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by Muhammad Azizurrohman

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The Role of Technology Information on Financial Literacy in Indonesia

Muhammad Rizkan
Rizqone2014@gmail.com
National Dong Hwa University, Taiwan
Chieh-Tse Hou
houc@gms.ndhu.edu.tw
National Dong Hwa University, Taiwan
Romi Bhakti Hartarto
Romi.hartarto@umy.ac.id
Universitas Muhammadiyah Yogyakarta, Indonesia
Muhammad Azizurrohman
m.azizur96@gmail.com
Sekolah Tinggi Pariwisata Mataram, Indonesia

Abstract: This study investigates factors that influence individuals' awareness of financial literacy in Indonesia. The data are collected from the survey conducted by Surveymeter Indonesia and RAND, namely the Indonesian Life Survey family which was conducted in 2014. This study divided those factors could affect Indonesia financial literacy into two-part; first, it uses technology as main independent determinant; second, it uses household characteristic as a control variable. The results from both probit and multinomial models show technologies and household characteristics positively and significantly affecting financial literacy. Specifically, it finds that households' usage of handphones, TV, newspaper, marriage, education level and income level are positive and significant influences their financial knowledge. The multinomial logit estimate comparing variables relative to high-level on financial literacy shows there are 6 out of 9 (handphone, TV, newspaper, marriage, education, and income) for low-level relative to high-level, negatively and significantly affecting financial literacy, the medium-level relative to high-level has 4 out of 9 (internet, newspaper, marriage, and education) are negatively and significantly affecting financial literacy.

Keywords: *Financial literacy, IFLS, Household head, Technology, Household characteristic, Probit, Multinomial logistic model.*

Introduction

Individuals require to have a greater sense of responsibility for their financial conditions, including income, life expectancy, welfare, financial freedom, etc. To improve these conditions, individuals are required to have skills in managing their finances, which are important because those skills can result in wage differences between people with high level of education earn and those with low level earn. The most basic reason is the rapid change of financial markets and financial products in current modern era. The influence of financial technology (fintech) changes people's behavior toward financial transactions, such as payments, investments, savings, and other financing decisions. Money management skill is required for every individual to prepare for the better future. Information and knowledge about financial literacy have become a necessity in everyday life. People who are well-literate tend to have deeper understanding about the financial industry and

have better information to access it - in other words, they tend to have better financial management skills than people who are less-literate.

Based on the definition by the Organization for Economic Cooperation and Development (OECD), financial literacy is not only about knowledge or/and understanding of what financial concepts are, but an understanding of the skill, motivation, and implementation of the concepts in life in order of making better financial decisions and improve individual financial well-being. World Bank's 2011) global index database focuses on financial literacy based on three leading ndicators; (1) ownership and use of an account at a formal financial institution, (2) saving behavior, and (3) borrowing activity. The addition of financial instruments and products positively impacts individuals to reach and access financial institutions. This diversity of instruments is created, considering individual demands and needs, such as financial services to a payday loan, pawnshop, mobile banking, etc. Thus, this will affect individuals' behavior in making a financial plan. Lusardi et al., 2018, have seen the changes in household balance sheets' asset and liability side. For instance, in the USA, many people were approaching retirement with more debt than previous generations.

Some prior studies have found evidence that financial literacy may have essential role implications on financial behavior. Individuals who are well-literate of financial literacy are more ready to plan their retirement (Lusardi and Mitchell, 2011a) and prepare for their future life, such as unexpected expenses and other costs (Brounen et al., 2016). Furthermore, individuals ar vell-awareness and can avoid over-indebtedness (Huston, 2012). Individuals also participated in the financial stock market (Van Rooij et al., 2011) and held better-diversified portfolios (Von Gaudecker, 2015). The result shows that people who are well-literate of financial literacy achieve higher net wealth (Van Rooij et al., 2012).

Financial literacy is one of the crucial issues to be discussed, especially in lower-middle-income and middle-income countries such as Indonesia. World ank (2011) has reported, as shown in figure 1, that the share of Indonesian age ranges 15- to 24-year-olds with accounts in financial institutions is relatively low compare to other countries. There were only 12.8 % young adults and less than 20 % adults have accounts in Bank. This evidence is supported by a national survey which stated that the most important reason for young adults and adults in Indonesia to have an account is secure, and another reason for not having an account is not having a job or lack of income (World Bank, 2011; Bank Indonesia, 2012).

Indonesia's GDP growth has an average of almost 6% each year since the global financial crisis in 2008, Indonesia's GDP is still below the average compared to other developing countries in East Asia and Pacific Region, but still strong.

The national financial literacy survey conducted by the Indonesian Financial Services Authority provides a snapshot of the financial literacy condition in Indonesia, which was very low in 2013. The Indonesian financial literacy index is only around 21.8%, which meant that out of every 100 populations, only 22 people are included in the well-literate category. This situation implies that Indonesian do not yet have sufficient financial knowledge. Figure 3 stated only 13 provinces had financial literacy index above the national average, which was 29.70%, indicating that the public's financial knowledge was not evenly distributed in all provinces.

was presented a national financial literacy survey based on financial service sectors in 2013 and 2016. The financial literacy index for banking was still higher than other financial industries. By contrast, the financial literacy index in the capital market sector was the lowest among all financial service sectors, although it increased from 3.79% to 4.40% between 2013 and 2016, respectively.

The survey by the Indonesian Financial Services Authority in 2016 revealed that out of every 100 populations, 86 people understood the benefits of financial products and services, while only 36 people understood risks. The poor understanding of the risks of financial products and services potentially causes problems, such as losing some money when saving or investing. Although it is not identified in the figure above, the Indonesian Financial Services Authority's survey was also suggested that 48 out of 100 people were not prepared to risk losing some money while saving or making an investment.

One way that can be used to measure the level of financial literacy, a case study of Indonesian, is to examine the share of population/individuals who are active in the financial system. The more individuals financially inclusive, the greater financial literacy and strengthen their understanding through their relationships with banks or other financial institutions. In terms of studying individuals specifically and households generally, the author will conduct research based on individuals' condition and characteristics (household head) in Indonesia in finding how individuals relate to financial literacy. The analogy of corporate finance, household finance, tries to find information on how individuals use financial instruments to achieve their goals. Household financial problems have many characteristics in characterizing the household financial situation itself. Individuals must have a long-term plan, such as planning to have an important asset that has not yet been traded in the future. Individuals must have the illiquid asset, for instance, houses and various other financial decisions. To attain this objective, we could find out, in more detail, the characteristic of individuals themselves.

The survey was conducted regularly by the Surveymeter Indonesia and RAND Indonesia, namely the Indonesian Family Life Survey (IFLS). IFLS provides various data at the individual and household levels. The survey contains data on households' knowledge about their access to the financial institution. Besides, the survey provides data related to the use of technology information at household levels, which enable individuals to address this research's objective. This research could be obtained by using the IFLS's latest wave in late 2014.

This study investigates the determinants of household financial literacy. In addition, it also wants to examine how technology and household characteristics affect individuals who have knowledge of financial literacy and whether there are differences in the effect of technology and household characteristics on the knowledge of three different household heads (low, medium, high) on financial literacy. The purpose of this study is to measure and examine how financial literacy is in Indonesia. This study contributes to previous research because this field has been studied, especially in developing countries. In addition, it is important to look deeply into household characteristics, as determinants, to research any field such as economics and finance. It is also important for a policy maker to take the right path and make regulations. This study also considers existing research as scientific work that can be used for further research.

Literature Reviews

The Organization for Economic Cooperation and Development (OECD INFE, 2011) has also defined financial literacy as a combination of knowledge, awareness, behavior, and attitude to build financial decisions and ultimately achieve financial well-being. However, the most used financial literacy measurement only focuses on assessing the financial knowledge (Lusardi and Mitchell, 2009, 2011a). Financial literacy can process financial information and make decisions such as a financial plan, debt, the accumulation of their wealth, and pension in the future (Lusardi and Mitchell, 2014).

Some prior studies have shown financial literacy to improve people's abil[1]y to make a better decision that is beneficial to the future life (Braunstein and Welch 2002; and Yoshino et al. 2017). Furthermore, financial education, such as risk assessment, budgeting, and knowledge of random events, are essential for gambling and any financial decision (Guichard and Turner, 2008; and Hurla et al., 2017).

During the 1990s, previous research focused on people's understanding of financial concepts, analyzing financial data well, and understanding how to manage finances (Bakken, 1966; Danes and Hira, 1987; Chen and Volpe, 1998). Furthermore, in the 2000s (Hilgert et al., 2003; Lusardi and Mitchell, 2011a), Financial literacy is measured as financial knowledge and other added variables, including financial behavior, financial skills, and perceived knowledge (Hung et al., 2009). Other financial literacy models are conceptualized into three dimensions: financial attitude, knowledge, and behavior (Atkinson and Messy, 2011). The concept of financial literacy through these three dimensions is also supported by (Atkinson and Messy, 2012; Lusardi and Mitchell, 2013; Xiao et al., 2014; Kadoya, Y., & Khan, 2017).

Financial knowledge refers to the knowledge related to personal finance concepts. People can be assessed using knowledge-based questions by asking people the questionnaire questions to assess and find out how in-depth their financial knowledge is. Financial knowledge is often used with financial literacy, but the terms do not overlap completely. Huston (2010) stated that financial knowledge is an integral dimension of, but not equivalent to, financial literacy.

Financial attitude plays an important implication in financial literacy. Someone with an excellent financial attitude will have adequate financial literacy as well. On the other hand, individuals who have a lack of financial attitude will have an impact on low financial literacy. With sound financial literacy, people make choices about financial products that are good for their future. It has been explained in Pankow, D. (2012), financial attitude as a state of opinion, mind, and judgment of a person about finance.

Financial behavior is also an essential key to financial literacy awareness (OECD, 2013b). Atkinson and Messy (2012) argued that positive results between people who are financially aware have good behavior in shaping building planning costs and can determine financial security. On the other hand, behavior that is not based on understanding, such as using credit, for example, can affect a person's financial well-being.

This section provides us the correlation between technologies and financial literacy based on existed researches. A study conducted by Fatoki (2014) stated that, on average, micro-entrepreneurs had little information on finance and skills. The study results also show the lack of using technology in which many respondents do not even have both email addresses and webpages due to their limited internet access. According to the result, the study explains that the less frequently entrepreneurs use technology, the lower their understanding of financial literacy. A study conducted by Arora (2016) shows how digital technology helps elementary school teachers teach financial literacy. This study found a positive relationship between using digital technology in improving financial literacy among children or students. The teachers he interviewed combined various instructional strategies using digital technologies to deliver their lessons on financial literacy. The culminating results showed that the students in their classes performed well on formative and summative assessments. Furthermore, Arora (2016) also cited in TDSB (2012), explained that providing students with access to technology has the potential to transform the way students learn and help prepare them for success by enhancing their knowledge and application of technology in ways that will inform their future careers. The relation of the use of technology in influencing financial literacy on an individual in the household could be concluded.

This section describes some information related to household characteristics such as the condition of the family, health status, occupation, income, expense, assets, and other information as provided by Surveymeter Indonesia and RAND Indonesia. From the point of view of household characteristics, many factors influence financial literacy, shown by some prior study evidence. The behavior of household members in reading news in the newspaper, as mentioned in a study conducted by Freeman (2013), shows that readers' news consumption behavior. This study explores the news consumption behavior of young adults age 18-24 years in Malaysia. The results present that most young people prefer online news instead of traditional news media. Furthermore, data present that young people tend to like entertainment news and dislike business and finance news.

Regarding marital status, married men are more well-literate. Higher well- literate finance will lead them to be less worried about their financial concerns and greater financial well-being. Singles are significant tendency to reduce individuals' financial literacy level compared to those who are married (Dew, 2008; Calamato, 2010; Brown and Graf, 2013).

A study by Taft et al. (2013) shows the relationship between financial literacy, well-being, and concerns. The results showed that age and education are positively correlated with financial literacy and financial well-being. Amadeu (2009) explained that the ability of financial literacy is found in someone who has a higher level of education and can access more information about financial literacy. During their undergraduate program with some relevant subjects to economics and finance, students have a positive effect on daily financial practices. Mandell (2008) also states that children's financial literacy is associated with their parents' education levels. To ensure students make the right financial decisions, financial education experts contend that families and schools should foster financial literacy before students enter the teen years (Allen, 2009).

In a previous study, Johnson and Sharraden (2007) stated that students in high-income families have significantly higher levels of knowledge than those in low-income families. Hence, Atkinson and Messy (2012) found Low-income levels have a close relationship to the low levels of financial

literacy. Calamato (2010) stated that students in low-income families tend to drop out of school, and it will affect their financial literacy awareness. Another literature shows that low-outcome families often occur in households with low financial literacy (Campbell, 2006; Badarinza et al., 2016).

On the other hand, a study by Chen and Volpe (1998) found that a person with long-time working experiences is concerned more with financial situations; they get more information, thus facilitating lots of information and providing a standard for people of decision-making. Working arrangements also could influence financial attitude and behavior, considering that individuals with steady income condition have better a plan to organize their financial life (Calamato, 2010). A survey conducted by Worthington (2006, 2008) and ANZ (2008) in Australia reports that financial literacy scores tend to have higher amongst individuals in managerial occupations, and professional, and occupation fields are also associated with an individual's financial literacy levels. A survey by Emirate Arab investors found individuals working in finance industries or investment show higher financial knowledge levels than those in another occupation field (Al- Tamimi and Bin Kalli, 2009).

Furthermore, employees have been categorized into two parts, namely urban and rural, depending upon whether the employee's place of employment is an urban area or rural area. From the results, employees working in urban areas are more financially literate than those working in rural areas (Bhushan and Medury, 2013).

Data and Method

The first part describes the Indonesian Family Life Survey (IFLS) as a dataset analysis. The second part presents the data collection technique, describes how the researcher measures the dependent and independent variables. The final part highlights the methods and data analysis techniques.

Indonesia Family Life Survey (IFLS)

This study's primary sources of data are collected from the Indonesian Family Life Survey (IFLS) obtained by Surveymeter Indonesia and RAND. IFLS is the most comprehensive survey ever conducted in Indonesia. This survey is a panel study of households, individuals, and communities that have been carried out by RAND Corporation for five waves since 1993 in 13 out of 27 provinces in Indonesia. The fifth batch survey (IFLS-5) was conducted at the end of 2014 with 15,900 households and 709 communities. Specifically, 50,000 individuals were participating in the survey.

Operational definition of variables

This study's primary purpose is to see the effect of access to technical information on financial literacy in Indonesia. This section presents a detailed description of the variables of interest in this study, specifically how they are constructed and measured.

Dependent variable

This study focuses on the financial literacy of typical household level in Indonesia. As the dependent variable in this study, the researcher constructs financial literacy variable based on data in questionnaire IFLS5, Book 2 at section BH (borrowing) on the survey. Typically, the heads of the household are required to answer the question of 'Do you or any other household member know of a place where you can borrow money?', and the question of 'What type of place is this?' in which there are fourteen financial institutions mentioned in the questionnaire, namely:

a. Private commercial bank
b. Cooperative
c. Government/semi-government bank
d. Agricultural bank
e. employer
f. Landlord
g. Store owner
h. Non-government organization
i. Neighborhood association
j. *Arisan* (Funding group)
k. Small farmers group
l. Moneylender
m. Office
n. Pawnshop
o. Non-bank financial-institution.

Independent variables

We also generate some determinants collected from questionnaire survey by Surveymeter Indonesia and RAND Indonesia. We collect some questionnaires from different books and sections. Selection of the questionnaire topic is essential to determine data processing. Therefore, we take several types of books. This study's primary independent variable is respondents included in a set of information technology variables, such as handphone ownership, internet access, and having a television. Other control variables are included in this study based on the questionnaire. Therefore, we consider household head and location characteristics since they may also affect the role of financial literacy and help improve the precision of the researcher's estimates.

Sample collection techniques

In the data collection method, the researcher obtained all related data from Indonesia Family Life Survey (IFLS) by recording directly from longitudinal data IFLS-5 in 2014. The data are collected from the Surveymeter, the IFLS questionnaire provides data summarized in the 2014 HH (Household) book. Respondents are provided in different types of books. The selected book is used as a benchmark for selecting the variables to be studied, both the dependent and independent variables. The selection of variables needed in this study is contained in IFLS-5 in the 2014 HH (Household) book.

Table 1. Questionnaire section in research

Variables	Book	Section	Question Coloumn
Financial literacy	Book 2A	BH	bh00 & bh01
Handphone	Book 3A	DL	dl03b
Internet access	Book 3A	DL	dl03d
TV	Book 2A	KR	kr24a
Newspaper	Book 3A	DL	dl02a
Married	Book K Final	AR	ar13
Education	Book K Final	AR	ar16 & ar17
Income	Book K Final	AR	ar15b
Household Head	Book K Final	AR	ar15c
Job	Book K Final	SC	sc05
Region	Book K Final	AR	ar02b

As shown in Table 1, the questionnaire contained in the IFLS-5 book has individual sections according to the questionnaire topic. In one section, several question columns must be selected. As shown in table 3, we provide "Topics of IFLS Questionnaire in Research" as a final summary of book collection and the selection step of variables from the questionnaire sections to form the dependent and independent variables. Lastly, all selected data are used for the next section, which is the regression part.

The method and data analysis technique

In term of answering research question 1, "*How do technologies and household characteristic affect household head who have knowledge about financial literacy and those who have not?*" which means that the value of this dependent variable "finlit_a" range 0 and 1, we use PROBIT model, binary outcome, represents the dependent variable with the occurrence of two possibilities like yes or no. Probit model will be:

$$\mathbf{Finlit\_a}_i = \alpha + \beta_1 \mathbf{hp}_i + \beta_2 \mathbf{internet}_i + \beta_3 \mathbf{tv}_i + \beta_4 \mathbf{newspaper}_i + \beta_5 \mathbf{married}_i + \beta_6 \mathbf{education}_i + \beta_7 \mathbf{job}_i + \beta_8 \mathbf{income}_i + \beta_9 \mathbf{region}_i + \varepsilon_i$$

In terms of answering research question 1, "Is there any different effect of technology and household characteristics for three different levels of household heads' knowledge (low, medium, high) on financial literacy?", we will use the MULTINOMIAL LOGISTIC model, which is an extension of binary logistic regression three or more categories of the dependent variable. Multinomial logistics model will be:

$$\mathbf{Finlit\_b}_i = \alpha + \beta_1 \mathbf{hp}_i + \beta_2 \mathbf{internet}_i + \beta_3 \mathbf{tv}_i + \beta_4 \mathbf{newspaper}_i + \beta_5 \mathbf{married}_i + \beta_6 \mathbf{education}_i + \beta_7 \mathbf{job}_i + \beta_8 \mathbf{income}_i + \beta_9 \mathbf{region}_i + \varepsilon_i \quad \text{Eq (2)}$$

Where α indicates the constant term, βn indicates the estimated coefficient, and ε indicates the error term.

Result and Discussion

Table 2 shows us definitions, observations, minimum, maximum, means, and standard deviations for independent variables included in this study. More detailed information regarding these variables is discussed in the next section.

Table 2. Descriptive statistics, summarize

Variable (s)	Definition	Obs	Mean	SD	Min	Max
Dependent						
Finlit_a	1 if the household heads know about financial institutions, 0 otherwise.	10426	0.86	0.36	0	1
Finlit_b	1 (low-level); 2 (medium-level); 3 (high-level) group of knowledge about financial literacy.	10426	2.37	0.73	1	3
Independent						
Technology information						
Handphone	1 if households own handphone; 0 otherwise	10426	0.77	0.42	0	1
Internet access	1 if households have internet access; 0 otherwise	10426	0.30	0.46	0	1
TV	1 if households have television; 0 otherwise	10426	0.90	0.31	0	1
Newspaper	1 if household head is able and usually to read the news in another language; 0 otherwise	10426	0.80	0.40	0	1
Married	1 if household heads are married; 0 otherwise	10426	0.85	0.36	0	1
Education	Household head's education in years of completion	10426	8.80	4.47	0	22
Log Income	Household head's per capita income	10426	13.93	1.12	0	17.91
Job	1 if household heads have a job; 0 otherwise	10426	0.900	0.30	0	1
Region	Urban-rural	10426	0.60	0.50	0	1

Source: IFLS-5 Questionnaire, data processed

Dependent variable

Based on the questionnaires, we generate "Financial literacy" as the dependent variable. This study has two dependent variables; they are made based on research questions and have different purposes. There are three steps to build these dependent variables, as follows:

(Step 1) – We range the knowledge of how many financial institutions and their products do respondents know.

Table 3. The number of respondents in each financial institution

Level of knowledge of fin. institutions	Freq	Cum (%)
0	1548	14.85
1	3534	33.90
2	2812	27.03
3	1524	14.62
4	604	5.79
5	226	2.17
6	86	0.82
7	38	0.36
8	21	0.20
9	13	0.12
10	5	0.05
11	4	0.04
12	2	0.02
13	2	0.02
14	1	0.01
Obs	**10426**	**100**

Source: IFLS-5 Questionnaire, data processed

As shown in table 3, the ranges are 0, 1, 2, ..., 14. Range 0 means that the household head does not know anything about financial institutions, 1 if the household head only knows 1 financial institution, and so on up to 14.

(Step 2) – This step is based on **research question 1**.

Table 4. The binary variable "finlit_a"

Level of knowledge of fin. institutions	Freq	Cum (%)
0	1548	14.85
1	8878	85.15
Obs	**10426**	**100**

Source: IFLS-5 Questionnaire, data processed

As shown in Table 4, we generate the binary variable "finlit_a," which has only two values (range 0 and 1). Range 0 means that respondents do not know financial institutions, 1 otherwise.

(Step 3) – This step is based on **research question 2**.

Table 5. The binary variable "finlit_b"

Level of knowledge of fin. institutions	**Freq**	**Cum (%)**
1 (low-level)	1548	14.85
2 (medium-level)	3534	33.90
3 (high-level)	5344	51.26
Obs	**10426**	**100.00**

Source: IFLS-5 Questionnaire, data processed

As shown in Table 5, we generate the variable "finlit_b," which has three different levels; 1, 2, and 3. Range 1 means that respondents are categorized into low-level, which means respondents DO NOT know even one financial institution, range 2 for medium-level, which means respondents know ONLY 1 financial institution, and range 3 for high- level means respondents know MORE than one financial institution.

The descriptive statistics show for the first dependent variable, "finlit_a", the number of respondents who know about financial literacy is over 85%, and regarding the second dependent variable, "finlit_b", typical respondents have a medium-level of knowledge about financial literacy, which is level 2.

Independent variables, technology information

Nalini et al. (2016) present evidence that people rely on the internet as a source of information and services, and their integration of the financial program with information technology practices will give more significant results in improved financial competency. The descriptive statistics show that the exposure to the samples' internet is low, amounted below to 30%. We also include a set of information technology variables in this study, such as handphone ownership and television. The selection of variables is based on Adhwa et al. (2019), which mentioned that level of awareness toward financial products among people with exposure to digital media such as portals, financial news channels, and market- related TV shows are higher, and their knowledge is also higher than those with no access. Based on the survey sample, around 77% of the households have a handphone, and 90% have television. Overall, the survey indicates that our samples are entirely exposed to information technology.

Independent variables, household characteristics

At the household data, we include variables that represent household socioeconomic status and household head characteristics. The researcher considers the household head since that one is influential when it comes to household decision making. The researcher uses such information as control variables. The researcher accounts for the household head's basic knowledge level based on whether they can read in other languages. Around 80% can read newspaper in other languages, means that most of the samples are well-literate. While representing socioeconomic status, we also use the household head's income, marital status, job, and education. The income of the household head is measured by per capita income in terms of logarithm form. Around 85% of the samples of household heads are married, while. 90% of them already have a job.

Regarding the education level, typical household heads in the sample have a junior secondary qualification, with their average years of completion is nine. This variable is considered necessary since higher education is often associated with more excellent family planning methods. As control variables, the researcher also includes sub-location characteristics in this study to account for regional heterogeneity, such as whether the households live in an urban area. There are up to 60% of households live in an urban area.

Correlation analysis

Pearson correlation analysis in this section shows the positive and negative relationship between variables. This correlation will be the part to evaluate the level of multicollinearity among regression. Gujarati and Porter (2009) explained the pair-wise correlation of two variables above 0.50 signals a possible multicollinear problem. Table 4 shows us, the strongest significant pair correlation is the pair between Internet access and Education at 0.5250, indicating that the existence of multicollinearity of these two variables.

Table 6. Correlation Pearson, full sample.

Variables	**Finlat_a**	**Finlat_b**	**Handphone**	**Internet access**	**TV**	**Newspaper**	**Married**	**Education**	**Job**	**Log Income**	**Region**
Finlat_a	1.000										
Finlat_b	0.783*	1.000									
Handphone	0.129*	0.163*	1.000								
Internet	0.095*	0.138*	0.346*	1.000							
TV	0.098*	0.098*	0.135*	0.043*	1.000						
Newspaper	0.129*	0.149*	0.257*	0.189*	0.053*	1.000					
Married	0.096*	0.093*	0.116*	- 0.052*	0.198*	0.081*	1.000				
Education	0.188*	0.244*	0.491*	0.525*	0.142*	0.350*	0.076*	1.000			
Job	0.053*	0.054*	0.078*	0.061*	0.050*	0.063*	0.140*	0.101*	1.000		
Log Income	0.128*	0.153*	0.305*	0.311*	0.171*	0.142*	0.115*	0.411*	0.145*	1.000	
Region	0.060*	0.065*	0.167*	0.231*	0.109*	0.043*	- 0.059*	0.275*	0.009	0.217*	1.000

*p<0.01.

Probit regression

This section explains Probit regression to measure how significantly and the probability of financial literacy for each respondent. The results of this model will answer research question 1.

Table 7. Probit model and Marginal effect Probit, result

Variable (s)	Probit	Marginal effect Probit
Handphone	0.055** (0.040)	0.0121** (0.008)
Internet	0.019 (0.043)	0.0042 (0.009)
Tv	0.226** (0.446)	0.0493** (0.010)
Newspaper	0.203*** (0.038)	0.0442** (0.008)
Married	0.234** (0.041)	0.0509** (0.009)
Education	0.043** (0.004)	0.0095** (0.001)
Job	0.076 (0.049)	0.0165 (0.010)
LogIncome	0.056** (0.014)	0.0122** (0.003)
Region	0.025 (0.033)	0.0056 (0.007)
Constant	-0.7657** (0.193)	0.8516** (0.003)
Observations	**10426**	
Log likelihood	**- 4122.5254**	
LR Chi2	**513.93**	
Prob>Chi2	**0.0000**	
Pseuduro R2	**0.0587**	
AIC / BIC	**8625.051 / 8337.571**	

Note: Robust standard errors are reported in parentheses; ** $p < 0.05$.

As shown in table 3, Table 7 column 1 shows there are 6 out of 9 determinants which are positive and significance level 5%. Determinants such us handphone, television, newspaper, married, education, and income are positively and significantly to financial literacy (finlit_a).

Table 7 column 2 shows us the marginal effect. Technology determinants such as owning a Handphone and having Television positively affect financial literacy (finlit_a) at a significance level of 5%. Individuals who had Handphone and Television in their houses have a 1.2% and 4.9% higher financial literacy than individuals who did not have, respectively. Regarding household

characteristics, Individuals who were able to read Newspaper weather in Bahasa Indonesia (Indonesian language) or/and other languages have a positive effect on financial literacy (finlit_a) at a significance level of 5%, where they have 4.4% higher of financial literacy than individuals who were not. Next, marital status has a positive effect on financial literacy (finlit_a) at a significance level of 5%. Married individuals have a 5.1% higher financial literacy than unmarried individuals. The increase in education level for one year will increase the probability of individuals' financial literacy by reached 1%. %. The increase in income level will increase the probability of individuals' financial literacy by 1.2%.

The output of the iteration log is - 4122.52, and it can be used for the model. It is also indicating how quickly the model converged. The likelihood ratio chi- square is f 513.93 and p-value of 0.000, which means that this model is statistically significant; that is, it fits significantly better than a model with no predictors.

Multinomial logistic regression

This section will answer research question 2. This model explains that the different levels of financial literacy (finlit_b) belong to individuals as respondents in this study. The three different levels are low-level, medium-level, and high-level on financial literacy. The response variable "finlit_b" will be treated as categorical under the assumption that financial literacy levels have no natural ordering. This model will allow Stata to choose the referent group, which is the most frequently occurring group to be the referent group.

Table 8. Multinomial logistic model, result

Multinomial Logistic			
Variable (s)	Low-Level	Medium-Level	High Level
Handphone	-0.1551** (0.077)	-0.1195 (0.061)	BASE OUTCOME
Internet	-0.0758 (0.085)	-0.1244** (0.057)	
Tv	-0.4343** (0.088)	-0.0917 (0.076)	
Newspaper	-0.4377** (0.075)	-0.1681** (0.060)	
Married	0.4690** (0.080)	-0.1201 (0.065)	
Education	-0.1060** (0.009)	-0.0621** (0.006)	
Job	-0.1335 (0.094)	0.0023 (0.076)	
LogIncome	-0.1201** (0.028)	-0.0491** (0.023)	
Region	-0.0185 (0.063)	-0.0841 (0.047)	
Constant	2.6814**	1.234**	

	(0.371)	(0.309)
Observations	**10426**	
Log likelihood	**-9942.356**	
LR Chi2	**810.18**	
Prob>Chi2	**0.0000**	
Pseuduro R2	**0.0391**	
AIC	**19924.71**	
BIC	**20069.75**	

Note: Robust standard errors are reported in parentheses; ** p < 0.05.

Low-level relative to high-level on financial literacy

This section is the multinomial logit estimate comparing variables relative to high-level financial literacy, given the other variables in the model are held constant. Regarding technology determinant, the multinomial logit having Hp to not having Hp would be expected to decrease by 0.155 for low-level to high-level financial literacy, given all other predictor variables in the model are held constant. In other words, individuals who had Hp more likely than those who did not have Hp to low-level to high-level financial literacy. Next, Tv – individuals who had Tv more likely than those who did not have Tv to low-level to high-level financial literacy by a decrease of 0.434. Regarding household characteristics, newspaper and married both would be expected to decrease by 0.437 and 0.469, respectively, for low-level to high-level financial literacy. Next, education level – estimate for a one-year increase in education level for low-level relative to high-level, given the other variables in the model are held constant. If an individual were to increase their education level for one year, the multinomial log-odds for low-level relative to high-level would be expected to decrease by 0.106 years on financial literacy. Last, low-level income relative to high-level financial literacy would be expected to decrease by 0.120 Rupiah or USD (log income).

Medium-level relative to high-level on financial literacy

This section has the same interpretation with low-level relative to high-level on financial literacy. The difference is that only internet access, newspaper, education, and income would be expected, affecting medium-level to high-level financial literacy. They all would be expected to decrease by 0.124, 0.168, 0.062, and 0.049, respectively, for medium-level to high-level financial literacy.

Conclusion

This study examined factors affecting financial literacy in Indonesia. The data collected is cross-sectional data obtained from the latest wave (wave5) of Surveymeter institute and RAND in 2014-2015. In order to answer research question 1, we use the Probit model to solve to question. The Probit regression test results indicate that there are 6 out of 9 factors that have a significant influence on financial literacy. These factors include owning mobile phones, having television, reading newspapers in foreign languages, marital status, education level, and the average of income per capita in a month. Meanwhile, internet access, job, and residence location (urban-rural) have no relationship and do not affect financial literacy.

On the other hand, regarding research question 2, we use Multinomial logistic regression. This model gives us an explanation of the different levels of financial literacy in Indonesia. First, low-level groups relative to the high-level group on financial literacy results show us 6 out of 9 determinants affect financial literacy. Second, the medium-level group relative to high-level group results shows that only 4 out of 9 determinants affect financial literacy.

Policy implications

The things that can be considered from this research are that the government will continue to improve supporting facilities, especially information and technology for the public towards financial literacy awareness. In this case, supporting factors such as Hp and Tv positively correlate with financial literacy, and so do several other supporting factors (control variables). Meanwhile, internet access users are still shallow. In this era, all internet access should be maximized. Then, work status should also be the place where people can learn and increase their financial literacy. The government must facilitate them. As well as the location where people live, shows have no relationship with financial literacy, based on the data that support for financial literacy is dominated by people who live in urban areas (Java), this is the task of the government where all people in other regions should feel the equal distribution of financial literacy.

Limitations of the study

This study has several limitations; firstly, the study only uses IFLS-5 cross- section data in 2014 so that further studies are needed with the latest data published in the future, in other words using panel data. Secondly, this study only uses certain variables, so it still needs to be studied further about other factors to see their financial literacy impact.

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