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How Does Financial Inclusion Optimize Bank Savings? a Moderating Function of Financial Literacy

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***Abstract*—The importance of financial literacy, savings, and financial inclusion to financial development has long been recognized. Financial inclusion represents effective access to financial services, while financial literacy represents people basic knowledge on financial management. A good score of literacy and inclusion is expected to improve people's engagement in banking services. This research examines how financial literacy mediates the relationship between financial inclusion and bank savings. By using province-level data taken from the Indonesian Financial Authority and Indonesian Central Bank, this paper finds empirical evidence that the positive impact of financial inclusion to total savings is mediated by financial literacy. These findings reflect the power of financial education not only in improving people's awareness of financial services but also stimulating people to act and save their money on the formal institution instead of saving their money under the pillow. Moreover, it induced financial institutions to strive for broader and more extensive services that led to higher financial inclusion. This result supports the collaborative importance of both financial inclusion and financial literacy.**

Keywords: financial literacy, financial inclusion, savings

I. INTRODUCTION

Countries around the world put efforts to improve financial literacy levels of their citizens. Financial literacy helps people manage their financial resources efficiently, as well as assist them in complex economic decision makings. Thus, it secures individuals from financial collapse during the economic crisis. On the other hand, financial inclusion represents effective access to financial services that enable people from all economic classes to financial services [30] in order to promote both people's welfare and more business opportunities. Inclusion is on the supply side of financial services, while literacy is on the demand side.

Literacy reflects people's awareness, skills, and knowledge on financial resources [31], which helps people making a better financial decision in life [2], [11], [22], [24]. Having good financial literacy leads to better investment decisions [2]. On the other hand, lack of it might impact welfare and create negative externalities [2], [6].

The demand and supply nature of them is expected to help the weak economic people accessing best suit financial products and prevent them from informal borrowing with an unexpected high-interest. It also assists the poor to save and plan the money for obtaining particular life goals. In the end, it improves peoples' welfare [30].

Better inclusion reduces the poverty level of a country [9]. It enables poor people, and low-income earners access financial services at a low price, keep their money safely, and enhance money management by taking property credit, proper credit card loans, and others. Nevertheless, without proper knowledge of financial management, easy access to financial facilities could be wrongly used, and at worse, it promotes unnecessary consumptions. Therefore, financial inclusion bring success if people not only access credit products but also improve their savings.

Saving is believed to have a positive relationship with economic growth [23], [20]. Research on savings has been under concerned since 1950. Several factors affecting people to save the money in the bank are personal income & inflation [21], life cycle during pre-retirement period [27], gross domestic products [25], economic uncertainty, fiscal policy, pension reform, financial liberalization, and external borrowing [23].

Although financial literacy, financial inclusion, and savings are equally important, the relationship between those three variables remains unclear. Grohmann & Menkhoff [19] is the first to describe the causal relationship between financial literacy and financial inclusion in which literacy promotes people to access financial services. They support Cohen & Nelson [12] argument stated that as people better understand financial services, they can maximize the products for decision making.

This research examines the relationship between those three variables by examining the mediating effect of financial literacy on the relationship between financial inclusion and savings. It provides a relatively new contribution to financial literacy literature, which previously more often focus on the individual-level analysis [6], [10], [16], [17], [26], [33]. Also, it provides a new point of view other than Grohmann & Menkhoff [19] findings on financial literacy and financial inclusion literature. This paper offers additional explanations on how financial literacy mediates the relationship between financial inclusion and savings. This mediation function reflects an active role of financial knowledge that may encourage people to save more by addressing that good knowledge will bridge the banks and people.

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II. Literature Review

Financial literacy is defined as awareness, skills, and knowledge to assist effective decisions about financial resources [31], for example, budgeting; managing money, credit and debt effectively; assessing needs for insurance and protection; evaluating the different risks and returns involved in savings and investment options; saving for long-term goals [6]. The U.S. Government Accountability Office (GAO) defined it as:

"The ability to make informed judgments and to take effective actions regarding the current and future use and management of money. It includes the ability to understand financial choices, plan for the future, spend wisely, and manage the challenges associated with life events such as a job loss, saving for retirement, or paying for a child's education."

Based on Cohen & Nelson [12], improved financial literacy is expected to pursue three broad objectives. First, it helps people improving their welfare since they know better how to borrow, save, invest, and mitigate risk effectively. Second, it also supports product uptake and usage. Consequently, financial institutions get more benefit from it. Third, better financial literacy means better customer protection and awareness. Customers know how to complain when they are threatened by loss on certain financial products. Based on the case in China mentioned by Cohen & Nelson [12], financial literacy supports effective and efficient microfinance. It is one of the pillars supporting financial inclusion.

At a household level, financial literacy can explain why people choose to save, invest, or borrow. Literate people tend to save or invest in order to get a higher gain in the future [24]. They use their knowledge to prepare future life cycle, such as retirement. People with better financial literacy are more likely to plan their retirement [11]. Nowadays, people are offered by numerous financial products, and financial management is getting more complex. By having good literacy, people have a wider choice to choose the best suit products. For example, when an individual is planning to extend their micro-business by obtaining productive credit, a more knowledgeable person will not easily choose a particular financial product directly. He/She will compare one credit product to another and even comparing between financial institutions. He/She is computing the cost and benefit of each option. In the end, he/she will apply a credit to a product that gives them the least cost of borrowing. On the opposite, less literate individuals just assume that all financial products are the same and choose any convenience product that they familiar with it. In the end, less literate individuals tend to pay more cost of borrowing [24].

Research on financial literacy is done not only with respondents of working people but also with students. Although students are not yet yielding any income, they are potential productive manpower in the future. Introducing financial literacy as earlier as possible is a preventive action for better financial management in the future. Because students not yet having financial resources, using them as subjects in several studies contains a limitation. Chen & Volpe [8] provide a mapping of financial literacy scores among students in America. They concluded that the majority of them are lack of financial knowledge. That is understandable since, at that time, pressure and programs to improve literacy is not yet booming. The study done by Blue, Grootenboer, & Brimble [5] suggests several points to improve the learning curriculum for financial literacy.

Many existing papers have documented the link between financial literacy and financial behavior. The work of Brahmana & Brahmana [7] on the relationship between financial literacy and financial planning shows a significant positive correlation. They found that the better financial literacy of migrant workers, the better they think of asset ownership. Other than Brahmana & Brahmana [7], Cole, Sampson, & Zia [13] predicts bank accounts and insurance ownership among citizens of Indonesia and India. They found that financial literacy is a powerful predictor of financial services demand. As people's financial literacy higher, they tend to choose formal financial markets rather than the informal ones [22].

Financial inclusion understood as effective access to affordable, quality, and sustainable basic financial services [30], for example, credit, saving, and payments method. In detail, people could access secure transactions to receive and store money, get access to both short term and long term credit, utilize long-term savings and investments, and to have insurance products [1]. Based on Demirgüç-Kunt & Klapper [15], the most common financial services used by people in low economics are (1) saving and (2) borrowing. However, it also captures several barriers to access financial services, especially in developing countries, such as high cost, proper distance, and lack of administrative documents. Therefore, financial inclusion is expected to eliminate such barriers by providing affordable services for all people regardless of their economic level. Financial inclusion could be positively associated with either increased credits or savings.

Financial inclusion is opening the gate for more credits and savings. The higher score on it reflects the accessibility of qualified financial products for either the rich or the poor. From the Global Findex Data, several Indonesian people save the money to the bank due to far distance between their home and the bank. Thus, a province with better financial inclusion provides better access to the financial services in terms of the number of channels and product diversifications than a province with a lower financial inclusion score. That easy access helps people to save money for the banks. A province with a higher level of financial inclusion also tends to ensure better access to financial services at an affordable cheap price. It motivates people from middle-low economic classes to save their money to banks. For developing countries like Indonesia, having a better financial inclusion score may encourage middle and low economic people to save their money to the bank without any fear of being charged expensively.

H1 – Financial inclusion is positively associated with people's total savings to the banks.

The availability of financial services (financial inclusion) does not always mean the people will react directly by increasing saving. If people do not have any knowledge of financial management, they will not understand why they should save. Financial knowledge is represented by financial literacy scores. Better scores on financial literacy stimulate people to save more. For example, based on evidence from Rusia, people with better financial literacy tend to save more money to the banks [22] in order to attain a particular goal [32].

Financial literacy helps to shape the demand for savings [14]. When people not familiar with the products, they will not demand them [13]. A province with a higher score on financial literacy reflects better citizens' knowledge of financial management and stimulates them to stick to their goal. It triggers people to utilize bank savings account and save their money there. Province financial literacy mediates the way financial inclusion can positively influence savings.

H2 – The relationship between financial inclusion and savings is mediated by financial literacy.

III. Research Methodology

A. Sources of data

This research merited data from Indonesia Financial Authority (OJK) and the Central Bank of Indonesia. As financial literacy and inclusion province index limited availability, this research used only 2016 available data. The questionnaires were filled by 9.680 respondents from 34 provinces covering heterogeneous demographic profiles, and then that data is used as a basis to compute the composite score index. The sampling method is multi-stage stratified random sampling, which classified the respondents based on geographic area, social strata, gender, profession, age, and education background. Following the World Bank and OECD technique, financial literacy is measured from the correct answer of questions accessing knowledge on interest, inflation, investment, and several basic features of financial services. Then, based on individual scores, a composite score of the individual in certain provinces is computed as province financial literacy score [28], [29].

B. Variables' operational definition

The financial inclusion index is measured using the same respondents, but a different type of questions. OJK computed the inclusion composite score of each province by using questions indicating awareness and confidence in utilizing several financial services. It measured both conventional and *Syariah* services varied in several types of financial institutions; banking, insurance, stock market, pension fund, venture capital, etc. (Otoritas Jasa Keuangan, 2016a). Saving data is taken from the Central Bank of Indonesia, which is stated in the OJK Indonesian Banking Statistics Report [28]. Savings are measured by the natural logarithm function of the total amount of people savings in each of 33 provinces in Indonesia in rupiah denomination.

I used mediation analysis to get the result on the hypothesis by using linear regression analysis performed by SPSS software. Financial literacy functions as a moderator of financial inclusion and bank savings when it meets the following conditions [4]: (a) variations in the level of financial inclusion significantly account for variations in financial literacy, (b) variations in financial literacy significantly account for variations in ban savings, (c) the impacts of independent variable to dependent variable become insignificant as the mediating variable is inputted in the regression equation.

The regression equations were done in 4 steps [4]:

(1) Regressing the mediator (financial literacy) on the independent variable (financial inclusion)

$$FL = ß_o + ß_1\ FI + e$$

(2) Regressing the dependent variable (savings) on the independent variable (financial inclusion)

$$S = ß_o + ß_1\ FI + e$$

(3) Regressing the dependent variable (savings) on the mediator variable (financial literacy)

$$S = ß_o + ß_1\ FL + e$$

(4) Multiple regression analysis to test the mediation effect

$$S = ß_o + ß_1\ FI + ß_2\ FL + ß_3\ FI \times FL + e$$

In which,

S = ln value of each province people' total savings to the banks.

FL = financial literacy index of each province

FI = financial inclusion index of each province

Steps 1-3 were to establish zero-order relationship among variables. Assuming all of them result in significant result, step 4 were performed to test the mediation effect. Fully mediation occurs when the relationship between financial inclusion and savings is no longer significant when financial literacy is in the model [4]. Step 4 is expected to yield a non significant result.

IV. Result

The first step is the classical assumption test. The normality test using Kolmogorov-Smirnov resulted in a 0,971 significance score, which represents the normal distribution of data. Heteroscedasticity was done with gletser method and resulted in the nonexistence of a heteroscedasticity problem with a significant score of more than 0,05 (0,885) and t score amounted 0,146. The multicollinearity test resulted in a 3,516 VIF score (< 10) and a tolerance score of 0,284 (>0,01). The linearity test presented a good result as the savings*literacy score was 0,002, and the savings*inclusion score 0,003. That linearity test result is far below the minimum requirement (0,05).

Step 1- Regressing Financial Inclusion to Savings

Table 1 shows the response of province-level financial inclusion to the total people savings to the banks. The impact of financial inclusion toward total savings is positively significance with a p-value of 0.000 (less than 0.05) and F-score 20,151 in 1 degree of freedom among total 32 province-level data collected through the Indonesian Central Bank. The standardized coefficients (beta score) of this regression is quite high as it reflects good p-value. From table II, R square of 0.628 represents the goodness of fit of the model and the proportion of variance in the savings, which can be explained by financial inclusion. This result supports hypothesis 1 of this research. Financial inclusion brings a significant positive impact on total savings. The availability and accessibility of sufficient and qualified financial inclusion surely will encourage people to be more trusting to keep their money in the banks.

TABLE I. FINANCIAL INCLUSION TO TOTAL SAVINGS REGRESSION (H1)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	24,153	1	24,153	20,151	,000
Residual	37,157	31	1,199		
Total	61,311	32			

TABLE II. MODEL SUMMARY (H1)

R	R Square	Adjusted R Square	Std. Error of the Estimate
,628[a]	,394	,374	1,09482

TABLE III. COEFFICIENT (H1)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-,611	2,515		-,243	,810
inclusion	,166	,037	,628	4,489	,000

Step 2- Regressing Financial Inclusion to Financial Literacy

Financial inclusion represents banks' initiatives to provide the market with accessible, qualified, and effective financial services. Nevertheless, it is unclear whether the market will automatically react to the banks' stimulus. This paper proposes an additional explanation of the mechanism of market reactions to financial services that are available in their province through people's financial literacy. Financial inclusion will result in an expected increase in market trust to utilize financial services when the people themselves have sufficient knowledge of finance. People's financial inclusion will help people to intrinsically be motivated in managing their money not only for current usages but also for future goals.

As written on table IV until VI bellow, the result of the regression test between financial inclusion (independent variable) to financial literacy (potentially mediation variable) is showing goof p-value of 0.000 less than 0.05, F scores 77,990, R square of 0,716, and high beta coefficient 0,846. It indicates a very good result that financial inclusion is significantly influencing financial literacy in a positive way. The next step is regressing financial literacy to savings. If the result of the third step is also supporting, then mediation analysis is possibly allowed.

TABLE IV. INCLUSION TO LITERACY REGRESSION

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	638,860	1	638,860	77,990	,000
Residual	253,938	31	8,192		
Total	892,799	32			

TABLE V. MODEL SUMMARY (INCLUSION TO LITERACY)

R	R Square	Adjusted R Square	Std. Error of the Estimate
0,846	,716	,706	2,86209

TABLE VI. COEFFICIENT (INCLUSION TO LITERACY)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	-28,546	6,58		-4,341	,000
inclusion	,851	,096	,846	4,489	,000

PREDICTORS: (CONTANT) FINANCIAL INCLUSION .

Step 3- Regressing Financial Inclusion to Financial Literacy

In table VII, until Table IX, there will be a regression analysis of financial literacy's positive impacts on savings. If the regression analysis results in significant p-value, t-score, and F-score, then the basic requirement to run a mediation analysis based on Baron & Kenney [4] is passed. Thus, table 3 indicates good results on the positive influence of financial literacy to saving from its p-value 0,000 (less than 0,05), a beta score of 0,686, and an F score of 27,506 significant at 0,000. It allows the researcher to do the last regression step to accommodate the mediation analysis. The last step is testing the mediation function of financial literacy to the relationship between financial inclusion and financial savings.

TABLE VII. FINANCIAL LITERACY TO SAVINGS REGRESSION

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	28,825	1	28,825	27,506	,000
Residual	32,486	31	1,048		
Total	61,311	32			

TABLE VIII. MODEL SUMMARY (LITERACY TO SAVINGS)

R	R Square	Adjusted R Square	Std. Error of the Estimate
0,686	,470	,453	1,02368

TABLE IX. COEFFICIENT (LITERACY TO SAVINGS)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Err	Beta		
Constant	5,372	1,021		5,260	,000
inclusion	,180	,034	,686	5,245	,000

Predictors: (contant) financial literacy

Step 4 - Mediation Analysis

Table X to table XI is the result of regression coefficient with savings as the dependent variable, financial inclusion as the independent variable, and financial literacy as the prospected mediator variable. In the first step, financial inclusion was regressed to savings and resulted in the support for H1. Moreover, when financial inclusion itself is having a positive significant impact to total savings (see table 1). Meanwhile, when financial literacy is inputed into the model, financial inclusion is not having a significant effect to total savings. This inverse result indicates a full mediation function of financial literacy towards the relationship between financial inclusion and total savings. **It supports hypothesis 2.**

TABLE X. COEFFICIENT FOR MEDIATION ANALYSIS

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	3,458	3,009		1,149	,259
literacy	,143	,065	,544	2,200	,0356*
inclusion	,044	,065	,167	,677	**,503**

Dependent Variable: Savings, Independent Variable: Financial Literacy and Financial Inclusion. * significant at 5%.

To ensure the mediation function, it must be checked whether there is an F changes after put financial literacy as a mediator. From table XI, F change is significant at 0,000 with value of 13,742. Compared to previous regression model (financial inclusion to savings), R square score is increasing from 0,394 to 0,478 after put financial literacy to the regression model. It means the addition of financial literacy as a mediator variable could improve the variation of savings that can be explained by the regression model. **It is fully supporting the second hypothesis.**

TABLE XI. SUMMARY OF VARIANCES CHANGES AFTER FINANCIAL LITERACY BEING PUT AS A MEDIATOR VARIABLE

R	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
			R Square Change	,478	Sig. F Change
,691[a]	,443	1,03274	F Change	13,742	,000
			df1	2	
			df2	30	

a. Predictors: (Constant), inclusion, literacy

Fully mediation function of financial literacy towards the relationship between financial inclusion to total amount of savings reflects the importance of knowledge towards people's real savings behavior. Financial inclusion is important. It reflects a qualified and accessable financial services that will encourage people to save their money in the banks. Nevertheless, financial inclusion alone can not guarantee a fact that people will save their money more. Thus, the level of people knowledge on financial management (financial literacy score) mediates the way finanial inclusion in improving savings.

V. CONCLUSION

In line with previous researches statements [12], [13], [14], [18], [22] financial inclusion ensures the same right to access financial services as a public good for both poor people and rich people. Helping them to manage financial resources better could mitigate massive negative externalities of the financial crisis through savings [16], [22]. Nevertheless, this mediation analysis provides a new empirical finding that financial inclusion alone is not enough. Thus, the level of people's financial literacy explained a bridging mechanism explaining how financial inclusion could result in higher savings.

This study results from complete previous research done by Grohmann et al. [18], who stated that financial literacy is positively related to financial inclusion. While Grohmann et al. [18] not yet tested the detailed mechanism on how those two crucial variables are connecting each other, this research sharpens it by providing a logical explanation on how financial inclusion and financial literacy relate to each other and finally influence people savings behavior.

Besides, the positive impact of financial literacy towards people's bank savings drawn from this paper enriches the finding of Baidoo et al. [3], who found a positive relationship of financial literacy and savings in Ghana from the survey data questionnaires approach. Different from them, instead of using a survey to draw on a conclusion of perceived literacy and savings, this research provides actual savings from Indonesian Central Banks, as well as financial literacy and financial inclusion index from the Indonesian Financial Authority. This research is hopefully could shed light on financial literacy, financial inclusion, and savings literature.

Financial literacy is a powerful variable in predicting financial inclusion and real bank savings through supply and demand mechanism. An increasing score of financial literacy represents a better understanding of financial products and a better capability to solve life problems with more extensive choices.

For example, when people are unable to fund their children varsity education, those who have better financial literacy know the variety of choice, such as borrowing from the bank, saved their money on the bank, purchasing insurance, or investing in stocks to prepare themselves for being ready to fund their children's education. It creates more demands on financial services. When that demand is captured by a good level of financial inclusion, the real action will be created. People will utilize financial services more. In Indonesia, the most popular financial services are savings. Savings allow people to plan for their future goals [24].

VI. Limitation and Suggestion

Nevertheless, this research contains several limitations. First, data used in this research is only 2016 data because only the 2016 literacy survey is available to public access. Soon after another survey announced in the future, future research is beneficial to complete the data. Second, I did not put any control variable because research on province-level financial literacy is rare. Future research may thoroughly identify and adapt from other country-level analyses to complete province-level analysis. Third, this research is not aimed to provide a model of financial literacy, but it is aimed to search positive externalities on it. Future research may think of the comprehensive model of financial literacy. Fourth, I did not run the survey by myself. Instead, the literacy index is gotten from surveyed done by OJK. Therefore, the reliability of instruments, respondents' profile, and the validity of instruments are outside my control. Nevertheless, OJK adopted a global standard instrument of financial literacy.

This research leaves several future research to be done in Indonesia. First, if financial literacy influences saving and financial inclusion, does it also influence borrowing and a nonperforming loan? Second, business culture has changed. Lots of online businesses offer easy access to a shop. It might affect lifestyle and financial behavior. It may contribute to the increase in nonperforming loans. Second, this research did not test the relationship between financial inclusion and saving. Many studies have proposed an untested statement on the impact of inclusion on savings. Future research may explore more with wide panel data at the province level. Third, we need a study of financial literacy, which is primarily directed to micro, small, and medium enterprises because they run the economic cycles, but they do not get any retirement/pension facilities. They are the dominant population in Indonesia. Most research discusses students' financial literacy and employee financial literacy. Study on micro, small, and medium enterprises is very limited.

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