development

Based on the literature review and informed choice model which was proposed by Brown *et al*. (2002), this study develops and proposes a conceptual framework which examines the disparities in how employees who have and have not exercised choice make retirement investment decisions for their retirement. Particularly, this conceptual framework includes essential factors namely basic and advanced financial literacy, perceived financial

literacy, pension knowledge. Other factors such as financial risk tolerance, financial advice and demographics characteristics which are considered control variables are also taken into account in order to investigate and indicate factors encouraging employees to exercise retirement investment choice (Figure 1).

Research methodology and data

Data collection method

Regarding data collection, objective respondents who are currently employees in private and public sector were collected based on the specific characteristics of Vietnam's economy and geographic region with a stratified random technique. Particularly, Ha Noi capital, Ho Chi Minh City and Da Nang city represent three main regions of Vietnam which are appropriate for the purpose of the research. Data collection was conducted in a period of two months from January to March 2018. Two methods were applied, including interviewing face to face and using the link online for those who would rather choose this option. A summary of sample process was 427 valid questionnaires used for data analysis from 700 questionnaires, in which 362 respondents participated in face-to-face interview using paper-based questionnaires and the rest of participants did it online. Invalid questionnaires which were not completed or with the same answer "Do not know" were removed from data analysis.

Measurement of variables

In this research, financial literacy was considered the main explanatory variables besides other variables such as pension knowledge, financial risk tolerance and financial advice variables. In addition, socio-demographic characteristics such as gender, age, education level, marital status, income level, family member and home ownership are also considered control variables. Dependent variables in this study are described as follows:
− Retirement investment choice: whether the respondents have exercised retirement investment choice or not (1 if yes; 0 if no).
− Growth investment choice: whether the respondents who have exercised retirement investment choice participate in growth investing option including stocks, mutual fund and investment trust or conservative investing option including deposit account; savings account and private pen-

sion funds (1 if participating in growth investing option; 0 if participating in conservative investing option).

Following Gallery *et al*. (2011); van Rooij *et al*. (2011), the research questionnaire was constructed and developed with six components. The first component financial literacy is measured by perceived financial literacy, basic financial knowledge and advanced financial knowledge. The next components are pension knowledge, financial risk tolerance, financial advice which were suggested by Luchak *et al*. (2000) and Gustman *et al*. (2012); and van Rooij *et al*. (2007) respectively. The last component in the research questionnaire includes socio-demographic characteristics.

Empirical model

Two estimation methods are employed including a linear probability model (LPM) and two-stage least squares (2SLS) model for analysis in this study. First, a linear probability model (LPM) is estimated because dependent variables are binary variable. Second, two-stage least squares model (2SLS) is applied to control endogeneity problem because of mistakes in measurement or unobserved variables. Moreover, another possible reason for endogeneity problem is reverse causality caused by investors who have experience of taking part in financial market such as investing in stock market or using sophisticated financial products. These investors might gain knowledge from these situations. According to Lusardi and Tufano, (2015); Fornero and Monticone (2011), this could lead to a negative effect on the correlation between financial literacy and financial behaviour. Therefore, the potential endogeneity of financial literacy is tested. Instrumental variables proposed by van Rooij *et al*. (2011) and Fornero and Monticone (2011) are applied in this research to address the endogeneity problem. These variables include parents' education level, training courses in economics and finance areas and respondents' experience in historical investment or sophisticated financial products. The Two-Stage Least Squares (2SLS) regression estimate is described as follows:

$$y_1 = \propto_1 y_2 + \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u \qquad (1)$$

Where y_2 is defined as an endogenous variable, and it is estimated by instrumental variables and all exogenous variables [instruments, $z = (1, x1,\ldots,xk, z1,\ldots, zm)$]. The instrumental variables are correlated with y_2, we have:

$$y_2 = \delta + \delta_1 x_1 + \delta_2 x_2 + \ldots + \delta_k x_k + \delta_{k+1} z_1 + \cdots + \delta_{k+m} z_m + \varepsilon \quad (2)$$

Results

Statistics of data collection

Table 1 provides detailed profile of the demographic factors of respondents. The table shows that the percentage of male and female respondents is 52% and 48%, respectively. Among the respondents, there are more than half of interviewed individuals around 52% in the age group of 26–35 years, 26% in the age group of 36–50 years old and the rest of respondents' age group are 16% and 6% for the age group of under 25 years and over 51 years, respectively. Regarding the education level, the majority of respondents have diploma or bachelor's degree (65%), because the objective respondents in this study are employees or office staff, post graduate degree (8%) and high school degree (27%). Most of respondents in this study are single (63%) and there is a half of respondents earning a monthly income of under VND 9 million and they also have their own home.

The statistics for the key variables used in the empirical analysis are presented in Table 2. It reports the descriptive statistics on analysis, including information about the observation of the sample survey and a range of points of measurement of critical variables for empirical analysis.

Regression analysis

Exercising retirement investment choice

Table 3 provides the estimation results of the factors which affect individuals' retirement investment choice decision-making. Generally, the results are robust and obtained from two different estimation methods LPM in column 1 and 2SLS in column 2.

The results of LPM estimation method in column 1 indicate that the correlation between exercising retirement investment choice and the factors of basic financial literacy, advanced financial literacy, and pension knowledge is positive and statistically significant. This means that individuals who are more financially literate in both basic and advanced financial literacy and pension knowledge are more likely to exercise retirement investment choice. As an illustration of this, when the score of these factors increases by 1, it is estimated to raise the likelihood of making choice about investment for retirement by 17.3%, 11.5% and 6.1% points respectively. On the contrary, other factors including perceived financial literacy; financial risk tolerance and financial advice have no correlation with choice about investment for retirement.

However, according to prior research of Lusardi and Mitchell (2007b); van Rooij *et al*. (2011), the authors indicate that the potential endogenous problem occurs when they examine the nexus of financial knowledge and stock market participation by applying Ordinary Least Squares (OLS) regression. Hence the results of the estimation based on LPM method in this study have a potential endogeneity problem, and this leads to bias against the results of investigating the relationship between financial literacy and finance behaviour in saving and investing of individual investors. In addition, in this research, other reasons could also cause this endogenous issue, such as investors' experience in their investment; improvement in knowledge by themselves or unobserved factors. Hence solely employing LPM estimate could have bias towards the results of this research.

To defeat endogenous problem in order to avoid bias in results, Two-Stage Least Squares (2SLS) estimation was applied in this research by integrating instrument variables into the estimation model. The results in column 2 in Table 3 reveal that exercising retirement investment choice is positively correlated and statistically significant with basic financial literacy level and pension knowledge at $P<0.01$ and $P<0.1$ respectively. Meanwhile, perceived financial knowledge is found to have a negative and statistically significant correlation with exercising retirement investment choice. This can be interpreted that those who have acquired a higher level of basic financial literacy have a propensity for making an investment choice for retirement. This finding is confirmed and in a similar trend, in comparison with prior studies conducted by Fornero and Monticone (2011) and Ricci and Caratelli (2017). Similarly, those who have gained greater pension knowledge have a propensity to exercise retirement investment choice. In other words, in order to encourage increased participation in retirement savings, it is necessary for employees to broaden their pension knowledge, especially that in relation to the rates of contribution and benefit of the social insurance system and their understanding of financial investment options available on the market. This result produces new evidence in relating to retirement investment choice and corroborates the finding that employees with greater pension knowledge are more likely to get better pension (Gustman *et al*., 2012). Nevertheless, there is no statistical significance in the association of exercising retirement investment choice with other factors, including sophisticated financial literacy level, financial risk tolerance and financial advice.

Hence the results partially support hypothesis 1A. This indicates that there is a positive correlation between basic financial literacy level and the propensity to make retirement investment choice. Similarly, hypothesis 2 is also substantiated. In other words, a positive correlation is found between

pension knowledge and the propensity to make retirement investment choice. In contrast, the results of this research do not support a part of hypothesis 1A, as well as hypotheses 3 and 4. This means factors including advanced financial literacy, financial risk tolerance and financial advice do not have impact on exercising retirement investment choice of Vietnamese employees.

Moreover, in the Two-Stage Least Squares (2SLS) model, the potential endogeneity of financial literacy is tested along with other instrument variables applied in this model. This research has employed Wu-Hausman test and F-statistics to check the endogenous problem of financial literacy and remove the weak problem of instrument variables, respectively. Consequently, the results confirm that with P-value < 0.05 endogenous variables are considered financial literacy variables. Likewise, with F-statistics in the first stage regression of 2SLS of 22.8 and 45.0 for basic financial literacy and advanced financial literacy respectively, the results confirm that instrument variables are not weak.

 Investment choice outcome

To identify the role of advanced financial literacy level in investment choice outcome through investing growth options or investing conservative options, hypothesis 1B is tested and the results is presented in Table 4.

Table 4 provides the estimation results of investment choice outcome of those who have participated in investment for their retirement. Two estimation methods are performed concurrently, including LPM and 2SLS. However, the results from 2SLS model in column 2 are far more statistically significant than those from LPM model in column 1.

The results in LPM model estimation indicate that participants who have a higher level of advanced financial literacy and consult with financial advisers are more likely to participate in growth investing option. Particularly, the possibility of investing in growth options is anticipated to increase by 17.6 and 20.8 per cent points when there is a rise of 1 score in advanced financial literacy or when participants consult with financial advisers respectively. This indicates that employees who have gained sophisticated financial knowledge or have used consultancy from advisers may increase demands for participation in growth investing. Meanwhile, other factors comprised of perceived financial literacy, basic financial literacy and financial risk tolerance have no association with investment choice outcome. Similar to the results from column 1, after applying Two-Stage Least Squares (2SLS) to control the endogenous problem, column 2 shows the same results. Regarding marital status, nonetheless, married participants

have a tendency to choose a conservative investing option. Hence hypothesis 1B is supported, which proposes that the higher level of advanced financial literacy employees have, the more likely they take part in growth investing option.

These results in table 4 also check the endogeneity of financial literacy. Once again researchers apply Wu-Hausman test and F-statistics. This research also checks appropriate instrument variables by applying 2SLS model under control of the endogeneity of financial literacy. By rejecting the null hypothesis (P-value < 0.05) and with F-statistics 15.9 for advanced financial literacy in the first stage regression of 2SLS, the results confirm that financial literacy is endogenous variable.

Discussion

Two-Stage Least Squares (2SLS) regression produces the results that basic financial literacy and pension knowledge are positively correlated with retirement investment choice decision-making. These results are consistent with previous works (Clark *et al*., 2015; Lusardi *et al*., 2013; Gustman & Steinmeier, 2005; Gustman *et al*., 2012; van Rooij & Teppa, 2008). Hence the result suggests that people with more basic financial literacy and pension knowledge have a propensity to take retirement investment choice decisions. In contrast, regarding financial risk tolerance and financial advice, the result reveals that retirement investment choice decision-making is not correlated with these factors. This result is not in line with previous studies (van Rooij *et al*., 2011; Calcagno & Monticone, 2015). Particulary, van Rooij *et al*., (2011) indicated that there is a correlation between financial risk tolerance and financial behaviour. In terms of financial advice, Calcagno and Monticone, (2015) supported and suggested the role of financial advice in providing information for making decisions.

With regard to people who have taken retirement investment choice decisions, it is proved that growth investing participation is solely chosen by people who have achieved advanced financial literacy and have sought advice from financial experts. Contrary to the propensity to make retirement investment choice, the result shows that investment choice outcome is not correlated with basic financial literacy. It means that only employees who have acquired sophisticated financial literacy are likely to choose a different option. The finding is in line with and confirms the research carried out by van Rooij *et al*. (2011) and Clark *et al*. (2015), who indicated that people with advanced financial knowledge are more likely to participate in growth investing option such as stock market. Recently, the findings

from study made by Feng *et al*. (2019) also indicated the nexus between financial literacy and financial household. Furthermore, the present research interestingly provides new evidence related to the role of advisers in financial decision on sophisticated financial products.

Generally, part of hypotheses 1A, 1B and hypothesis 2 are supported by the findings from the 2SLS estimation model whereas hypotheses 3 and 4 are not supported. Accordingly, it is proposed that basic financial literacy and pension knowledge have some impacts on decisions on retirement investment choice whereas advanced financial literacy and financial advice from experts affect employee's selection of or participation in growth investing.

Conclusions

Establishing a conceptual framework is the prime objective of this research in order to examine and define what part financial literacy, pension knowledge and other major factors play in encouragement to those in the workforce to prepare for their financial well-being in retirement by taking retirement investment choice decisions. The findings indicate that both basic financial literacy and pension knowledge have dramatic impacts on decisions on retirement investment choice. Further, sophisticated financial literacy also motivates people to exercise choice of the outcome of retirement investment. Hence the dominant role of financial literacy, pension knowledge and financial advice in motivating people to take decisions on retirement investment choice is defined. Consequently, the results of this research could be precious to the government and financial institutions so that these organisations can be fully aware of people's demand for pension savings and satisfy their needs. These organizations may design and provide financial literacy programs with long-term prospect for development of these programs. This is because in order to ensure financial well-being of individuals in retirement, it is essential for these individuals to recognize that there is a gap in their financial knowledge so that they are not capable of solving complicated financial problems. It is also important to build confidence in their basic financial literacy in order to take retirement investment choice decisions.

Also, the findings could be valuable to financial advisors as this research indicates that individuals who seek advice from financial advisors have a tendency to select growth investing option. The findings also propose that financial institutions should launch sustained educational cam-

paigns and use practical approaches to assist those seeking advice on finance.

Regarding further examination on this area, future research can be expanded by exploring the dynamics of individual investors' participation in stock market and the role of financial education capital factor.

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Annex

Table 1. The respondents' demographic and socioeconomic details

Variables	Categories	Frequency	%
Gender	Male	222	52%
	Female	205	48%
Age group	<= 25 years	68	16%
	26 to 35 years	222	52%
	36 to 50 years	110	26%
	51 to 60 years	27	6%
Education	High school	115	27%
	Diploma/bachelor's degree	278	65%
	Post-graduate's degree	34	8%
Marital status	Married	154	37%
	Single	273	63%
Children	No children	201	47%
	1 child	103	24%
	2 children	110	26%
	>2 children	13	3%
Income level	<= VND9 million	213	50%
	>VND9 to 15 million	115	27%
	>15 million	99	23%
Home owner	Yes	226	53%
	Not yet	201	47%

Table 2. Descriptions and statistics of key variables

	Mean (S.D)	Observation	Min	Max
Retirement investment choice (1 = yes)	0.510 (0.500)	427	0	1
Perceived financial literacy	2.634 (.996)	427	1	5
Basic financial literacy score	2.428 (1.113)	427	0	4
Advanced financial literacy score	4.018 (2.193)	427	0	8
Pension knowledge score	3.039 (1.421)	427	0	6
Financial risk tolerance	11.62 (2.421)	427	5	20

Table 3. Exercising retirement investment choice

	LPM (1)	2SLS (2)
Basic financial literacy	.173***(.017)	.525***(.089)
Advanced financial literacy	.115***(.007)	.036 (.038)
Perceived financial literacy	-.001 (.011)	-.039** (.019)
Pension knowledge	.061***(.012)	.039* (.021)
Financial risk tolerance	-.0001 (.004)	-.017 (.035)
Financial advice (base group: no advice)		
- Friends & colleagues	.0002(.023)	-.004 (.042)
- Adviser	.018 (.042)	-.005 (.059)
Gender (base: female)		
- Male	.008 (.022)	.024 (.042)
Age (base group: age <=25)		
- 25 < age <= 35	-.007 (.034)	.018 (.054)
- 36 < age <= 50	-.020 (.041)	.026 (.068)
- 50 < age <= 60	-.080 (.056)	-.148 (.090)
Education level (base group: high school)		
- Diploma/bachelor's degree	-.017 (.026)	.070 (.052)
- Post graduate degree	-.008 (.046)	.089 (.104)
Married	.001 (.033)	-.052 (.053)
Number of children	.018 (.017)	.031 (.029)
Income (base group: under VND9 million)		
- VND>9-15 million	-.048* (.028)	-.038 (.045)
- Over VND15 million	.018 (.027)	-.055 (.051)
Home owner	.012 (.028)	.043 (.052)
Observations	427	427
R^2	0.82	0.51
Durbin (score) chi2 (2)		106.27 (p=0.00)
Wu-Hausman F (2,406)		67.261 (p=0.00)
First-stage regression (F- test):		
- Basic financial literacy		22.8
- Advanced financial literacy		45.0

Robust Standard errors in parentheses; ***P<0.01, **P<0.05, *P<0.1

Table 4. Investment choice outcome (N=218)

	LPM	2SLS
Basic financial literacy	.007 (.044)	.028 (.173)
Advanced financial literacy	.176***(.029)	.302***(.047)
Perceived financial literacy	.004 (.031)	.019 (.035)
Financial risk tolerance	-.029 (.060)	-.005 (.012)
Financial advice (base group: no advice)		
- Friends & colleagues	.063 (.061)	.090 (.061)
- Adviser	.208** (.102)	.225**(.110)
Gender (base: female)		
- Male	.025 (.055)	-.073 (.065)
Age (base group: age <=25)		
- 25 < age <= 35		
- 36 < age <= 50	-.046 (.090)	-.047 (.090)
- 50 < age <= 60	.024 (.113)	.055 (.109)
Education level (base group: high school)	-.140 (.145)	-.074 (.148)
- Diploma/bachelor's degree		
- Post graduate degree	-.012 (.060)	-.074 (.093)
Married	.026 (.115)	-.103 (.141)
Number of children	-.141 (.086)	-.167* (.097)
Income (base group: under VND9 million)	-.001 (.043)	-.028 (.048)
- VND>9-15 million		
- Over VND15 million	.046 (.070)	.042 (.074)
Home owner	-033 (.068)	.015 (.077)
Observations		
R-squared	.047 (.075)	.133 (.077)
	218	218
	0.28	0.19
Durbin (score) chi2 (2)		14.279 (p=0.00)
Wu-Hausman F (2,406)		6.939 (p=0.00)
First-stage regression (F- test):		
- Basic financial literacy		12.21
- Advanced financial literacy		15.9

Standard errors in parentheses; ***P<0.01, **P<0.05, *P<0.1

Figure 1. Framework for retirement investment choice decisions