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Doctoral thesis summary

Financial literacy and Its Impact on Retirement Investment Choice: An Investigation of Vietnamese Employees

Finanční gramotnost a její vliv na investování v rámci důchodu:
Průzkum vietnamských zaměstnanců

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ABSTRACT

The main objective of this research is to develop a conceptual framework which investigates and confirms the role of financial literacy and other key factors motivating people in the working stage to make investment choice decisions for financial well-being in the retirement stage.

More specifically, in the literature review section, choice theories are explored in order to apply the aspects of choice theories to the context of retirement investment choice decisions. According to the review of empirical research into personal finance and financial decision-making, it is demonstrated that financial literacy plays a vital role and it is considered a prime factor in making informed investment decisions. Although recent research into financial behaviours and financial decision-making has been considered and developed, most research in this area has focused on saving intentions, retirement planning, stock market participation and derivative market participation. There is a limited number of research into the role of financial literacy in both basic and advanced financial literacy levels as well as other factors such as pension knowledge, financial risk tolerance and financial advice in the context of retirement investment choice decisions.

In order to achieve the main objective of this research, three research questions (RQ) are addressed and five hypotheses are proposed. This research is an empirical quantitative-based research. To undertake this study, a survey questionnaire is selected as a research instrument. Primary data is collected from a survey of 427 respondents who are current employees in the private and public sectors in Vietnam. Both univariate and multivariate analyses are applied to address the research questions. More particularly, descriptive statistics is used to measure basic and advanced financial literacy levels. Then a Two-Stage Least Squares (2SLS) regression is employed to test the hypotheses and the findings propose that exercising retirement investment choice is influenced by employees' basic financial literacy and pension knowledge while participating in or selecting growth investing option is affected by advanced financial literacy level and financial advice from experts.

This research also makes significant contributions to knowledge by giving evidence showing the relationship between financial literacy and retirement investment option in emerging financial market context specifically in Vietnam. In addition, this research has also expanded earlier studies by considering pension knowledge a significant factor in relation to exercising retirement investment choice decisions. Finally, the findings from this research have considerable implications for policy-makers and financial institutions, particularly pension industry and financial advice services.

ABSTRAKT

Hlavní cíl disertační práce se zaměřuje na rozhodování o investicích, neboť důchodové připojištění má silný vliv na růst a akumulaci aktiv a důchodových výhod. Tento problém se dotýká zejména jednotlivců, kteří jsou v pracovní fázi. V rámci dosažení hlavního cíle se práce zaměřuje na vytvoření rámce pro výběr investičních penzijních fondů se záměrem prozkoumat a vysvětlit problematiku výběru investic do důchodu a identifikovat hlavní faktory ovlivňující tato rozhodnutí.

Literární rešerše představuje teorie rozhodování za účelem aplikování aspektů rozhodování v kontextu investování v rámci důchodu. Podle empirického výzkumu osobních financí a investičního rozhodování je zdůrazněna potřeba finanční gramotnosti, jako hlavního faktoru pro investiční rozhodování. Současně je možné sledovat posun ve výzkumu oblasti chování a finančního rozhodování s důrazem na záměry úspor, plánování důchodového věku, účast na trhu akcií a účast na trhu derivátů. Oblast finanční gramotnosti v kontextu investování v důchodě je nedostatečně prozkoumaná, společně s jinými faktory jako důchodové znalosti, tolerance finančního rizika a finanční poradenství.

Aby bylo dosaženo hlavního cíle, předložená dizertační práce navrhuje tři výzkumné otázky (RQ) a pět hypotéz. Disertační práce je empirickým kvantitativním výzkumem, přičemž byl zvolen dotazník jako nástroj sběru dat. Primární data byla získána od 427 respondentů, kteří jsou zaměstnanci veřejného a soukromého sektoru ve Vietnamu. Pro řešení výzkumných otázek jsou využity jak jednorozměrné, tak multivariační analýzy. Podrobněji byla popisná statistika použita k měření úrovně základní a pokročilé finanční gramotnosti. Poté dvoustupňová regrese nejmenších čtverců (2SLS), přičemž výsledky naznačují, že volba investic do penzijního připojištění je ovlivněna základními finančními znalostmi zaměstnanců a důchodovými znalostmi, zatímco účast na volbě růstu nebo investování je ovlivněna pokročilou úrovní finanční gramotnosti a finančním poradenstvím od odborníků. Tento výzkum také přispívá k poznání tím, že poskytuje důkazy, které poukazují na vztah mezi finanční gramotností a možností investování do penzijního připojištění v kontextu vznikajících finančních trhů, konkrétně ve Vietnamu. Současně výzkum rozšířil dřívější studie tím, že zvažil důchodové znalosti jako významný faktor ve vztahu k výkonu rozhodnutí o výběru investic do důchodu. Závěry této disertační práce představují značné důsledky pro tvůrce politik a finanční instituce, zejména pro oblast penzijního připojištění a finanční poradenství.

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1. INTRODUCTION

Retiring from the job, which is compulsory part of retirement stage, triggers a turning point in life. Following the trends of the world, there have been plenty of changes in the view of individual retirement preparation. More specifically, there has been a shift from defined benefit plan to defined contribution pension plan in the past few decades. The noticeable point is that individuals have responsibility for protecting their own financial well-being in retirement stage. Therefore, it is very important to make decisions for retirement investment when they are in working stage and they must deal with how to make good choice in their decisions because they are aware of the necessities and importance of financial well-being in retirement stage of individuals' life cycle.

Today the appearance and development of new financial products and instruments for retirement investment in financial markets are really sophisticated and complicated. Individual investors have many choices to invest their money and they also have a chance to access and select them. However, this issue is a challenge for individual investors because it requires them to have knowledge to understand the benefits, costs, risk and return of each transaction of financial instruments. In addition, the fundamental knowledge plays an important role in informed investment decisions and individuals should identify which one best fits their circumstance. According to literature from personal finance and financial decision-making, financial literacy plays an essential role in making informed financial decisions (Arnone, 2004). Empirical studies into this field indicate that individuals with better knowledge of financial literacy contribute a lot to their financial well-being (Lusardi & Tufano, 2015a, Disney et al., 2015; Almenberg & Dreber, 2015).

Financial literacy plays an essential positive role in two subjects: individual investors, and financial system and economy. For individual investors, financial literacy helps them understand how to make sound decisions, how to prepare for their retirement, and how to maximize the utility of financial source and financial well-being. Regarding financial system and economy, financial literacy may inspire individual investors to confidently increase the demand for accessing and using financial services and products. In addition, the lack of financial literacy may impact on the perception of healthy finance and it could lead to poor financial plan, financial assessment and wrong financial decisions.

Accordingly, financial literacy is a means allowing individual investors to make right choices when they need to make financial decisions. It seems to be an essential component and indispensability to support and help people achieve their financial goals. Therefore, exploring, measuring and investigating the level of financial literacy and its role in financial decision-making in the context of retirement investment choice are necessary and prioritized in any countries.

2. LITERATURE REVIEW

This chapter presents an overview of theoretical perspectives related to choice theories and informed choice model. After that this section also review an empirical research related financial decision-making and goes further specific retirement investment choice decisions. According to a literature review of personal finance and pension finance, financial decisions are impacted by financial literacy level and a range of circumstantial and demographic and socio-economic factors. The review shows outstanding that there is limited empirical research which are examined into aspect of the relationship between financial literacy and investment choice in the context of retirement in emerging market in general and in Vietnam particular. Therefore, that is an opportunity that this research pursues to address. This chapter also describes the geographical context of the research such as an overview of the current pension system and financial economic background in Vietnam.

2.1 Choice Theories

Choice theories are applied to explore and understand factors which can be applied to motivate individual active exercise their choice in wide-range of commercial behaviors in the context of decision-making in retirement investment. Particularly, choice theories hypothesized in context of decision-making process discuss four aspects which mainly focus on salient attributes of the choice, the context of the choice, time horizon of the decision and reversibility of choice (Ambler *et al.*, 2004; Arkes, 1991; Bordalo *et al.*, 2013; Posavac *et al.*, 1997; Thaler, 1980; Tversky & Simonson, 1993).

The salient attributes of choice are considered to explain that individuals are often attracted to salient attributes of options when these attributes stand out among other characteristics and the stages of life may also have an influence on making investment choice decisions. Salience and the context of choice concepts specifically relate to retirement investment choice context. It is explained as follows: First, they relate to the economic environment and perspective. Gerrans, (2012), for instance, argues that financial crisis affects the confidence and belief of individuals' investment decision-making and changes their behavior savings and investment choice. Second, life cycle stages of individuals may exert an influence on retirement investment choice because normally people just concern and pay more attention to the matters related to pension and retirement when they nearly get retirement or late in their working stage (Mercer, 2006).

The concept of time horizon of choice plays a vital role and affects decision-making. Laibson (1997) claims that postponement is considered as a factor to explain irrational choices because people have a tendency to consider and perceive value in the short-term period than in the long-term period. Although

people who perceive that short-term decisions affect long-term achievements such as saving their money in early their life stage can make more accumulate wealth in their retirement stage, they just really do action and think it is a necessary saving for their retirement when they closely reach retired stage. Hence, Zauberman & Kim (2011) believe that one of the reasons of retirement saving deficit may relate to time perception.

Reversibility of choice has a relationship with time horizon of choice and it is suggested to connect financial decisions. Thaler (1980) argues that reversibility of choice may inspire individuals to exercise choice or no choice in the decision-making process. In an empirical research in the Netherlands, van Rooij & Teppa (2008) think that reversibility of choice could be a factor which also affects decision-making in actions of individuals' defaulting behaviors such as voting and participating in retirement voluntary savings programs. The next section will discuss informed choice and constraints on it.

2.2 Retirement Choice

Informed choice

The most outstanding challenge in retirement investment choice is wide-range of complicated choice decisions that individuals have to decide as retirement income is influenced by retirement investment approach that individuals applied.

In 1994, the World Bank supported pension income policy with a three-pillar approach namely government support, mandatory private pension and voluntary savings for pension respectively. However, default options will appear if an individual does not make any decision choice among options. Default option means that individuals have no additional voluntary savings even though they will have insufficient savings when they reach retirement age. In other words, default option is a choice of employers and employees who have no choice. Therefore, default options in each case of three decisions are very important to individuals and it should be followed by policy implications. This issue also applies into individuals who have knowledge and skills are really necessary and challenging to choose default option.

Constraints on informed choice

Brown et al., (2002) developed a framework (figure 2.1) with details of constraints which affect individuals' attainment of informed choice in retirement investment. This framework comprises endogenous and exogenous constraints. Endogenous constraints refer to factors such as insufficient professional financial knowledge, reluctant to become informed and 'risk transfer costs' of members. By contrast, exogenous constraints come from information asymmetry problems and policy problems. However, this research focuses on the assessment of endogenous constraints.

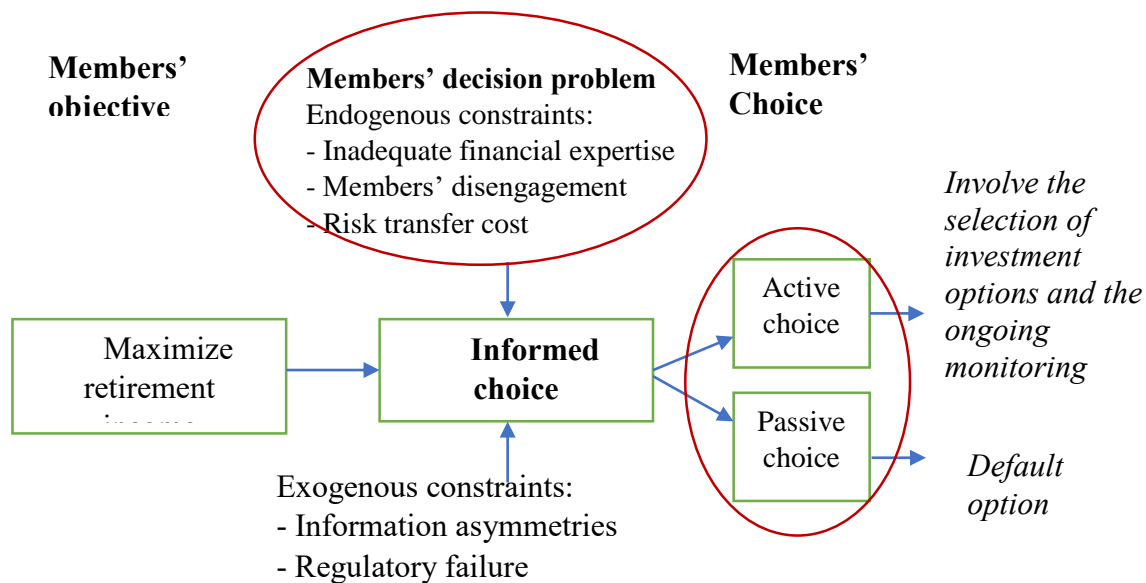


Figure 2-1: Informed choice framework

Source: Brown et al., 2002

To make sound decisions on savings and investment for retirement is not easy. This belongs to individuals' life stages and requires individuals to attain foundation knowledge to understand their financial circumstances such as pension benefits from social security, current assets, disposable income, and plan to retiree (Vidler, 2004). Hence, financial literacy and skills are usable to support individuals to make decision about investment to make informed investment decisions.

2.3 Financial Literacy and Financial Decision-making

The role of financial literacy

Financial literacy has become an increasingly concerned topic for both policy makers and researchers in many countries. They are interested in financial literacy level of matured people as a strategy to develop a stable economy and social security. Hence, they have conducted research to measure financial literacy across thirty countries (OECD/INFE 2016). According to literature review from personal finance, financial literacy plays a key role in decision-making investment.

First of all, when discussing benefits of financial literacy to individuals, Capuano & Ramsay (2011) propose that people with financial literacy can help and support them access, compare financial products and avoid unnecessary transaction costs to make appropriate decisions. Specifically, Cole & Fernando (2008) state that individuals with high level of disposable income and financial literacy tend to save and invest their money in financial products effectively. Furthermore, recently some empirical research shows that advanced financial literacy level significantly relates to stock market participation and derivative market participation (Almenberg & Dreber, 2015; Hsiao & Tsai, 2018; van Rooij,

Lusardi, & Alessie, 2011). In addition, Jappelli & Padula (2013; 2015) also recognize that financial literacy level and individuals' wealth have a positive correlation with portfolio allocations.

Besides the benefits of financial literacy to individuals, financial literacy also plays an important role in financial stability in the economy and decreases the cost burden of social security. It is argued and explained that individual investors with sufficient financial knowledge level are capable of accessing and evaluating financial products which contributes to create a competitive market. At the same time, nowadays together with an increase in life expectancy and a decrease in the birth rate, governments of many countries want to share the retirement income responsibility with individuals because they cannot provide the benefits as defined benefit pension plan in the past. Therefore, this contributes safety and stability to financial economy.

Accordingly, individuals must have sufficient financial knowledge to help them make sound financial decisions in suitable specific circumstances at each stage in their life cycle.

Financial Literacy and Financial Decision-making

Individuals' financial knowledge is considered to be related to decision-making in a collection of financial circumstances. For instance, greater participation in stock market can be associated with one's increased levels of financial literacy (Christelis, Jappelli & Padula, 2010; van Rooij *et al.*, 2011; Yoong, 2011), along with other traits such as more savings for retirement (Bucher-Koenen & Lusardi, 2011), a more diverse portfolio (Guiso & Jappelli, 2008) and better wealth accumulation (Lusardi & Mitchell, 2007a; Lusardi, Michaud & Mitchell, 2013). However, recently much more research has considered whether the effectiveness of financial literacy in refining financial decision-making (Fernandes *et al.*, 2014; Gustman *et al.*, 2012; Hastings *et al.*, 2013; Miller, Reichelstein *et al.*, 2014).

Modern literature has looked into the impact of financial literacy on retirement outcomes. More specifically, the results of extensive research which used US data from various sources find that financial knowledge plays an important role and a key factor in planning and preparing for retirement (Lusardi and Mitchell, 2007a; 2007b; 2008). In addition, utilizing statistics analysis from other countries, one can now confirm that financial knowledge and retirement planning are positively and significantly related. For instance, a study conducted in the Netherlands, Alessie, van Rooij and Lusardi (2011) proves that financial literacy is tightly linked to one's retirement preparedness level.

While a number of studies on financial literacy and investment decisions in developed countries have been accumulated in recent years, their main focuses are on savings behaviors, retirement planning and portfolio allocation (Agnew *et*

al., 2013; Croy *et al.*, 2010; Bateman *et al.*, 2010, 2012; Gerrans *et al.*, 2008). Apart from Gallery *et al.* (2011), a limited number of researches have closely looked into financial literacy in the context of more complex retirement investment decision-making. This study, therefore, aims to deal with the significant literature gap based on the work of Gallery *et al.* (2011) in order to examine how important it is to motivate employees to exercise retirement investment choice. In the following section, other factors having an impact on retirement investment choice decision-making are considered.

2.4 Other Factors Influencing Retirement Investment Choice Decisions

Pension Knowledge

As reviewed above, most research into investment decision-making has focused on financial literacy as the main indicator to examine this investment process. However, this research proposes a framework in which besides financial literacy, pension knowledge and other factors are also considered and examined to explore and identify factors which motivate individuals to exercise retirement investment choice in their working stage.

A limited number of research has been conducted to examine the level of individuals' pension knowledge. Clark & others (1999); Ghilarducci (1990) and Mitchell (1988) prove that pension knowledge is measured by several aspects which are comprised of defined benefit pension, defined contribution pension; contribution and benefit information. Pension knowledge of individuals is normally assessed by the probability that they can give correct answers to questions regarding the operation or application of defined-benefit pension system. According to Luchak, *et al.*, (2000), a set of pension knowledge questions includes age, voluntary, eligibility conditions, contribution formula and benefit formula.

This research supports the hypothesis set by prior researchers that pension knowledge makes people robustly understand saving and perceive the need for saving for retirement (Gustman & Steinmeier, 2005; Gustman *et al.*, 2012). It is necessary to understand and aware potential benefits and policies of social welfare in their countries' system as people know what they need to contribute to and how much they earn when they reach retirement stage. Accordingly, this may make people perceive that whether they should invest or save more money in the working stage for the retirement stage or not. It means that when people reach retirement, wealth accumulation and pension income might be also related to pension knowledge. Therefore, it can explain that if they are knowledgeable about their pension, they will recognize that with the current contribution rate and benefit rate, the future pension income is not enough for their standard of living

when they get retirement stage. *Hence, this study examines whether employees' pension knowledge affects their retirement investment choice decision-making.*

Financial Risk Tolerance

Pension fund members who are responsible for investment choice of defined contribution plans are believed representatives with in-depth economic knowledge, rational action and capacity for a maximum increase in utility. However, according to prospect theory of Kahneman and Tversky (1979), people do not follow what the economic theory suggests consistently, particularly when they have to deal with risk and unpredictability. In addition, based on Personal Financial Planning Standards, Davey and Resnik (2008) suggest that risk tolerance refers to the level at which an investor is ready to take the risk of producing a less financially profitable outcome in order to achieve a more financially profitable one. Davey & Resnik (2008) and McCarthy (2009) also find that financial risk tolerance is comprised of several features of risk such as investment, insurance, borrowing, etc.

It is necessary to possess a certain level of knowledge and experience in order to understand the risks associated with investment products so this knowledge is essential for individual investors to make financial decisions such as long-term investment. Benjamin *et al.* (2013) and Dohmen *et al.* (2010) prove that lower cognitive abilities are connected with lower levels of financial risk tolerance. Moreover, Clark & Strauss (2008) and van Rooij *et al.* (2011b) indicate that individuals' attitudes and perception of financial risks play an important role in a wide range of financial decisions. *Therefore, financial risk tolerance is also an important part of making financial decisions, especially in the context of retirement investment. As a result, how confident individuals are to make retirement investment decisions depends on their financial risk tolerance. Accordingly, in this research, financial risk tolerance of respondents could be considered a factor affecting their retirement investment choice.*

Financial Advice

Regarding personal financial advice, financial advisors play an important role such as offering information; minimizing common mistakes; making understandable; and giving solutions for overcoming barrier. In 1961, Stigler (1961) introduced the concept of "return to information search" that individual investors have a propensity to stop looking for information when the marginal cost matches the marginal benefit. They support the idea that consulting with advisers may benefit more than searching information without advisers' assistance as they think that hiring advisers may reduce cost compared with self-searching.

According to the literature, most financial decisions are not made in isolation. In fact, a variety of social influences are used in individuals' financial decision-making process. Particularly, they can get information from many different sources and they may look for advice in order to help them make financial decisions. For an example, Glaeser & Scheinkman, (2000) proposed a model based on the Social Exchange Theory (Homan, 1958) and Contact hypothesis (Allport, 1954) to test the effects of social interactions on individuals' behavior and they suggest that individuals' decision-making is affected by social interactions with others to receive and tackle information.

Accordingly, those who spend time taking financial advice will improve their financial knowledge and have confidence in their financial decision-making. Therefore, it is assumed that people consulting with financial experts have a tendency to make retirement investment choice.

2.5 Geographical context of the research.

The context of pension income in Vietnam

Social insurance is one component of a social security system in Vietnam besides other components such as health insurance and unemployment insurance. Before 1995, the pension scheme just covered formal sector or the public sector participation. At the present time Vietnam pension system is defined benefit only and it operates by mechanism PAYG (pay-as-you-go). The pension system is funded by the contributions of employers and employees in both the private and public sectors. In the present, the total social insurance contribution rate was 26%, including 18% and 8% of employers' and employees' contributions respectively.

Regarding the pension rights, in order to receive pension income, employees have to contribute for a period of 20 years and the normal retirement age is 60 for males and 55 for females. Particularly, for each year after the fifteenth year, 2% of both males and females' contribution rate is calculated for extra rate of the benefit rate but not over 75%. However, the pension system employs different rules of the pension rights between the public and private sector. The pension income for employees who work in the public sector is calculated as the average wage reported in the last ten years while that for employees working in the private sector is calculated as the average of all the reported wages. *Generally, similar to most developing countries, Vietnam has a pension system with limited coverage and benefits. Therefore, in general pension income cannot cover living standard when people reach retirement age.*

Financial – Economic background of Vietnam

As an emerging country with a continual process of opening and reforming the economy, Vietnam has basic features of an emerging market such as depressed capital markets and regulatory infrastructures. Accordingly, the economic growth

in 2018 is predicted to achieve 6.7 percent. In terms of GDP, the average Vietnamese annual growth rate is 6.50 percent between 2000 and 2018 (figure 1.2).



Figure 2-1: Vietnam GDP growth
 Source: Trading Economics, 2018

As regards stock market, Vietnam set up the first stock market in Ho Chi Minh City in 2000. Five years later, the second stock market was founded in Hanoi capital. The total capitalization of Vietnamese stock market amounted to approximately \$50billion in 2015, accounting for about a quarter of GDP. Regarding the bond market, in 2013 the size of this market accounted for around 16.9 percent of GDP. This percentage is a lot lower than that (56.6 percent) of emerging markets in East Asia (Asia Development Bank, 2014).

However, consumer finance services in big cities such as Ho Chi Minh and Ha Noi are modern and efficient with a large number of banks branches, financial companies, securities companies and mutual funds. Hence, this can assist customers to access financial services like savings accounts, time deposits, investment funds, credit cards, consumer loans and home mortgages easily. Particularly, customers can purchase insurance products at bank branches or on a wide network of direct sales in these cities. Further, there are also a vast number of brokers' offices, allowing customers to gain access to their services.

In order to reduce pension deficiency, Vietnamese government has developed and reformed financial system and financial institutions by developing banking sector, stock market, and insurance industry. In addition, individuals can access other financial services and products such as stock market, investment trust, mutual funds and life insurance combined with a pension fund but participants are required to have some financial knowledge to make informed decisions.

3. RESEARCH PROBLEM, RESEARCH QUESTIONS AND RESEARCH OBJECTIVE

3.1 Research Problem and Gaps in the Literature

People in the working stage are progressively facing complex decisions on how to make sound investment decisions and which one is appropriate for their personal circumstance. In addition, together with the fast-growing economy and financial markets, there are wide-ranging choices of financial products and financial instruments to invest for their retirement such as stock markets, long-term deposits at banks, government bonds, corporate bonds, private pension funds, mutual funds and investment trusts. According to the literature from personal finance and financial decision-making, financial literacy plays an essential role in making informed financial decisions (Arnone, 2004). Empirical studies into this field indicate that individuals with better knowledge of financial literacy contribute a lot to their financial well-being (Lusardi & Mitchell, 2011a; Lusardi & Tufano, 2015a, Disney et al., 2015; Almenberg & Dreber, 2015).

Added to this complication, developing countries in general and Vietnam in particular has an inefficient social security system and this system currently has to face challenges of low coverage rates, inequities in contribution and benefits among different groups of participants, and financial unsustainability (World bank, 2012). Given that the benefits and pension income from the social insurance system are very low and do not cover basic standard of living when people reach retirement in developing countries, particularly in Vietnam, making investment choice decisions for retirement stage from the working stage is really necessary and important. In addition, according to the findings from preliminary survey which was conducted to inquire into the real situation of Vietnamese employees, the problems employees who are currently working have rely on their personal circumstance. In most cases, the nature of their problems such as wealth, asset accumulation, or pension income depends on how they make savings and invest their money when they are currently working and factors impacting on their perception of making investment choice for their retirement. Therefore, this situation raises the question whether Vietnamese employees who are currently in the working stage have saved their money for their retirement by exercising retirement investment choice or not. Another question asks what the role of financial literacy level in retirement investment choice is because their choice extremely affects the growth rate and volatility of the accumulated wealth and crucial retirement benefits. Consequently, employees who are currently in the working stage have to face the challenge of making decisions on retirement investment choice.

As mentioned in Literature review Chapter, most prior researches which were conducted into personal finance area found that financial literacy is the main factor influencing investment decision-making and accumulative wealth of individuals (Agnew *et al.*, 2013; Croy *et al.*, 2010; Lusardi & Mitchell, 2007a; Lusardi *et al.*, 2013). However, the majority of such researches engrossed retirement planning and savings intentions. In addition, most earlier studies just considered the relationship between financial literacy and stock market participation (van Rooij *et al.*, 2011); financial literacy and derivative market participation (Hsiao & Tsai, 2018); financial literacy and retirement planning (Boisclair, *et al.*, 2015); financial literacy and individual saving (Mahdzan & Tabiani, 2013; Ismail & Rashid, 2013; Jappelli & Padula, 2013; Pan, 2016) or the determinants of household savings and financial behaviour (Agarwalla *et al.* 2015; Agarwal *et al.* 2015; Pan, 2016). Very few studies offered the suggestion that more research should be done to explore and identify what factors drive individuals to make investment choice for their retirement. Therefore, very limited number of studies examined financial literacy in the context of retirement investment decision-making. Therefore, the research on this aspect is limited and not covered completely.

Accordingly, the research problem of this study is: *“Employees who are currently in the working stage have to face the challenge of making decisions on investment choice for financial well-being in the retirement stage”*.

3.2 Research questions and Research Objectives

Given that there is a gap in investment choice for retirement, *the main objective of this research is to develop a conceptual framework which investigates and confirms the role of financial literacy and other key factors motivating people in the working stage to make investment choice decisions for financial well-being in the retirement stage*. In order to achieve the main objective of this research, the research questions are posed in the context of pension in Vietnam. First of all, a theoretical framework of this research was set based on literature review in order to identify the main factors impacting on individuals' financial decision-making in the context of retirement investment choice. Then specific research questions are posed. These research questions generally address the role of financial literacy and other factors in retirement investment choice exercised by employees in Vietnam. Therefore, at the first step, the level of financial literacy is assessed in order to provide an overview of financial literacy of Vietnamese employees. Therefore, the first research question is posed:

Research Question 1: What is the level of financial literacy of Vietnamese employees?

Its partial objective: Assessing Vietnamese employees' financial literacy level in order to provide an overview of financial literacy of Vietnamese employees.

Then, the differences between basic and advanced financial literacy levels are also explored in the specific situation of retirement investment choice decisions. Hence, this research examines the role of financial literacy in the context of retirement investment choice. Accordingly, the second research question is posed:

Research Question 2: What is the relationship between financial literacy and retirement investment choice decision-making of Vietnamese employees?

Its Partial objective: Exploring employees' ability to use financial knowledge to make choices for their retirement. Therefore, the role of financial literacy in their retirement investment choice is examined.

Hypothesis H1A: *The level of financial literacy is positively related to the likelihood of exercising retirement investment choice.*

Hypothesis 1B: *The level of financial literacy is positively related to the likelihood of selecting growth investing options rather than conservative investing options.*

Although there is a limited number of research into the relationship between pension knowledge and retirement saving decisions, Jappelli and Padua (2013) suggest that individuals with generous Social Security benefits often have fewer motives for saving and accumulating wealth. The researcher believes that pension knowledge might support individuals in planning retirement investment. This can be explained that with pension knowledge, individuals know how much they should contribute and how much they can get when they reach retirement. Hence, they can see a clear picture of their pension income and this may impact on their perception of their retirement saving decisions. In addition, previous personal financial literature proposes that there are other factors also affecting investment decision-making (Van Derhei & Holden, 2001; Kempson, 2009). They acknowledged that financial risk tolerance and financial advice have a relationship with a diversity of financial decisions. Hence, to examine the role of pension knowledge and other key factors which can affect retirement investment choices of Vietnamese employees who are currently in the working stage, the third research question is posed:

Research Question 3: Are pension knowledge, financial risk tolerance and financial advice of Vietnamese employees correlated with their retirement investment choice decision-making?

Its partial objective: Examining the role of pension knowledge, financial risk tolerance and financial advice which can affect retirement investment choices of Vietnamese employees who are currently in the working stage.

***Hypothesis 2:** The level of pension knowledge is positively related to the likelihood of exercising retirement investment choice.*

***Hypothesis 3:** The level of financial risk tolerance is positively related to the likelihood of exercising retirement investment choice.*

***Hypothesis 4:** Employees who consult with financial experts have a propensity for exercising retirement investment choice*

4. CONCEPTUAL FRAMEWORK

As mentioned in the geographical context of the research section, the rate of contribution and benefit of social insurance in Vietnam are quite low. Hence, exercising retirement investment choice needs to be considered and this research focuses on retirement investment choice decisions because these decisions deeply affect the accumulation of their wealth for their retirement in the future.

When individuals are confronted with a range of options, they cannot make decisions and normally walk away or they just select default options (Choi *et al.*, 2003, 2004; van Rooij & Tappa, 2008). For example, previous research related to defined contribution funds for their retirement savings presents that people are not often dynamic when choosing an option and they have a propensity to select default options (Cronqvist & Thaler, 2004; Gerrans *et al.*, 2008). Likewise, in Vietnam, individuals have a habit and a propensity to keep their money in informal savings. However, in line with worldwide trends, financial system in emerging markets such as Vietnam have developed step by step with a range of financial instruments and products for both corporations and individuals.

Previous research proposes that low level of financial knowledge may deter individuals from actively making informed choice (Bernheim & Garrett, 2003; Lusardi & Mitchell, 2006). Research related to financial literacy has also expanded into implications for individuals' financial wellbeing such as saving behaviour, retirement planning and financial making-decisions. For instance, Bernheim (1997) recognizes that for individuals with inadequate basic financial literacy, the rules of thumb affect their saving behaviours. In these researches, it is proved that individuals' financial literacy level relates to their retirement planning and their accumulated wealth (Alessie *et al.*, 2011; Lusardi and Mitchell, 2006, 2008, 2009). In addition, Dvorak and Hanley (2010) also suggest that higher level of financial literacy has a propensity to involve making decisions on their defined contribution plan and they also have a tendency to participate in stock market (Christelis *et al.*, 2010; van Rooij *et al.*, 2011; Yoong, 2011).

With the aim of contributing to the literature in this area, this research explores retirement investment choice decisions of employees who are currently in

working stage in emerging market with not fully developed pension system such as Vietnam. As mentioned in section 2.1.2 at the Literature review Chapter, pension benefit that employees receive in the future when they reach retirement age is not enough to cover their living standard. Therefore, these employees have to save their money to prepare for their retirement by exercising retirement investment choice. This situation is contrast with that in developed countries where pension system and financial system are developed and reformed such as Australia, the UK, the US or some of European countries.

Although an increasing number of researches into financial literacy and retirement decisions have recently been conducted in developed countries (Agnew *et al.*, 2013; Bateman *et al.*, 2010, 2012; Clark-Murphy, Gerrans & Speelman, 2009; Croy *et al.*, 2010; Gerrans *et al.*, 2008), not many of them examine the effects of financial literacy and other factors on retirement investment choice decisions. Instead, these researches mainly concentrate on fields related to retirement planning, regular savings or stock and derivative markets as mentioned and discussed in literature review chapter.

Accordingly, based on the Literature review and the gaps mentioned in previous Chapters, the researcher suggests a framework for financial literacy and retirement investment choice (figure 4.1)

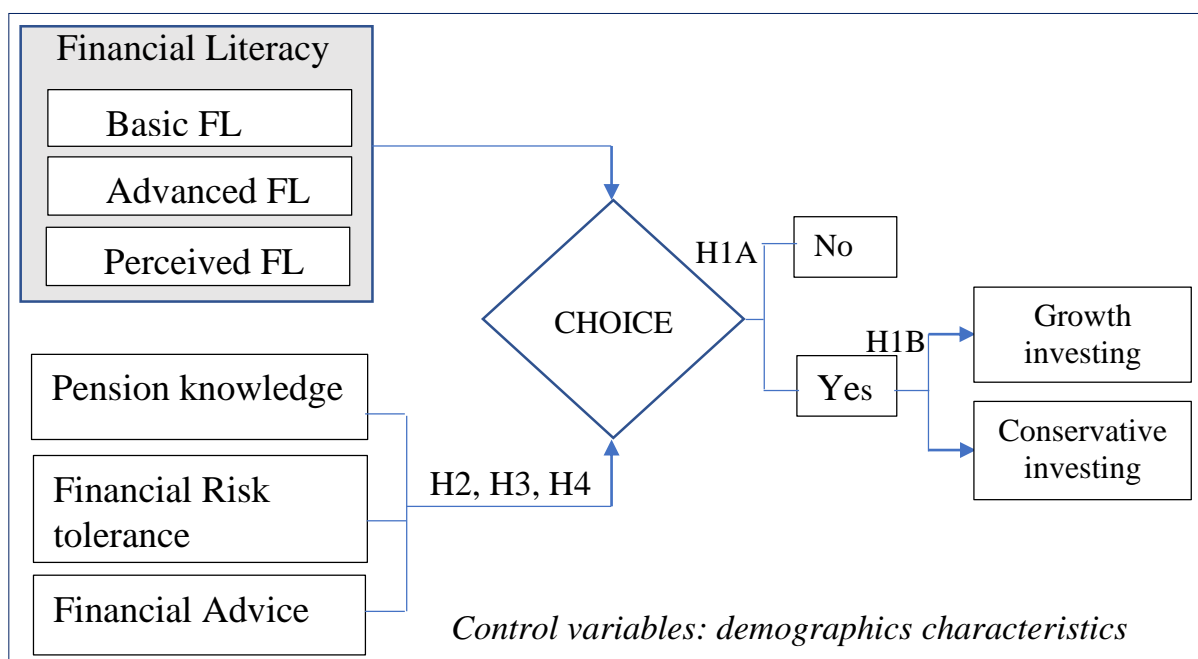


Figure 4-1: Framework for retirement investment choice decisions

Source: Researcher's original construction based on literature

5. METHODOLOGY OF RESEARCH

5.1 Data collection method

Sampling and sample size

This research is an empirical quantitative-based research. To investigate this study, a survey questionnaire was selected as a research instrument. Regarding sampling strategy, probability sampling technique is selected to collect data for this research. Specifically, stratified random technique is applied to collect objective respondents. At the first step, the population is divided into three groups or three stratum based on three main geographical regions of Vietnam: Northern, Central and Southern Vietnam. Then, a sampling frame for each group (a constructing list) will be conducted. Finally, in each strata, from the sampling frame, the number of respondents will be selected based on the percentage of that group representing the population.

In order to make a sampling frame for collecting data of this research, researcher based on the geography of Vietnam and specific characteristics of Vietnam economy. Geography of Vietnam is divided into three main regions including Northern, Central and Southern Vietnam and then one place will be selected to represent each region. Therefore, respondents of this research are selected based on three main regions of Vietnam in which Ha Noi capital represents Northern Vietnam, Ho Chi Minh City represents Southern Vietnam and Da Nang represents Central Vietnam. Sample distribution is detailed in table 5.1.

Table 5.1: Share of population in three main regions in Vietnam: sample vs. population

	Our sample	Population GSO (2016)
Northern Vietnam	132 (31%)	34%
Central Vietnam	101 (24%)	27%
<u>Southern Vietnam</u>	<u>194 (45%)</u>	<u>39%</u>
Total sample	427 (100%)	100%

Source: researcher calculated and developed based on the percentage of labor workforce (GSO, 2014)

Regarding sample size, there are many suggestions. For instance, a sample size of 217 is recommended by Krejcie & Morgan (1970), while Cohen (1992) proposes that sample size may be calculated following parameters such as significant level or criterion, effect size, desired power, and estimated variance. According to Cohen's formula, a sample size of around 116 would be appropriate for using correlation analysis and multiple regression analysis. This researcher explains and thinks that the sample size of 116 still ensures a significant level at

95% and with medium effect size 0.3, the desired power achieved 0.8. Accordingly, this research attempts to collect as much data as possible, targeting four hundred (400) respondents.

To access Vietnamese employees who are currently working, a list of firms was obtained from Department of Planning and Investment where all of the firms registered and updated their information and business directory sites. Collecting data was conducted for three months at the beginning of 2018 and it was conducted by doing face-to-face interviews using paper-based questionnaires, delivering the questionnaire to each respondent directly and collecting right after they complete it, and emailing the link to respondents who prefer to do it online. 468 employees participated in this survey from 700 questionnaires distributed to 121 firms. However, 427 out of 468 questionnaires were retained and valid for data analysis. 41 questionnaires were eliminated because respondents did not complete all the questions in the questionnaire or their answers were bias of extreme values such as answering the same “Do not know” to all questions in financial literacy section.

Questionnaire design

This research applied a questionnaire which was designed to conduct data collection and then the data will be analyzed to test the hypotheses and address the research questions. Based on the conceptual framework in chapter 4, the questionnaire of this research comprises six components including financial literacy, pension knowledge, retirement investment choice, financial risk tolerance, financial advice and socio-demographic factors. The full questionnaire is attached to Appendix. (Table 5.3).

Table 5.2: Components of questionnaire survey

Section No.	Section Name
1	Financial literacy
2	Pension knowledge
3	Retirement investment choice
4	Financial risk tolerance
5	Financial advice
6	Socio-demographic factors

Source: researcher constructed based on literature

Questionnaire pilot

The pilot survey of the questionnaire of this research was conducted in two rounds. The first round was conducted by people who are experts in financial and pension knowledge such as professors in universities and specialists in insurance industry and bank industry. The purpose of this round is to test the clarity of questions; the relevance of ranges and scales of the answers to each question; and whether the arrangement of questions was logical. Then, all participants’

comments or suggestions were considered and revised for the second round which was carried out by individuals who are currently working. The aim of the second round is also to test the clarity and grammatical or spelling errors of questions again. Finally, the feedback and comments from the second round were considered in order to improve the survey questionnaire design.

5.2 Measurement of Variables

Financial Literacy measurement

The process of measuring financial literacy variables plays an important role because such variables are considered key variables which are used to address two research questions (research questions 1 and 2) in this study.

Table 5.3: Financial literacy construct

Construct	Survey Question No	Variable code	Indicators	Source
Perceived Financial Literacy	Q3	PFL1	Self-assessment financial knowledge	
Actual Financial Literacy	Q4	BFL1	Compound interest	Lusardi & Mitchell, 2009
Basic Financial Knowledge	Q5	BFL2	Inflation	
	Q6	BFL3	Time value of money	
	Q7	BFL4	Money illusion	
Advanced Financial Knowledge	Q8	AFL5	Risky assets	van Rooij <i>et al.</i> , 2011
	Q9	AFL6	Long period returns	
	Q10	AFL7		Bateman <i>et al.</i> , 2012
	Q11	AFL8	Volatility	
	Q12	AFL9	Risk diversification	
	Q13	AFL10	Asset allocation	
	Q14	AFL11	Performance indicators	
Q15	AFL12	Risk rating of investment options	Gallery <i>et al.</i> , 2011	
			Return rating of investment options	

Source: researcher constructed based on literature

Perceived financial knowledge is constructed with the purpose of assessing respondents' financial knowledge by themselves. Likert-scale was used for measurement ranging from 1 (very low) to 5 (very high).

Actual financial knowledge in this research is comprised of two levels including basic financial knowledge and advanced financial literacy. To measure actual financial knowledge, the answers to questions were designed as multiple-choice answers and they are also captured as dichotomous variables. It is coded 1 for correct answer, otherwise 0.

Pension knowledge – Independent variable

Pension knowledge factor is constructed from six items adopted from Luchak & Gunderson, (2000) and Gustman et al., (2012). Respondents' knowledge of retirement age of eligibility; the number of years for contribution; voluntary contribution to social insurance; contribution formula; benefit formula; and eligibility conditions for early retirement benefits was assessed. The measurement is based on the number of correct answers to questions (Q16 – Q21) and the answers are coded by six dichotomous variables (PK1 – PK6). Responses could range from 0 to 6. This factor is used to test hypothesis 2 and address a part of research question 3 about the association between pension knowledge and retirement investment choice of employees who are currently in the working stage. The internal reliability of this variable is also estimated by Cronbach's alpha test before running regression. These items of pension knowledge are presented in table 5.5 below.

Table 5.4: Pension knowledge construct

Construct	Survey Question No	Variable code	Indicators	Source
Pension knowledge	Q16	PK1	Retirement age of eligibility	Luchak & Gunderson, (2000)
	Q17	PK2	The number of years for contribution	
	Q18	PK3	Eligibility conditions for early retirement benefits	
	Q19	PK4	Voluntary contribution to social insurance	Gustman et al., (2012)
	Q20	PK5	Contribution formula	
	Q21	PK6	Benefit formula	

Source: researcher constructed based on literature

Financial Risk tolerance – Independent variable

Financial risk tolerance is constructed by five items adopted from Grable (2000) and Joo & Grable, (2004). Likert-scale was used for measurement ranging from 1 (strongly agree) to 5 (strongly disagree) from question 22 and question 26

in the questionnaire and the answers are coded by five variables (FRT1 – FRT5). It is considered an independent variable in the model to test the hypothesis H3 which addresses part of research question 3. Regarding this variable, the relationship between respondents’ financial risk tolerance and their retirement investment choice could be identified. These items are used to measure respondents’ financial risk tolerance, which are presented in table 5.6 below.

Table 5.5: Financial risk tolerance construct

Construct	Question No	Variable code	Items	Source
Financial Risk tolerance	Q22	FRT1	In terms of investment, safety is more important than returns.	Grable (2000) Joo & Grable, (2004)
	Q23	FRT2	It is more satisfactory for me to deposit money in the bank than putting it on the stock market.	
	Q24	FRT3	When I think of the word “risk” the term “loss” comes to mind immediately.	
	Q25	FRT4	It depends on luck to earn money on stocks and bonds.	
	Q26	FRT5	Investing is too difficult to understand.	

Source: researcher constructed based on literature

These questions are measured by Likert-scale from strongly agree to strongly disagree. Financial risk tolerance index score ranges from 5 to 25. This means that the higher level of financial risk tolerance individuals has, the higher scores they obtain. The reliability of this factor is also checked by Cronbach’s alpha test.

Financial advice – Independent variable

Financial advice variable is used to test the hypotheses H4 to address part of research question 3. Particularly, this question could identify the relationship between financial advice and retirement investment choice.

The first item in financial advice factor is coded 1 if respondents used consultation from financial advisors, otherwise it is coded 0. However, in order to

expand further insight into employees' source of advice, this item is also considered other sources that respondents could use such as friends, family members and colleagues.

Retirement investment choice – Dependent variables

Regarding the conceptual framework in chapter 4 at figure 4.1, retirement investment choice is a dependent variable which is applied to address research question 2 (RQ2) and research question 3 (RQ3). The main purpose is to identify and explore the role of financial knowledge in retirement investment choice by testing hypotheses H1A and H1B of research question 2 (RQ2). Particularly, when respondents presented “Yes”, it means that they have accessed retirement investment choice. It is coded 1 and captured CHOICE, otherwise it is coded 0 for respondents presenting “No” as they do not exercise retirement investment choice.

To do further analysis and test hypothesis H1B, for respondents who have accessed retirement investment choice, there are two outcomes. It is coded 1 for respondents who have participated in growth investing option (stocks, mutual funds and investment trusts). Conversely, it is coded 0 for those who have participated in conservative investing option (CDs, saving account, or private pension funds) in their retirement investment choice.

Socio-demographic Characteristics - Control variables

** For detail information, please look at the Doctoral thesis document.*

5.3 Methods of Analysis

Data analysis of this research is primarily conducted by univariate, bivariate and multivariate analysis. Firstly, univariate analysis will be applied to address the research question 1 (RQ1) to measure the level of financial literacy of respondents and then bivariate analysis will be conducted to preliminarily address the research question 2 (RQ2) about the association between each financial literacy level and retirement investment choice before going further with regression analysis. After that, multivariate regression analysis is performed to address research questions 2 and 3 (RQ2 & RQ3) by testing the hypotheses (H1A, H1B, H2, H3 and H4) in the conceptual framework of this research.

Based on the conceptual framework and hypothesis development in chapter 4, retirement investment choice is a dependent variable which is expected to have an association with independent variables such as financial literacy levels, pension knowledge and other explanatory variables such as financial risk tolerance, financial advice; and control variables such as demographic characteristics. Since exercising retirement investment choice variable is a binary variable, it is estimated by linear probability model (LPM). However, Possible mistakes in

measurement and unobserved variable bias can be the cause of possible endogeneity. It can give results with a negative impact on the association between financial literacy and financial behavior such as savings, borrowing and investing decisions (Lusardi and Tufano, 2015a; Fornero and Monticone, 2011). Another possible issue is reverse causality because it is explained that individuals who invested in stock market or other advanced financial products may receive financial knowledge from some kind of finance course training. Therefore, dueling with this issue, the Two-Stage Least Squares (2SLS) regression is applied to overcome endogenous problem which causes bias in results (Wooldridge, J.M., 2010).

Two-Stage Least Squares (2SLS) regression estimate is described below (Equation 5.1 & Equation 5.2). Particularly, at the first stage, regression performs the endogeneity variables with instrument variables and a range of predictor variables. In the second stage, financial literacy variables estimated in the first stage are used as independent variables along with explanatory variables so as to forecast retirement investment choice in regression analysis.

The prior literature in this area has also suggested and demonstrated endogenous problem of financial literacy and it has proposed instrument variables to address this issue, comprising education level of respondents' parents (van Rooij al., 2011), mathematical ability (Jappelli and Padula, 2013). Moreover, Bernheim et al., (2001); Fornero and Monticone (2011); Grohmann et al., (2018) and Lusardi & Tufano (2015a) have used training program of education in economics and finance at school and experience in using credit or loans as well as these instrument variables of financial literacy in their research. In this research, researcher follows Lusardi and Tufano (2015a) and Fornero and Monticone (2011) to apply instrument variables because it is appropriate for our scenario. That means the instrument variables capture respondents' financial knowledge before exposing to retirement investment choice. These instrument variables are applied in the Two-Stage Least Squares (2SLS) regression analysis.

The Two-Stage Least Squares (2SLS) regression procedure:

$$y = \alpha + \beta_i V_{en} + \beta_i X_{ex} + \epsilon \quad \text{(Equation 5.1)}$$

$$V_{en} = \alpha + \beta_i X_{ex} + \beta_i X_{iv} + u \quad \text{(Equation 5.2)}$$

Where V_{en} is the endogenous regressor variables; X_{ex} is the exogenous regressor variables; X_{iv} are instrument variables; y is a dependent variable; β is the coefficients; u and ϵ are error terms.

Although financial literacy was demonstrated as endogenous variables, Wu-Hausman test is run to check endogeneity variable. In addition, F-statistics is also considered to check whether instrument variables are weak or not in the first stage of 2SLS regression (Wooldridge, J.M., 2010).

6. FINDINGS AND DISCUSSION

This chapter analyzes data collection and reports results based on research questions and hypotheses of this research. Most statistical tests and multivariate regressions were analyzed by Stata version 13.0. Firstly, Vietnamese employees' financial literacy is measured by descriptive statistics of the answers to questions about perceived financial literacy and actual financial literacy in order to address research question 1 (RQ1). After that, multivariate regression analyses are employed to deal with research question 2 (RQ2) and research question 3 (RQ3) to investigate factors such as financial literacy, pension knowledge, financial risk tolerance and financial advice which relate to retirement investment choice.

6.1 Profile of research's respondents

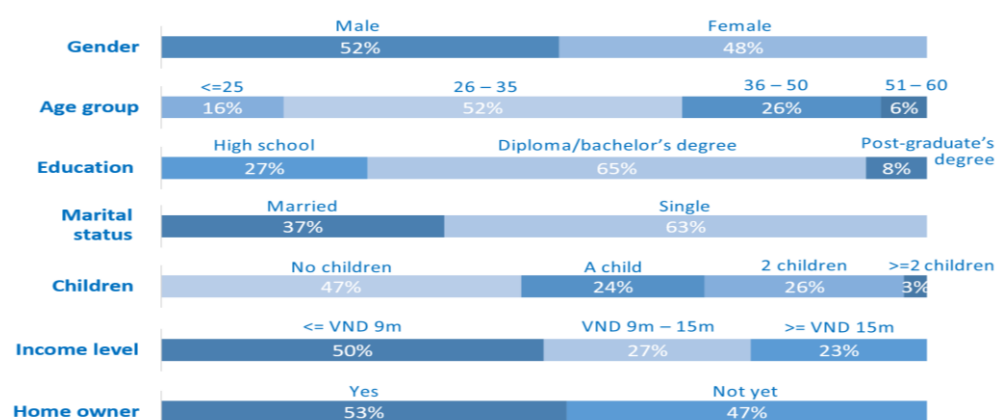


Figure 6.1: Respondents' profile

Source: Researcher developed based on sample survey

Figure 6.1 gives information on respondents' profile of this study. In terms of gender, the percentage of male and female is relatively comparable. Just over half of respondents, 52%, are male (n=222) and female respondents account for 48% (n=205). Regarding age group, more than half of respondents, 52%, are in the age group between 26 and 35 years old (n=222). It is also the largest percentage of respondents. As regards education, the table shows that more than fifty percent of respondents in this research have diploma or bachelor's degree because the respondents in this research are employees who currently work in the private and public sectors. In terms of marital status and the number of children, there are 63% (n=273) of respondents with single status and over one third are married (37%, n=154). Nearly half of them, 47%, have no children and only 3% of them have more than 2 children. With respect to respondents' monthly income and home ownership, from the table we can see that exactly half of participants (n=213) earn VND 9 million and the table also shows that 53% of respondents (n=226) have their own home and the rest (47%, n=201) have not owned this property yet.

6.2 Measurement of Employees' Financial Literacy Level

Research question 1 (RQ1) is posed in order to provide a general view of Vietnamese employees' financial literacy level:

RQ1: What is the level of financial literacy of Vietnamese employees?

As mentioned in previous chapter, financial literacy in this research will be assessed as both perceived financial literacy and actual financial literacy (basic financial literacy and advanced financial literacy).

Actual Financial Literacy

Actual financial literacy is built with basic financial literacy and advanced financial literacy and this measurement is based on previous study (Bateman *et al.*, 2012; Gallery, Gallery *et al.*, 2011; Lusardi & Mitchell, 2009; van Rooij *et al.*, 2011). Basic financial literacy aims to assess respondents' understanding of basic financial concepts. These concepts are very basic ones, but they could be a foundation of knowledge for individuals if they want to make investment decisions. In addition, advanced financial literacy aims to evaluate respondents' advanced financial concepts related to sophisticated financial knowledge and knowledge of financial products in financial market. This covers topics associated with long term period return, diversification, volatility, and concept of risk and return in investment.

Basic Financial Literacy

Table 6.1: Frequencies of responses to basic financial literacy questions (N = 427)

Panel A: <i>Percentage of Correct, Incorrect, Don't Know Responses</i>		Correct	Incorrect/DNK				
Compound interest		57.4%	42.6%				
Inflation		64.4%	35.6%				
Time value of money		62.1%	37.9%				
Money illusion		51%	49%				
Panel B: <i>Number of Correct Responses</i>		None	1	2	3	All 4	Mean
N corrects		14 3.3%	82 19.4%	126 30.3%	117 33%	88 14%	2.3

Source: Researcher developed based on sample survey

Table 6.1 gives information on how respondents give answers to questions on basic financial literacy. Panel A shows the percentage of correct responses to questions related to compound interest, inflation, time value of money and money illusion. It is obvious to see that all respondents gave more correct answers to

these questions than incorrect ones. Approximately 60 percent of respondents responded to the first three questions correctly and 51 percent knew the answer to the question of money illusion.

However, panel B indicates that only 14 percent of respondents (n=88) answered all questions correctly and more than 3 percent (n=14) answered these questions incorrectly. About a third knew the right answers to two or three questions (n=126 and 117 respectively) and nearly one fifth (n=82) gave correct responses to one question. The mean of correct answers to these basic financial literacy questions is over 2.3. *Accordingly, the level of basic financial literacy of respondents in this study is considered over medium.*

Compared with previous studies, the proportion of correct answers respondents in this study gave to basic financial literacy questions is much lower when answering the same questions. Particularly, only 57.4 percent of participants in this study knew the right answer to compound interest question while the percentage of correct responds to this question in Lusardi and Mitchell (2009), van Rooij *et al.*⁴¹ (2011) and Bateman *et al.*⁴² (2012) was 69 percent, 76.2 percent and 72 percent respectively. Similarly, in this study just 64.4 percent of respondents answered the question on inflation correctly whereas in Lusardi and Mitchell (2009), van Rooij *et al.* (2011) and Bateman *et al.* (2012) this figure was 87.1 percent, 82.6 percent and 78.4 percent respectively. Indeed, financial literacy is a new concept and it is also the first step in researching into this area in developing countries such as Vietnam. Therefore, basic financial knowledge has not yet been mentioned and concerned in education system programs as it has in developed countries. Hence, the level of basic financial literacy of respondents in this research is relatively lower than that in previous empirical research.

Advanced Financial Literacy

Table 6.2: Frequencies of responses to advanced financial literacy questions (N = 427)

Panel A: <i>Percentage of Correct, Incorrect, Don't Know Responses</i>	Correct	Incorrect/DNK
Risky asset	62.3%	37.7%
Long-term period return	32.8%	67.2%
Volatility	60.2%	39.8%
Diversification	62.2%	37.8%
Asset allocation	52.0%	48.0%
Performance	34.2%	65.8%
Risk rating	58.8%	41.2%
Return rating	39.3%	60.7%
Panel B: <i>Number of</i>		

<i>Correct Responses</i>	None	1	2	3	4	5	6	7	8	Mean
N corrects	26	33	53	92	22	74	69	35	23	4.02
	6%	7.8%	12,4 %	21.5 %	5.2 %	17.3 %	16.2 %	8.2 %	5.4 %	

Source: Researcher developed based on sample survey

Table 6.2 shows how respondents answer questions on advanced financial literacy. Panel A gives the percentage of correct responses to eight different questions and panel B provides the proportion of respondents selecting different numbers of correct answers to these questions.

As can be seen from panel A, the majority of participants gave correct answers to most of these questions. Particularly, about 60 percent of respondents correctly answered questions related to risky asset, volatility, diversification and risk rating. Exactly 52 percent knew the answer to the question on asset allocation. However, only over 39 percent chose the right answer to return rating question and approximately a third correctly answered questions on long-term period return and performance. This proportion is also far smaller in comparison with that in previous studies. For instance, regarding long-term period return, in Lusardi and Mitchell (2009), van Rooij *et al.* (2011), and Bateman *et al.* (2012), this proportion was 62.3 percent, 47.2 percent, and 55.2 percent respectively, while the figure in this study is just under 33 percent. Likewise, the percentage of correct answers to question on performance is also much lower than that in other studies. In the ANZ survey (2011) and Gallery, Gallery *et al.* (2011), this percentage was 66 percent and 51.4 percent respectively, compared to 34.2 percent in this study.

The highlighted point in advanced financial literacy level is responses to questions on advanced financial concepts related to long-term period return and evaluating investment performance. More specifically, less than 35 percent of the respondents in this research gave correct answers to these questions. It means that they lack sophisticated financial knowledge related to evaluating investing performance and the long-term period investment concept.

Moving on to panel B we can obviously see that the highest percentage of respondents, 21.5 percent (n=92), chose three questions correctly. In the second place, about 17 percent (n=70) gave correct responses to five and six questions. However, between 6 percent and 8 percent of respondents answered none or seven questions correctly. As a result, the mean of this panel is just over 4.

Accordingly, the level of advanced financial literacy of respondents in this study is considered around medium level and it is also lower in comparison with prior studies mentioned above.

Perceived Financial Literacy

To measure perceived financial literacy variable, respondents were asked to rate their financial understanding on a five-point Likert scale from 1 to 5. A higher score shows a greater understanding of financial literacy. Figure 6.2 shows the rate of respondents' financial literacy.

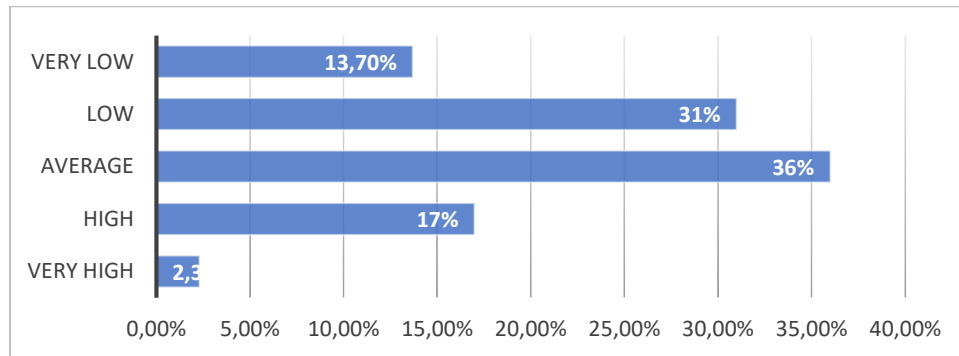


Figure 6-2: Self-assessment financial literacy of respondents (N = 427)

Source: Researcher developed based on sample survey

Figure 6.2 gives information on how respondents evaluate their financial literacy themselves. The majority of respondents believe that their level of financial literacy is low or average. It means that, the respondents are not confident about their understanding financial knowledge related investment decision-making and retirement planning. More specifically, they self-assess their financial knowledge lower than their actual financial knowledge, the highest percentage, 36 percent, think that they have financial knowledge level of average and 31 percent of participants feel that their comprehension of financial knowledge is quite low. At a higher level, 17 percent evaluate their financial literacy of high level and only 2.3 percent believe that they have very high level.

Summary of Vietnamese employees' Financial Literacy

Overall, the level of actual financial literacy of respondents in this study is considered as medium. While perceived financial literacy suggests that respondents in this research are not confident about their understanding and their knowledge related to finance, actual financial literacy shows that their comprehension of finance is higher than they believe. More specifically, males have a higher level of actual financial literacy in comparison with females and this gap is almost the same in both basic and advanced financial literacy levels. In addition, education affects respondents' actual financial literacy deeply, especially in advanced financial literacy level.

6.3 Regression Analysis

RQ2: What is the association between financial literacy and retirement investment choice of Vietnamese employees?

In this research question, two hypotheses are proposed to address this question that relates to employees' decisions to exercise retirement investment choice (H1A) and their retirement investment choice outcomes such as growth investing option or conservative investing option (H1B).

RQ3: Are pension knowledge, financial risk tolerance and financial advice of Vietnamese employees correlated with their retirement investment choice?

In the research question three (RQ3), three hypotheses are proposed to address this question that relates to the relationship of employees' pension knowledge (H2), financial risk tolerance (H3) and taking financial advice (H4) with decisions to exercise retirement investment choice. First of all, some statistics tests will be applied in order to get preliminary results and then two-stage least squares (2SLS) regression analysis is used to test these hypotheses in this research.

Factors associated with exercising retirement investment choice (H1A, H2, H3 and H4)

As discussed in chapter 5 at methods of analysis section (section 5.3.2), since exercising retirement investment choice variable is a binary variable, it is estimated by linear probability model (LPM). However, there may be a possible endogeneity which can have a negative impact on the association between financial literacy and financial behavior such as savings, borrowing and investing decisions. Therefore, dueling with this issue, the Two-Stage Least Squares (2SLS) regression is applied to overcome endogenous problem which causes bias in results (discussed in chapter 5 at section 5.3.2).

Before multivariate regression analysis is performed, multicollinearity indication is checked by variance inflation factors (VIFs) for each of independent variables. The result of VIFs shows that the highest figure 3.23 is quite good because it is below 10 (Hair *et al.*, 2006). Moreover, robust standard errors are also applied while multivariate regression analysis is being conducted.

Table 6.3: Multivariate analysis of 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 advise)		
- 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

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

Source: Researcher developed based on sample survey

Table 6.3 displays two columns: the results of the LPM in column 1 shows that basic financial literacy, advanced financial literacy and pension knowledge are positively and statistically significant for exercising retirement investment choice at all conventional levels. Specifically, the change in basic financial literacy, advanced financial literacy and pension knowledge score by 1 is estimated to increase the probability that they exercise retirement investment choice by 17.3%, 11.5% and 6.2% points respectively. These results indicate that actual financial literacy and pension knowledge have a positive relationship with retirement investment choice while perceived financial literacy, financial risk tolerance and financial advice show there is no association between them and retirement investment choice.

However, the results of the LPM (column 1) estimates contain several potential problems because according to prior research (Lusardi & Mitchell, 2007b; 2010; Van Rooij et al., 2011), authors have detected the potential endogeneity problem when they evaluate the association of financial literacy with retirement planning and stock market participation by using ordinary least squares (OLS) regression. In addition, Jappelli and Padula (2011) have clarified financial literacy endogeneity problem in the context of savings decisions. In this research, financial literacy endogeneity may come from some reasons. First, it may come from their experience. For instance, individual investors can get more knowledge through

participating in investment. Secondly, financial literacy endogeneity problem may come from themselves. It means that individuals' attempt to learn more knowledge in order to get more effective management of their investment. Lastly, the endogeneity problem may come from unobserved factors. Therefore, in this situation likewise, it could lead to bias in the results if it just simply applies LPM estimates which is reported in columns 1 in table 6.3.

Accordingly, two-stage least squares (2SLS) regression was applied to overcome endogenous problem which causes bias in results. In prior literature on financial literacy, instrument variables have been proposed to solve financial literacy endogeneity problem. These instrument variables comprise education level of respondents' parents (van Rooij et al., 2011; Lusardi, Mitchell and Curto, 2010), their experience in mortgage, loans consumer or credit card (Fornero and Monticone, 2011). Moreover, Bernheim et al., (2001) and Lusardi & Tufano (2009) have used training program of education in economics and finance at school as an instrument variable of financial literacy in their research. In this research, we follow Lusardi and Tufano (2009); Lusardi, Mitchell and Curto (2010) and Fornero and Monticone (2011) to apply instrument variables because it is appropriate for this scenario. That means the instrument variables capture respondents' financial knowledge before exposing to exercise retirement investment choice.

The two-stage least squares (2SLS) regression shown in column 2 in table 6.3 addresses potential financial literacy endogeneity problem by incorporating instrument variables in the model. As a result, there is a positively and statistically significant relationship of exercising retirement investment choice with basic financial literacy, and pension knowledge at 0.01 and 0.1 significant levels and respectively while self-assessment financial knowledge shows a negatively and statistically significant relationship with exercising retirement investment choice. It means that employees with higher basic financial knowledge are more likely to make retirement investment choice. This result is confirmed and in line with the results of previous research (Fornero & Monticone, 2011; Ricci & Caratelli, 2015). Likewise, employees with higher level of pension knowledge tend to exercise investment choice for their retirement. It suggests that improving employees' knowledge related to pension knowledge, specifically understanding the contributions and benefit rate of the social insurance system and available investment choice from financial market are effective ways to increase employees' involvement in their retirement savings. This finding provides new evidence in the context of retirement investment choice and it also confirms the finding suggested by Gustman, *et al.*, (2012) that individuals who would receive more generous pension have a deeper understanding of pension knowledge.

However, the association of exercising retirement investment choice with advanced financial literacy level, financial risk tolerance and financial advice is not statistically significant. *Hence, these findings partly support hypothesis H1A which proposes that employees with higher level of basic financial literacy have a propensity for exercising retirement investment choice. Likewise, the result also supports hypothesis H2 which suggests that employees with higher level of pension knowledge are more likely to exercise retirement investment choice. Conversely, these results indicate that hypotheses H3 and H4 and a part of hypothesis H1A are not supported.* It means that exercising retirement investment choice of Vietnamese employees is not affected by advanced financial literacy level, financial risk tolerance and financial advice.

Although financial literacy endogeneity problem was demonstrated by previous research, Wu-Hausman test is run to check endogeneity variable. In addition, F-statistics is also considered to check whether instrument variables are weak or not in the first stage of 2SLS regression. The result from Wu-Hausman test has rejected the null hypothesis as financial literacy variables are endogeneity variables by P-value < 0.05. To support these instrument variables which are not weak, F-statistics in the first stage regression of 2SLS are 22.8 for basic financial literacy and 45.0 for advanced financial literacy.

Financial literacy and investment choice outcome - H1B

In regard to those who have made investment choice for their retirement, H1B predicts that employees with high level of financial literacy have a propensity to participate in growth investing for their retirement investment. Before conducting multivariate regression analysis, multicollinearity indication is checked by variance inflation factors (VIFs) for each of independent variables. The result of VIFs shows that the highest figure 3.70 is quite good because it is below 10 (Hair *et al.*, 2006).

Once again two-stage least squares (2SLS) regression is applied to predict the relationship between financial literacy and investment choice outcome (investing growth options or investing conservative options).

Table 6.41: Multivariate regression analysis of financial literacy and 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	-.046 (.090)	-.047 (.090)
- 36 < age <= 50	.024 (.113)	.055 (.109)
- 50 < age <= 60	-.140 (.145)	-.074 (.148)
Education level (base group: high school)		
- Diploma/bachelor's degree	-.012 (.060)	-.074 (.093)
- Post graduate degree	.026 (.115)	-.103 (.141)
Married	-.141 (.086)	-.167* (.097)
Number of children	-.001 (.043)	-.028 (.048)
Income (base group: under VND9 million)		
- VND>9-15 million	.046 (.070)	.042 (.074)
- Over VND15 million	-.033 (.068)	.015 (.077)
Home owner	.047 (.075)	.133 (.077)
Observations	218	218
R-squared	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

Source: Researcher developed based on sample survey

Table 6.4 displays two columns: column 1 (LPM) presents results of the relationship between financial literacy and investment choice outcome; and column 2 (2SLS) confirms results when the endogenous problem of financial literacy is addressed by doing 2SLS regression analysis. The outcome variable is dichotomous variable indicating who have exercised retirement investment choice (1 = growth investing choice, 0 = conservative investing choice), and independent variables comprise self-assessment financial literacy, basic financial literacy, advanced financial literacy, perceived financial literacy, pension knowledge, financial risk tolerance, financial advice, and demographic characteristics.

Column 1 (LPM) shows there is an association of growth investing choice with advanced financial literacy level and financial adviser. Specifically, when advanced financial literacy score rises by 1, the probability of investing in growth options is estimated to increase by 17.6 percent points. Similarly, this probability is also predicted to grow by 20.8 percent points when employees take financial adviser. These results indicate that only employees with advanced financial literacy level and employees who have taken consultancy from adviser have a propensity for participating in growth investing while there is no association of

perceived financial literacy, basic financial literacy and financial risk tolerance with investment choice outcome. Similar to the results in LPM model in column 1, after controlling endogeneity problem by carrying out two-stage least squares (2SLS), the results in column 2 (2SLS) show the same results. However, with regard to marital status, it is interesting that those who married are more likely to select conservative investing option than those who are single. These results are statistically significant. *Hence, the finding partly supports hypothesis H1B which suggests that employees with higher level of advanced financial literacy have a propensity for participating in growth investing.*

Although financial literacy endogeneity problem was demonstrated, Wu-Hausman test is still used to check endogeneity variable. Moreover, F-statistics is also employed to check instrument variables whether they are weak or not. The results show that the rejected null hypothesis considered as financial literacy variables are endogeneity variables by P-value < 0.05 and F-statistics in the first stage regression of 2SLS is 15.9 for advanced financial literacy. This means that the instrument variable is not weak.

Summary of regression results

The results from multivariate regressions show that employees good at basic financial literacy level have a propensity for exercising retirement investment choice. Among employees who have exercised investment choice, those with higher level of advanced financial literacy have a propensity to choose growth investing for their retirement. More essentially, this finding is consistent with the findings from Gallery *et al.*, (2011) and van Rooij *et al.*, (2011). Unexpectedly, there is no evidence supports the association between employees' financial risk tolerance and their retirement investment choice. However, this research suggests and provides new evidence that employees who take financial advice from experts are more likely to participate in growth investing.

Overall, these findings from multivariate regression analysis provide evidence which supports hypothesis H2 and a part of hypotheses H1A & H1B while no evidence supports hypotheses H3 and H4. These findings propose that exercising retirement investment choice is influenced by employees' basic financial literacy and pension knowledge while participating in or selecting growth investing option is affected by advanced financial literacy level and financial advice from experts.

7. CONCLUSIONS

7.1 Summary of key findings

Financial literacy

The findings from perceived financial literacy indicate that participants do not feel confident about their financial literacy whereas the analysis of actual financial literacy reveals that their level of financial literacy is higher than that of perceived financial literacy. As a consequence, this result suggests that a large percentage of participants in this research may not be confident about their comprehension of common financial problems.

Secondly, according to responses to questions on fundamental economic and financial concepts, the level of basic financial literacy of respondents in this research is medium, lower than that in previous research (Bateman *et al.*, 2012; Lusardi & Mitchell, 2009; van Rooij *et al.*, 2011). Regarding advanced financial literacy level, although the result presents average level - the same as the level of basic financial literacy, the result impresses that respondents lack knowledge related to investment performance evaluation and they do not perform well when answering questions on long-term period return concepts. These concepts and knowledge are considered affecting investment decision-making, and wealth accumulation of individuals. In point of fact, it is proposed by choice theory reversibility feature that participants' perception of choice can be influenced by the time when they recognize the results of their choice (Dubois *et al.*, 2012). In addition, Brown *et al.* (2002) find that lack of financial knowledge could be an obstacle to investment choice.

Factors associated with retirement investment choice decisions

The results from a Two-Stage Least Squares (2SLS) regression show that basic financial literacy and pension knowledge have a positive relationship with exercising retirement investment choice while perceived financial literacy shows a negatively and statistically significant relationship. In addition, the results also indicate there is no association between exercising retirement investment choice and financial risk tolerance as well as financial advice. Accordingly, it is reasonable to indicate that the more basic financial literacy and pension knowledge individuals have, the more likely they make retirement investment choice.

Regarding those who have made investment choice for their retirement, these results present that only employees with advanced financial literacy level and those who have consulted financial advisers have a propensity for participating in growth investing while perceived financial literacy, basic financial literacy and financial risk tolerance are not found to have an association with investment

choice outcome. These findings suggest that only employees with sophisticated financial knowledge tend to select a different option.

These findings suggest that besides basic financial literacy, pension knowledge also plays an important role in making retirement investment choice decisions. Moreover, these findings in this research also indicate that sophisticated financial literacy inspires individuals to make a different choice in retirement investment choice outcome.

7.2 Contributions

7.2.1 Contributions to Theory

Firstly, this dissertation develops and verifies a framework for exercising retirement investment choice decisions. Accordingly, the key factors determining to exercise retirement investment choice are identified. This research has expanded previous research into financial literacy area which primarily focused on general and basic financial literacy (Bateman *et al.*, 2012; Hsiao & Tsai, 2018; Lusardi & Mitchell, 2009; van Rooij *et al.*, 2011) by inheriting instrument from Gallery *et al.* (2011) to measure more specific knowledge related to retirement investment choice at advanced financial literacy level. Consequently, this research also expands earlier literature by giving empirical evidence that basic financial literacy is positively significant with exercising retirement investment choice decisions while those who have higher advanced financial literacy level are more involved in making investment choice outcome with growth investing.

Secondly, this research has expanded earlier studies by considering pension knowledge factor in relation to exercising retirement investment choice decisions. While prior literature has emphasized the role of financial literacy in investment decisions, this research finds the evidence that besides financial literacy, pension knowledge also plays an important role in making investment choice decisions for retirement.

Further, this research also discovers that employees who have taken advice from experts are more likely to exercise retirement investment choice outcome with growth investing option. This confirms choice theories that employees find retirement investment choice more attractive when they perceive and recognize that growth investing option in long-term period for retirement become more salient (Bordalo *et al.*, 2013; Ferraro *et al.*, 2005).

Generally, the findings show an extremely high demand for doing research into financial literacy, especially in the context of retirement investment choice decisions. In addition, by developing and employing its model, this research also defines the decisive role of financial literacy, pension knowledge and financial advice encouraging employees to make retirement investment choice decisions.

7.2.2 Contributions to Practice

First of all, these findings convince policy-makers of the need for designing financial literacy programs and offering long-term prospects of stimulating the development of financial literacy programs. This is because it is necessary for employees to perceive that their financial knowledge is inadequate for sophisticated financial problems and to motivate them to be confident about their basic financial knowledge to exercise investment choice for their retirement to improve financial wellbeing of the general population

The government and financial institutions are conscious of the need for employees to concern with their pension savings. Therefore, these findings may provide valuable information for those who take responsibilities for producing solutions to improve individuals' knowledge related to pension and finance so individuals can make informed choice decisions that will influence their retirement and financial well-being.

The findings of this research should also be of interest to financial advice providers because this research finds that employees who have consulted with advisers have a propensity for participating in growth investing option. This finding suggests that more pragmatic approaches and efficient education campaigns for those looking for financial advice should be developed by financial institutions.

Generally, owing to several crucial policy implications revealed, the findings of this research identify an insufficiency of financial literacy which negatively impacts on investment decision-making, especially more complicated matters such as retirement investment choice. In addition, a shortage of sophisticated financial knowledge could prevent individuals from selecting retirement investment options. Hence, it can be inferred the leading role of financial education in the development of financial literacy.

7.2.3 Limitations and areas for further research

There are some limitations of this research. First, this research has relevant standard limitations in relation to cross-sectional survey questionnaire (Cavana *et al.*, 2001). Second, as assessment of the representativeness of the sample likened to the population of Vietnamese employees reported in chapter 6, the sample was over-representation by these companies which have a website and details contact showing up on business directory.

For conducting further investigation, future research can examine individuals' participation in progress regarding changes and frequencies of subsequent investment choice and their causes.

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**Financial literacy and Its Impact on Retirement Investment
Choice: An Investigation of Vietnamese Employees**

Finanční gramotnost a její vliv na investování v rámci důchodu: Průzkum
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