FINTECH DRIVEN FINANCIAL INCLUSION: THE CASE OF VIETNAMESE HOUSEHOLDS

Thi Hoai Linh TRUONG[1], Thi Nhu Quynh LE[2], Thanh Tam LE[1], Hong Mai PHAN[1*]

[1*]School of Banking and Finance (SBF) National Economics University, Hanoi, Vietnam.
[2]Department of Credit Risk Management, Joint Stock Commercial Bank for Foreign Trade of Vietnam, Hanoi, Vietnam.

*Corresponding Author
E-mail: hongmai@neu.edu.vn

ABSTRACT

Many cross-country studies find the significant role of Fintech in accelerating the pace of financial inclusion, filling a gap left by traditional service providers, and delivering affordable and suitable financial services to the poor. Vietnam is one of the countries having the lowest financial inclusion state with merely 31% of adults having an account at a formal financial institution. However, the country is among the emerging fintech markets in the region with an increasing rate of digital penetration. Contributing to the increasing literature on digital inclusive finance, our research investigates the effects of Fintech on financial inclusion in Vietnam. The paper uses the data on Vietnam's digital financial inclusion stage and households in two years 2018 and 2020. The data on households is obtained from the Vietnam Household Living Standard Surveys (VHLSSs) in 2018 and 2020. In general, Vietnamese households have low access to all formal financial services. In addition, the popularity of using Fintech products such as mobile and internet banking services and online payment has a significant impact on household usage of savings, accounts, ATMs, and credit cards.

Keywords: Fintech, Inclusion, Households, Vietnam.

INTRODUCTION

Financial inclusion is a state where individuals and businesses have access to useful and affordable financial products and services that are delivered responsibly and sustainably to meet their needs (World Bank, 2018). Currently, 65 percent of adults in the world's poorest countries lack access to even the most basic transaction account to send and receive payments; only 20 percent of adults in developing economies save through a formal financial institution (Pazarbasioglu *et al.*, 2020). It is believed that access to finance is of great importance, especially to the poor, because it enables households to make longer-term consumption, education, healthcare, and investment decisions carry out productive activities, and cope with life shocks (Park & Mercado, 2015).

The impacts of financial inclusion have been studied at both cross-country and household levels. The reviews by Cull *et al.* (2014), Karlan *et al.* (2014), Demirgüç-Kunt and Singer (2017), Kelikume (2021) and He and Du (2022) show increasing empirical evidence that financial inclusion is generally beneficial on the three economic levels (household, local, and macroeconomy). However, the extent of the impacts varies with financial products and periods.

For example, Cull *et al.* (2014) review that micro-credit for consumption purposes increases the consumption or income in poor households over a relatively short time but the longer-term impacts are less clear. Cull *et al.* (2014) also summarize the positive effects of micro-credit for business purposes on income (India, the Philippines, and Mongolia), business size (Mexico), and the scale of agriculture activities (Morocco). Another review by Karlan *et al.* (2014) confirmed the significant effect of savings on the poor in multi-dimensions. For instance, savings help households manage cash flow spikes, smooth consumption and accumulate working capital or household assets in Nepal, Malawi, and Kenya (Dupas & Robinson, 2013; Prina, 2015). Access to a savings account also empowers women in business, increases healthcare and education expenditures, and makes households resilient to health shocks in Kenya (Prina, 2015). New types of payment services improve their ability to manage shock by sharing risks and saving time and transaction costs (Demirgüç-Kunt & Singer, 2017).

The world experienced three stages of financial inclusion, namely Supporting Green Revolution (1970-1980), Microcredit - Microfinance (1980-2010), Inclusive Finance for G20 (2010-2015), and now is in the fourth stage Digital Inclusive Finance. Digital financial inclusion refers to the use of technology in finance (Fintech) to promote financial inclusion. The premise for fintech-driven financial inclusion is the fact that of 2.5 million "unbanked" individuals in the world, 1 billion have mobile phones, which means that for many, financial mobility could be right around the corner. Many cross-country studies find the significant role of Fintech in accelerating the pace of financial inclusion, filling a gap left by traditional service providers, and delivering affordable and suitable financial services to the poor (Beaton & Bazarbash, 2020; Pazarbasioglu *et al.*, 2020). For example, based on the sample of 52 countries, (Sahay *et al.*, 2020) find that digital financial inclusion in these economies improved between 2014 and 2017, especially in Asia and Africa, and even where traditional financial inclusion is diminishing. (Beaton & Bazarbash, 2020; Song & Jing, 2020) show evidence that FinTech credit fill the credit gap in consumer and business segments. Digital lending to business increases as the efficiency of traditional financial institutions in granting credit declines. Pazarbasioglu *et al.* (2020) find that Fintech can help alleviate constraints to financial access, deliver affordable and suitable financial services to the poor, and leverage digital transaction data and alternative data sources to overcome information asymmetries. In addition, Fintech transforms business models in many fields of finance sectors to better meet user's need including the poor. (Pazarbasioglu *et al.*, 2020) estimate that a fully digital transaction drops the cost to 3.3 percent.

Technologically enabled financial innovations are bringing new business models, applications, processes, and products with associated profound impacts on the operations of financial institutions as well as the provision of financial services. Industry research on different Fintech verticals, such as payment, lending, and asset management, shows the remarkable contributions of Fintech to inclusive finance through new digital services, customization of services, lower intermediation cost, improvement in service quality, and so on (Foerster *et al.*, 2017; Crouzet *et al.*, 2019; Fuster *et al.*, 2019; Chodorow-Reich *et al.*, 2020; Demirgüç-Kunt *et al.*, 2020; Philippon, 2020). For instance, Philippon (2020) assesses that Fintech decreases the cost of asset management services and lending. In the case of robot advisors in asset management services, a new pattern of fixed costs can improve participation by relatively less wealthy households. In the credit market, alternative data sources (Big data) are likely to reduce non-statistical

discrimination in lending that hurt minorities by prejudice or negative stereotyping but also reduce the effectiveness of existing regulations.

Contributing to the increasing literature on digital inclusive finance, our research investigates the effects of Fintech on financial inclusion in Vietnam. Vietnam is one of the countries having the lowest financial inclusion state with merely 31% of adults having an account at a formal financial institution (lower than Indonesia (49%), Malaysia (85.3%), and Thailand (81.6%)) (Demirgüç-Kunt *et al.*, 2018). However, the country is among the emerging fintech markets in the region with an increasing rate of digital penetration. The percentages of internet users, mobile phone ownership, and social media use are rising fast, reaching 70.3%, 97%, and 73.7% of the population, respectively (We are Social, 2021). With the population of approximately 96.2 million and 60% of them being under 35, there is a broad scope, therefore, for Fintech to facilitate more financial inclusion in Vietnam. Despite a hot topic, whether and how Fintech promotes financial inclusion in Vietnam has not been studied in any quantitative research. Our paper, from a micro perspective, seeks answers for two sub-questions. First, does Fintech improve the usage of Vietnamese people for financial services? Second, are these effects heteroskedastic across the group?

The study uses the data on Vietnam's financial inclusion state and households in two years 2018 and 2020. The household data come from the latest Vietnam Household Living Standard Surveys (VHLSSs) in 2018 and 2020 which contain detailed demographic information on household and financial usage. Firstly, based on the ideas of Sahay *et al.* (2020) and Sahay *et al.* (2021) as well as the availability of data, we select indicators representing the level of digital financial inclusion in Vietnam. Then the impact of Fintech on household usage of financial services will be evaluated. We further investigate the financial inclusion features of Fintech through heterogeneity analysis. The paper is expected to have the following contributions. First, the study is contributed to the emerging literature on the role of financial innovation in enhancing inclusive finance. In addition, it enriches the research on the determinants of a household's financial choice and provides further evidence of previous influencing factors. Second, insights from the study can provide national policymakers with an understanding of the ongoing financial inclusion situation in Vietnam.

The remaining part of the research is structured into three parts. The second part is about the evaluation method. The findings and conclusion are presented in the last parts.

MATERIALS AND METHODS

Research Question

Given the Vietnam Fintech landscape, the study focuses on the impacts of fintech on financial inclusion in saving and payment products. The study answers the following two research questions: First, does Fintech improve the usage of Vietnamese people to saving and payment products? Second, how do these effects vary across the group?

Dataset

The paper uses the data on Vietnam's digital financial inclusion stage and households in two years 2018 and 2020. The data on households is obtained from the Vietnam Household Living Standard Surveys (VHLSSs) in 2018 and 2020. VHLSS is a national wide household survey

conducted every two years by the General Statistical Office of Vietnam with the technical support of the World Bank. The latest survey was carried out in 2020. VHLSS 2018 and 2020 cover 9,396 and 9389 households, respectively, which are representative of the national, regional, rural, and urban levels. The surveys provide detailed household information, including demography, income, expenditure, education, employment and assets, and the usage of financial services. Data on expenditure is collected on sub-categories such as food expenditure and non-food expenditures on healthcare, education, housing, and durables. Given the enormous information in these surveys, VHLSSs are the most reliable and comprehensive dataset for all related research. In addition to the data on households, variables representing financial inclusion level in Vietnam are collected from the following source: Statista (2021), World Bank Global Financial Inclusion database (Global Findex), IMF's Financial Access Survey (FAS), We are Social (2018 and 2020).

Method

The effects of Fintech are analyzed through the model that studies the effect of fintech on the probability of using financial services.

Measurement of Digital Financial Inclusion

According to Sahay *et al.* (2020) and Khera *et al.* (2021), financial inclusion in payment services can be categorized into traditional financial inclusion and digital financial inclusion. They further distinguish between two different dimensions: access and usage within each type (Sha'ban *et al.*, 2020; Banna & Alam, 2021). This distinction is considered important because the high access to financial services does not necessarily mean a higher level of financial inclusion if services are not used. For each dimension, the variables are selected to represent two different aspects of financial inclusion in payments – access and usage. In the work of Sahay *et al.* (2020) and Khera *et al.* (2021), the access dimension of digital payments (digital access index) is measured by access to digital infrastructure (i.e. mobile subscription per 100 people and % of the population who have internet access) and access to mobile money agents (i.e. number of registered mobile money agents per 100,000 adults). These factors are considered essential for mobile banking, mobile money, and the internet to function as new channels to access financial services. On the other hand, the extent of usage of digital payments (digital usage index) is measured using the following indicators: percentage of adults who have a mobile account, percentage of adults who use the mobile phone to receive salary and wages, percentage of adults who use the internet to pay, percentage of adults who use mobile phone to make receive salary or wages. Given the availability of data for Vietnam, we choose the similar indicators to represent the state of fintech-driven financial inclusion. The list and data sources are detailed in **Table 1**.

Table 1. The list of selected indicators for digital financial inclusion

Indicators	Data Source
Digital financial inclusion	
Access to digital infrastructure	
Internet users (% population)	We are Social
Mobile internet users (% population)	We are Social
Usage popularity	

% of the population aged +15 (owning or using each financial product) making online purchases/paying bills online	We are Social
Number of mobile and internet banking transactions per 1,000 adults (logarithm form)	FAS
Value of mobile and internet banking transactions (% of GDP)	FAS

Impacts of Fintech on the Usages of Financial Services

To understand the effect of Fintech on promoting access of households to financial services, the study uses the logit model for the pooled data. The model is detailed as follows:

$$\Pr(F_{it} = 1) = \frac{\exp(\beta_0 + Fintech_t\beta_1 + Fintech_t * I_{it}\beta_2 + X_{it}\beta_3)}{1 + \exp(\beta_0 + Fintech_t\beta_1 + Fintech_t * I_{it}\beta_2 + X_{it}\beta_3)} \qquad (1)$$

in which F_{it} is a dummy variable in which the value 1 means using financial service. $Fintech_t$ is a variable representing the fintech-driven financial inclusion in Vietnam. $Fintech_t * I_{it}$ is an interaction between $Fintech_t$ and *the logarith of household income*$_{it}$. The reason for including this interaction is that we hypothesize that households' usage of digital depends on the level of household income. High household income is assumed to be associated with better education opportunities (i.e. higher financial literacy), higher demand for digital financial services, and better access to digital infrastructure, which are essential to the adoption of fintech services in households. X_{it} is a vector of control variables representing the characteristics of households. Referring to the existing literature about Vietnam household finance (Cuong, 2008; Nguyen & Van den Berg, 2011; Lensink & Pham, 2012), control variables are selected from three levels: (i) the household level including Household size, Proportion of children in the household, Proportion of elderly in the household, Proportion of members with post-high school education, Proportion of Members with Technical Degree, Proportion of Members working in Agriculture Sector, Proportion of Members working in Industry Sector, Proportion of Members working in Service Sector, Income quantile (low, lower-middle, upper-middle, high), Poverty status, Ethnic minorities, (ii) the head of the household level such as Head with post-high school education; Sex of household head (male = 1), Age of head; and (iii) the regional level including Urban, Rural.

RESULTS AND DISCUSSION

Usage of Financial Services

Table 2 shows the summary of households' usage of financial services in 2018 and 2020. In general, Vietnamese households have low access to all formal financial services. The situation has not significantly improved over the two years. In 2018, about 23.8% and 13.1% of surveyed households have a loan and saving informal institutions respectively, compared to 20.6% and 14.4% in 2020. Among financial services, accounts and ATMs are the most popular. The proportion of households having accounts increases from 27.6% to 35.4% while the figure for ATMs rises from 36.7% to 45.8%. There is a big discrepancy between the proportion of households using accounts and those having ATM cards. This may be because the cardholder uses an ATM card for the only purpose of withdrawing without considering other services

related to the ATM account. This suggests that cash is still the dominant means of transactions Products such as credit cards, life, and non-life insurance, and securities are the least popular with the adoption rate of 3.8%, 6%, and 2.1%. This result shows that financial services are complex and require a broad financial literacy has been rarely used by households in Vietnam.

Table 2. Percentage of households using financial services by groups in 2018 and 2020

	Total	Loan	Saving	Account	ATM	Credit card	Life insurance	Non-life insurance	Securities
Year 2018									
Total	9,396	0.238	0.131	0.276	0.367	0.03	0.038	0.021	0.001
Urban/Rural									
Rural	6,570	0.277	0.084	0.19	0.282	0.011	0.031	0.016	0.001
Urban	2,826	0.148	0.238	0.477	0.565	0.075	0.054	0.034	0.004
Ethnicity									
Kinh, Hoa	7,818	0.206	0.149	0.315	0.415	0.035	0.044	0.021	0.002
Ethnic Minorities	1,578	0.397	0.039	0.084	0.128	0.006	0.01	0.023	0
Region									
Mekong Delta	2,031	0.279	0.068	0.168	0.274	0.018	0.03	0.01	0.001
Red River Delta	1,992	0.105	0.2	0.354	0.423	0.042	0.032	0.023	0.003
Midlands and Northern Mountainous Areas	1,533	0.339	0.095	0.183	0.266	0.01	0.037	0.018	0.001
Northern and Coastal Central Region	2,067	0.263	0.14	0.255	0.377	0.026	0.057	0.019	0
Central Highlands	651	0.379	0.081	0.226	0.301	0.018	0.052	0.072	0.005
Southeastern Area	1,122	0.135	0.181	0.529	0.594	0.077	0.025	0.02	0.001
Sex of Household Head									
Female	2,381	0.194	0.152	0.297	0.385	0.038	0.042	0.019	0.001
Male	7,015	0.253	0.124	0.269	0.361	0.028	0.037	0.022	0.002
Head with Post High School Education									
No	8,114	0.244	0.114	0.251	0.342	0.021	0.036	0.019	0.001
Yes	1,282	0.2	0.236	0.435	0.527	0.088	0.054	0.036	0.003
Income Quantile									
Low	2,349	0.317	0.019	0.051	0.075	0.003	0.009	0.017	0
Lower Middle	2,349	0.255	0.068	0.188	0.304	0.006	0.029	0.016	0
Upper Middle	2,349	0.217	0.128	0.327	0.46	0.018	0.045	0.018	0
High	2,349	0.163	0.308	0.539	0.629	0.094	0.07	0.034	0.005
Year 2020									
Total	9,389	0.206	0.144	0.354	0.458	0.038	0.06	0.031	0.003
Urban/Rural									
Rural	6,308	0.244	0.102	0.257	0.363	0.017	0.046	0.021	0.001
Urban	3,081	0.128	0.228	0.554	0.652	0.08	0.086	0.05	0.007

Ethnicity									
Kinh, Hoa	7,854	0.178	0.161	0.396	0.508	0.044	0.068	0.032	0.004
Ethnic Minorities	1,535	0.352	0.053	0.143	0.203	0.008	0.016	0.023	0.001
Region									
Mekong Delta	2,027	0.235	0.079	0.214	0.333	0.025	0.037	0.017	0.001
Red River Delta	1,986	0.091	0.234	0.472	0.575	0.055	0.066	0.033	0.002
Midlands and Northern Mountainous Areas	1,536	0.291	0.107	0.263	0.365	0.019	0.047	0.044	0.004
Northern and Coastal Central Region	2,067	0.242	0.17	0.309	0.429	0.039	0.088	0.032	0.004
Central Highlands	651	0.364	0.086	0.336	0.436	0.009	0.049	0.052	0
Southeastern Area	1,122	0.085	0.135	0.619	0.668	0.073	0.058	0.018	0.009
Sex of Household Head									
Female	2,456	0.166	0.152	0.368	0.462	0.043	0.052	0.024	0.003
Male	6,933	0.221	0.14	0.35	0.456	0.036	0.062	0.033	0.003
Head with Post High School Education									
No	7,799	0.21	0.131	0.322	0.43	0.026	0.053	0.028	0.002
Yes	1,251	0.203	0.235	0.497	0.592	0.111	0.103	0.055	0.014
Income Quantile									
Low	2,348	0.307	0.029	0.088	0.133	0.003	0.015	0.02	0
Lower Middle	2,347	0.212	0.092	0.274	0.398	0.014	0.039	0.025	0.001
Upper Middle	2,347	0.167	0.162	0.435	0.577	0.029	0.066	0.035	0.002
High	2,347	0.139	0.291	0.62	0.723	0.106	0.119	0.043	0.009

The usage of financial products is varied across groups. Except for loans, urban areas have significantly higher usage of financial services than rural areas. The popularity of credit in rural areas is partly thanks to the policy credit programs by the government which provides loans to policy beneficiaries at preferential interest rates without collateral. The easy and cheap access to government-subsidized credit induce rural households to take loans. By ethnicity, there are big gaps in usage between Kinh, Hoa households, and ethnic minorities. The percentage of ethnic households having loans (39.7% in 2018 and 35.2% in 2020) is double that of the Kinh and Hoa groups (20.6% and 17.8%). As one of the targets of policy credit, ethnic minorities easily access and acquire loans. In contrast, other financial services witness the very low participation of ethnic minorities.

The usage of financial services is different among the education levels of the household head. The proportion of using financial services in the group with the head having post-high school education is remarkably higher than that of the group with lower education level in all categories except credit. By income quantile, the higher the income level, the lower percentage of having a loan and the higher percentage of using other services. The gaps between the lowest quantile and highest quantile over all types of financial products are big. Education in Vietnam is said to be quite heavy with a wide range of knowledge. Therefore, it is easy for household heads with a high level of education to understand financial services and use them. Because Vietnam is still a country that still values "degrees", having a high level of education will receive

more opportunities to find a job with a good income. These characteristics combined with the benefits that financial services bring, contribute to increasing the level of usage of financial services.

Impacts of Fintech on the Usages of Financial Services

Tables 3-7 show the estimated results of logit regressions. In general, access to digital infrastructure, including the internet and mobile, significantly affects the likelihood of household usage of saving and payment products **(Table 3)**. Remarkably, the effects depend on the level of household income. For such products as saving and credit cards, the household income per capita must exceed a given level to have a positive effect on the likelihood of usage. Otherwise, the effect is negative. The household income will generally be used to cover daily expenses for members, education costs for children...If income exceeds these expenditures, the surplus can be put into the banks. Using credit cards is also only allowed for those who have a stable income and exceed a certain threshold based on the requirements regulated by financial service providers. For ATM and account products, the effects are significantly positive in which higher income results in a higher likelihood. Similarly, the popularity of using Fintech products such as mobile and internet banking services and online payment has a significant impact on household usage of savings, accounts, ATMs, and credit cards **(Table 4)**. The effects also depend on the level of income **(Table 7)**. The positive effects appear if household income per capita is above a given threshold.

Other factors positively contributing to the likelihood of using financial services are household size, head with post-high school education, the proportion of members with a technical degree, the proportion of members working in the agriculture sector and industry sector, and households living in urban areas **(Tables 5 and 6)**. Factors having the negative impacts on the likelihood of usage are households being minor ethnicity, poverty, households living in rural areas, the proportion of children in the household, the proportion of elderly in the household, proportion of members working in the service sector, the household head being male adage of the head in the household.

Table 3. Effects of access to digital financial infrastructure on household usage of saving and payment products

	Saving	Saving	Account	Account	ATM	ATM	Credit Card	Credit Card
Internet users (% population)	-0.1034***		-0.0126		0.0219		-0.0935**	
	(0.0208)		(0.0193)		(0.0200)		(0.0340)	

Internet users (% population) # Log of monthly household income per capita	0.0138***		0.0134***		0.0127***		0.0185***
	(0.0013)		(0.0012)		(0.0013)		(0.0017)
Mobile internet users (% population)	-0.1115***		-0.0424*		-0.0150		-0.1171***
	(0.0178)		(0.0169)		(0.0175)		(0.0280)
Mobile internet users (% population) # Log of monthly household income per capita	0.0144***		0.0140***		0.0133***		0.0192***
	(0.0013)		(0.0013)		(0.0013)		(0.0018)
Head with Post High School Education=1	0.3309***	0.3309***	0.1410	0.1411	-0.0666	-0.0664	0.3066*	0.3066*
	(0.0871)	(0.0871)	(0.0795)	(0.0795)	(0.0831)	(0.0831)	(0.1398)	(0.1398)
Sex of Household Head=1	-0.0073	-0.0075	-0.1351**	-0.1352**	-0.2520***	-0.2521***	-0.0441	-0.0445
	(0.0539)	(0.0539)	(0.0465)	(0.0465)	(0.0472)	(0.0472)	(0.0985)	(0.0985)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Head Age	0.0131***	0.0131***	-0.0112***	-0.0112***	-0.0138***	-0.0138***	0.0015	0.0015
	(0.0024)	(0.0024)	(0.0021)	(0.0021)	(0.0020)	(0.0020)	(0.0051)	(0.0051)
Household Size	0.0915***	0.0916***	0.3023***	0.3024***	0.4307***	0.4309***	0.2541***	0.2543***
	(0.0188)	(0.0188)	(0.0155)	(0.0155)	(0.0165)	(0.0165)	(0.0337)	(0.0337)
Proportion of Children in Household	-0.0786	-0.0787	-0.4944***	-0.4942***	-0.7370***	-0.7367***	0.3393	0.3387
	(0.1689)	(0.1689)	(0.1364)	(0.1364)	(0.1346)	(0.1346)	(0.3133)	(0.3133)
Proportion of Elderly in Household	0.0243	0.0247	-0.7084***	-0.7082***	-1.0392***	-1.0392***	-0.6395*	-0.6391*
	(0.1189)	(0.1189)	(0.1011)	(0.1011)	(0.0998)	(0.0998)	(0.2658)	(0.2658)
Proportion of Members with Post High School Education	-0.0870	-0.0866	-0.0091	-0.0088	0.3087*	0.3090*	0.1754	0.1753
	(0.1423)	(0.1423)	(0.1318)	(0.1318)	(0.1386)	(0.1386)	(0.2430)	(0.2430)
Proportion of Members with Technical Degree	0.3195**	0.3191**	0.4701***	0.4698***	0.2676**	0.2674**	0.5927***	0.5925***

(0.0978)	(0.0978)	(0.0904)	(0.0904)	(0.0952)	(0.0952)	(0.1789)	(0.1789)

Proportion of Members working in Agriculture Sector

-1.3207	-1.3243	2.7056*	2.7010*	4.7375**	4.7341**	0.0875	0.0849
(1.1033)	(1.1035)	(1.2197)	(1.2201)	(1.5673)	(1.5675)	(1.4044)	(1.4053)

Proportion of Members working in Industry Sector

-0.2282	-0.2298	1.8024***	1.8011***	4.5267***	4.5254***	0.5388*	0.5363
(0.1691)	(0.1692)	(0.1766)	(0.1767)	(0.2634)	(0.2634)	(0.2745)	(0.2746)

Proportion of Members working in Service Sector

-0.8268***	-0.8271***	-0.6237***	-0.6244***	-0.4262***	-0.4269***	-1.2105***	-1.2118***
(0.1063)	(0.1063)	(0.0922)	(0.0922)	(0.0916)	(0.0917)	(0.2370)	(0.2371)

Income Quantile (Base = Low)

Lower Middle

0.4026**	0.4008**	0.4005***	0.3951***	0.6282***	0.6210***	-0.1596	-0.1628
(0.1271)	(0.1273)	(0.0914)	(0.0916)	(0.0865)	(0.0867)	(0.3163)	(0.3165)

Upper Middle

0.6246***	0.6219***	0.6229***	0.6145***	0.8896***	0.8784***	0.0327	0.0274

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.1428)	(0.1431)	(0.1152)	(0.1156)	(0.1139)	(0.1143)	(0.3151)	(0.3157)
High	0.9208***	0.9178***	0.6672***	0.6555***	0.8512***	0.8350***	0.4449	0.4381
	(0.1836)	(0.1842)	(0.1590)	(0.1596)	(0.1598)	(0.1604)	(0.3515)	(0.3525)
Poverty, yes = 1	-1.3575***	-1.3594***	-0.7726***	-0.7730***	-0.8227***	-0.8224***	-0.4279	-0.4314
	(0.3028)	(0.3027)	(0.1532)	(0.1532)	(0.1294)	(0.1294)	(0.6014)	(0.6015)
Ethnic Minorities	-0.1818	-0.1817	-0.6845***	-0.6839***	-0.9289***	-0.9278***	-0.2548	-0.2545
	(0.1063)	(0.1063)	(0.0794)	(0.0794)	(0.0747)	(0.0747)	(0.2630)	(0.2630)
Urban Status yes=1	0.3518***	0.3520***	0.5472***	0.5473***	0.4150***	0.4149***	0.6707***	0.6712***
	(0.0501)	(0.0501)	(0.0421)	(0.0421)	(0.0435)	(0.0435)	(0.1011)	(0.1011)
Region (Base = Mekong Delta)								
Red River Delta	0.9554***	0.9553***	0.9555***	0.9554***	0.6925***	0.6922***	0.2783	0.2784

64

Örgütsel Davranış Araştırmaları Dergisi
Journal of Organizational Behavior Research
Cilt / Vol.: 8, Sayı / Is.: 1, Yıl/Year: 2023, Sayfa/Pages: 52-73

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0762)	(0.0762)	(0.0604)	(0.0604)	(0.0585)	(0.0585)	(0.1443)	(0.1443)
Midlands and Northern Mountainous Areas	0.7781***	0.7784***	0.7381***	0.7385***	0.7186***	0.7190***	-0.2548	-0.2546
	(0.0973)	(0.0973)	(0.0755)	(0.0755)	(0.0704)	(0.0704)	(0.2093)	(0.2093)
Northern and Coastal Central Region	0.9299***	0.9298***	0.6118***	0.6119***	0.5746***	0.5748***	0.3229*	0.3226*
	(0.0787)	(0.0787)	(0.0624)	(0.0624)	(0.0590)	(0.0590)	(0.1531)	(0.1531)
Central Highlands	0.2878*	0.2881*	0.8016***	0.8019***	0.6476***	0.6479***	-0.6442*	-0.6435*
	(0.1255)	(0.1255)	(0.0887)	(0.0887)	(0.0862)	(0.0862)	(0.2834)	(0.2835)
Southeastern Area	0.2628**	0.2628**	1.2755***	1.2754***	0.9197***	0.9195***	0.4739**	0.4740**
	(0.0892)	(0.0892)	(0.0696)	(0.0696)	(0.0696)	(0.0696)	(0.1500)	(0.1500)
Constant	-4.5696***	-4.3062***	-8.8358***	-6.9504***	-10.5612***	-8.1445***	-9.1110***	-7.7964***
	(1.1345)	(0.8411)	(0.9822)	(0.7302)	(0.9923)	(0.7373)	(2.1376)	(1.5907)

Observations	18440	18440	18440	18440	18440	18440	18440	18440
Ll	-6070.1887	-6070.3671	-8356.7442	-8356.3404	-8443.4893	-8442.7305	-2017.4458	-2017.4088

Standard errors in parentheses

="* p<0.05   ** p<0.01   *** p<0.001"

Table 4. Effect of the popularity of Fintech usage on household's usage of saving and payment products in general

	Value of mobile and internet banking transaction (% of GDP)	Value of mobile and internet banking transaction (% of GDP) # Log of monthly household income per capita	% of population aged +15 (owning or using each financial product) making online	% of population aged +15 (owning or using each financial product) making online # Log of monthly household income per capita	Log of number of mobile and internet banking transaction per 1000 adults	Log of number of mobile and internet banking transaction per 1000 adults # Log of monthly household income per capita
Formal Saving	-0.0114***	0.0014**				
	(0.0015)	(0.0002)				
Formal Saving			-0.2956***	0.0357***		
			(0.0429)	(0.0050)		
Formal Saving					-0.8230***	0.1010***
					(0.0959)	(0.0096)
Account	-0.0112***	0.0015***				
	(0.0014)	(0.0002)				
Account			-0.2918***	0.0388***		
			(0.0386)	(0.0046)		
Account					-0.5989***	0.1007***
					(0.0919)	(0.0092)
ATM	-0.0113***	0.0015***				
	(0.0014)	(0.0002)				
ATM			-0.3017***	0.0412***		
			(0.0389)	(0.0046)		
ATM					-0.4967***	0.0972***
					(0.0950)	(0.0095)
Credit card	-0.0181***	0.0021***				

	(0.0021)	(0.0002)			
Credit card			~0.5178***	0.0612***	
			(0.0632)	(0.0071)	
Credit card					~1.0231***	0.1351***
					(0.1375)	(0.0129)
Observations	18440	18440	18440	18440	18440	18440
Standard errors in parentheses		* p<0.05		** p<0.01		*** p<0.001

Table 5. Effect of the popularity of Fintech usage on household's usage of saving and payment products in terms of the head of the household level

	Head with Post High School Education=1	Sex of Household Head=1	Head Age
Saving	0.3303*** (0.0868)	~0.0102 (0.0538)	0.0127*** (0.0024)
Saving	0.3303*** (0.0867)	~0.0096 (0.0538)	0.0126*** (0.0024)
Saving	0.3309*** (0.0871)	~0.0082 (0.0539)	0.0130*** (0.0024)
Account	0.1437 (0.0793)	~0.1368** (0.0465)	~0.0114*** (0.0021)
Account	0.1441 (0.0792)	~0.1365** (0.0465)	~0.0115*** (0.0021)
Account	0.1415 (0.0795)	~0.1357** (0.0465)	~0.0112*** (0.0021)
ATM	~0.0601 (0.0829)	~0.2538*** (0.0472)	~0.0139*** (0.0020)
ATM	~0.0594 (0.0828)	~0.2535*** (0.0472)	~0.0140*** (0.0020)
ATM	~0.0655 (0.0831)	~0.2526*** (0.0472)	~0.0138*** (0.0020)
Credit card	0.3066* (0.1397)	~0.0557 (0.0984)	0.0013 (0.0051)
Credit card	0.3069* (0.1394)	~0.0569 (0.0983)	0.0012 (0.0050)
Credit card	0.3065* (0.1399)	~0.0463 (0.0985)	0.0015 (0.0051)
Observations	18440	18440	18440
Standard errors in parentheses	* p<0.05	** p<0.01	*** p<0.001

Table 6. Effect of the popularity of Fintech usage on household's usage of saving and payment products in terms of the household level

Household Size	Proportion of Children in Household	Proportion of Elderly in Household	Proportion of Members with Post High School Education	Proportion of Members with Technical Degree	Proportion of Members working in Agriculture Sector	Proportion of Members working in Industry Sector	Proportion of Members working in Service Sector

Saving	0.0883***	-0.0906	0.0256	-0.0497	0.3053**	-1.4483	-0.1936	-0.8128***
	(0.0188)	(0.1683)	(0.1186)	(0.0412)	(0.0975)	(1.1164)	(0.1680)	(0.1060)
Saving	0.0860***	-0.0948	0.0231	-0.0377	0.3033**	-1.4675	-0.1635	-0.8037***
	(0.0188)	(0.1681)	(0.1185)	(0.1408)	(0.0974)	(1.1201)	(0.1673)	(0.1058)
Saving	0.0918***	-0.0794	0.0259	-0.0841	0.3172**	-1.3405	-0.2347	-0.8280***
	(0.0188)	(0.1689)	(0.1189)	(0.1423)	(0.0978)	(1.1047)	(0.1692)	(0.1063)
Account	0.2992***	-0.5025***	-0.0782***	0.0189	0.4553***	2.5711*	1.8162***	-0.6256***
	(0.0154)	(0.1363)	(0.1010)	(0.1315)	(0.0908)	(.2245)	(0.1768)	(0.0923)
Account	0.2971***	-0.5075***	-0.7098***	0.0271	0.4525***	2.5625*	1.8346***	-0.6201***
	(0.0154)	(0.1362)	(0.1010)	(0.1314)	(0.0908)	(1.2218)	(0.1763)	(0.0922)

Account	0.3027***	-0.4936***	-0.7076***	-0.0070	0.4683***	2.6808*	1.7965***	-0.6268***
	(0.0155)	(0.1364)	(0.1011)	(0.1318)	(0.0905)	(1.2219)	(0.1769)	(0.0923)
ATM	0.4283***	-0.7411***	-1.0437***	0.3284*	0.2558**	4.6228**	4.5427***	-0.4336***
	(0.0164)	(0.1344)	(0.1001)	(0.1386)	(0.0958)	(1.5717)	(0.2638)	(0.0920)
ATM	0.4262***	-0.7454***	-1.0453***	0.3335*	0.2532**	4.6116**	4.5612***	-0.4301***
	(0.0163)	(0.1344)	(0.1001)	(0.1386)	(0.0958)	1.5682	(0.2639)	(0.0919)
ATM	0.4313***	-0.7355***	-1.0394***	0.3105*	0.2664**	4.7186**	4.5210***	-0.4296***
	(0.0165)	(0.1346)	(0.0999)	0.1386	(0.0953)	(1.5682)	(0.2634)	(0.0918)
Credit card	0.2506***	0.3224	-0.6269*	0.2009	0.5804**	-0.0300	0.5513*	-1.2100***
	(0.0336)	(0.3117)	(0.2648)	(0.2419)	(0.1781)	(1.4341)	(0.2754)	(0.2369)

Credit card	0.2474***	0.3198	-0.6241*	0.2156	0.5767**	-0.0589	0.5842*	~1.1952***
	(0.0335)	(0.3110)	(0.2646)	(0.2412)	(0.1779)	(1.4403)	(0.2754)	(0.2366)
Credit card	0.2548***	0.3362	-0.6377*	0.1752	0.5914**	0.0726	0.5271*	~1.2169***
	(0.0337)	(0.3133)	(0.2657)	(0.2431)	(0.1788)	(1.4090)	(0.2448)	(0.2372)
Obs	18440	18440	18440	18440	18440	18440	18440	18440

Standard errors in parentheses * p<0.05 ** p<0.01 *** p<0.001

Table 7. Effect of the popularity of Fintech usage on household's usage of saving and payment products in terms of income quantile and region of households (Base = Low)

	Lower Middle	Upper Middle	High	Poverty, yes = 1	Ethnic Minorities	Urban Status yes=1
Saving	0.5816***	0.9104***	1.4010***	~1.4682***	~0.2043	0.37238***
	(0.1236)	(0.1354)	(0.1638)	(0.3020)	(0.1062)	(0.0499)
Saving	0.6703***	1.0533***	1.6308***	~1.4951***	~0.2138*	0.3787***
	(0.1214)	(0.1299)	(0.1570)	(0.3021)	(0.1063)	(0.0498)
Saving	0.3985***	0.6185***	0.9176***	~1.3692***	~0.1821	0.3534***
	(0.1277)	(0.1441)	(0.1858)	(0.3026)	(0.1063)	(0.0501)
Account	0.5011***	0.7984***	0.9902***	~0.8607***	~0.702`***	0.5616***
	(0.0883)	(0.1093)	(0.1461)	(0.1528)	(0.0794)	(0.0421)
Account	0.5902***	0.9449***	1.2269***	~0.8896***	~0.7147***	0.5669***
	(0.0853)	(0.1027)	(0.1336)	(0.1528)	(0.0794)	(0.0421)
Account	0.3769***	0.5871***	0.6190***	~0.7767***	~0.6819***	0.5478***
	(0.0922)	(0.1170)	(0.1016)	(0.1531)	(0.0794)	(0.0422)
ATM	0.6770***	0.9883***	1.0560***	~0.8928***	~0.9398***	0.4265***

	(0.0826)	(0.1065)	(0.1451)	(0.1283)	(0.0475)	(0.0435)
ATM	0.7603***	1.1262***	1.2807***	-0.9206***	-0.9527***	0.4315***
	(0.0791)	(0.0992)	(0.1319)	(0.1281)	(0.0744)	(0.0434)
ATM	0.5950***	0.8390***	0.7789***	-0.8230***	-0.9243***	0.4149***
	(0.0874)	(0.1156)	(0.1624)	(0.1292)	(0.0747)	(0.0435)
Credit card	-0.0143	0.2535	0.8248*	-0.6069	-0.2714	0.6960***
	(0.3172)	(0.3130)	(0.3405)	(0.6051)	(0.2638)	(0.1010)
Credit card	0.0805	0.4021	1.0638**	-0.6528	-0.2820	0.7036***
	(0.3157)	(0.3080)	(0.3278)	(0.6061)	(0.2640)	(0.1007)
Credit card	-0.1715	0.0131	0.4218	-0.4487	-0.2535	0.6734***
	(0.3175)	(0.3176)	(0.3558)	(0.6018)	(0.2631)	(0.1011)
Observations	18440	18440	18440	18440	18440	18440
Standard errors in parentheses			* p<0.05	** p<0.01		*** p<0.001

CONCLUSION

The findings show that Vietnamese households have low access to all formal financial services. The usage of financial services is still significantly limited for the population in rural areas, ethnic minorities, and groups with low education and low income. Notably, digital infrastructure and the prevalence of Fintech products have a significant impact on households' likelihood to use basic financial products such as savings, payments...

To take advantage of Fintech to stimulate financial inclusion in Vietnam, there are some recommendations as follows:

First, it is necessary to improve the legal framework for Fintech, especially for financial services that contain many risks such as peer-to-peer lending, cryptocurrency, and crowdfunding. In Vietnam, there is currently only a legal framework for digital payment services, but there are no legal regulations for other digital technology services. A complete legal framework is a prerequisite to encourage the activities of Fintech companies and financial intermediaries as well as ensure the legitimate rights and interests of service users.

Second, to achieve coverage and increase financial access for people and businesses, especially low-income people in rural and remote areas, it is necessary to build up information technology infrastructure in underdeveloped and digitally-adopted regions. To bring the service to everyone, and cancel out areas without financial services, it requires a large, modern switching system that can connect to new means of payment as an extension arm to develop and bring services to the people.

Third, ensuring a network of financial service providers with safe, efficient, and responsible operation. In particular, promoting the role of Fintech companies, microfinance institutions and non-banking credit institutions, and other special types of institutions such as the Social Policy Bank, the Agriculture Bank Industry, and Rural Development…The objective is that basic

financial services are appropriately provided to financially excluded persons through traditional to modern distribution channels.

Last and not least, the government focuses on protecting consumers of financial services in the digital age. More specifically, it is necessary to develop a comprehensive, effective financial consumer protection framework that is suitable for the digital environment. At the same time, promote information, communication, guidance, and education for people in accessing and using financial services, especially digital finance, improving skills in financial management as well as application of financial services in the usage of technology in financial transactions.

References

Banna, H., & Alam, M. R. (2021). Impact of digital financial inclusion on ASEAN banking stability: implications for the post-Covid-19 era. *Studies in Economics and Finance*, *38*(2), 504-523. doi:10.1108/SEF-09-2020-0388

Beaton, M. K., & Bazarbash, M. (2020). *Filling the Gap: Digital Credit and Financial Inclusion* (No. 2020/150). International Monetary Fund.

Chodorow-Reich, G., Gopinath, G., Mishra, P., & Narayanan, A. (2020). Cash and the economy: Evidence from India's demonetization. *The Quarterly Journal of Economics*, *135*(1), 57-103.

Crouzet, N., Gupta, A., & Mezzanotti, F. (2019). Shocks and technology adoption: Evidence from electronic payment systems. *Techn. rep., Northwestern University Working Paper*. URL: https://www.kellogg.northwestern.edu/faculty/crouzet/html/papers/TechAdoption_latest.pdf

Cull, R., Ehrbeck, T., & Holle, N. (2014). Financial inclusion and development: Recent impact evidence. *Focus Note, 92,* URL: https://www.cgap.org/sites/default/files/FocusNote-Financial-Inclusion-and-Development-April-2014.pdf

Cuong, N. V. (2008). Is a governmental Micro-Credit Program for the poor really pro-poor? Evidence from Vietnam. *The Developing Economies*, *46*(2), 151-187.

Demirgüç-Kunt, A., & Singer, D. (2017). Financial inclusion and inclusive growth: A review of recent empirical evidence. *World Bank Policy Research Working Paper*, (8040). URL: https://openknowledge.worldbank.org/handle/10986/26479.

Demirguc-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2018). *The Global index Database 2017: Measuring financial inclusion and the fintech evolution*. Washington, DC: World Bank, URL: https://openknowledge.worldbank.org/handle/10986/29510.

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2020). The Global Findex Database 2017: Measuring financial inclusion and opportunities to expand access to and use of financial services. *The World Bank Economic Review*, *34*(Supplement_1), S2-S8.

Dupas, P., & Robinson, J. (2013). Savings constraints and microenterprise development: Evidence from a field experiment in Kenya. *American Economic Journal: Applied Economics*, *5*(1), 163-92.

Foerster, S., Linnainmaa, J. T., Melzer, B. T., & Previtero, A. (2017). Retail financial advice: does one size fit all?. *The Journal of Finance*, *72*(4), 1441-1482.

Fuster, A., Plosser, M., Schnabl, P., & Vickery, J. (2019). The role of technology in mortgage lending. *The Review of Financial Studies*, *32*(5), 1854-1899.

He, C., & Du, H. (2022). Urbanization, inclusive finance and urban-rural income gap. *Applied Economics Letters*, *29*(8), 755-759. doi:10.1080/13504851.2021.1885603

Karlan, D., Ratan, A. L., & Zinman, J. (2014). Savings by and for the Poor: A Research Review and Agenda. *Review of Income and Wealth*, *60*(1), 36-78.

Kelikume, I. (2021). Digital financial inclusion, informal economy and poverty reduction in Africa. *Journal of Enterprising Communities: People and Places in the Global Economy*, *15*(4), 626-640. doi:10.1108/JEC-06-2020-0124

Lensink, R., & Pham, T. T. T. (2012). The impact of microcredit on self-employment profits in Vietnam. *Economics of transition*, *20*(1), 73-111.

Nguyen, C., & Van den Berg, M. (2011). *The impact of Informal Credit on Poverty and Inequality: The Case of Vietnam*. Munich Personal RePEc Archive Paper, 54758. URL: https://mpra.ub.uni-muenchen.de/54758/

Park, C. Y., & Mercado, R. (2015). Financial Inclusion, Poverty, and Income Inequality in Developing Asia, ADB working paper series, 426.

Pazarbasioglu, C., Mora, A. G., Uttamchandani, M., Natarajan, H., Feyen, E., & Saal, M. (2020). Digital financial services. *World Bank Group*, *54*. URL: http://pubdocs.worldbank.org/en/230281588169110691/Digital-Financial-Services.pd

Philippon, T. (2020). On fintech and financial inclusion (BIS Working Papers No. 841). *Bank for International Settlements*.

Prina, S. (2015). Banking the poor via savings accounts: Evidence from a field experiment. *Journal of Development Economics*, *115*, 16-31.

Sahay, M. R., Ogawa, M. S., Khera, P., & Ng, M. S. Y. (2021). *Is Digital Financial Inclusion Unlocking Growth?* (No. 2021/167). International Monetary Fund.

Sahay, R., Eriksson Von Allmen, U., Lahreche, A., Khera, P., Ogawa, K., Bazarbash, M., & Beaton, K. (2020). *The Promise of Fintech Financial Inclusion in the Post COVID-19 Era.* IMF Department Paper, 20/09.

Sha'ban, M., Girardone, C., & Sarkisyan, A. (2020). Cross-country variation in financial inclusion: a global perspective. *The European Journal of Finance*, *26*(4-5), 319-340.

Song, X. L., & Jing, Y. G. (2020). Spatial econometric analysis of digital financial inclusion in China. *International Journal of Development Issues*, 20(2), 210-225. doi:10.1108/IJDI-05-2020-0086

Statista, (2021). Transaction value of the fintech sector in vietnam from 2017 to 2025, by segment. URL: https://www.statista.com/forecasts/1228355/fintech-transaction-value-by-segment-vietnam#:~:text=Transaction%20value%20in%20the%20digital,to%20reach%2026.4%20billion%20dollars.

We are social (2021). Digital 2021: Vietnam. URL: https://datareportal.com/reports/digital-2021-vietnam?fbclid=IwAR0VKUSxVpws7A17pIBwE554JBkZbc-7l1acHA6C8Kw3xs3GKlcn2LtC0kk

World Bank (2018). Financial inclusion URL: https://www.worldbank.org/en/topic/financialinclusion