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**FINANCIAL INCLUSION IN VIETNAM:
THE IMPACTS OF DEMOGRAPHIC FACTORS ON THE USE
OF FINANCIAL SERVICES**

A Research Paper presented by:

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CONTENTS

List of Figures.....	iv
List of Tables.....	iv
List of Acronyms.....	v
Abstract.....	vi
CHAPTER 1: INTRODUCTION.....	1
1.1. Problem statements.....	1
1.2. Relevance and justification of the research.....	2
1.3. Research Objectives and Questions.....	3
1.4. Scope of study.....	3
1.5. Contribution of the study.....	4
1.6. Limitations of the study.....	4
1.7. Chapter outline.....	4
CHAPTER 2: CONTEXT OF VIETNAM.....	5
CHAPTER 3: LITERATURE REVIEW.....	13
CHAPTER 4: METHODOLOGY AND DATA COLLECTION.....	21
4.1. Econometric models.....	21
4.2. Data collection.....	23
4.2.1. Data Source.....	23
4.2.2. Variable description.....	25
4.2.2.1. Dependent variables.....	25
4.2.2.2. Explanatory variables.....	25
CHAPTER 5: RESEARCH RESULTS.....	27
5.1. Descriptive Statistics.....	27
5.2. Main analysis.....	27
5.3. Robustness analysis.....	33
5.3.1. Probit model with 2014 dataset and 2017 sample but excluding employed variable.....	33
5.3.2. Multivariate probit model with the original sample.....	35
CHAPTER 6: CONCLUSIONS.....	37
6.1. Conclusion.....	37
6.2. Limitations and future research.....	37
REFERENCES.....	39

List of Figures

Figure 1: Number of academic research of financial inclusion from 1990 - 2018.....	3
Figure 2: Account ownership and GDP per capita of Vietnam, in comparison with some countries .	6
Figure 3: Gaps in account ownership in Southeast Asia countries and Vietnam.....	7
Figure 4: Reasons for unbanked	8
Figure 5: Savings behaviour in Vietnam during 2011-2017.....	9
Figure 6: Distinction between access to and use of financial services.....	15

List of Tables

Table 1: Summary table of literature review on the determinants of financial inclusion using demand-side data.....	19
Table 2: Descriptive statistics.....	29
Table 3: Correlation matrix	30
Table 4: Demand-side determinants of financial inclusion indicators in Vietnam (2017) – Probit Regression.....	32
Table 5: Demand-side determinants of financial inclusion indicators in Vietnam (2014) – Probit Regression.....	34
Table 6: Demand-side determinants of financial inclusion indicators in Vietnam (2017) – Multivariate Probit Regression.....	36

List of Acronyms

SDGs	Sustainable Development Goals
UFA2020	Universal Financial Access by 2020
GDP	Gross domestic products
ATM	Automated teller machine
SMEs	Small-, medium-sized enterprises
ADB	Asian Development Bank

Abstract

The research paper aims to understand the determinants of financial inclusion in Vietnam from the demand side. The empirical results are based on the World Bank's 2017 Global Findex Database. Applying probit and multivariate probit estimations, it will analyse the correlation between individual characteristics (age, gender, income, education and employment status) and the use of formal financial services in Vietnam. Financial inclusion in this paper is defined as the probability of having a formal account / formal saving / formal credit. Sub-sample estimation for the year 2014 is also employed for robustness purpose. The main findings are that wealth and education have a positive and statistically significant relation with the level of financial inclusion in most of cases. While age and occupation are less likely to affect a person's participation in financial system, gender shows no effect on the probability of having a formal account / formal saving / formal credit. The implication of these findings for policy is that the government should take the socio-economic characteristics into consideration to address the un-favoured groups of population when establishing the financial inclusion policies.

Relevance to Development Studies

An inclusive financial system is believed to be a key element for poverty reduction and inequalities. Several studies have found the positive relationship between financial inclusion and economic growth. Indeed, many governments have been attempting to facilitate financial inclusion and access to financing. Although the access and the use of financial services are common in developed countries, the level of financial inclusion in developing countries, like Vietnam, is still quite low. To encourage the population participating in financial system, it is essential to understanding the determinants of being financial included. It will help to shape the deliberate policies, enhance the country's economy

Keywords

financial inclusion, account ownership, the use of financial services, Vietnam, individual characteristics, formal accounts, formal savings, formal credit

CHAPTER 1: INTRODUCTION

1.1. Problem statements

In recent years, there has been a growing interest in the linkage between an inclusive financial system and socio-economic development in both developing and developed countries. Sustainable Development Goals (SDGs), adopted by all United Nations Member States in September 2015, has addressed poverty and inequality as major challenges the world is facing. Despite not being directly mentioned in SDGs, financial inclusion is considered as an important enabler to achieve eight of 17 goals (Klapper et al., 2016: 1). A well-functioning inclusive financial system will help to reduce the poverty traps and unequal income distribution, thus boosts the economic growth (World Bank, 2013: 1; Demirgüç-Kunt et al., 2008: 106). With access to financial services, individuals and households can manage risk, earn interest, reduce the cost of credit (Ghosh, 2013: 3), make plans for their future, invest in better healthcare and education system (Klapper et al., 2016: 5), thus improve their living standards. For business, the online payment system will support core business operations and increase consumption and productive investment (Blancher et al., no date: 6-8)

Recognizing the prominence of the inclusive financial system to the overall development, many international organizations, such as the World Bank and International Money Fund, have taken action on supporting financial inclusion initiatives in emerging markets. Also, governments have been endeavouring to remove constraints which exclude people from accessing financial services, as well as to increase the residents' financial literacy. For example, in Myanmar, an educational program, named Basic Financial Literacy Booklet, has been executed in rural areas to improve households' financial literacy (Chen, 2019: 2). Through the Financial Sector Master plan, the Malaysian government has issued Guideline for Basic Banking Services which enables all segments of the population to have a basic account and access to banking services at low costs (De Luna-Martinez, 2017: 26-27).

While financial inclusion plays such a significant part of the development of financial markets and the economy, it is estimated that, in 2017, 1.7 billion people, accounting for nearly 31 percent of the world population aged over 15, don't own an account in the formal financial institutions, according to 2017 Global Findex Database. They are referred to as the "unbanked" population. With the purpose of scaling down the proportion of the unbanked, through the Universal Financial Access by 2020 (UFA2020), the World Bank Group set the goals of achieving one billion new accountholders by 2020. They also provide a framework for action to promote financial inclusion in 25 prioritized countries which constitute a large portion of the world's financially excluded population (World Bank, 2018c).

In Vietnam, financial inclusion is not a new concept. It has lain in the root of national strategies and government policies for many years. Also, it has been mentioned as one of the key subjects in international conferences. For instance, in Asia-Pacific Economic Cooperation 2017, which was hosted by Vietnam, the role of financial inclusion to agricultural development was chosen to be the main topic of discussion (Le and Nguyen, 2017). It is because Vietnam has been in the transformation process into an upper-middle-income country and financial inclusion is believed to be a means to achieve sustainable development and poverty alleviation. However, the level of inclusiveness in Vietnam remains quite low with only 31 percent of Vietnamese adults reported to have an account at formal financial institutions, according to Global Findex Database 2017. With the attempt to increase financial inclusion, the Vietnamese government is on its way to building up the national strategies and a firm legal corridor. Since promoting financial inclusion becomes an integrated part of Vietnam's economic development, it raises the necessity to comprehend the driving factors of financial inclusion before designing and implementing any policies.

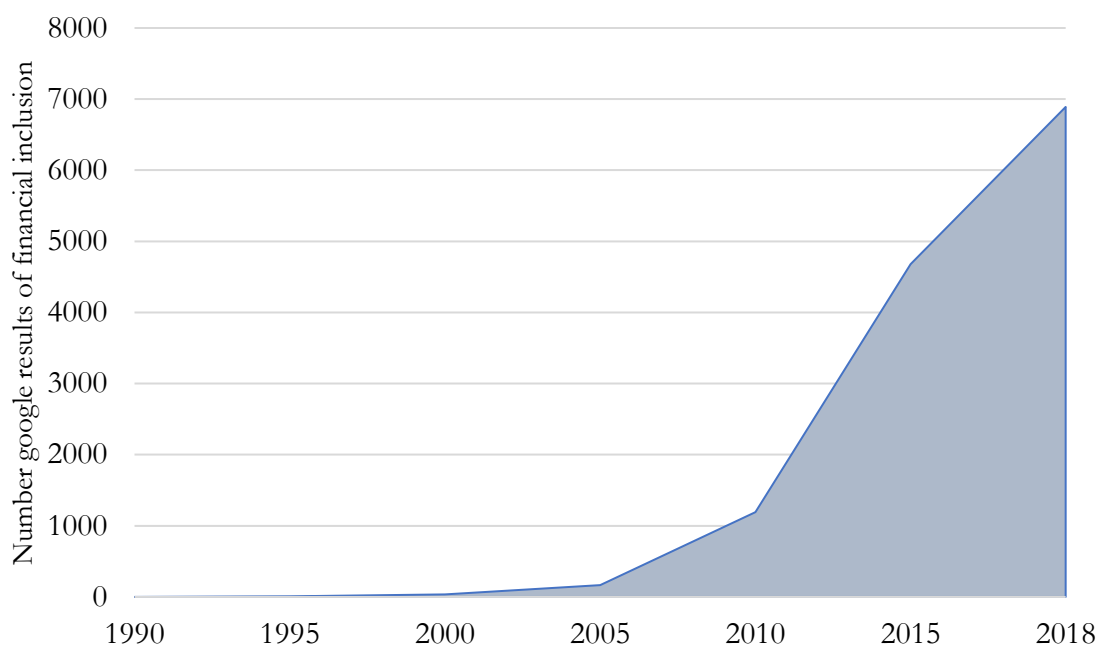
1.2. Relevance and justification of the research

In the last decade, financial inclusion has increasingly attracted attention in the academic literature. Figure 1 illustrates the number of academic research on financial inclusion during the period of 1990-2018, which is derived from Google Scholar for the keyword “financial inclusion”. Since the first appearance of this concept in the 1990s, there had been little scientific references addressing it. However, the year 2010 witnessed a skyrocket in the number of studies in this field, up to thousands per year. This emphasises the importance of the topic to economic development.

While a variety of research identified the positive linkages between financial inclusion and economic growth/ poverty alleviation, there is still an ongoing debate on its determinants. Many researches (e.g. Beck et al., 2005) supposed that the supply (measured by the indicators of banking penetration) is the primary driving force of financial inclusion. However, others (e.g. Tuesta, 2014; Abel, Mutandwa and Roux, 2018) criticized the limitations of supply-side approaches and pointed out that the level of inclusiveness in financial markets is determined by demand-side factors. Following these arguments, this paper approaches financial inclusion in Vietnam from user-side. During 2014-2017, the infrastructure of financial systems in Vietnam have been improved, yet the rate of financial inclusiveness remains unchanged. Assumed that there is no constraint in access to financial services, then the financial decision will be solely affected by demand elements. It includes socio-economic characteristics, individual attitudes and perceptions. However, the paper concentrates only on the

effect of an individual's characteristics on their possibility of being financially excluded. It is reasonable to use an individual's characteristics to explain and predict an action since these traits are constant for a long period (Roe, 1984). Also, this approach was proposed by many prior studies in this topic.

Figure 1: Number of academic research of financial inclusion from 1990 to 2018



Source: Google Scholar (Accessed: July 28th 2019)

1.3. Research Objectives and Questions

The main objective of the research paper is to analyse demographic factors behind financial inclusion and the extent to which these factors influence the use of a formal account, formal saving and formal credit in Vietnam. by addressing the following question:

- ***How individual characteristics affect financial inclusion in terms of owning a formal account, formal saving and formal borrowing in Vietnam?***

1.4. Scope of study

The paper employed the individual-level data from World Bank's Global Findex Database in 2017, which covers 1,002 adults in 52 provinces of Vietnam. Using probit and multivariate probit estimations, it will examine the correlation between individual characteristics (age, gender, income, education and employment status) and financial inclusion indicators. Financial inclusion in this paper is defined as the probability of having a formal account / formal saving / formal credit.

1.5. Contribution of the study

Although the number of research on financial inclusion has been increasing in recent years, there are little studies about the determinants of the use of financial services in Vietnam. This paper can contribute to the literature as one of the first researches on financial inclusion in the country. Moreover, by using the same data source and the same method, it provides a cross-check on the findings of earlier studies.

The main findings of the paper may provide an overview of the participants in the financial markets. It could be useful for community educators, financial institutions and policymakers to identify which groups of the population are un-favoured. Thus, they will have more appropriate responses to and supports for each group.

1.6. Limitations of the study

There are some restricted points which are important to be taken into the consideration. Firstly, the analyses exploit within-country variation and changes over time when using cross-sectional sample. Secondly, other potential determinants are excluded from the sample due to the lack of data. Lastly, it does not cover all aspects of financial inclusion.

1.7. Chapter outline

The remaining of the paper is organized as follows:

Chapter 2 gives the contextual setting of financial inclusion in Vietnam, including comparisons with other countries. It provides a general view on financial activities (bank account, savings and borrowing) of Vietnamese people and the barriers of the unbanked population.

Chapter 3 dedicates to the literature on financial inclusion. It gives many existing definitions of the concept, as well as how other studies approach the topic from different dimensions. Thence, it will shape the research paper.

Chapter 4 provides the econometrics model underpinning the estimations and the data collection.

Chapter 5 presents the main empirical results of estimations to determine the drivers of financial inclusion in Vietnam. A robustness test is applied to check whether the results are consistent with the database of 2014

Chapter 6 draws the conclusion from the main findings. Then, it will point out some limitations of the paper to give suggestions for future research.

CHAPTER 2: CONTEXT OF VIETNAM

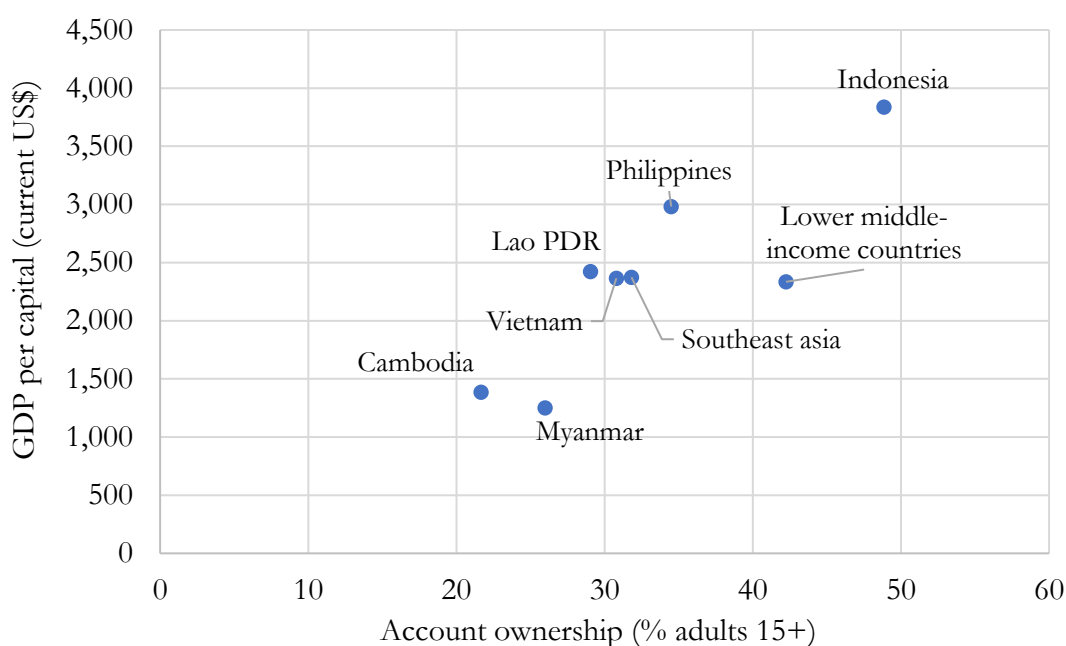
Vietnam is considered as a prominent subject for this research field. On the one hand, it has a variety of opportunities to expand financial inclusion. Its GDP per capita growth has increased significantly from about \$100 in the 1990s to over \$2,300 in 2017, according to World Bank data. The financial sector makes a big contribution to the evolution of the nation's economy as the role of financial intermediations has increased. It is estimated that there were over 10 thousand commercial bank branches and more than 1,000 People's Credit Funds around the country in 2016. The number of ATMs has been increasing from 2,000 machines in 2006 to 17,000 at the end of 2016 (Le and Nguyen, 2017). Four microfinance licensed institutions with more than 150 programmes are operated to provide financial services to poor people in rural areas. In addition, the technological adoption in the financial system of Vietnam speeds up at exponential rate with more than 48 percent of the population using the Internet and 125 million people subscribing the mobile phone. Most of the commercial banks has evolved internet banking and mobile banking while some has been working with Fintech partners to develop e-wallets. (Vietnam Microfinance Working Group, 2018). It is estimated that the share of adults with a mobile money account increased from 0.15 percent to 3.50 percent during the period of 2014 – 2017, according to the World Bank Findex Database.

On the other hand, financial inclusion in Vietnam takes on several challenges. Fundamentally, Vietnam is still a cash-based economy. Although electronic commerce has been increasing in recent years, two-third of payment transactions remain “cash-on-delivery” (Le and Nguyen, 2017). Moreover, a mass of financial institutions centre on the urban areas and its surroundings while the most rural towns in the country are hardly reached. The emergence of digital payments via a mobile account is expected to promote financial inclusion but it still has some limitations. Since the legal framework is under-developed, it is required a credit or debit card linked to a mobile account. Therefore, they are not considered a formal account. At the moment, there is only one product of M-Service company, which under The Global System for Mobile Association's program for the Unbanked, allowing users deposit cash make payments, receive or transfer money from their mobile account, in the absence of a bank card.

With these above difficulties, formal account ownership in Vietnam remains at a low rate. The share of adults with a formal account in 2017 remained stable at 30.80 percent, compared to the year 2014. This proportion is lower than the average level of the Southeast Asia countries (50.64 percent) and much lower than that of the world (68.50 percent). This comparison may be biased because as

pointed out by Demirgüç-Kunt and Klapper (2013: 290), the differences in GDP per capita between countries accounts for the variations in account penetration. To have a better evaluation, it would be fair to compare the level of formal account ownership of Vietnam with that of other lower middle-income countries in Southeast Asia and in the world. As can be seen from figure 2, the gaps are narrowed down. The average shares of account ownership in Southeast Asia is scaled down to 31.83 percent when excluding Singapore, Malaysia, Thailand and Brunei. In comparison with the remaining countries in the region, Vietnam is lagged behind the Philippines and Indonesia while being ahead of Cambodia and Myanmar in terms of account ownership. This results could be explained as countries with higher GDP per capita will have a higher level of account penetration. However, there is only one exception, that is Lao PDR. Although Lao LDR had a higher level of income than Vietnam, its level of account ownership (29.05 percent) is a little bit lower than that of Vietnam (30.80 percent). In comparison with lower-middle-income countries, account ownership in Vietnam is still below the average level of the group (43.34 percent)

Figure 2: Account ownership and GDP per capita of Vietnam, in comparison with some countries in 2017

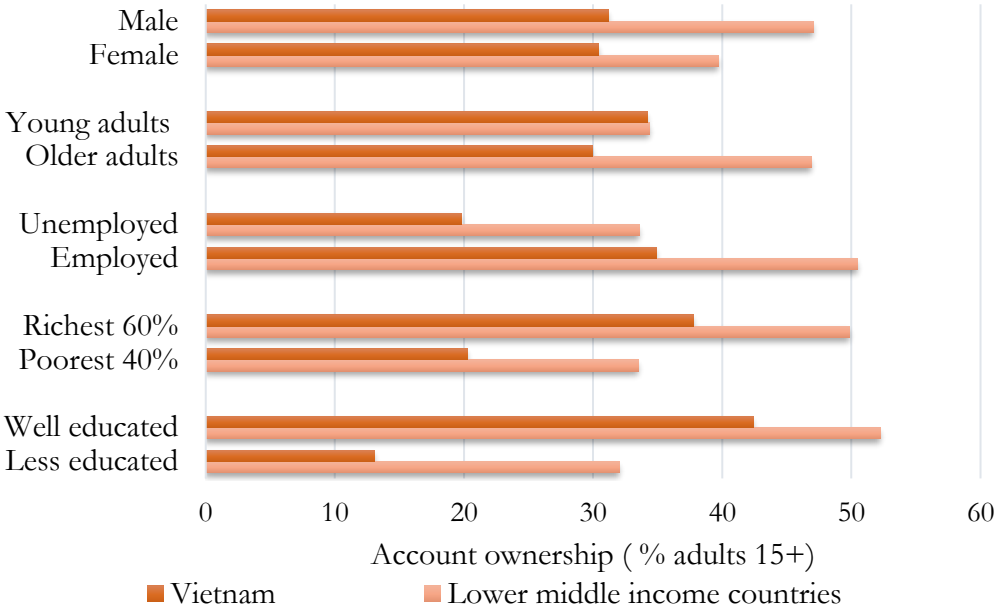


Source: The Global Findex Database & World Development Indicators (Accessed: April 2nd 2019)

Within Vietnam, there are variations in account ownership by individual characteristics (Figure 3). Those who are in the labour force population tend to have an account than those who are unemployed

by 15.08 percentage point. This gap had been widened by five percentage point since 2011. Also, the income gap accounts for the differences in account ownership. 37.80 percent of the richest 60 percent own an account, compared with 20.28 percent of the poorest 20 percent. This leaves the income gap around 17.50 percentage point, which has remained since 2011. Education is revealed to matter for the probability of having a formal account. Account ownership among those who have a higher level of education is about triple as likely as that of less-educated adults (42.43 percent, compared with 13.04 percent). These gaps share the same pattern with other lower-middle-income countries: Employed, wealthier and well-educated adults are more likely to have a formal account.

Figure 3: Differences in account ownership between Vietnam and other lower-middle income countries by individual characteristics in 2017

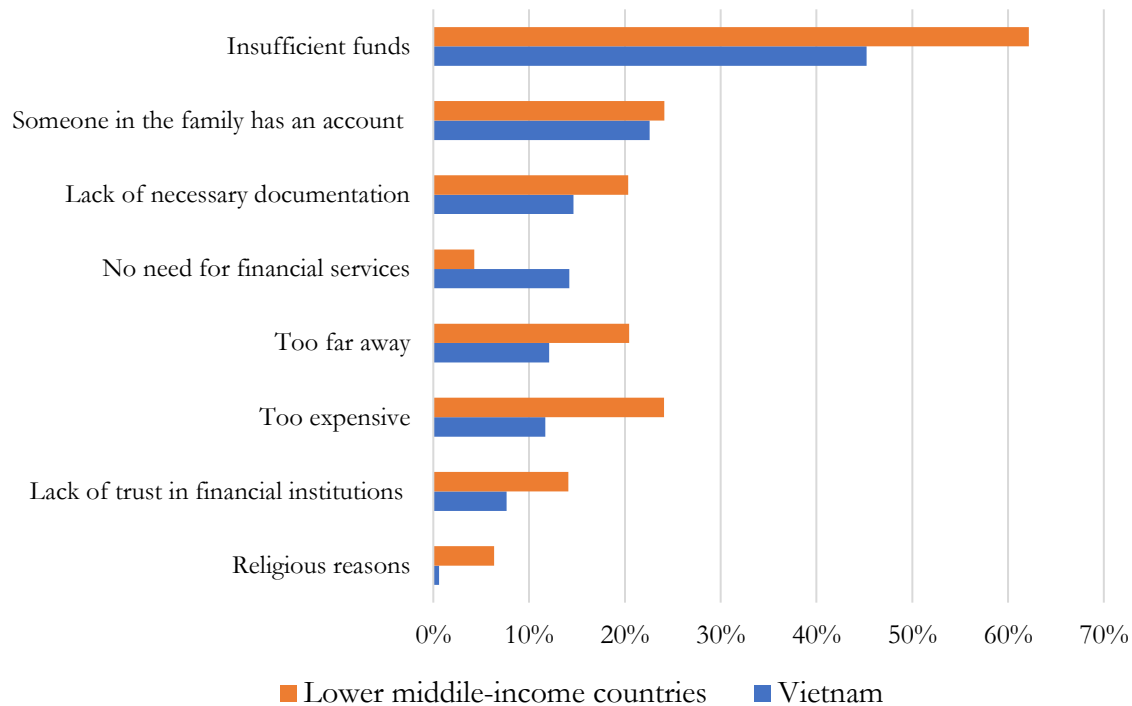


Source: Global Findex Database 2017 (Accessed: April 2nd 2019)

Nonetheless, account ownership in Vietnam reveals some differences with other low middle-income countries. In lower-middle-income countries, men are likely to have a formal account with the share of 47.09 percent, compared to 39.70 percent of women while, in Vietnam, there is no significant gender gap. While the growth of account ownership among women increased steadily from nearly 19.00 percent in 2011 to 30.40 percent in 2017, the portion of men having an account rose from 24.54 percent to 31.20 percent. This helps to narrow the gender gap in the country. Another difference is the age gap in account ownership. In lower-middle-income countries, account penetration tends to be lower among the young adults with 34.39 percent, compared to 46.94 percent of the older adults. On

the contrary, young Vietnamese are more likely to have an account than their older counterparts. The age gap in account ownership in Vietnam is only 4.30 percentage points, compare with 12.55 percentage-point gap in the average of other lower-middle-income countries.

Figure 4: Self-reported reasons for not having a formal account in Vietnam and lower middle-income countries in 2017 (% of unbanked population)

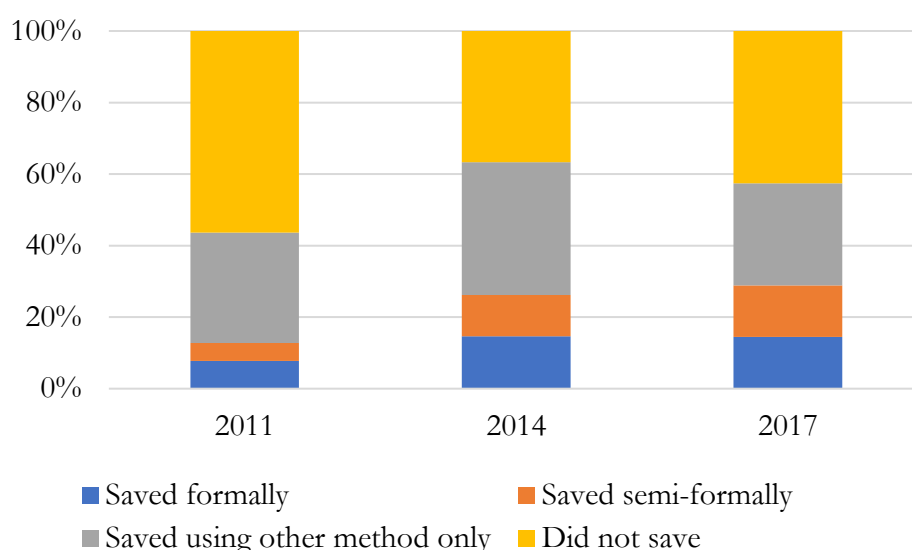


Source: Global Findex Database 2017(Accessed: April 2nd 2019)

To understand why nearly 70.00 percent of Vietnamese population remained unbanked, figure 4 provides the eight reasons cited by respondents without a bank account in the Global Findex Survey 2017. 44.25 percent of them reported lack of money as the main barriers to account ownership. It is interpretable as Vietnam is still a lower-middle-income country. At the end of 2016, there are around 9 million Vietnamese people living in poverty. The majority of them are ethnic minorities or rural population (World Bank, 2018a: 23). However, not only in Vietnam, this reason is also found to be the main barrier to account penetration globally (Demirgüç-Kunt *et al.*, 2018: 39-40). The second frequently cited barrier are a family member has an account with 22.75 percent of the unbanked population. “Lack of documentation” and “no need for financial services” are the next reasons associated with not having a bank account, contributing nearly similar proportions of 14.00 percent.

Distance (reported by 12.10 percent), high transactions cost (reported by 11.70 percent), distrust in financial institutions (reported by 7.66 percent) are less important barriers, which discourage the use of financial services. Only a very small portion of adults without a formal account (0.59 percent) reported to be financially excluded because of religious reasons. For the lower middle-income countries, “insufficient funds”, “someone in the family has an account” and “too expensive” are still the most cited barriers to participate in financial systems with 62.17%, 24.11% and 24.09% of unbanked population, respectively. “No need for financial service” is the least cited reason with 4.27%.

Figure 5: Savings behaviour in Vietnam during 2011-2017 (% of total population)

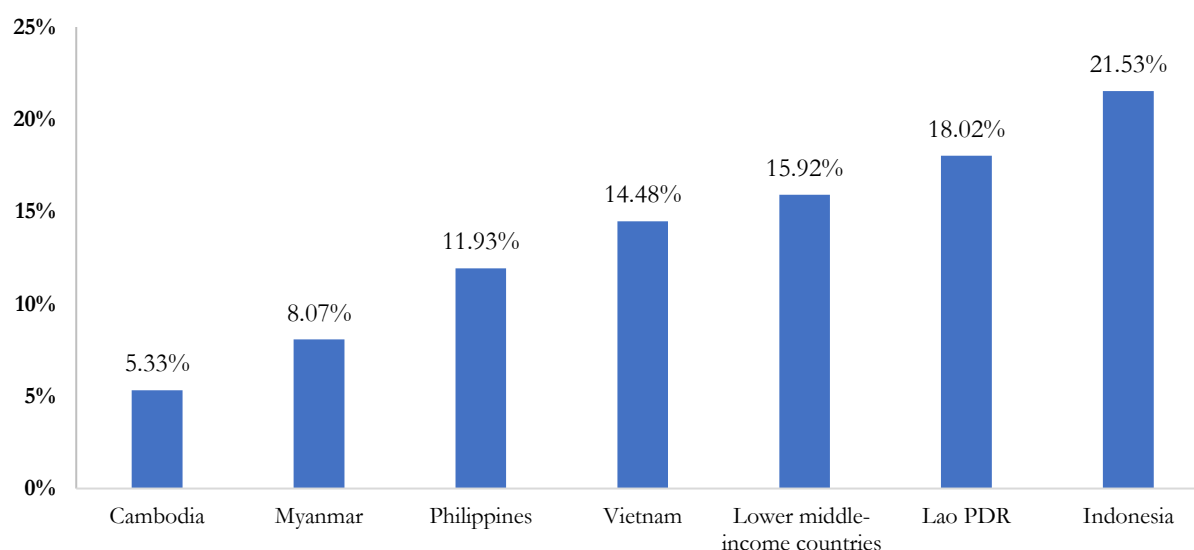


Source: Global Findex Database 2011, 2014, 2017 (Accessed: April 2nd 2019)

Figure 5 illustrates how Vietnamese adults saved money during the period 2011-2017. In 2017, it is estimated that 57.40 percent of Vietnamese adults set aside money in the past year. This level reduced from 63.30 percent in 2014. There are several ways they can choose to save money. According to the Global Findex Survey, the number of Vietnamese savers reported to set aside their money formally in financial institutions increased from 17.74 percent in 2011 to 23.08 percent in 2014, and to 25.23 percent in 2017. Beside formal savings, they can use saving clubs or an acquaintance to save money. The saving clubs have been a common alternative source of savings for Vietnamese people for a long time, posing a great challenge for financial inclusion in Vietnam. The shares of these semi-formal savers to total savers rose from 11.62 percent in 2011 to 25.02 percent in 2017. However, the bigger concern is those who save using other ways. They account for nearly half of the savers although their share has decreased since 2011. Using data from Vietnam Access to Resources Household Survey

to analyse savings behaviour in 12 provinces of Vietnam, Newman et al., (2008: 4) indicated that home and informal savings constitute a great proportion of households' savings. Most of them are kept at home in the form of cash, gold or jewellery. Also, they pointed out the formal savings decisions are different due to age, wealth and education of households (Newman et al., 2008: 7). This differences in savings due to individual characteristics are observed in the Global Findex Survey as well. Female, wealthier, younger, well-educated and employed adults are found to be more likely to save formally tend to save more.

Figure 6: Formal savings in Vietnam and other countries in 2017 (% of total population)



Source: Global Findex Database 2017 (Accessed: April 2nd 2019)

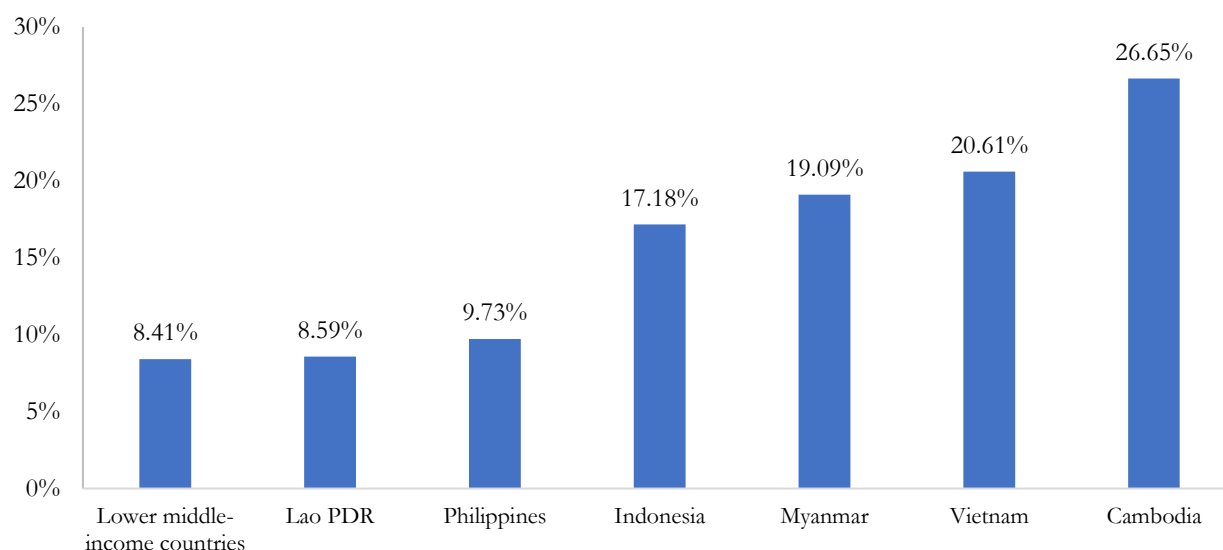
Compared to other countries, the proportion of adults who save formally in Vietnam (14.08%) is higher than that in Cambodia (5.33%), Myanmar (8.07%) and Philippines (11.93%). This figure of Vietnam is quite close to the average level of lower-income countries in the world. Meanwhile, Indonesia is the lower middle-income country in Southeast Asia with the highest percentage of population setting aside money at a financial institution (21.53%)

For credit services, those who reported having borrowed money within the past 12 months, accounts for about 49.00 percent of the adult population. Only 20.61 percent of adults borrowed money from a financial institution or used a credit card. Others reported borrowing informally using alternative sources such as savings clubs or from their family/ friends. Lainez (2015: 154) stated that informal credit in Vietnam had been an entrenched channel which may continue excluding households from the formal financial system. Especially, those who live in rural areas prefer these informal sources

of credit since they fail to meet the bank lending criteria (Le and Nguyen, 2017). Pham and Lensink found that credit behaviour also varied from different groups of gender while Barslund and Tapp figured out the relationship between exclusion and level of education (as quoted in Lainez (2015: 147). The Global Findex database 2017 shows that male, older, poorer and less educated adults are more likely to have debts than their counterparts in Vietnam.

Figure 7 compares the level of financial inclusion in Vietnam, in terms of formal credit, to that of some countries in the region and the lower middle-income countries. Cambodia is the lower middle-income country in Southeast Asia with the highest percentage of population borrowing from a financial institution (26.65%), followed by Vietnam (20.61%). Only 8.41% of adults in the lower middle-income countries reported to have formal credit in 2017.

Figure 7: Formal credit in Vietnam and other countries in 2017 (% of total population)



Source: Global Findex Database 2017 (Accessed: April 2nd 2019)

With the current state of financial inclusion, the Vietnamese government has formulated a variety of strategies, orientations and policies to improve the financial market infrastructures and to support vulnerable populations, small-, medium-sized enterprises (SMEs). In 2010, agricultural credit policy had been implemented to facilitate the access to credit products in the agricultural sector (Le and Nguyen, 2017). In 2011, through Decision No. 2195/2011/QĐ-TTĐ, Vietnamese government approved the proposal of establishing and developing the microfinance system in Vietnam up to 2020. The objective of this proposal is to provide basic financial services to the poor, low-income workers,

as well as SMEs at an affordable transaction cost. With the technical support from ADB and financial aid from World Bank, Vietnam is working toward (1) developing a legal and regulatory framework, (2) strengthening monitoring capacity to ensure the efficiency in management of microfinance activities, (3) improving the capacity of financial institutions, and (4) completing financial infrastructures for a greater access to transaction accounts (Linh and Hao, no date). In 2017, according to Decision No. 637/QĐ-NHNN, the Scheme on non-cash payment in Vietnam for 2016-2020 has been officially implemented to improve the mechanisms and policies for a cashless payment (Hang, 2017). Other programs such as Vietnam Microfinance Development Strategy 2010-2020 and Restructuring the system of people's credit funds until 2020 are operated to promote a cashless payment system. The ultimate purposes of these attempt are to facilitate financial access for the entire population and to ease the constraint of economic development.

In such a context, comprehending the factors that matter to financial inclusion will help to shape coherent strategies for further development. In the effort of contributing to the general understanding, analysing the effects of socio-economic characteristics on financial inclusion is expected to provide compelling evidence or policy recommendation for community educators and policymakers.

CHAPTER 3: LITERATURE REVIEW

Financial inclusion has been a subject of intense research while it is not a new concept. A strand of literature has taken into consideration the significant role of financial inclusion. Greater access to the financial system may stimulate a country's overall development in several channels. Firstly, it helps to increase a nation's saving and investment. Analysing the access to bank accounts of small groups in rural Kenya, Dupas and Robinson (2013: 164) found that business households who used the transaction accounts frequently built up more savings and investment, thus had higher expenditures, compared to those in the control group. Mobilizing saving facilitates the vulnerable groups, such as women and poor people, to access financial services. This spurs investment in production and economic welfare (Dupas and Robinson, 2013: 164).

Secondly, financial inclusion may increase the poor's income and consumption, thus contribute to poverty alleviation. International Monetary Fund (2018: 14) pointed out that a higher level of financial inclusion is correlated with a considerable decrease in income inequality. While insurance products help the poor to manage risks from unexpected events like price shocks, health, natural disasters, credit services at an affordable transaction cost will expand their production. Therefore, they will have more opportunities to gain higher income and access to better education, healthcare services (Copestake, 2010:4). Moreover, Burgess and Pande (2005:793) observed that the expansion of bank penetration, as well as saving and lending activities in rural India promoted the total output in non-agricultural sectors. Hence, it spurred employment rate and reduced the poverty in these areas.

Thirdly, financial inclusion creates value to SMEs (Demirgüç-Kunt, Beck and Honohan, 2008: 9-10). Since these firms constitute a large proportion of labour force in a nation, it has a significant impact on the overall development (Ayyagari, Demirguc-Kunt and Maksimovic, 2011: 21). By reducing the constraints of financial access, firms may increase their productivity and investment, hence create more jobs opportunities (Blancher *et al.*, no date: 5).

Another strand of the literature has concentrated on the concepts and measurements of financial inclusion since there has been no official definition of financial inclusion. Different countries or geographies define this term in different ways based on their social, economic and political context. One of the early studies on financial inclusion (or exclusion) was introduced by Leyshon and Thrift (1995: 312), who featured financial exclusion as "those processes that prevent poor and disadvantaged social groups from *gaining access* to the financial system". Carbó, et. al. (2005:1) defined financial

exclusion as “the inability and/or reluctance of particular societal groups to *access* mainstream financial services.”

In contrast to financial exclusion, the Asian Development Bank (2015:71) clarified financial inclusion as “ready *access* for households and firms to reasonably priced financial services”. The most recent and common recognition of this term is that “individuals and businesses have *access to* useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way,” stated by World Bank (2017).

Most of the definitions highlighted the importance of boarder access to financial services, whereas, the use of financial services has been neglected (Singh and Roy, 2015:12). Stone (2005: 8-9) pointed out that in some developed countries, such as the United States and the United Kingdom, access to finance can be treated equivalently as usage. However, it is not the case in developing countries which have either physical or institutional restrictions on access. For these countries, it will be more appropriate to approach financial inclusion in the dimension of the usage rather than access.

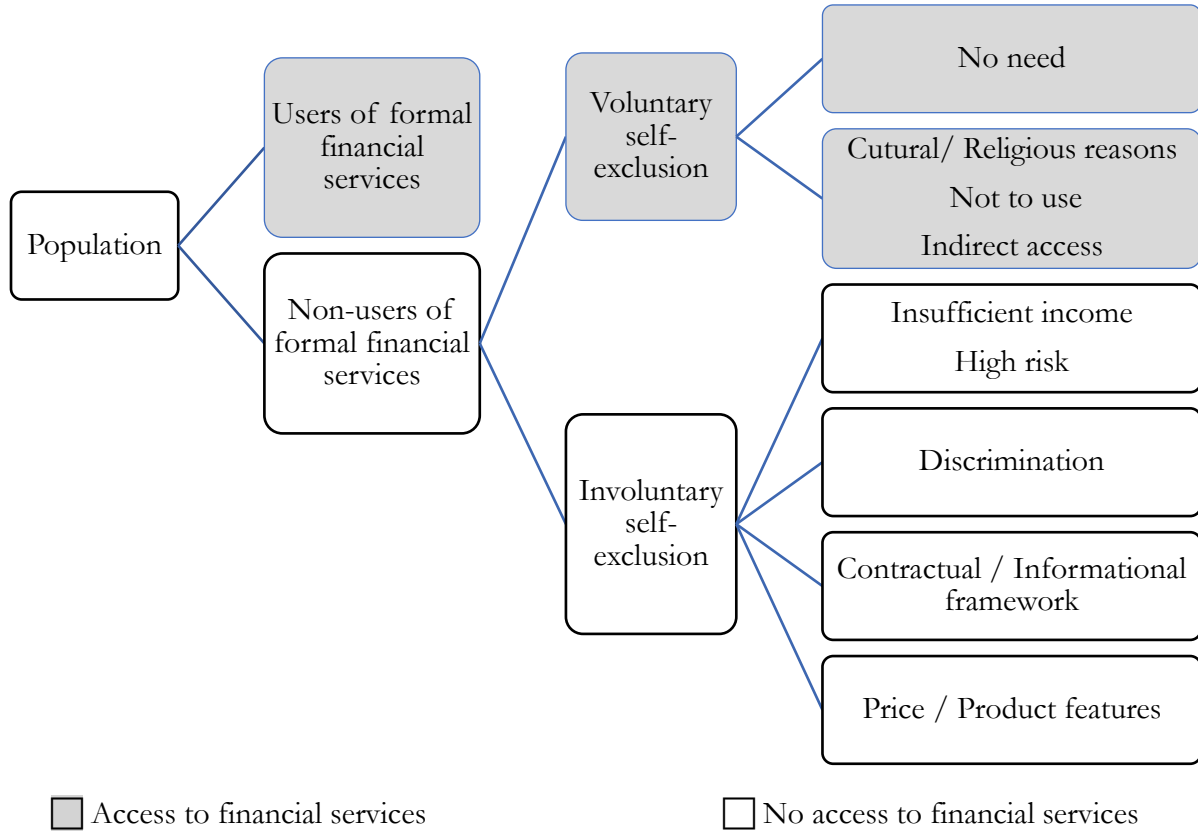
Demirgüç-Kunt, et. al. (2008: 26-29) laid the stress on the distinction between *access to* and *use of* financial services in demonstrating financial inclusion (Figure 6). These two terms are not the same. While *access* is only determined by the supply side, the *usage* involves both demand and supply side. To put a clearer interpretation of the differences between *access* and *use*, the authors divided the non-users of financial services into two categories: voluntary and involuntary exclusion.

Voluntary exclusion is those who choose not to get involved in, despite having access to, financial systems. Some of them may find a certain financial product unattractive due to ethical or religious. Alternatively, they do approach to financial services but in an indirect way, for instance, using their relative’s account for transactions. They are referred to as “self-exclusion”. From the policymakers’ perspective, there is a little to be done to bring these groups of people out of exclusiveness because it comes from the lack of demand, not from the inadequate supply (Demirgüç-Kunt, et. al., 2008: 26-29).

Another group of nonusers are involuntarily excluded. From the supply-side’s viewpoint, these unbankable groups include individuals and households who do not have adequate income or exposure to the high lending risk to suppliers. Also, government failures or market imperfections may account for exclusion in this category. Non-attractive products, lack of information, high transaction costs, poor risk management systems and ill-informed regulations constraint this group of population to

access financial products and services. These barriers of financial inclusion are worth to be addressed in the policy framework (Demirgüç-Kunt, et. al., 2008: 26-29).

Figure 8: Distinction between access to and use of financial services



Source: Demirgüç-Kunt, Beck and Honohan, (2008: 29)

Honohan and King, (2009:20) argued that while the distinction between access and usage has been left unclear due to a variety of definition of access used, the primary focus should be shifted to the measurement of usage. Usage statistics tend to give an accurate reflection of access. World Bank, (2013: 16) indicated the existence of voluntary exclusion in the system make it more difficult to observe and measure the actual access, compared to actual use. Hence, in their report, they preferred to assess financial inclusion from the dimension of financial usage.

Other studies attempted to determine financial inclusion from different dimensions or perspectives. From the providers' viewpoint, Beck et al. (2005: 4) proposed a set of traditional indicators to determine banking system penetration in term of physical access, affordability, and eligibility of deposit and lending services. These indicators include geographic and demographic penetration of branches and ATMs, the number of loan accounts per capita, loan-to-GDP ratio, the

number of deposit accounts per capita and deposit-to-GDP ratio. The authors found that countries with a higher level of bank density and higher use of loan services have a greater level of financial inclusion. However, Sarma (2008: 4) pointed out that using these indicators separately cannot explain correctly the extent of financial inclusion. For instance, the number of accounts may overestimate the shares of the banked population since a person may own more than one account or some accounts belong to foreigners (Allen et al., 2012: 3). Also, the differences in the dimensions can give a pale reflection of the current state. Amidžić et al. (2014: 4) added that the combination of these indicators may be problematic while taking Albania as an example. The country has a high debt-to-income ratio and yet a disproportionate number of bank branches.

In an attempt to construct a single index which captures information on various aspects of inclusive financial markets, Sarma (2008: 6-11) proposed an index of financial inclusion. It covers three dimensions of financial inclusion – namely banking penetration, availability and usage of banking services. The index is constructed in the same method with the UNDP's indicators. The higher the index's value is, the more inclusive the financial system is. While it is a valuable and useful measure to observe the change in financial inclusion over time and across economies, Amidžić *et al.* (2014: 15) pointed out that the assumption of exogenously giving equal weight to its dimensions will lead to misinterpreting its effects on financial inclusion. Therefore, they presented a new composite index with proper weighting scheme. Although this index is successful in overcoming the shortcomings, as other existing indicators, it is constructed solely on the supply-side data at country level. Cámara and Tuesta (2014: 6) argued that to a certain extent, higher access points to financial services or better governance only facilitates the access to financial markets, but does not imply a higher level of inclusiveness. Since the financial decisions made by individuals can be influenced by their socio-economic characteristics and behaviour traits, the determinants of financial inclusion can be driven not only by supply-side but also by demand-side (Abel, Mutandwa and Roux, 2018: 3).

Still, little is provided about the driving forces behind financial inclusion from the user's aspect. One of the first attempts to approach financial inclusion from demand-side was made by Demirguc-Kunt and Klapper (2012). They gave a critical overview of financial behaviours across 148 nations using a new set of data from the World Bank – the Global Financial Inclusion (Global Findex) Database. Following Demirguc-Kunt and Klapper's qualitative research, Allen et al. (2012) conducted an empirical model to investigate the determinants of financial inclusion in 123 countries with more than 120,000 participants, at both individual-level and country-level. They found that those who have

insufficient income or live in rural areas are particularly prone to financial exclusion. Also, distance to financial service points and transaction costs also reported as main barriers to access financial services.

Inspired by the findings, some research developed the literature by exploring the demographic factors' impact on financial inclusion within a region (e.g. Demirgüç-Kunt and Klapper, 2012, Zins and Weill, 2016, for Africa countries), or a country (e.g. Fungáčová and Weill, 2014, for China; Cámara and David, 2015, for Peru). In general, these studies used account ownership to evaluate the level of inclusiveness. And they found that age, gender, level of income, marital status and employment status are determinants of financial inclusion. However, their effects show a mixed pattern. Table 1 presents a summary of these studies.

From the view of the above discussion, financial inclusion is a multi-faceted concept with “access to” and “use of” financial services lie at the heart of the debate on its measurement. However, many research (e.g. Stone, 2005; Singh and Roy, 2015; Honohan and King, 2009) tend to favour the “usage” dimension because of its simplicity. Following their argument, financial inclusion used in this paper will be defined as the proportion of people using formal financial services (e.g. having a bank account, saving and borrowing). By this definition, the paper will centre around the use of financial service to limit the scope and to overcome the defects in measuring the access.

While the usage of financial services can be measured by either supply or demand, the paper will employ the user-side data for the analysis. It is because the user-side data is proved to be more consistent to measure the account penetration and the extent to which demographic factors will affect the users' financial decision. Table 1 presents a summary of the literature which investigate the impact of demand-side factors on financial inclusion, in terms of account ownership

Most of studies in the literature review table (such as Zins and Weill, 2016 and Fungáčová and Weill, 2014) suggested some determinants of financial inclusion (e.g. age, gender, level of wealth and education). They observed that being a male, older, richer and well-educated adult is more likely to be financial included. Therefore, I expected these factors also have the same effect on financial inclusion in Vietnam. Other factors (such as marital status and region) are also proposed in some prior studies and they did have a significant relation with financial inclusion. However, in my paper, they are not included in the specifications due to lack of data. For the methodology, I prefer probit model, rather than logit model, since most of the empirical studies in the literature employed it. This will to make my results comparative.

One important thing to note from this literature is that there is a little research for the case of Vietnam in this field. The research of Allen et al., (2012) is the only studies in the summary table including Vietnam in their sample. However, the authors did not analyse it as an individual country but together with other countries. This may make differences in my paper's results with previous studies.

Table 1: Summary table of literature review on the determinants of financial inclusion using demand-side data

Year	Author(s)	Sample size	Estimator	Determinants of financial inclusion						
				female	income	age	age2	education	employed	other factors
2012	Franklin Allen, et. al.	123 countries in 2011 (N=125,073)	Probit	0	+++	+++	---	+++	+++	rural (---) married (+++)
2013	Mamudu Abunga Akudugu	Ghana in 2011 (N=1000)	Logit	0	+	+++	---			
2014	Zuzana Fungáčová and Laurent Weill	China in 2011 (N=4,145)	Probit	---	+++	+++	---	+++		
2015	Noelia Cámara and Tuesta David	Peru in 2011 (N= 26,456)	Probit	0	+++	0	0	+++		financial literacy (++) married (-)

2016	Alexandra Zins and Laurent Weill	37 African countries in 2014 (N=37,072)	Probit	---	+++	+++	---	+++		
2017	Letenah Ejigu Wale Daniel Makina	18 Sub-Saharan African countries in 2011 (N=18,000)	Probit	---	+++	+++	---	+++		
2017	Miguel Ampudia and Michael Ehrmann	15 European countries (N=50,000) and United States (N=6,500) in 2010	Probit	- (for US) 0 (for EU)	+++	---		+++	+++	married (+++) race (++)

Note: +/ ++/ +++ (-/--/---) denotes a positive (negative) effect with statistically significant level at 10 percent, 5 percent, 1 percent, respectively. 0 denotes insignificance. Financial inclusion in these research is defined as account ownership

CHAPTER 4: METHODOLOGY AND DATA COLLECTION

This chapter concentrate on investigating the extent to which individuals' characteristics influence their decision to participate in the financial system. Following prior studies, the research approaches financial inclusion from the usage of a formal account, formal savings and formal credit. While an account is a fundamental product to access financial markets, savings and credit are essential services to expand and improve financial inclusion. A quantitative research method is applied to determine the main factors of financial inclusion in Vietnam

4.1. Econometric models

In the search for determinants of financial inclusion, the main analyses in the paper replies on the threshold theory of decision provided by Hill and Kau (1973), followed by Akudugu (2012). The idea is that when one makes a binary choice, there is a reaction threshold at which his or her decision may change. The differences among the individual would be expected to contribute to the threshold. To build up the theoretical framework, they assumed that Y is a decision variable, which takes a value of 1 if the individual decides to take action and 0 otherwise. X is a set of exogenous factors such as characteristics, level of education, etc., which distribute to the threshold X^* . At the certain value of X less than X^* , there is no adoption of the decision. As X reaches the critical value of X^* , it results in a positive reaction. This approach is captured by the following relationship:

$$Y_i = \beta X_i + u$$

$$\text{Where } Y_i = \begin{cases} 0 & \text{if } X < X^* \\ 1 & \text{if } X \geq X^* \end{cases} \text{ for all } i, i = 1, 2, 3, \dots n \text{ individuals}$$

X_i is a set of exogenous factors affecting the decision of individual i^{th}

The probability of individual taking action is given as:

$$\text{Prob}(Y_i = 1) = F(\beta'X_i)$$

$$\text{Prob}(Y_i = 0) = 1 - F(\beta'X_i)$$

In this context, the outcome variable is the individuals' decision to being included in the financial system, which is a binary. This variable will be measured in term of (1) account ownership, (2) the usage of saving products and (3) the usage of bank credit. These outcomes will be based on individuals' characteristics. Keeping in mind the availability of the data, the set of explanatory variables includes age, gender, level of income, labour status and education.

- Age. Many research showed that adults may have more demand for financial products, compared to the very young. However, as ageing, they may face with increasing challenges in accessing financial services such as loss of mobility, physical impairments, cognitive decline (AgeUK, 2016: 7) and decreasing financial literacy (MacLeod *et al.*, 2017: 3). Some may find it troublesome to commute to traditional financial institutions because of distance or to catch up with technology changes in digital banking. Others may no longer have the ability to manage their finance (Bleijenberg *et al.*, 2017: 1) or to remember passwords and pin cards (AgeUK, 2016: 7). To some extent, it is true for the case of Vietnam where the elderly are more likely to suffer the loss of independence and social exclusion. They prefer saving in cash or store gold, jewellery at home until the end of their lives. For these reasons, at a certain threshold, age may become a restriction for older people to be financially included.
- Gender. Demirguc-Kunt and Klapper (2012: 15, 2013:329) pointed out that there are gender gaps in account penetration in developing countries, regardless of the level of income, education, age and regions. Legal discriminations against women (both at the workplace and in the household), as well as gender norms (such as domestic violence and child marriage), make it difficult for women to have a bank account, to use saving and credit products (Demirgüç-Kunt, Klapper and Singer, 2013: 26). United Nations Capital Development Fund, (2006: 24-25) put forward that women are placed at a disadvantage due to their mobility, physical and financial ability. Therefore, men are more likely to receive a loan from most banks, compared to women. It is believed that gender bias does exist in financial inclusion, especially in developing countries like Vietnam.
- Income. Sinha and Subramanian (2007: 16) put forward the close linkage between income and inclusiveness. They found that households with small income stream are less likely to hold a formal savings account. It is because they have little incentive to save money and or they are ineligible for some certain financial products. Demirgüç-Kunt and Klapper (2013: 281-282) supported that in many countries, having a bank account is considered as an unnecessarily expensive thing since the transaction costs are quite high for low-income people.
- Employment status. Since the lack of formal employment is associated with unsubstantial income, those who are out of the workforce may find it difficult to have a bank account. Also, employed adults have more demand for financial services as receiving wages through a bank account or saving from their earnings (Demirgüç-Kunt *et al.*, 2018: 30). Therefore, working

adults are expected to have more probability of being financially included. However, it is important to note that in some cases, employment does not imply the possibility of having an account. It is because, in many developing countries, employees still prefer cash payment for their workers' wages (Botric and Broz, 2017: 217) or informal workers tend to spend their earnings in cash (Sinha and Subramanian, 2007: 17).

- Education. Many research (Akudugu, 2013: 4; Cámara and David, 2015: 25; Fungáčová and Weill, 2014: 196; Allen *et al.*, 2012: 25) found the positive relationship between the level of education and inclusiveness. Atkinson and Messy (2013: 18) emphasized the importance of education, especially financial literacy in promoting financial inclusion. Less-educated people are more likely to have a lower level of financial literacy or are unaware of financial products, which discourages them from involving in a variety of financial practices.

For this discrete choice model, either the logit estimation or the probit estimation can be employed since both of them calculate the probability that a person will select an option rather than the others. They present similar results so they are used alternatively in applications. The main difference is its cumulative distribution function. While the logit model follows the logistic distribution, probit model observes the standard normal distribution. I prefer the latter to the former so that my results can be comparative with the results of other related studies in the literature (Demirgüç-Kunt and Klapper, 2013; Fungáčová and Weill, 2014; Cámara and David, 2015; Fungáčová and Weill, 2016)

Moreover, I run multivariate probit model to estimate the correlated outcomes simultaneously. This approach was introduced by Ashford and Sowden (1970). It allows the error term of each equation correlating in pairs. Instead of calculation the probability of each financial inclusion indicators, it will predict these choices jointly. There may have no prior studies using this method to examine the relationship between individual's characteristics and financial inclusion. This will contribute to the literature of the topic

4.2. Data collection

4.2.1. Data Source

The data are employed from the World Bank's Global Findex Database. It provides the most updated information about how people around the world access to financial services as well as individual characteristics (World Bank, 2018b). This database is collected by Gallup, Inc. using nationally representative surveys of more than 150,000 individuals in 148 countries. On average, there are about

1,000 respondents in each country. However, the sample size can be increased in proportion to country size.

The survey has been conducted in 2011, 2014 and 2017. For each year, individuals are chosen randomly to conduct a face-to-face interview. While data is available for three years, panel data cannot be acquired to examine the trends in financial inclusion over time due to the different set of observed individuals. Therefore, the paper employs the cross-sectional database in 2017, which is the latest update information, to give an insight into the current state of financial inclusion in Vietnam. In 2017, the sample size of Vietnam covers 1,002 respondents in 52 provinces¹.

However, there are 999 observations in my sample, compared to 1,002 in the original one from the Global Findex database 2017 because I eliminated three observations. Those who did not have a bank account and cited religious norms as their only barrier to financial services are dropped out of the sample. In some religions, particularly Islam, believers are forbidden to take interests from banking. They have voluntarily excluded themselves from the financial market to comply with their religious beliefs regardless of their individual characteristics. Conducting a survey among Muslims in Norway in 2015 and 2016, Brekke (2018:5) observed that demographic factors (such as age, level of education, and origins) have no effect on their financial decision. Since these believers only constitute a very small percentage in the data, this elimination will not affect the outcomes. For those who are voluntarily self-excluded because of “no need” and “someone in the family has one”, I decided to keep these observations in the sample. In my opinion, an individual’s characteristics may have an influence on these reasons for exclusion. Although there are little prior studies supporting my idea, there is a considerable disproportionation due to an individual’s characteristics among these observations in the sample. Those who are female, employed and have completed secondary education or less are more likely to cite these two reasons than their counterparts.

¹ Global Findex data exclude 11 provinces: An Giang, Dac Lak, Dien Bien, Gia Lai, Ha Giang, Ha Tinh, Kien Giang, Kon Tum, Nghe An, Quang Binh, and Thanh Hoa. The excluded areas represent about 19 percent of the population (World Bank, 2018b).

4.2.2. Variable description

4.2.2.1. Dependent variables

Following prior studies, the research approaches financial inclusion in three dimensions: account ownership, savings and credit. While an account is a fundamental product to access financial markets, savings and credit are essential services to expand and improve financial inclusion.

- The original data for account penetration (*account*), was obtained by questions whether the respondents hold an account at a bank or other formal financial institutions. It also comprises those who use mobile money services in the past year. As these services are covered in The Global System for Mobile Association's program for the Unbanked and work independently from a bank account, it can be considered as formal account. It offers a more feasible way for people to approach financial services. Therefore, in the paper, mobile money account owners are perceived as a part of the banked population. The value of *account* equals one if the respondents reported having either a formal account or mobile money account, or both, and zero otherwise.
- The second dimension of financial inclusion is saving behaviour. Indeed, having an account cannot ensure that the owners may use it to save money. They have multiple ways to save, for example using a savings club or a circle of acquaintances. For this kind of information, respondents are asked whether they saved formally at a financial institution. If they give a "yes" answer, the dummy variable (*saving*) will take a value of one; and zero otherwise.
- The third dimension of financial inclusion is credit behaviour. Similar to savings, people have various sources to borrow. They may borrow formally from a financial institution, including bank, credit union and microfinance institution; or from a family member/friends or from saving clubs. If they reported borrowing from a formal institution in the past year, the dummy variable (*credit*) will take a value of one; and zero otherwise.

4.2.2.2. Explanatory variables

The determinants of financial inclusion and socioeconomic characteristics, namely gender, age, income, level of education and employment status – are represented as the following variables:

- Gender is represented by a dummy variable (*female*), which takes the value 1 if the respondent is female. It is expected that there is a negative correlation between being a woman and the level of financial inclusion.

- Age is a continuous variable, which denotes the number of years (*age*). Age is expected to carry a positive sign. However, at a certain threshold, it will turn into negative. Therefore, the squared of age (*age2*) is taken into consideration to capture an inverted U-shaped relationship between age and financial inclusion.
- The relative income is divided into five dummy variables for *poorest* 20 percent (*income_1st*), second 20 percent (*income_2nd*), third 20 percent (*income_3rd*), fourth 20 percent (*income_4th*) and richest 20 percent (*income_5th*). Each variable takes a value of one if the respondent's income belongs to that quintile and zero else. The regression will exclude the poorest 20 percent as it is the omitted dummy variable. It is expected that the higher income level relates to the greater use of financial services.
- For the education background, the paper uses three dummy variables for completed primary or less (*edu_pri*), *secondary* (*edu_sec*) and *completed* tertiary or more (*edu_ter*). *Edu_pri* is the excluded variable in the estimations. Each variable takes a value of one if respondents reach that level of education and zero otherwise. Those with higher education are expected to have a higher probability of being financially included since they comprehend the products and their benefits. The paper looks for the positive relationship between the level of education and financial inclusion.
- Employment status is a dummy variable (*employed*), which captures whether the respondents are in the workforce or not. The value of *employed* equals one if the person has a job and zero otherwise. Since more and more employers prefer to pay salaries into a bank account, employed individuals are more likely to be included in financial systems than their counterparts. Therefore, the expected sign of this variable is positive.

CHAPTER 5: RESEARCH RESULTS

5.1. Descriptive Statistics

Table 2 indicates the summary statistics of all variables used in the estimations and their expected signs. The sample covers Vietnamese adults from 15 to 91 years old. The average age of respondents is 43. Most of them are employed with 74.17 percent of respondents in the workforce. The proportion of women in the sample is 57.4 percent. It is observed that 33.4 percent of Vietnamese adults have an account at formal financial institutions. 29.4 percent of Vietnamese individuals reported borrowing money formally in the past year, while only 16.5 percent saved money at formal financial institutions.

Before examining the extent to which individuals' characteristics affect their decision to use financial products, it is necessary to analyse the correlation between these variables. It will give a sense of the signs of the coefficient. As presented in part A table 3, there is no high intercorrelation among the predictor variables in the model, which eases the multicollinearity problem. The second part of table 3 gives a forecast about the significant relationship between individuals' characteristics and three indicators of financial inclusion. The coefficient signs of *age* variable, are unexpected negative, while female variable has no significant relationship with all financial inclusion indicators. Dummy variables for education and income show a positive association with formal saving and formal account. The correlation between credit variable and education- /income-related variables are unstable. One can predict that the results will not fulfil all expectations.

5.2. Main analysis

Table 4 reports the probit estimations of the relationships between an individual's characteristics and financial inclusion in Vietnam. It indicates how these demographic factors may affect the probability of having a formal account, formal saving and formal credit which are used alternatively as the indicators for financial inclusion.

It is surprising to observe that gender have no significant effect on all three financial inclusion indicators. This finding is similar to the results of Allen et al. (2012). They pointed out that gender is not related to the probability of being financially included at the global level. The results of the studies for specific countries such as Ghana (Akudugu, 2013) and Peru (Cámara and David, 2015) are alike. Such a revelation can be explained as the increasing role of women in economic activities as well as in public life. More and more women become the primary income earner in their households. In some circumstances, men have to migrate within the country or overseas to work while their wife becomes

the receiver of the remittances and domestic money transfers (United Nations Capital Development Fund, 2006: 25). This helps to weaken gender bias in financial inclusion.

On the one hand, *age* has a positive influence on the possibility of having an account at formal institutions, while the squared of *age* has a negative effect. It confirms the expectation that there is an inverted U-shaped relationship between age and formal account. Older people tend to be financially included due to the increasing demand for financial services. If they get one year older, the probability of owning a formal account is higher by 1.30 percentage points. However, after a certain age, this probability will diminish. It is due to their physical disabilities hinder their access to financial institution. Fungáčová and Weill (2014: 202) found the same results for the case of China and explained it as a “generational effect”, which is determined by both demand and supply side. On the other hand, this nonlinear relationship does not hold for formal saving and formal credit as both *age* and *age2* do not significantly relate to these two indicators.

A higher level of education is found to be associated with a higher likelihood of having a formal account or formal saving. While both dummy variables for education (*edu_sec* and *edu_ter*) are positive at a significant level of 1 percent, tertiary education has a larger coefficient. The possibility of having a formal account (formal saving) for those who have finished post-secondary education or more increases 55.60 percentage points (30.49 percentage points), compared to those who just completed elementary education. This asserts the importance of education in improving financial inclusion. These findings are homogeneous with the studies in the literature. However, education shows no effect on formal credit.

Similar to education, income only impacts on the probability of owning a formal account or formal saving whereas no significant difference in the likelihood of formal credit among income groups is found. Those who are among the richest 20 percent in the country have a higher possibility to owning an account at formal institutions (formal saving) by 15.30 percentage points (18.29 percentage points), compared to those who are among the poorest 20.00 percent. One can conclude that a higher income will increase the likelihood of being financially included as people have more extra money to save. Other studies in the literature also favoured education as a robust determinant of financial inclusion.

Table 2: Descriptive statistics

Variable	Definition	Obs.	Mean	Std. Dev.	Min	Max	Expected sign
A. Indicators of financial inclusion							
account	= 1 if respondent has a formal account	999	0.334	0.472	0	1	X
saving	= 1 if respondent saves formally	985	0.164	0.371	0	1	
borrowing	= 1 if respondent borrow formally	991	0.294	0.456	0	1	
B. Determinants of financial inclusion							
female	= 1 if respondent is female	999	0.574	0.495	0	1	(-)
age	= age in number of years	999	42.388	16.213	15	91	(+)
age2	= the squared of age (in years)	999	2059.288	1522.361	225	8281	(-)
income_1st	= 1 if respondent's income belongs to the first quintile	999	0.178	0.383	0	1	
income_2nd	= 1 if respondent's income belongs to the second quintile	999	0.180	0.385	0	1	(+)
income_3rd	= 1 if respondent's income belongs to the third quintile	999	0.186	0.389	0	1	(+)
income_4th	= 1 if respondent's income belongs to the fourth quintile	999	0.207	0.406	0	1	(+)
income_5th	= 1 if respondent's income belongs to the fifth quintile	999	0.248	0.432	0	1	(+)
employed	= 1 if in the workforce	999	0.742	0.438	0	1	(+)
edu_pri	= 1 if completed primary or less	999	0.338	0.473	0	1	
edu_sec	= 1 if secondary education	999	0.511	0.500	0	1	(+)
edu_ter	= if completed tertiary or more	999	0.151	0.358	0	1	(+)

Table 3: Correlation matrix

	female	age	age2	edu_pri	edu_sec	edu_ter	inc_1st	inc_2nd	inc_3rd	inc_4th	inc_5th	employed	account	saving	credit
A. Correlation among individuals' characteristics															
female	1.000														
age	0.054*	1.000													
age2	0.054*	0.981***	1.000												
edu_pri	0.120***	0.348***	0.341***	1.000											
edu_sec	-0.116***	-0.210***	-0.212***	-0.730***	1.000										
edu_ter	0.002	-0.166***	-0.154***	-0.301***	-0.431***	1.000									
inc_1st	0.047	0.138***	0.150***	0.231***	-0.151***	-0.094***	1.000								
inc_2nd	0.041	-0.0353	-0.036	-0.016	0.079*	-0.089*	-0.218***	1.000							
inc_3rd	-0.029	0.036	0.032	-0.011	0.067**	-0.079**	-0.223***	-0.224***	1.000						
inc_4th	0.001	-0.015	-0.024	-0.010	-0.008	0.025	-0.238***	-0.239***	-0.245***	1.000					
inc_5th	-0.053***	-0.109***	-0.107***	-0.171***	0.0111	0.210***	-0.268***	-0.269***	-0.275***	-0.294***	1.000				
employed	-0.069**	-0.233***	-0.289***	-0.144***	0.0582*	0.109***	-0.102***	-0.069**	0.018	0.003	0.133***	1.000			
B. Correlation matrix between individuals' characteristics and three indicators of financial inclusion															
account	-0.019	-0.258***	-0.263***	-0.336***	0.078**	0.334***	-0.141***	-0.050	-0.044	0.019	0.192***	0.161***	1.000		
saving	0.0263	-0.104***	-0.105***	-0.227***	0.089***	0.179***	-0.136***	-0.029	-0.058*	0.018	0.181***	0.073**	0.449***	1.000	
credit	0.0112	-0.156***	-0.163***	-0.015	0.003	0.015	-0.009	0.015	0.007	0.004	-0.016	0.097***	0.086***	-0.015	1.000

(*), (**), (***) denotes statistically significant level at 10 percent, 5 percent, 1 percent, respectively

Unexpectedly, employment status has no significant relationship with having a formal account and formal saving. This finding differs from the results of Allen et al., (2012) and (Ampudia and Ehrmann, 2017). Nevertheless, there is a positive effect on formal credit at 10 percent significant level. Those who are employed are more likely to borrow from a formal institution, compared to their counterparts.

Adjusted R-squared indicates how well the explanatory variables can explain the variation in each of financial inclusion indicators. The adjusted R-squared in the regression (1) has the highest value (18.3 percent) since most of the variables (age, income, education) are statistically significant. The value decreases to 10.80 percent when formal saving is substituted as the dependent variable. It bottoms out at 3.20 percent in case of formal credit as only one variable can explain the variation in the dependent variable.

To sum it up, the results show a mixed pattern of financial inclusion in Vietnam. Being older, well-educated, wealthier favour the possibility of having an account, hence increase the probability to use other financial services. For formal saving, a higher level of income and education are the main determinants while employment status is found to be the only driven of formal credit in Vietnam.

**Table 4: Demand-side determinants of financial inclusion indicators in Vietnam (2017)
Probit Regression**

Variables	Formal account (1)	Formal saving (2)	Formal credit (3)
female	0.014 (0.0313)	0.035 (0.0218)	0.0185 (0.02945)
age	0.013 ** (0.0063)	0.0029 (0.0042)	0.0027 (0.00527)
age2	-0.0002 *** (0.00007)	-0.000035 (0.00005)	-0.000087 (0.00006)
edu_sec	0.246 *** (0.0366)	0.1588 *** (0.0293)	-0.0391 (0.03488)
edu_ter	0.556 *** (0.045)	0.3049 *** (0.05901)	-0.0367 (0.0463)
inc_2nd	0.028 (0.0571)	0.0748 (0.0533)	-0.0022 (0.04934)
inc_3rd	0.0416 (0.0514)	0.0518 (0.05051)	-0.00699 (0.04852)
inc_4th	0.079 (0.056)	0.1177 ** (0.05367)	-0.01189 (0.04717)
inc_5th	0.1530 *** (0.0559)	0.1829 *** (0.05394)	-0.04359 (0.04575)
employed	0.050 (0.0389)	0.01209 (0.02839)	0.0664* (0.03517)
Observations	999	985	991
R-squared	0.183	0.108	0.032
Adjusted R-squared	0.166	0.083	0.014

Noted: (*), (**), (***) denotes statistically significant level at 10 percent, 5 percent, 1 percent, respectively.

Marginal effects are reported in the table. Standard errors are in parentheses.

5.3. Robustness analysis

To check the robustness, I applied the same probit model with (1) 2014 dataset and (2) 2017 sample but excluding employed variable. Also, taking into consideration the potential correlation caused by unobserved individual characteristics, a multivariate probit model is employed. This approach is expected to give a better analysis since it allows error term of each equation correlating in pairs.

5.3.1. Probit model with 2014 dataset and 2017 sample but excluding employed variable

Table 5 illustrates the results of the robustness test with probit model. The regression (4) to (6) estimate the possibility of each financial inclusion indicators with the Global Findex Database in 2014. Since the data for the *employed* variable is not available for the year of 2014, it is not included in the regression.

Still, being a female does not have an effect on the formal account and formal saving. However, it has a positive relationship with having a formal credit. It is implied that in 2014, women are more likely to be involved in the financial system through credit activities. This finding appears to contradict the results of Fungáčová and Weill, (2014), which indicated that being a female reduces the possibility of borrowing at a formal institution.

Another difference in the robustness analysis is the association between age and three financial inclusion indicators. Age and the age squared have no effect on the probability of formal account. This result goes against most of the literature. The only study which supported this finding is (Cámara and David (2015) for the case of Peru. Meanwhile, the year 2014 witnessed a nonlinear relation between formal saving / formal credit and age, which could not be found in 2017.

The association between the *education* variable and formal account/ formal saving remains unchanged in 2014. A remarkable difference is that the dummy variable for tertiary education is found to be negative with formal credit. It indicates that those who have higher education will less likely to borrow money from a formal institution. There is no considerable difference in the relationship between income and three indicators of financial inclusion in 2014.

To make the robustness test more comparative, I run regression (7) to (9) on the 2017 dataset but without *employed* variable. When excluding the employed variable, there is no difference in the results of formal account and formal saving, compared to the main analysis. However, in the regression (9), there is a negative relationship between formal credit and the squared of age, which is not witnessed in the regression (3). As can be seen from table 5, education and income are two factors which remain the effect on financial inclusion indicators through all regression.

Table 5: Robustness check with 2014 dataset and 2017 sample without *employed* variable - Probit Regression

Variables	2014			2017		
	Formal account (4)	Formal saving (5)	Formal credit (6)	Formal account (7)	Formal saving (8)	Formal credit (9)
female	0.0103 (0.0309)	-0.0299 (0.0221)	0.0517 ** (0.0243)	0.0112 (0.0313)	0.0353 (0.0218)	0.0155 (0.0294)
age	-0.0001 (0.0049)	0.0139 *** (0.0041)	0.0363 *** (0.0051)	0.0156 *** (0.0060)	0.0035 (0.0039)	0.0056 (0.0050)
age2	-0.0001 (0.0001)	-0.0002 *** (0.0001)	-0.0004 *** (0.0001)	-0.0002 *** (0.0001)	-0.0000 (0.0000)	-0.0001 ** (0.0001)
edu_sec	0.1149 *** (0.0351)	0.0375 (0.0259)	-0.0297 (0.0269)	0.2481 *** (0.0365)	0.1593 *** (0.0293)	-0.0355 (0.0348)
edu_ter	0.5587 *** (0.0492)	0.2943 *** (0.0592)	-0.0933 ** (0.0342)	0.5606 *** (0.0447)	0.3071 *** (0.0588)	-0.0289 (0.0466)
inc_2nd	0.0296 (0.0571)	0.0983 ** (0.0526)	-0.0516 (0.0346)	0.0273 (0.0570)	0.0740 (0.0532)	-0.0047 (0.0492)
inc_3rd	0.0930 * (0.0561)	0.0424 (0.0467)	-0.0389 (0.0349)	0.0444 (0.0572)	0.0521 (0.0505)	-0.0031 (0.0486)
inc_4th	0.1801 *** (0.0586)	0.1289 ** (0.0531)	-0.0508 (0.0349)	0.0816 (0.0564)	0.1177 * (0.0537)	-0.0103 (0.0472)
inc_5th	0.2553 *** (0.0578)	0.1993 *** (0.0556)	-0.0348 (0.0364)	0.1588 *** (0.0558)	0.1841 *** (0.0539)	-0.0372 (0.0459)
Observations	994	988	992	999	985	991
R-squared	0.182	0.121	0.076	0.182	0.108	0.029
Adjusted R-squared	0.166	0.098	0.056	0.166	0.085	0.012

Noted: (*), (**), (***) denotes statistically significant level at 10 percent, 5 percent, 1 percent, respectively.

Marginal effects are reported in the table. Standard errors are in parentheses.

5.3.2. Multivariate probit model with the original sample

Multivariate probit model, proposed by Ashford and Sowden (1970), is the generalization of probit model. It estimates correlated binary outcomes jointly. In the univariate probit model, the potential cross-commodity correlation among financial inclusion indicators for the same adults are not observed. Unobserved factors may be related in the error term. In the multivariate probit model, this shortcoming can be overcome. Instead of calculating the probability of each financial inclusion indicator, it will predict these choices jointly. It allows the error term of each equation correlating in pairs

Table 6 analyses the determinants of three financial services by multivariate probit model. When jointly predicting these financial inclusion indicators, age still has an inverted-U shaped relationship solely with the possibility of having a formal account. Education and wealth remain as important factors of financial inclusion with high levels of statistical significance. This confirms that being well-educated and richer increases the probability to be financially included via deposit services. On the contrast, there is no association between these individual characteristics with the use of formal credit. Only employment status is found to have a significant relationship with formal credit. This suggests that those who have a job are more likely to borrow from a formal financial institution. These findings are consistent with the results of probit model.

In addition, the last three rows of Table 6 present the variance-covariance matrix of the error terms in the use of formal financial services. Taking into consideration the impacts of unobserved factors, this indicates whether the participation of a person in these services is substitutes or complementary. The correlation coefficient between formal account and formal saving is positive and statistically significant at the 1% level, appearing that the participation of a person in formal account will promote their participation in formal saving. However, the covariance between formal credit and formal account (formal saving) is not significant, suggesting that these financial inclusion indicators are not related.

Table 6: Demand-side determinants of financial inclusion indicators in Vietnam (2017)
Multivariate Probit Regression

Variables	Formal account (10)	Formal saving (11)	Formal credit (12)
female	0.0374 (0.0916)	0.141 (0.102)	0.0511 (0.0879)
age	0.0385 ** (0.0182)	0.0147 (0.0192)	0.0105 (0.0157)
age2	-0.000609 *** (0.000211)	-0.000178 (0.000216)	-0.000286 (0.000175)
edu_sec	0.686 *** (0.114)	0.726 *** (0.139)	-0.104 (0.103)
edu_ter	1.509 *** (0.154)	1.013 *** (0.168)	-0.0812 (0.145)
inc_2nd	0.0521 (0.162)	0.304 (0.198)	-0.0190 (0.146)
inc_3rd	0.131 (0.161)	0.147 (0.202)	-0.0383 (0.145)
inc_4th	0.256 * (0.155)	0.475 ** (0.187)	-0.0435 (0.141)
inc_5th	0.409 *** (0.150)	0.692 *** (0.180)	-0.155 (0.141)
employed	0.122 (0.119)	0.0244 (0.133)	0.186 * (0.111)
Constant	-1.795 *** (0.389)	-2.325 *** (0.431)	-0.473 (0.342)
Observations		978	
Correlation coefficient			
rho21: Formal account x Formal saving		0.6005 ***	
rho31: Formal account x Formal credit		0.0597	
rho32: Formal saving x Formal credit		-0.04055	

Noted: (*), (**), (***) denotes statistically significant level at 10 percent, 5 percent, 1 percent, respectively.

Coefficients are reported in the table. Standard errors are in parentheses.

CHAPTER 6: CONCLUSIONS

6.1. Conclusion

Since financial inclusion has a positive influence on economic growth and poverty alleviation, it is essential to investigate the extent to which an individual's characteristics will affect their decision to participate in the financial system. Using the Global Findex database in 2017 and the probit model, the paper address the issues for the case of Vietnam.

For formal account and formal saving, educational attainment and level of wealth are found to the major determinants of financial inclusion. As expected, those who are well-educated and wealthier have a higher probability to be financially included. These findings are almost identical with the results of Allen et al. (2012), Akudugu, (2013), Cámara and David, (2015). Other factors have a mixed pattern. The nonlinear effect of the respondents' age is only significantly statistic with the likelihood of formal account in the main analysis while this relationship can be observed for formal saving or formal credit in 2014. Gender and employment status play a less important role in the individuals' decision to engage in the financial system, but only in formal credit. Being a woman and having a formal job may increase the possibility of borrowing at a formal institution. This reflects a difference from previous research.

The main findings in this paper helps to identify groups of population which need to be targeted to enhance financial inclusion in Vietnam. For example, vulnerable groups such as less-educated and poor adults are less likely to be financially included. Community educators and policymakers may design proper strategies to improve people's financial literacy as well as to increase the living standard. Financial institutions can consider to lower the requirements to facilitate the access to financial services. Customized services, such as microfinance products for low-income individuals, can be developed to meet the needs of target groups

6.2. Limitations and future research

Financial inclusion is a multi-dimensional concept, which is not straightforward to observe and measure. Therefore, it is unavoidable for the paper to expose some limitations.

Firstly, while the survey took place in three years, it can only be analysed at one point in time. It limits the research in the cross-sectional model, which is not suitable to examine the changes in individuals' usage of financial services over time, as well as to exploit within-country variation. As stated by Allen *et al.*, (2012: 25), the results of cross-sectional analysis only indicate the significant correlations between variables, not causality.

Secondly, it is important to note that there are other factors which are major drivers of financial inclusion. For example, Cámara & David, (2015) pointed out that the regional variations may affect the household's financial decision. Those who live in the urban area have wider access to financial services while rural areas have a low density of bank branches and weak political institutions. According to the General Statistics Office of Vietnam, in 2017, it was estimated that about 65 percent of the total population live in the countryside. The differences between urban and rural population may have a significant effect on the overall level of inclusiveness, thus need to be addressed in the analysis. Also, Allen et al., (2012) and Ampudia and Ehrmann (2017) considered marital status as a determinant of financial inclusion. Due to the lack of data, the impact of these factors on the level of inclusiveness is neglected in this paper.

Another caveat of the paper is that it does not cover all aspects of financial inclusion. While defining financial inclusion as the usage of financial services, it takes no account of other dimensions, such as the outreach and quality of financial services. Moreover, the paper only concentrates on the usage of deposit and credit whereas it sets aside other financial products, such as insurance and payment.

With the expansion of indicators to measure the level of financial inclusion, future research will be able to overcome these limitations to give a more true and fair view of financial inclusion. Furthermore, mobile banking and e-wallets have been developed and become more and more popular in Vietnam. It is expected to replace traditional banking in the near future. Therefore, it may be a prominent subject to investigate more in this field.

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