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The effect of financial literacy and fintech usage on income levels: a study in Vietnam

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Abstract

Purpose – Drawing from the economic growth theory and the human capital theory, this study investigates the relationship between financial literacy, the use of financial technology (fintech) and income levels of graduates in Vietnam.

Design/methodology/approach – Data were collected through a web-based survey in 2023. The questionnaire was designed on "Google Form" and sent randomly to Vietnamese graduates via social networks such as Facebook and Zalo. Final data consisted of 450 respondents. The three techniques used are ordinary least square, ordinal logit and structural equation model.

Findings – The results show that financial literacy and the use of fintech positively affect income levels. Basic and advanced financial literacy have an impact on the use of fintech and income levels. Financial literacy also has an indirect impact on income levels.

Practical implications – The scale of postgraduate financial training in Vietnam needs to be increased as the financial literacy of Vietnamese is still low compared to the world. An increase in financial literacy will increase the effectiveness of using fintech services and increase income levels.

Originality/value – This study is the first to build a research model focusing on the role of financial literacy and fintech usage in increasing income levels. In particular, fintech usage is a mediator between financial literacy and income levels. Next, this is also the first time these issues have been mentioned in Vietnam. Finally, this paper helps policymakers in attracting more businesses to invest in Vietnam and developing a fintech market that can help people increase their income and thus reduce poverty.

Keywords Economic growth, Financial literacy, Fintech usage, Income levels, Vietnam

Paper type Research paper

1. Introduction

> The number one problem in today's generation and economy is the lack of financial literacy. Greenspan A., Former Federal Reserve Chairman, once said.

Financial literacy (FL) and financial technology (fintech) usage contribute to economic growth through increased income and poverty reduction (Appiah-Otoo & Song, 2021; Xu, Yang, Tong, & Li, 2023; Zhang, Zhang, Wan, & Luo, 2020). Human capital theory (Becker, 1975, 2009) postulates that human knowledge plays a vital role in increasing productive capacity and increasing income. Mokyr (1994) also argues with Adam Smith that technology is a key contributor to the development of a country.

Following economic growth theory (Douglas, 1928) and human capital theory (Mokyr, 1994), this study suggests that FL and fintech usage can help people increase income and reduce poverty. This is also confirmed by previous studies. For example, Xu, Yang, Tong, and

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Li (2023) postulate that FL increases income levels, both short-term and long-term, through making informed financial decisions and achieving good outcomes. Zhang, Zhang, Wan, and Luo (2020) find that fintech has a positive associated with increased income and this impact is greater for rural households than urban households.

Graduates are a key workforce of a country's economy as they contribute greatly to economic growth (Holland, Liadze, Rienzo, & Wilkinson, 2013). However, few studies have focused on graduates (Hammer & Zureck, 2022; Phung, 2024) and the mediating role of fintech use in the relationship between FL and income levels remains unexplored. Existing literature only studies the impact of FL (or use of fintech) on poverty reduction (measured through income levels) (Roongsrisoothiwong, 2024; Ye, Chen, & Li, 2022; Zhang *et al.*, 2020). Therefore, this study fills this gap by examining the direct and indirect effects of FL and use of fintech on the income level among graduates in Vietnam.

The main research question is "what is the role of FL and fintech usage in increasing income levels". Two reasons to support this question are: first, financial literacy has an impact on poverty reduction (measured by income levels) (Koomson, Ansong, Okumu, & Achulo, 2023; Ouattara & Zhang, 2020; Xu *et al.*, 2023). Second, higher levels of fintech use are associated with lower levels of poverty (Appiah-Otoo & Song, 2021; Zhang *et al.*, 2020). This study, therefore, investigates the direct and indirect effect of FL and fintech usage on income levels among graduates. The results can help policymakers, educators, firms and investors alike come up with more effective strategies and policies to increase income levels and thus alleviate poverty.

1.1 Vietnam fintech market

Vietnam is a low-middle income country with a population of over 105 million people (CIA, 2025). Figure 1 shows Vietnam's GDP per capita from 2018 to 2024 (Statista, 2024). Overall, GDP per capita in Vietnam is increasing every year, for example, a 13.3% increase in GDP per capital between 2022 and 2024 (4,102 USD in 2022 compared to 4,649 USD in 2024). This is a positive sign that Vietnamese economy is growing with increasing income rate. However, as seen in Figure 2 (IMF, 2025), Vietnam's GDP per capita is still at the lowest level compared to other Southeast Asian countries such as Malaysia, Indonesia, Thailand and Philippines.

Regarding the fintech industry in Vietnam, Figure 3 shows the annual growth in the number of fintech firms from 2018 to third quarter of 2022 (Statista, 2022). The number of fintech firms grew from 144 in 2018 to 263 in 2022, showing an incredible 183% increase in five

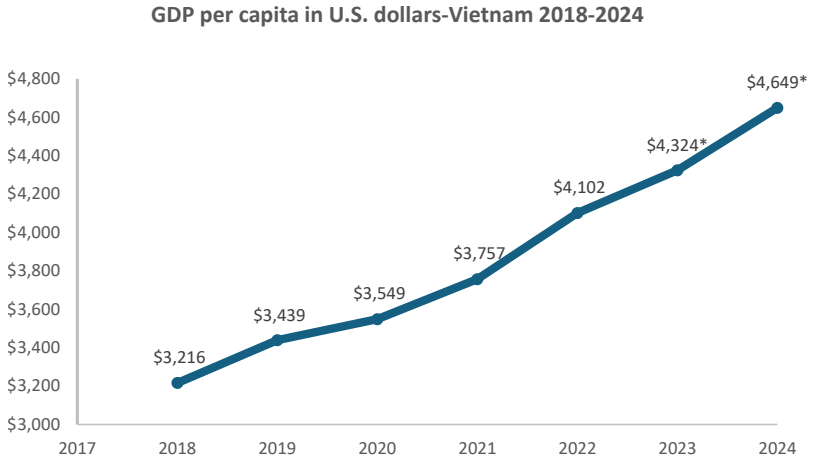

Figure 1. GDP per capita in U.S. dollars from 2018 to 2024. Note: * Estimate. Source: Statista (2024)

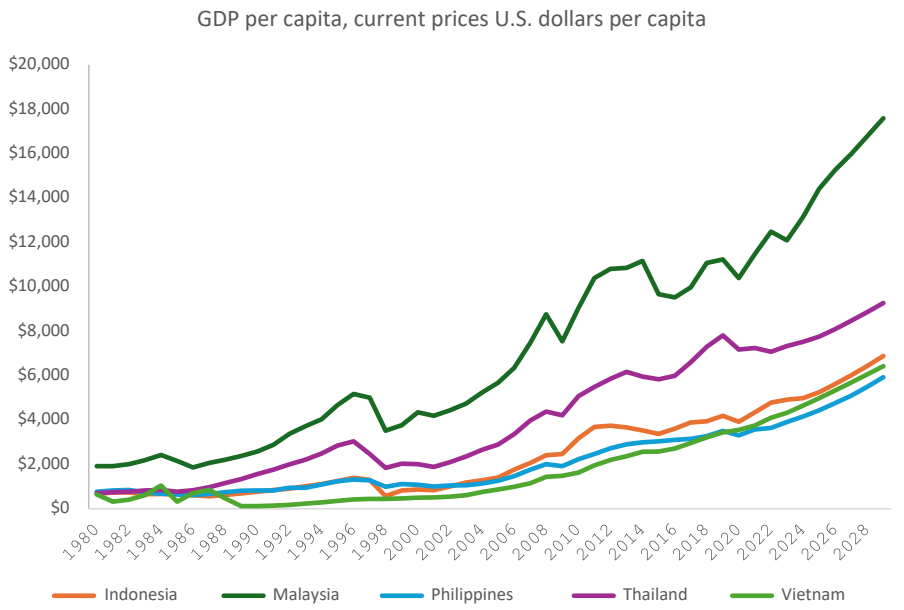

Figure 2. GDP per capital in across ASEAN countries. Source: IMF (2025)

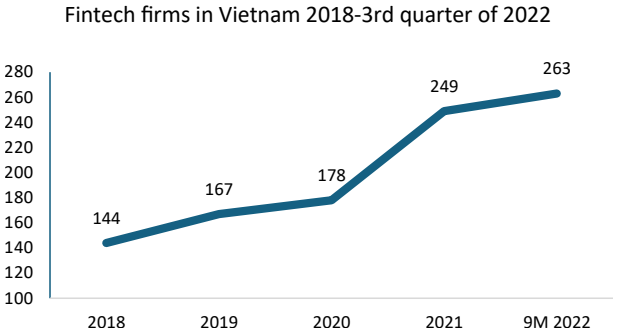

Figure 3. Fintech firms in Vietnam from 2018 to third quarter of 2022. Source: Statista (2022)

years. Five segments in the Vietnam fintech market are alternative financing, digital assets, digital investment, digital payments and neo-banking. Among these, digital payments are the main contributor (90%) to the growth of the fintech industry (Phung, 2023b).

Although the Vietnam fintech industry is developing, the number of fintech firms is the lowest across Southeast Asian countries. Namely, according to a 2020 report by Nathan, Setiawan, and Quynh (2022), while Vietnam has 141 fintech companies, Singapore has 1,200, followed by Indonesia (557), Malaysia (407), Thailand (227), Philippines (212). According to Vietnam Fintech Summit (2024), the main reason for the small number of fintech companies in Vietnam is the limited legal framework. For example, investors are still unclear about the nature of fintech products or services, the standards or conditions for fintech companies to operate and how to protect consumers' personal information. Therefore, this article will be a useful reference for policymakers to improve the legal framework to attract more fintech companies.

Within the context explained above, this study makes three contributions. First, this study is the first to build a research model focusing on the FL and use of fintech affecting income levels. Especially, fintech usage is a mediator between FL and income levels. For example, previous studies (Xu *et al.*, 2023; Ye, Chen, and Li, 2023) only examined FL and their effect on poverty reduction. Second, Next, this is also the first time these issues have been mentioned in Vietnam. Existing literature (Li, Wu, & Xiao, 2020; Koomson *et al.*, 2023) investigated that of Chinese and African households. Finally, our finding contributes to policymakers in attracting more companies and investors, developing fintech market in emerging markets.

The structure of the study is presented as follows. Section 2 provides literature review including theoretical background and hypothesis formation. Section 3 discusses methodology involving survey process, techniques, measures of variables and several tests. Section 4 focuses on results and discussions including implications, limitations and future directions. The last section is the conclusion.

2. Literature review

2.1 Theoretical background

2.1.1 Economic growth theory. Economic growth theory is derived from Cobb–Douglas production function (Douglas, 1928) that emphasizes the relationship between education and economic growth as follows:

$$Y = A\,K^{\alpha}\,H^{1-\alpha} \tag{1}$$

Consider per unit of labor and taking logs, (1) can be displayed as follows.

$$\mathrm{Ln}\left(\frac{Y}{L}\right) = \ln A + \alpha\,\mathrm{Ln}\left(\frac{K}{L}\right) + (1-\alpha)\,\mathrm{Ln}\left(\frac{H}{L}\right) \tag{2}$$

Or

$$\mathrm{Ln}\,y = \mathrm{Ln}\,A + \alpha\,\mathrm{Ln}\,k + (1-\alpha)\,\mathrm{Ln}\,h \tag{3}$$

Where:

Y: output;

A: total factor productivity;

K: the stock of physical capital; and

H: the stock of human capital.

At the individual level, following economic growth theory, this study examines the relationship between financial literacy (human capital: H) and income levels (Y).

2.1.2 Human capital theory. Human capital refers to an individual's education achievement, knowledge, experience and skills (Becker, 1975). The theory emphasizes that education and skills can increase one's productive capacity, contributing to business development and economic growth (Becker, 1975, 2009). Human knowledge has an association with economic growth that helps increase income and reduce poverty (Mokyr, 1992, 1994). In addition, Mokyr (1994) also asserts that technological progress is also a key factor explaining a country's economic situation. Therefore, this study proposes that financial literacy and fintech use can increase income levels.

2.2 Related literature review and hypotheses formation

FL is the ability to understand basic financial knowledge to make informed financial choices such as saving, investing, borrowing and more (Klapper, Lusardi, & Van Oudheusden, 2015).

Fintech usage refers to the use of electronic payment applications or software for digital access to make financial transactions (Morgan & Trinh, 2020). Income levels contribute to poverty reduction in a country (Palmer, 2015). Therefore, this study suggests a positive relationship between financial literacy, fintech usage and income levels.

The linkage between FL and fintech usage is found by many scholars across countries. Notably, financial literacy scores are assessed based on two levels: basic and advanced financial literacy and they have an impact on fintech usage (Hasan, Noor, Gao, Usman, & Abedin, 2023; Morgan & Trinh, 2020; Yoshino, Morgan, & Long, 2020). Namely, in Japan, Yoshino *et al.* (2020) use survey data on 25,000 individuals aged from 18 to 79 to examine the impact of financial literacy on fintech adoption. The results display that financial literacy has a positive association with use of fintech services. In Vietnam, Morgan and Trinh (2020) employ survey data on 1,058 households and find a positive link of financial literacy to awareness and use of fintech products. In Bangladesh, Hasan *et al.* (2023) surveyed 817 individuals and explored that knowledge regarding fintech applications can impact fintech access. Given these findings, this study proposes the following hypotheses.

H1. FL is positively associated with fintech usage.

H1a. Basic FL is positively associated with fintech usage.

H1b. Advanced FL is positively associated with fintech usage.

Recent research also finds a link between financial literacy and income levels or poverty reduction across countries. Specifically, Xu *et al.* (2023) examine rural households' financial literacy and explore that financial literacy has a current and long-term influence on reducing poverty in China. Koomson *et al.* (2023) investigate individuals in East Africa and report that financial literacy accounts for increasing income, in which a rise in financial literacy is related to a 6.9% rise in income. Ouattara and Zhang (2020) examine financial literacy and its impact on income levels in Indonesia. The results show that financial literacy plays a vital role in increasing income and reducing poverty. Since this relationship has not been explored in Vietnam, this study proposes the following hypotheses.

H2. FL is positively associated with income levels.

H2a. Basic FL is positively associated with income levels.

H2b. Advanced FL is positively associated with income levels.

Literature on the association between fintech usage and income levels is still limited. For example, Appiah-Otoo and Song (2021) employ a panel of 31 provinces in China from 2011 to 2017 to examine the linkage between fintech and income levels. The results show that fintech increases income levels and reduces poverty in China. Zhang *et al.* (2020) explore that fintech development has a positive association with household income in China. In addition, the positive impact is greater for rural households than urban households, implying that fintech development make a closer income gap between rural and urban people. These findings are consistent with Ye *et al.* (2022), who posit that fintech has a stronger effect on income levels and poverty alleviation in low-income provinces than high-income provinces. Li *et al.* (2020) also discover that internet inclusive finance promotes household consumption in China and digital payment is a mediator between digital finance and household consumption. Based on the evidence, the following hypotheses are suggested below.

H3. Fintech usage is positively associated with income levels.

H4. Fintech usage mediates between financial literacy and income levels.

Figure 4 shows the conceptual framework of this study.

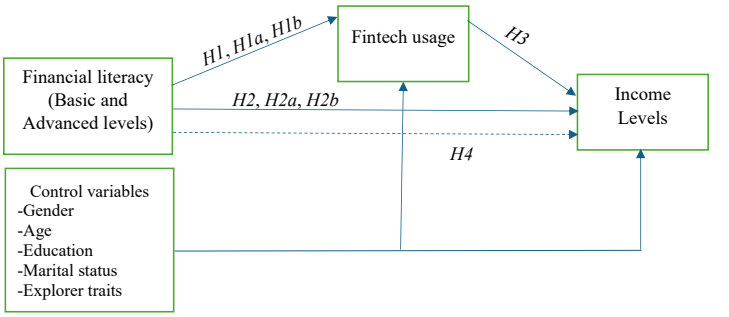

Figure 4. The conceptual framework of the study. Source: Authors' own work

3. Methodology

3.1 Survey process and techniques

This study was undertaken in Vietnam. Data were collected through a web-based survey. The questionnaire was designed on "Google Form" and sent randomly to graduates via social networks such as Facebook, Zalo, etc. The survey lasted five months from March to July 2023. Final data consisted of 450 respondents. The three techniques used are structural equation model (SEM), ordinary least squares (OLS) and ordinal logit regression (Logit) with the support of SPSS and AMOS software.

3.2 Measures

FL is measured through 16 questions (Van Rooij, Lusardi, & Alessie, 2011) with 1 point for a correct answer. Each respondent's level of financial literacy was calculated as a ratio of their actual score to 16 points. This method is widely applied by scholars (Koomson *et al.*, 2023; Tran, Phung, Nguyen, & Nguyen, 2023; Phung, 2023a). Of the 16 questions on financial literacy, the first five questions relate to the basic level and the remaining 11 questions relate to the advanced level (Van Rooij *et al.*, 2011).

Fintech usage is a(n) independent and dependent variables (a mediator variable). The question to measure Fintech usage based on the studies by Wang & Shih, 2009; Morgan & Trinh, 2020, through the question of "*How often do you use electric payment applications such as MoMo, VNPAY or ZaloPay?*" on a scale from 1 (never) to 5 (very often). This question is also based on Phung's (2023c) study with the Vietnamese version.

Income levels are measured through the respondents' monthly income level from 1 (no income) to 5 (USD 2,000/month) which is based on studies (Appiah-Otoo & Song, 2021; Koomson *et al.*, 2023; Xu *et al.*, 2023).

3.3 Correlation tests

This study undertook the correlation tests between the variables. The results are displayed in Table 1, showing that income levels have a statistically significant correlation with fintech usage, financial literacy, work experience and explorer traits. In addition, financial literacy is positively correlated with fintech usage, work experience and explorer traits. Explorer traits also have a positive correlation with gender, education, marital status and work experience.

4. Results

4.1 Data description

Data description is presented in Table 2. The sample consisted of 62% males and 38% females. All graduates have a university degree and five to ten years of work experience. They also have

Table 1. Correlation tests

	Income levels	1	2	3	4	5	6	7
1. Fintech usage	0.180**							
2. Financial literacy	0.283**	0.180**						
3. Gender	0.049	0.079	0.105*					
4. Education	0.029	0.047	0.260**	0.109*				
5. Age	0.091	0.019	0.119*	0.004	0.147**			
6. Marital status	0.043	0.046	−0.012	0.091	0.154**	0.034		
7. Work experience	0.153**	0.217**	0.038	0.137**	0.146**	0.050	0.404**	
8. Explorer trait	0.148**	0.232**	0.087	0.164**	0.151**	0.024	0.428**	0.569**

Note(s): **. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)
Source(s): Authors' own work

three years or more of financial investment experience. The majority of respondents were single, 45 years old or less and prone to explorer traits in terms of technology.

Table 2 and Figure 5 also indicate that most respondents used fintech services and earned a monthly income of 30 million (VND) or more, equivalent to 1,200 (USD) or more. Monthly income levels (VND), in which 72% of the respondents earned over 30 million, followed by 21% with less than 10 million and 7% with between 10 to 30 million (VND).

Table 2. Data description ($N = 450$)

Variables	Mean	Median	SD	Min	Max
Gender (Male = 1)	0.62	1	0.49	0	1
Education	3.05	3	0.42	1	4
Age	2.75	3	0.99	1	4
Marital status (Married = 1)	0.38	0	0.49	0	1
Work experience	1.64	1	1.05	1	5
Technology-related traits (Explorer trait = 1)	1.76	1	1.02	1	4
Fintech usage	3.14	3	1.47	1	5
Income levels	2.50	3	0.82	1	3
Financial literacy	9.55	10	3.33	0	15
Basic financial literacy	9.62	10	4.39	0	15
Advanced financial literacy	9.53	10	3.45	0	15

Source(s): Authors' own work

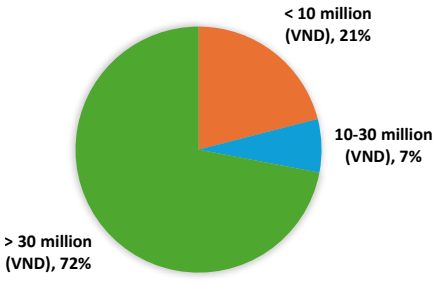

Figure 5. Income levels. Source: Authors' own work

Regarding financial literacy levels (see Table 2 and Figure 6), respondents, on average, answered 10 out of 16 questions correctly (for both basic and advanced level). Respondents performed in financial literacy from 0 (lowest score) to 15 (highest score). Figure 5 also shows that most respondents (80%) scored 8 points or more; 18% scored between 1 to 7 points and 2% of them did not answer any question correctly.

4.2 Determinants of income levels

This study investigates determinants of income levels using three methods of SEM, OLS and Logit. The results are presented in Table 3 and Figure 7, showing that financial literacy and fintech usage are the key predictors of income levels.

Regarding fintech usage, Models 1 and 2 report a coefficient of 0.05*** (see Models 1 and 2), suggesting that the more the fintech services are used, the higher the income level. A coefficient of −1.186*** (see Model 3) proposes that individuals with low levels of fintech usage have lower incomes than those with high levels of fintech usage.

In addition, financial literacy has a strong influence on income levels. Namely, a coefficient of 0.06*** (see Models 1 and 2) reveals that the higher the level of financial literacy, the higher the income. A negative coefficient of −1.099*** means that individuals with lower levels of financial literacy have lower incomes than those with higher levels of financial literacy.

Lastly, several demographic variables such as age, education, work experience, explorer traits account for income levels. Specifically, individuals under 25 years old have a lower income levels than individuals over 45 years old (see Model 3, $\beta = -0.759$*). Respondents with higher levels of education and work experience are more likely to increase income (see Model 1; $\beta = 0.154$* and 0.077*). Individuals with the explorer trait have a higher income than individuals without this trait (see Model 1, $\beta = 0.243$***).

4.3 Determinants of fintech usage

This study examines determinants of fintech usage using three methods of SEM, OLS and Logit. The results are presented in Table 4 and Figure 7, showing that financial literacy is the key predictor of fintech usage.

Specifically, both models 1 and 2 report a coefficient of 0.073*** between financial literacy and fintech usage, statically meaning that for every percentage point increase in financial literacy, use of fintech increases by 0.073. Model 3 show a negative coefficient of −0.727***, indicating that individuals with lower levels of financial literacy are less likely to use fintech services than individuals with higher levels of financial literacy.

Moreover, several demographics have an impact on fintech usage, including marital status, work experience and explorer traits. Namely, married respondents are less likely to use fintech services than single respondents (see Models 1 and 2). Model 3 reports that single individuals use fintech services more than married individuals. More work experience is associated with more frequent use of fintech services (see Models 1 and 2). Explorer traits are also related to the use of fintech, in that individuals possessing more explorer traits are more likely to use

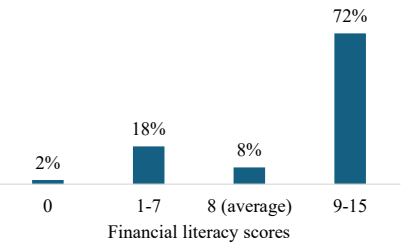

Figure 6. Financial literacy levels. Source: Authors' own work

Table 3. Determinants of income levels

IVs	SEM (1)	OLS (2)	Logit (3)
Fintech usage	0.056**	0.055**	
	(2.141)	(2.093)	
Fintech usage: Low vs high			−1.186***
			(9.548)
Financial literacy	0.067***	0.066***	
	(5.744)	(5.662)	
Financial literacy: lower vs higher than average			−1.099***
			(17.029)
Gender (Male = 1)	−0.003	−0.002	
	(−0.035)	(−0.031)	
Female vs male			0.066
			(0.077)
Age	0.052	0.052	
	(1.393)	(1.384)	
Under 25 vs over 45 years old			−0.759*
			(3.644)
Education	0.154*	0.151*	
	(1.660)	(1.608)	
University vs Master or higher			0.237
			(0.349)
Marital status (Married = 1)	−0.026	−0.026	
	(−0.307)	(−0.304)	
Single vs married			0.177
			(0.423)
Work experience	0.077*	0.080*	
	(1.797)	(1.805)	
Work experience: less vs more			−0.986
			(1.405)
Explorer trait	0.243***	0.049	
	(2.971)	(1.061)	
Explorer trait: less vs much			−0.074
			(0.022)
Intercept/-2 Log Likelihood		1.808***	571.14
R^2/Adjusted R^2/Pseudo R^2	0.121	0.105	0.172
Chi-square/F Change	0.094***	7.585***	612.18***
Df	1	8	20

Note(s): ***: $p < 1\%$; **: $p < 5\%$, *: $p < 10\%$. Dependent variable: Income levels. *t*-test in the parenthesis. SEM indicator: AGFI = 0.998; RFI = 0.993, TLI = 1.074; RMSEA = 0.004
Source(s): Authors' own work

fintech services (see Models 1 and 2). Model 3 also shows that the less explorer traits a person possesses, the less likely he or she is to use fintech services.

4.4 Basic and advanced financial literacy

This section focuses on basic and advanced levels of financial literacy and examines (1) their impact on the use of fintech and income levels and (2) the impact of demographic variables on basic and advanced levels of financial literacy. The purpose is to highlight the importance of financial literacy levels (basic or advanced) in using fintech services and increasing income. The results are presented in Tables 5 and 6.

First, Table 5 reports that advanced financial literacy is significant to accounting for both fintech usage and income levels, while basic financial literacy only explains income levels. Namely, for fintech use, advanced financial literacy has a coefficient of 0.869** (see Model 1)

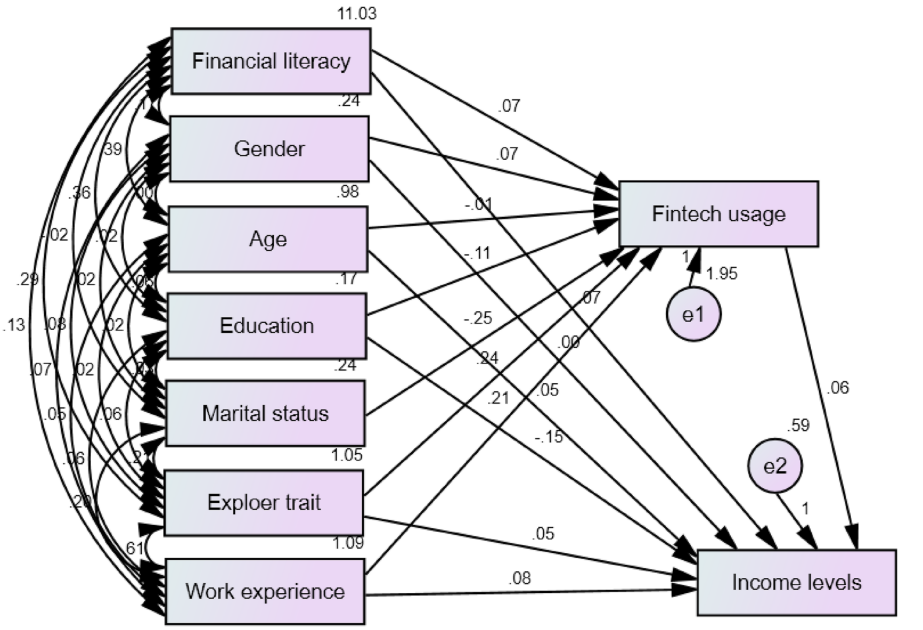

Figure 7. Structural equation model (SEM). Source: Authors' own work

suggesting that individuals with higher levels of advanced financial literacy are more likely to use fintech services. Regarding income levels, both basic and advanced financial literacy have an impact on it. Basic financial literacy has a coefficient of 0.336** and advanced financial literacy has a coefficient of 0.763*** (see Model 2) revealing that respondents with higher levels of basic or advanced financial literacy are more likely to increase income.

Second, Table 6 shows three demographic variables affecting overall, basic and advanced financial literacy, including gender, age, education and marital status. Namely, (i) gender is also significant to explain basic financial literacy, in that male respondents have higher levels of basic financial literacy than the female counterparts (see $\beta = 0.045$* in Model 1). (ii) Advanced financial literacy increases when ages increase (see $\beta = 0.017$* in Model 2), meaning that the older the respondents are, the higher the level of advanced financial literacy they achieve. (3) Education levels account for both basic and advanced financial literacy. A coefficient of 0.119*** (see Model 1) and 0.115*** (see Model 2) proposes that individuals with higher levels of education attain higher levels of basic and advanced financial literacy. (4) Marital status has a coefficient of −0.583* (see Model 1) and −0.040* (see Model 3) revealing that married respondents have lower levels of financial literacy than single respondents.

4.5 Indirect effects

This study investigates the indirect effect of financial literacy on income levels through fintech usage. The results are presented in Table 7, indicating that financial literacy has a direct and indirect on income levels. The direct effects have already been presented in the tables above and therefore, this section focuses on the indirect effect on income levels through fintech usage (see Model 3).

The indirect effect of financial literacy has a positive coefficient ($\beta = 0.004$***, Model 3) suggesting that financial literacy enhances the use of fintech, which in turn helps increase income and reduce poverty. Model 3 also show that three demographic variables including

Table 4. Determinants of fintech usage

IVs	SEM (1)	OLS (2)	Logit (3)
Financial literacy	0.073***	0.073***	
	(3.527)	(3.499)	
Financial literacy: lower vs higher than average			−0.727***
			(10.459)
Gender (Male = 1)	0.073	0.073	
	(0.525)	(0.521)	
Female vs male			−0.066
			(0.129)
Age	−0.008	−0.008	
	(−0.112)	(−0.112)	
Under 25 vs over 45 years old			0.203
			(0.792)
Education	0.114	0.114	
	(0.677)	(0.671)	
University vs Master or higher			0.397
			(1.676)
Marital status (Married = 1)	−0.248*	−0.248*	
	(−1.605)	(−1.693)	
Single vs married			0.384*
			(3.504)
Work experience	0.210***	0.210***	
	(2.667)	(2.646)	
Work experience: less vs more			−0.146
			(0.055)
Explorer trait	0.243***	0.243***	
	(2.971)	(2.948)	
Explorer trait: less vs much			−0.649*
			(3.249)
Intercept/-2 Log Likelihood		2.087***	896.40
R^2/Adjusted R^2/Pseudo R^2	0.101	0.084	0.146
Chi-square/*F* Change	0.094***	6.869***	826.22
Df	1	7	16

Note(s): ***: $p < 1\%$; **: $p < 5\%$, *: $p < 10\%$. Dependent variable: fintech usage. *t*-test in the parenthesis. SEM indicator: AGFI = 0.998; RFI = 0.993, TLI = 1.074; RMSEA = 0.004
Source(s): Authors' own work

Table 5. Financial literacy (basic and advanced), fintech and income levels

IVs	Fintech (1)	Income levels (2)
Basic financial literacy	0.290	0.336**
	(1.02)	(2.139)
Advanced financial literacy	0.869**	0.763***
	(2.384)	(3.768)
Control variables	*Yes*	*Yes*
Intercept	2.071***	1.787***
Adjusted R^2	0.081	0.106
F Change	5.926***	6.924***
Df	8	9

Note(s): ***: $p < 1\%$; **: $p < 5\%$, *: $p < 10\%$. Dependent variable: fintech usage and income levels. *t*-test in the parenthesis. Method applied: OLS
Source(s): Authors' own work

Table 6. Demographics and financial literacy (basic and advanced levels)

IVs	Overall financial literacy (1)	Basic financial literacy (2)	Advanced financial literacy (3)
Gender (Male = 1)	0.514*	0.045*	0.023
	(1.623)	(1.684)	(1.126)
Age	0.285*	0.020	0.017*
	(1.853)	(1.536)	(1.715)
Education	1.936***	0.119***	0.115***
	(5.184)	(3.787)	(4.700)
Marital status (Married = 1)	−0.583*	−0.043	−0.040*
	(−1.651)	(−1.439)	(−1.726)
Work experience	−0.087	0.012	0.002
	(−0.485)	(0.773)	(0.16)
Explorer trait	0.284	0.023	0.015
	(1.524)	(1.448)	(1.193)
Intercept	2.410***	0.152***	0.170***
Adjusted R^2	0.076	0.044	0.061
F Change	7.168***	4.428	5.826
Df	6	6	6

Note(s): ***: $p < 1\%$; **: $p < 5\%$, *: $p < 10\%$. Dependent variable: financial literacy (overall, basic and advanced levels). *t*-test in the parenthesis. Method applied: OLS
Source(s): Authors' own work

Table 7. Direct effect, indirect effect and total effect

IVs	Fintech usage	Income levels		
	Direct effect (1)	Direct effect (2)	Indirect effect via fintech usage (3)	Total effects (4)
Financial literacy	0.073***	0.067***	0.004***	0.071***
Gender (Male = 1)	0.073	−0.003	0.004	0.001
Age	−0.008	0.052	0.0001	0.052
Education	−0.114	0.154*	−0.006	0.148
Marital status (Married = 1)	−0.248*	−0.026	−0.014*	−0.040
Work experience	0.210***	0.077*	0.012***	0.089***
Explorer traits	0.243***	0.045***	0.014***	0.059***
Fintech usage	n/a	0.056**	n/a	0.056**

Note(s): ***: $p < 1\%$; **: $p < 5\%$, *: $p < 10\%$. Dependent variables: Fintech usage and Income levels. All coefficients are based on SEM. n/a: not applicable
Source(s): Authors' own work

marital status ($\beta = -0.014$*), work experience ($\beta = 0.012$***) and explorer traits ($\beta = 0.014$***) have an indirect impact on income levels. These results propose that married respondents are less likely to use fintech services than single respondents and therefore, are less likely to increase income than single respondents. Individuals with more work experience and explorer traits use more fintech services, leading to greater income levels.

In summary, financial literacy, fintech usage, work experience and explorer traits have both direct and indirect effects on income levels (see total effects in Model 4), showing that these factors play an important role in income levels.

4.6 Discussion

This study investigates the relationship between financial literacy (basic and advanced levels), fintech usage and income levels. The results show that financial literacy is the key predictor of fintech usage and income levels. Both basic and advanced have a positive impact on income levels; but only advanced financial literacy affects fintech use. Regarding mediating analysis, fintech usage is a significant mediator between financial literacy and income levels. Based on these findings, seven out of eight hypotheses are supported, including H1, H1b, H2, H2a, H2b, H3 and H4 (see Table 8). The following discussion is presented below.

First, financial literacy (overall and advanced levels) have an influence on fintech usage. This result is consistent with previous studies (Hasan *et al.*, 2023; Morgan & Trinh, 2020; Yoshino *et al.*, 2020). Moreover, this finding also reiterates that human capital theory plays a vital role in technological innovation (Becker, 1975, 2009); that is, individuals with higher levels of financial literacy are more likely to use fintech services.

Second, advance financial literacy affects fintech use, while basic financial literacy does not. A reason for this is that basic financial literacy focuses on basic financial knowledge including numeracy, interest compounding, inflation, time value of money and money illusion (Van Rooij *et al.*, 2011). In contrast, use of fintech services requires advanced skills such as analysis, evaluation and investment knowledge (Van Rooij *et al.*, 2011). Recently, the distinction between basic and advanced levels of financial literacy in fintech use has not been examined (Yoshino *et al.*, 2020; Morgan & Trinh, 2020). These results, therefore, need to be re-examined in further research.

Next, financial literacy (overall, basic and advanced levels) and fintech usage affect income levels, suggesting that higher levels of financial literacy and more frequent use of fintech services are associated with income levels. These findings are in line with prior studies (Koomson *et al.*, 2023; Ouattara & Zhang, 2020; Xu *et al.*, 2023). In addition, our results are also confirmed by Mokyr (1994), who argues with Adam Smith that technology is indispensable for a developing economy. That is, individuals using more fintech services are more likely to increase their income.

Last but not least, fintech usage is a mediator between financial literacy and income levels, implying that financial literacy enhances use of fintech services, which in turn increase income. Recent research on the mediating role of fintech is limited; for example, Li *et al.* (2020), who explored that digital payment is a mediator between digital finance and consumption. Hence, this study contributes to the literature on the mediating role of fintech usage.

5. Implications, further research and conclusion

5.1 Implications

This study has the following implications. First, graduates play an important role in economic growth (Holland *et al.*, 2013). However, the scale of postgraduate training in Vietnam is very

Table 8. A summary of hypotheses

No.	Hypotheses			Supported
H1	Financial literacy	->	Fintech usage	Yes
H1a	Basic financial literacy	->	Fintech usage	No
H1b	Advanced financial literacy	->	Fintech usage	Yes
H2	Financial literacy	->	Income levels	Yes
H2a	Basic financial literacy	->	Income levels	Yes
H2b	Advanced financial literacy	->	Income levels	Yes
H3	Fintech usage	->	Income levels	Yes
H4	Financial literacy → Fintech usage	->	Income levels	Yes

Source(s): Authors' own work

low compared to the world. For example, Vietnam trained 122 thousand postgraduates in 2021 (110 thousand master's students and 12 thousand doctoral students). This figure is less than 30% of that in Malaysia and Thailand and 50% Singapore and the Philippines, which is approximately 1/9 times the average level of OECD countries, calculated based on each country's population (Nhat Hong, 2023). Therefore, policymakers need to have more policies to encourage learners to pursue higher education so that there will be more graduates in the future.

Second, financial literacy plays a vital role in fintech usage and income levels. However, financial literacy levels are generally low (less than the average) in major emerging countries (e.g. Brazil, China, India, Russian Federation, South Africa) and some Southeast Asian Nations (ASEAN) including Vietnam (Klapper *et al.*, 2015). Several reasons for low levels of financial literacy include income levels, education and consumer protection (Klapper *et al.*, 2015). Clearly, financial education plays an important role in improving financial literacy levels. However, in some ASEAN countries such as Vietnam and Thailand, finance courses are taught more to university students than to high school students and below. This leaves some people with limited financial knowledge unless they go to university. Therefore, policymakers and educators need to come up with appropriate policies to create opportunities for students at all levels to be equipped with financial literacy.

Next, the use of fintech services help people increase income. However, Vietnamese people, especially in rural areas, have limited access to fintech services, which is a barrier to the growth of this market. The reasons are that (1) individuals lack awareness about security of personal information such as name, ID number, passport, address; (2) Legal framework is too simple, focusing on macro-level proposals and payment regulations, while lacking standards and regulations related to operating companies and fintech services and products (Vietnam Fintech Summit, 2024). Individuals, therefore, need to be equipped with technological skills and knowledge to (1) use fintech services effectively and (2) avoid potential risks when using high-tech products.

As individuals who do not have strong financial literacy may make horrible financial decisions, business leaders should provide opportunities for their workforce to improve their financial literacy and fintech use because it can help them achieve financial stability and success. This, in turn, can create a more engaged and committed workforce for the organization. Business leaders can invest in building their own financial education programs or collaborate and partner with educational institutions to provide such programs for their employees.

In summary, increasing financial literacy and fintech usage must be a national priority. Policymakers need to have incentive policies to increase the number of fintech firms. Similarly, educators need to include in their strategic plans educational programs related to improving financial literacy levels. It is important to equip students with financial literacy at all levels from elementary school, middle school, high school to university. Government leaders should support and collaborate with educational institution leaders (public, private and/or non-profit) to make financial literacy a vital part of the curriculum. School curriculum, vocational training programs, finance-focused seminars/workshops, etc. are among a few formats to provide an opportunity for everyone to improve their financial literacy.

5.2 Limitations and future directions

This study has inevitable limitations. First, several factors are not statically significant to explain use of fintech services and income levels. For example, basic financial literacy does not affect fintech use. Gender neither affects fintech usage nor income levels. Hence, these consequences need to be re-examined in further research. Moreover, the scope of the study only focuses on Vietnam and therefore, needs to be expanded abroad or to diverse cultures.

5.3 Conclusion

This study investigated predictors of income levels of graduates in Vietnam by using SEM, Logit and OLS methods and found significant results. FL and fintech usage are the key factors

affecting income levels. Moreover, fintech usage is a mediator between financial literacy and income levels. Next, both basic and advanced levels of financial literacy influence income levels while only advanced levels account for fintech usage. Finally, demographic factors including gender, age, education, marital status, work experience and explorer traits have an impact on financial literacy, fintech usage and income levels. The authors, therefore, enthusiastically and passionately call for significant investments in financial education at individual, organizational and governmental levels to help increase the financial literacy level and the usage of fintech, which will, in turn, help increase income levels of graduates in Vietnam.

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