



## Do Shadow Banking Depositors Discipline the Market?

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### Abstract

The shadow banking sector comprises non-bank financial institutions that do not have a deposit guarantee and are barely supervised by the regulator. Efforts to monitor shadow banking must be done well, in both developed and developing countries. Regulators in several countries however have not been fully effective in supervising shadow banking financial institutions, particularly in developing countries such as Indonesia. Therefore, the public's role—in this case, depositors—is essential to supervise shadow banking through the practice of market discipline. However, some factors may cause the market discipline practice to fail, such as low financial literacy. This research aims to examine the influence of financial literacy on the performance of market discipline. This study's research method is a survey of 255 lecturers who have savings accounts in the shadow banking sector in Indonesia. The multivariate analysis method used in this study is partial least squares structural equation modelling (PLS-SEM). This study provides evidence that financial literacy and its variables significantly affect market discipline's effectiveness in shadow banking. By showing that market discipline plays a role in building a sustainable financial ecosystem, this research contributes to depositors, investors, the financial industry, and regulators. Promoting market discipline is an important duty of regulators and other financial institutions. Likewise, promoting financial literacy among depositors and investors, especially in developing countries with low literacy levels, is a challenge to overcome when seeking to create a sustainable financial system.

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**Keywords:** Financial literacy, Market discipline, Shadow banking, Sustainable finance

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## Introduction

In the past decade, shadow banking has developed in leaps and bounds worldwide. The term "shadow banking" was proposed by Gross (2007) and McCulley (2007) during the financial crises of 2007 and 2008. The lesson from the 2007–2008 Global Financial Crisis (GFC) was that the rapid growth of shadow banking, through its impact of financial innovation accompanied by weak regulation and monitoring, was the cause of the systemic risk of financial crises. Moreover, the lack of transparency and inadequate disclosure produced the risk of fraud in shadow banking which caused the financial crisis.

According to Financial Stability Board (FSB) data in the Global FSB Report (October 2014), the largest shadow banking markets are in the United States (US), the United Kingdom (UK) and Europe, but shadow banking is also expanding rapidly in emerging markets. In Indonesia, an emerging market, shadow banking is continuing to grow rapidly. Based on the FSB Report (2017), Indonesian shadow banking has moved from 10<sup>th</sup> rank in 2012 to third rank, after Argentina and Hong Kong, in 2017. However, if this growth is not accompanied by adequate supervision and regulation, it can be the cause of a financial crisis like the GFC that occurred in the US in 2008.

Although shadow banking does not formally have a safety net from the government, shadow banking effectively expands the money supply (Levitin, 2016). Moreover, shadow banking's implicit guarantee remains, undermining the market discipline of depositors. In line with that, Bennett, Hwa and Kwast (2015) found that the government's guarantee during the crisis eroded market discipline. Meanwhile, McIntyre and Zhang (2019) found that uninsured depositors disciplined the market during the pre-crisis period. When shadow banking regulations are debatable, depositors' role in disciplining the market can be used as an alternative to monitoring shadow banking institutions' performance.

Market discipline refers to monitoring by market participants. Shareholders, bondholders and depositors can play a role in monitoring and disciplining financial institutions (De Ceuster & Masschelein, 2003; Llewellyn & Mayes, 2003; Llewellyn, 2005). How can depositors discipline the market? Depositors discipline the market by withdrawing their funds (Thiratanapong, 2007; Yilmaz & Muslunov, 2008; Önder & Özyildirim, 2008). Market discipline not only reduces the probability of the failure of financial institutions but can also minimise the cost of failure (Llewellyn & Mayes, 2003; Llewellyn, 2005). Cubillas, Fonseca and Gonzalez (2012) state that improving market discipline is needed to prevent financial crises. According to Busch and van Rijn (2018), policy makers should be aware that the rapid expansion of shadow banking activities can create moral hazard risks. The failure of non-bank financial institutions has been proven to create systemic risk. Regarding the contribution of market discipline, it is important that non-bank financial institutions that act as shadow banks are monitored, as they could disrupt financial stability. This statement is consistent with the view of Huang and Wang (2017), who stated that improving regulation is one of the three steps in financial reform to accomplish an efficient financial system. The key is the effective enforcement of market discipline.

The factor that serves as a determinant to effectively discipline the market is financial literacy. The GFC also highlighted the low level of financial literacy, which affected financial stability and caused the financial crisis (Lusardi & Mitchell, 2014; Priyadharsini, 2017). Limited empirical research has investigated the effect of financial literacy on market discipline. Soma, Primiana, Wiryono and Febrian (2016) provided evidence that financial literacy has a significant effect on market discipline. This finding is consistent with the findings of Widdowson and Hailwood (2007), who stated that achieving higher financial literacy levels among depositors

would make market discipline more effective. This statement is aligned with the findings of Alamsyah, Ariefianto, Saheruddin, Wardono and Trinugroho (2020), who suggested that increasing financial literacy would serve to enhance depositors' market discipline. Hall (2008) also stated that financial literacy could strengthen financial stability by promoting market discipline in the financial system. Previous studies by Hess and Feng (2005, 2007); Eling and Schmit (2012); Kozłowski (2016); and Soma *et al.* (2016) found that market discipline would work in non-bank financial institutions. However, limitations exist in non-bank financial institutions, such as shadow banking, as they do not have deposit insurance.

This study provides evidence of the important role of market discipline in maintaining financial stability. Using both online and offline surveys to collect the data, PLS-SEM and SmartPLS software were used to analyse the data to investigate the impact of financial literacy and its variables on market discipline among Indonesian shadow banking depositors. Only limited studies have investigated the relationships between these variables. Therefore, this study contributes to the development of knowledge, demonstrating the importance of investors' financial literacy in strengthening market discipline in shadow banks. This study also has policy implications for maintaining the stability of Indonesia's financial ecosystem by empowering depositors through financial literacy and promoting market discipline. Thus, the study's findings provide evidence of the important role of monitoring shadow banks in emerging markets through market discipline.

## Literature Review

### *Shadow Banking*

Shadow banking takes a variety of forms within and across countries. In China, shadow banking institutions consist of trust loans, wealth management products (WMPs), undiscounted bankers' acceptances, peer-to-peer lending, etc. (Chen, He & Liu, 2020). In Indonesia, shadow banking, known as non-bank financial institutions, includes trust companies, securities companies, bank wealth management arms, entrusted private entities and financial technology (fintech) companies, such as peer-to-peer (P2P) lending and crowdfunding (Syarifuddin, 2020). However, not all non-bank financial institutions act as shadow banks. If these institutions do not carry out credit intermediation activities, they do not pose a systemic risk. Provided they are under the correct regulations, they are no longer categorised as shadow banking. Shadow banks are defined by the Financial Stability Board (FSB) as non-bank financial intermediaries engaged in credit intermediation (including investment funds) and incorporating a narrower definition that excludes entities that do not directly engage in credit intermediation or that are consolidated into banking groups.

Shadow banking institutions have weaker regulation and less supervision than banking institutions. They do not have a blanket guarantee to protect depositors' funds. In line with this definition, Fein (2013) and Elliott, Kroeber and Qiao (2015) stated that shadow banking comprises unregulated or lightly regulated entities operating outside the regulated banking system. Moreover, Adrian and Shin (2009); Pozsar, Adrian, Ashcraft and Boesky (2010); and Bengtsson (2013) described shadow banking as the result of financial innovation during financial crises. Kessler and Wilhelm (2013) argued that the development of shadow banking is not an impact from financial innovation, but rather from the failure of regulatory reform. Furthermore, Moosa (2017) suggested regulating shadow banking to prevent the next financial crisis.

### ***Market Discipline***

Market discipline has been the main pillar of the regulation of financial institutions since the 1980s (Min, 2014). Market discipline began to develop, becoming a concern in the 2000s after the GFC hit many countries. The 2007–2008 GFC provided the lesson that market discipline failed due to uninsured depositors. Even though uninsured depositors could employ market discipline over a financial institution, this could potentially reduce agency costs through informed monitoring (Alanis, Beladi & Quijano, 2015).

A previous study found that market discipline is undermined by an implicit guarantee, deposit insurance, financial literacy and the increasing practice of shadow banking, accompanied by moral hazard practices, with market discipline found to fail during a crisis (Berger & Turk-Ariss, 2015). Thiratanapong (2007) revealed that market discipline by depositors increased after the 2007–2008 crisis in Thailand and that an explicit guarantee was found to weaken market discipline during that crisis. Their study findings were consistent with those of Yilmaz and Muslunov (2008) and with Önder and Özyildirim (2008), who reported that a full guarantee eroded market discipline in Turkey. Murata and Hori (2006) and Fueda and Konishi (2007) also found that deposit insurance was related to depositor discipline.

Market discipline theory predicts that when excessive risk taking is present, depositors will most likely either ask for higher returns on their deposits or withdraw their funds (Aysan, Disli, Duygun & Ozturk, 2017). Moreover, McIntyre and Zhang (2019) reported that depositors effectively discipline the market when they punish financial institutions by withdrawing their deposits rationally or by asking for higher interest rates based on actual risk. Thus, market discipline is an action taken by a depositor or an investor. It involves the withdrawal of funds or of deposits or the request for a higher interest rate return to discipline a bank or financial institution that is perceived to be taking too much risk or taking actions that are not compatible with the depositor's or investor's interests.

Previous research has found that markets are effectively disciplining non-bank financial institutions in New Zealand (Hess & Feng, 2007), Indonesia (Soma *et al.*, 2016) and Poland (Kozłowski, 2016). Dumontaux and Pop (2013) stated that the failure of market discipline in the large financial company, Lehman Brothers, which caused the GFC in 2007–2008, affected non-bank financial services. A previous study also found that uninsured deposits enhanced depositors' market discipline in Japan (Kobayashi, 2007). The practice of market discipline continues to be a current subject for discussion in various countries.

Bliss and Flannery (2002) argued that market discipline consists of two main roles: monitoring and influence. Their research was further developed by Stephanou (2010) into a market discipline framework, consisting of four concept blocks interrelated with market discipline's main functions of monitoring and influence. The four blocks are information and disclosure; market participants; the discipline mechanism; and internal governance. Soma *et al.* (2016), using empirical analysis, indicated that market discipline in non-bank financial institutions shows the relationship between the discipline mechanism and the responsibility for financial decision making on credit and debt.

### **Financial Literacy**

A further lesson from the 2007–2008 GFC was that financial literacy is critical in enhancing financial stability by increasing the role of market discipline. Mason and Wilson (2000) stated that financial literacy is a person's ability to obtain information, and to understand and evaluate the relevant information needed to make financial decisions with an awareness of the financial

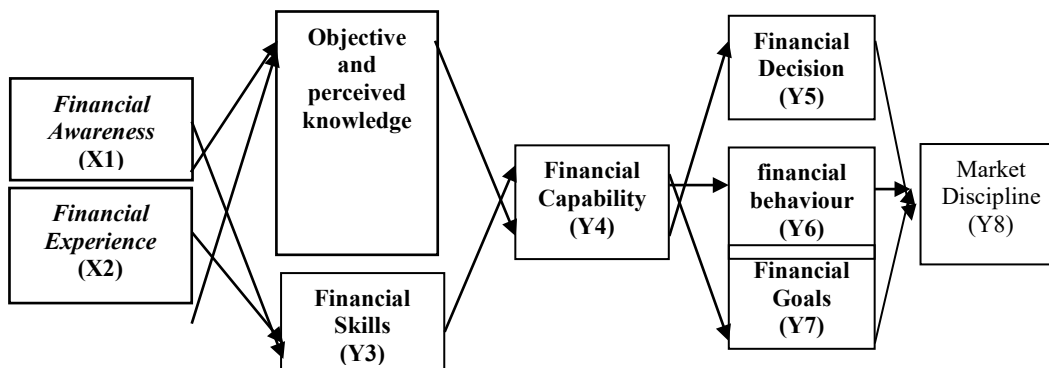
consequences. Financial literacy is defined by various concepts that have been continuously studied and developed over time. Previous studies have conceptualised financial literacy using multiple variables to build a theoretical foundation for developing the concept and method for financial literacy evaluation.

Financial literacy has been defined as financial knowledge (Danes & Hira, 1987; Chen & Volpe, 1998; Volpe, Kotel & Chen, 2002; Huston, 2010). Lusardi, Mitchell and Curto (2014) developed financial knowledge measurement, including the measurement of knowledge of the capital market, of risk diversification, of fees, and of numeracy to construct a financial literacy index. Hilgert, Hogarth and Beverly (2003) extended the study of the relationship between financial knowledge and financial behaviour. Furthermore, Robb and Woodyard (2011) proved that both objective and subjective financial knowledge affected financial behaviour. According to the Jump \$tart Coalition, financial literacy is “the ability to use knowledge and skills to manage one’s financial resources effectively for a lifetime financial security”. Atkinson and Messy (2012); Mandigma (2013); Hasting, Madrian and Skimmyhorn (2013); and Khan, Rothwell, Cherney and Sussman (2017) argued that financial literacy is a combination of knowledge, skills and attitudes, with all these variables affecting financial behaviour.

According to Cardak and Wilkins (2009), financial awareness and knowledge are important in determining financial product ownership. Furthermore, Kalra, Mathur and Rajeev (2015) indicated that financial literacy correlates with financial awareness and financial skills. Asaad (2015) argued that financial literacy focuses on knowledge and on appropriate perceived financial confidence to make sound financial decisions. Moreover, Sherraden (2013) proposed that financial capability is financial literacy, focusing on the combination of financial knowledge and financial skills. Lusardi and Tufano (2015) defined financial literacy as a relationship between debt knowledge, financial experience and debt loads.

Regarding the view that financial literacy’s contribution is important, Eniola and Entebang (2017) provided evidence that financial knowledge, financial awareness and financial attitudes affect sound financial decision making by owners that impact on company performance. Shahryar and Tan (2014) also emphasised that financial awareness is important in constructing financial literacy among students. Thus, financial literacy can be considered a combination of financial attitude and behaviour, financial skills, knowledge, awareness, capability, goals and decisions to achieve financial well-being (Priyadharshini, 2017).

Based on the theories and previous research findings, the study’s conceptual model is shown in Figure 1.



**Figure 1. Conceptual Model**

The current study proposes the following hypothesis:

**H1:** Financial awareness and financial experience have an effect on market discipline through mediating variables: financial skills, objective and perceived knowledge, financial capability, financial goals, financial decisions and financial behaviour.

### Research Methodology

This study aims to estimate the effect of financial literacy and its variables on market discipline. All latent variables are constructed using manifest variables as indicators, as shown in Table 1. This study proposed multiple variables of financial literacy measured by six indicators of financial awareness; five indicators of financial experience; six indicators of objective and perceived financial knowledge; five indicators of financial skills; four indicators of financial capability; four indicators of financial behaviour; three indicators of financial goals; and five indicators of financial decisions. Regarding market discipline measures, Stephanou (2010) proposed four dimensions of market discipline, namely, information and disclosure, market participants, disciplinary mechanisms, and internal governance, with 18 indicators in total. All constructs are measured in the reflective mode as a construct variable reflects its indicator variables. The data are collected by purposive sampling using an online and offline survey among lecturers holding a financial institution savings account. Using screening questions, 255 lecturers with savings accounts in shadow banking filled in the survey questionnaires with valid responses. This study was conducted in seven cities in Indonesia (47 respondents from Jakarta; 50 from Bandung; 29 from Solo; 75 from Yogyakarta, 36 from Surabaya, 14 from Semarang, and four (4) from Malang).

As the population proportion of depositors in shadow banking institutions is unknown, the minimum sample is determined following Aaker, Kumar, Leone and Day (2019, p. 309), with the following formula:

$$n = \frac{z^2(0.25)}{\text{Sampling error}^2} = \frac{2^2(0.25)}{0.1^2} = 100$$

where:

$z^2$  = 95% confidence interval (CI);

$n$  = number of samples; and

*Sampling error* = 10%.

Based on this calculation, this study requires a minimum of 100 survey respondents. Thus, the sample of 255 respondents complies with the minimum sample requirement.

The gender profile is distributed as 54% female respondents and 46% male respondents. The largest group of respondents (39%) is in the income range of Indonesian rupiah (Rp.) 5–10 million (39%). Most respondents are in the age range of 26–45 years old. Based on the sample, 78% of respondents have good savings habits. Furthermore, they routinely save money each month.

Analysis in this study is conducted using partial least squares structural equation modelling (PLS-SEM). This study uses PLS-SEM to predict the complex model built and to develop a theoretical framework for the effect of financial literacy on market discipline, with limited studies in the literature having examined the relationships between these variables. Data are analysed using SmartPLS 3.0 software to investigate the nexus of financial literacy and its variables with market discipline. This study conducts a mediation test analysis to investigate the strength of the mediator variables, employing the bootstrap-test method developed by Preacher and Hayes (2004, 2008); Zhao, Lynch and Chen (2010); Nitzl, Roldan and Cepeda (2016); Carrión, Nitzl and Roldán (2017); and Hair, Hult, Ringle and Sarstedt (2017).

The analysis and observation unit of the study comprises depositors at shadow banking financial institutions. The questionnaire uses closed-ended questions with a 5-point Likert scale.

The PLS-SEM analysis is carried out in two stages. The first stage encompasses the evaluation of measurement models through indicator reliability (Chin, 2010); internal consistency reliability (Hair *et al.*, 2017; Ringle, Sarstedt, Mitchell & Gudergan, 2018); convergent validity (Chin, 1998); and discriminant validity (Hair, Sarstedt, Ringle & Mena, 2012; Henseler, Ringle & Sarstedt, 2015). The second stage comprises evaluation of structural models through collinearity; predictive relevance ( $R^2$ ,  $Q^2$ , PLSpredict); significance and relevance of path coefficients; and assessment of the heterogeneous data structure (Henseler, Ringle & Sinkovics, 2009; Sarstedt, Ringle, Smith, Reams & Hair, 2014; Ringle *et al.*, 2018). The researcher also evaluates the total effect, direct and indirect effects (Albers, 2010; Ringle *et al.*, 2018), and mediation tests using the bootstrap approach (Preacher & Hayes, 2004, 2008; Zhao *et al.*, 2010; Nitzl *et al.*, 2016; Hair *et al.*, 2017). Tables 1 to 4 present the measurement model evaluation.

**Table 1. Indicator Reliability**

Indicators	Loading Factor
<b>Financial Awareness</b>	
Documenting bills (FA4)	0.844
Evaluate spending regularly (FA1)	0.836
Make a list before shopping (FA2)	0.832
Comparing some financial products before making a decision (FA3)	0.830
Willingness to have discussions on a financial issue (FA6)	0.822
Gathering information related to financial issues (FA5)	0.766
<b>Financial Experience</b>	
Doing financial records (FE2)	0.841
Holding emergency savings (FE1)	0.831
Having investment experience in the stock market (FE4)	0.829
Having experience in managing personal assets (FE3)	0.824
Having savings experience in a non-bank institution (FE5)	0.785
<b>Objective and Perceived Knowledge</b>	
Writing down where money is spent (FP1)	0.855
Knowledge of risk and return (FP2)	0.835
Discussion of economic and financial issues (FP3)	0.827
Institution knowledge (FK1)	0.795
Basic and advanced financial knowledge (FK2)	0.790
General knowledge (FK3)	0.765
<b>Financial Skills</b>	
Managing risks through purchasing insurance (FS2)	0.868
Keeping bills and receipts where they are easy to find (FS3)	0.865
Evaluating debt regularly (FS4)	0.863
Evaluating savings financial statement regularly (FS5)	0.843
Money management (FS1)	0.828
<b>Financial Capability</b>	
Money in cash (FC2)	0.880
Gathering information before deciding to buy (FC4)	0.842
Paying bills (FC1)	0.838
Buying items when they need to be bought (FC3)	0.833
<b>Financial Behaviour</b>	

Retirement investment (FB4)	0.888
Paying bills on time (FB1)	0.886
Investment diversification (FB3)	0.884
Charitable behaviour (FB2)	0.879
<b>Financial Goals</b>	
Making plans on how to use your money (FG1)	0.906
Planning for long-term goals such as retirement (FG2)	0.901
Saving money to buy things with cash not credit (FG3)	0.851
<b>Financial Decisions</b>	
Being sorry for buying an item without consideration (FD3)	0.876
Buying on impulse (FD4)	0.864
Being sorry for buying an item after being easily persuaded (FD2)	0.858
Buying an item after pressure from others (FD5)	0.847
Making decisions without planning (FD1)	0.836
<b>Market Discipline–Discipline Mechanisms</b>	
Government for corporate control (DM6)	0.801
Collateral/margin requirements (DM2)	0.788
Legal redress (DM3)	0.787
Quantity/price adjustments in financial instruments (DM1) (equity, debt, depositors, certificates of deposit [CDs], etc.)	0.772
Supervisory actions (bank resolution/exit mechanisms) (DM4)	0.760
Market for corporate control (DM5)	0.744
<b>Market Discipline–Information and Disclosure</b>	
Media and research analysts (ID4)	0.795
Accounting and financial reports (ID1)	0.788
Credit rating agencies (ID3)	0.775
Prudential disclosure (ID2)	0.760
<b>Market Discipline–Internal Governance</b>	
Risk governance (IG1)	0.765
Board composition, independence and qualifications (IG3)	0.747
Executive remuneration arrangements (IG2)	0.738
<b>Market Discipline–Market Participants</b>	
Depositors (MP2)	0.799
Clearing houses (MP5)	0.792
Counterparties (MP1)	0.780
Debt investors (MP4)	0.775
Shareholders (MP3)	0.756

Source: Calculated using SmartPLS 3.0.

Note: Rule of thumb: indicator reliability > 0.7 is valid (Chin, 2010).

Table 1 shows the estimation of the loading factor of each latent variable's indicator. All loading factors are more than 0.7; thus, it can be concluded that all indicators are valid. Table 2 provides the goodness of fit for the measurement model, using the criteria of consistency reliability (CR); Cronbach's alpha coefficient (CA); and average variance extracted (AVE). All average variance extracted (AVE) values are above 0.5; therefore, convergent validity is achieved. As shown in Table 2, consistency reliability (CR) and Cronbach's alpha (CA) values are above 0.8;



thus, internal consistency reliability is achieved. Based on the *p*-value, each latent variable has a significant effect.

**Table 2. Internal Consistency Reliability and Convergent Validity**

Latent Variable	CR	<i>p</i> -Value	CA	<i>p</i> -Value	AVE	<i>p</i> -Value
Market Discipline	0.964	0.000	0.960	0.000	0.598	0.000
Financial Behaviour	0.935	0.000	0.907	0.000	0.782	0.000
Financial Decisions	0.932	0.000	0.909	0.000	0.733	0.000
Financial Skills	0.931	0.000	0.907	0.000	0.728	0.000
Financial Awareness	0.926	0.000	0.904	0.000	0.676	0.000
Objective and Perceived Knowledge	0.921	0.000	0.896	0.000	0.659	0.000
Financial Experience	0.912	0.000	0.880	0.000	0.676	0.000
Financial Goals	0.917	0.000	0.864	0.000	0.786	0.000
Financial Capability	0.911	0.000	0.870	0.000	0.720	0.000

Source: Calculated using SmartPLS 3.0.

Note: Rules of thumb: CR = composite reliability > 0.07; CA = Cronbach’s alpha > 0.07; AVE = average variance extracted > 0.05.

**Table 3. Discriminant Validity: Fornell–Larcker Criteria and Heterotrait-Monotrait Ratio (HTMT)**

<i>fornell-Larcker Criterion</i>	Financial Awareness	Financial Behavior	Financial Capability	Financial Decision	Financial Experience	Financial Goal	Financial Skill	Market Discipline	Obj&Perceived Knowledge
<i>Correlation</i>									
Financial Awareness	0.822								
Financial Behaviour	0.708	0.884							
Financial Capability	0.678	0.730	0.848						
Financial Decisions	0.657	0.739	0.704	0.856					
Financial Experience	0.685	0.651	0.665	0.668	0.822				
Financial Goals	0.662	0.659	0.649	0.633	0.626	0.886			
Financial Skills	0.789	0.699	0.723	0.677	0.756	0.717	0.853		
Market Discipline	0.734	0.772	0.703	0.768	0.656	0.732	0.766	0.774	
Objective&Perceived Knowledge	0.757	0.719	0.750	0.678	0.745	0.704	0.799	0.731	0.812
<i>Heterotrait-Monotrait Ratio</i>									
Financial Awareness									
Financial Behaviour	0.780								
Financial Capability	0.760	0.817							
Financial Decisions	0.724	0.813	0.787						
Financial Experience	0.763	0.728	0.756	0.745					
Financial Goals	0.747	0.743	0.743	0.712	0.713				
Financial Skills	0.868	0.771	0.811	0.745	0.845	0.809			
Market Discipline	0.784	0.825	0.763	0.820	0.710	0.799	0.819		
Objective&Perceived Knowledge	0.832	0.796	0.844	0.747	0.832	0.796	0.886	0.786	

Source: Calculated using SmartPLS 3.0.

Note: HTMT = heterotrait–monotrait ratio. The two grey-highlighted results indicate discriminant validity problems, according to the HTMT criterion of 0.85. However, they are still accepted with the HTMT criterion of 0.90 (Henseler *et al.*, 2015).

Table 3 presents the results of the measurement model’s evaluation, using discriminant validity. The Fornell–Larcker criterion matrix is used which indicates that the square root of the AVE value of each latent variable is above the correlation value between each latent variable. Table 3 also presents the HTMT criteria matrix which indicates that no discriminant validity issues are present.

## Results

The evaluation of the study's structural models is done by evaluating the coefficient of determination ( $R^2$ ), the correlation coefficients ( $R$ ), the significance, the effect size ( $F^2$ ) and  $Q^2$  values. The researcher also evaluated the total effect, direct effect and indirect effect (Albers, 2010; Ringle *et al.*, 2018). Table 4 presents the collinearity test results on the outer model, showing that all indicator values are less than 5; thus, it can be concluded that all indicators are free from the problem of collinearity (Hair *et al.*, 2017). The analysis results of the coefficient of determination ( $R^2$ ) show that the structural model's strength is moderate and close to strong (Table 5). The correlation coefficient evaluation ( $R$ ) shows that the relationship's direction is positive (Table 6). The evaluation of the significance of the structural model, carried out through the bootstrapping procedure, confirms that the financial literacy construct and its variables together have a significant effect on market discipline performance. The resulting  $t$ -statistic value is greater than 1.96 (significant at 5%) (see Table 7). The  $F$ -squared ( $F^2$ ) effect size evaluation results show that the magnitude of the effect is included in the high, medium and small categories (Table 8). The model's predictive power is high and medium, shown by the results of Stone–Geisser's  $Q$ -squared ( $Q^2$ ) evaluation analysis (Table 9). Thus, this study's model has fulfilled predictive relevance; that is, the model has been properly constructed. The evaluation of all path coefficients in this study from exogenous variables to endogenous variables shows that they are positive and significant. The evaluation of all paths of exogenous variables to endogenous variables through mediating variables is significant. The results of the evaluation of the total effect are also significant. The mediation test was carried out using the bootstrapping approach (Zhao *et al.*, 2010; Hair *et al.*, 2017). The mediation test results indicate that the mediating variable in the financial awareness–market discipline (FA–MD) relationship creates a complementary partial mediation, indirect and direct. Both effects are significant and point in the same direction. At the same time, the mediation in financial experience–market discipline (FE–MD) relationship is full mediation (Table 10 and Figure 2).

**Table 4. Collinearity Statistics (VIF)**

Latent Exogenous Variable		Latent Endogenous Variable		Latent Endogenous Variable	
Indicator	VIF	Indicator	VIF	Indicator	VIF
FA1	2.269	FS3	2.633	DM1	2.485
FA2	2.686	FS4	2.561	DM2	2.514
FA3	2.469	FS5	2.423	DM3	2.704
FA4	2.805	FC1	2.175	DM4	2.521
FA5	1.793	FC2	2.616	DM5	2.222
FA6	2.354	FC3	2.038	DM6	2.774
FE1	2.247	FC4	1.976	ID1	2.741
FE2	2.402	FB1	2.805	ID2	2.312
FE3	2.125	FB2	2.685	ID3	2.446
FE4	2.359	FB3	2.851	ID4	2.649
FE5	1.858	FB4	2.905	IG1	2.498
FK1	2.090	FG1	2.469	IG2	2.807

FK2	2.070	FG2	2.412	IG3	2.246
FK3	1.893	FG3	1.957	MP1	2.864
FP1	2.639	FD1	2.273	MP2	2.855
FP2	2.384	FD2	2.648	MP3	2.360
FP3	2.411	FD3	2.856	MP4	2.613
FS1	2.244	FD4	2.649	MP5	2.721
FS2	2.666	FD5	2.403		

Sources: Calculated using SmartPLS 3.0.

**Table 5. Coefficient of Determination ( $R^2$ )**

Latent Variable	Adjusted $R^2$	Strength of the Model
Market Discipline (MD)	0.742	Moderate
Financial Skills (FS)	0.707	Moderate
Objective and Perceived Knowledge (OK)	0.667	Moderate
Financial Capability (FC)	0.601	Moderate
Financial Behaviour (FB)	0.531	Moderate
Financial Decisions (FD)	0.494	Moderate
Financial Goals (FG)	0.419	Moderate

Source: Calculated using SmartPLS 3.0.

**Table 6. Correlation Coefficient Evaluation ( $R$ )**

Variables	Original Sample (O)	Criterion $\geq 0.05$
Financial Awareness → Financial Skills	0.509	Positive
Financial Awareness → Market Discipline	0.194	Positive
Financial Awareness → Objective and Perceived Knowledge	0.462	Positive
Financial Behaviour → Market Discipline	0.247	Positive
Financial Capability → Financial Behaviour	0.730	Positive
Financial Capability → Financial Decisions	0.704	Positive
Financial Capability → Financial Goals	0.649	Positive
Financial Decisions → Market Discipline	0.293	Positive
Financial Experience → Financial Skills	0.408	Positive
Financial Experience → Market Discipline	0.013	Positive
Financial Experience → Objective and Perceived Knowledge	0.429	Positive
Financial Goals → Market Discipline	0.247	Positive
Financial Skills → Financial Capability	0.342	Positive
Objective and Perceived Knowledge → Financial Capability	0.476	Positive

Source: Calculated using SmartPLS 3.0.

**Table 7. Significance of Path Coefficient ( $t$ -statistics value)**

Variables	$t$ -value	$p$ -value	Significant
Financial Awareness → Financial Skills	9.402	0.000	Yes
Financial Awareness → Market Discipline	3.424	0.001	Yes

Financial Awareness → Objective and Perceived Knowledge	8.776	0.000	Yes
Financial Behaviour → Market Discipline	4.351	0.000	Yes
Financial Capability → Financial Behaviour	19.746	0.000	Yes
Financial Capability → Financial Decisions	17.053	0.000	Yes
Financial Capability → Financial Goals	13.214	0.000	Yes
Financial Decisions → Market Discipline	5.555	0.000	Yes
Financial Experience → Financial Skills	7.410	0.000	Yes
Financial Experience → Market Discipline	0.260	0.795	No
Financial Experience → Objective and Perceived Knowledge	7.991	0.000	Yes
Financial Goals → Market Discipline	5.145	0.000	Yes
Financial Skills → Financial Capability	5.678	0.000	Yes
Objective and Perceived Knowledge → Financial Capability	8.334	0.000	Yes

Source: Calculated using SmartPLS 3.0.

Note: Significant if greater than 1.96 (significant at 5%)

**Table 8. Effect Size Test ( $f^2$ )**

Variables	$f^2$	Effect Size
Financial Capability → Financial Behaviour	1.142	High
Financial Capability → Financial Decisions	0.982	High
Financial Capability → Financial Goals	0.729	High
Financial Awareness → Financial Skills	0.473	High
Financial Awareness → Objective and Perceived Knowledge	0.342	Medium
Financial Experience → Financial Skills	0.304	Medium
Financial Experience → Objective and Perceived Knowledge	0.295	Medium
Objective and Perceived Knowledge → Financial Capability	0.207	Medium
Financial Decisions → Market Discipline	0.128	Medium
Financial Goals → Market Discipline	0.110	Medium
Financial Skills → Financial Capability	0.107	Medium
Financial Behaviour → Market Discipline	0.083	Medium
Financial Awareness → Market Discipline	0.056	Small
Financial Experience → Market Discipline	0.000	Small

Source: Calculated using SmartPLS 3.0.

Note: Significant if greater than 1.96 (significant at 5%).

**Table 9. Stone–Geisser’s  $Q^2$  ( $Q$ -squared)**

Variables	SSO	SSE	$Q^2$ (=1-SSE/SSO)	Predictive Capability
Financial Behaviour	1,020.000	633.795		High
Financial Capability	1,020.000	606.196		High
Financial Decisions	1,275.000	847.025	The model has predictive relevance	Moderate
Financial Goals	765.000	530.727		High
Financial Skills	1,275.000	682.555		High
Market Discipline	4,590.000	2,740.678		High
Objective and Perceived Knowledge	1,530.000	918.531		High

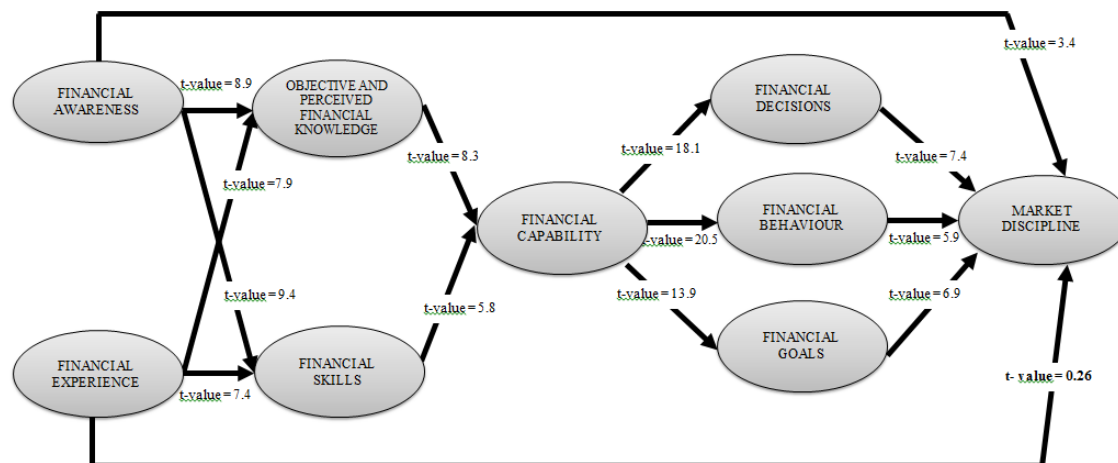
Source: Calculated using SmartPLS 3.0.

Note: SSO : Sum of the square Observation Error; SSE: Sum of the square Prediction Error

**Table 10. Mediation Analysis–Bootstrap Method**

Variables	Direct Effect	t-value	sig	Indirect Effect	t-value	sig	Result
Financial Awareness → Market Discipline	0.194	3.424	Yes	0.216	6.860	Yes	Complementary partial mediation Indirect-only mediation (full mediation)
Financial Experience → Market Discipline	0.013	0.260	No	0.188	6.908	Yes	

Source: Calculated using SmartPLS 3.0 (Hair *et al.*, 2017).



**Figure 2. Deterministic Model of Financial Literacy and Market Discipline**

### Analysis and Discussion

Figure 2 shows the estimation of the structural models and the nexus between the variables. The effect of the path coefficient of each independent latent variable in affecting its dependent variable is explained. This study reveals that the determinant factors of financial literacy, as shown in its relationships, are financial awareness, experience, objectives and perceived knowledge, skills, capability, goals, decisions and behaviour. The results are consistent with the findings of Priyadharshini (2017), who revealed the relationship between financial literacy and its variables: financial skills, financial knowledge, financial capability, financial awareness, financial goals, financial behaviour and financial decisions. They are also aligned with the findings of Sohn, Joo, Grable, Lee and Kim (2012), who revealed the relationship between financial experience and financial knowledge. The study also provided evidence that financial literacy is associated with improved market discipline. This result was consistent with the findings of Soma *et al.* (2016), who revealed that financial literacy has a significant effect on market discipline. Financial decisions were found to be the most influential factor in strengthening the effect of market discipline on shadow banks. This was indicated as the coefficient of the financial decisions–market discipline relationship has a higher value than that of other variables (see Table 6).

Based on the results, shadow banking in Indonesia was found to be mostly in the form of fintech companies and micro-financial institutions, including cooperatives and Baitul Maal Wa Tamwil (BMT), which is a semi-formal Islamic microfinance institution (MFI) in Indonesia (Wulandari, 2019). As BMT has weak regulation and less supervision than banking institutions, these factors distinguish it from non-shadow banks in Indonesia. It does not have a blanket guarantee to protect depositors’ funds. This study indicated that depositors with a good level of financial literacy will punish financial institutions that are not prudent in their management of funds raised from third parties or customers.

Looking to the future, due to shadow banking continuing to grow rapidly but without adequate accompanying supervision and regulation, this study recommends that customers’ financial literacy be improved to strengthen market discipline in shadow banks. This result is consistent with the fundamental approach in the study conducted by Hess and Feng (2005, 2007). Depositors and investors play a role in the implementation of market discipline mechanisms. This study’s results are consistent with those of De Ceuster and Masschelein (2003). Savings insurance affects market discipline performance in non-shadow banking financial institutions. Shadow

banking institutions have weak supervision, are unregulated and do not have savings insurance. The study's results convey the view that depositors' and investors' role in carrying out market discipline is greatly encouraged. This result is indirectly consistent with the opinions of Demirgüç-Kunt and Huizinga (2004) and Hadad, Agusman, Monroe, Gasbarro and Zumwalt (2011) that the role of financial literacy is necessary for effective market discipline. The results of this study are also consistent with the findings of Widdowson and Hailwood (2007); Soma *et al.* (2016); and Alamsyah *et al.* (2020). This research enriches behavioural studies by using PLS-SEM and the mediation analysis–bootstrap method model (Preacher & Hayes, 2004, 2008; Iacobucci *et al.*, 2007;; Zhao *et al.*, 2010; Nitzl *et al.*, 2016; Hair *et al.*, 2017).

## Conclusion

The future sustainable financial strategy for developing countries can be achieved through: (1) promoting the building of market discipline into the financial ecosystem and (2) empowering depositors and investors through financial literacy to achieve financial sustainability. This study's results are in line with the findings of Soma *et al.* (2016) and Alamsyah *et al.* (2020) that financial literacy has a significant effect on market discipline. This research found that depositors whose deposits are not guaranteed will monitor and discipline the market.

Lack of financial knowledge among depositors increases the likelihood of financial fraud in the financial services industry. Market discipline can play a role in creating a sustainable financial framework. A sustainable financial framework ecosystem requires the role of three financial industry actors; the regulator that plays a role in maintaining financial stability; the financial industry that has responsibility for financial inclusion; and depositors and investors, as consumers, who need to have good financial literacy. The reason is that financially literate people have beneficial effects on the financial system, such as: (1) making wiser decisions in investment choices and financial products, leading to demand for more innovative financial institutions, and (2) improving market discipline practices in financial institutions which ultimately increases risk management practices and produces higher service standards.

In addition to depositors acting as agents to discipline financial institutions, effective market discipline performance also requires regulators to promote and educate the public on the importance of monitoring financial institutions. Depositors and investors play a role in the implementation of market discipline mechanisms. Depositors whose deposits are not guaranteed will monitor and discipline the market. Open and transparent disclosure of information, adequate information quality, and easy access to, and availability of, information are important factors in providing adequate information to depositors enabling them to discipline the market. Future research can refer to this study's results, further developing the study's research model and testing it empirically. This study also recommends that shadow banking regulation and supervision be considered as part of the financial system's dynamic development.

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