

Journal Home  
Aims & Scope  
Editorial Board  
Policies  
Open Access statement  
Journal Impact and Download Figures  
Ethics & Malpractice

Most Popular Papers

Receive Email Notices or RSS

### SPECIAL ISSUES:

Special Issue from The Fourth Annual International Capital Markets Conference 2023

Industrial Analysis from Multidimensional Perspectives

Sustainable Development Goals Aligned Business Practices

Special Issue: Sustainable Accountability, Circular Economy and Corporate Financial Performance.

Select an issue:

All Issues

Enter search terms:

in this journal

Advanced Search

ISSN: 1834-2019



[Home](#) > [ba1](#) > [AABFJ](#)

[Follow](#)

PLEASE NOTE: Because of a large number of recent submissions, this journal is closed to new submissions until 30 August, 2024.

The *Australasian Accounting, Business and Finance Journal* is a double blind peer reviewed academic journal. The AABFJ publishes interdisciplinary research which informs a range of business-related fields. These include accounting, finance and financial planning research. We are included on the Web of Science's Emerging Sources Citation Index. AABFJ holds a B ranking on the Australian Business Deans Council (ABDC) journal list. We are ranked Q2 under Scimago and our articles appear in the Scopus database. We are signatories to the SDG Publishers Compact.

Contact: [AABFJ Editor](#).



ISSN: 1834-2000 (print). ISSN: 1834-2019 (online).

### Current Issue: Volume 18, Issue 3 (2024) Special Issue from The Fourth Annual International Capital Markets Conference 2023

The National Institute of Securities Markets (NISM), along with the Systemic Risk Centre (SRC) at the London School of Economics (LSE), presents this Special Issue of articles selected from The Fourth Annual International Capital Markets Conference 2023.



### Academic articles

- [PDF](#) Greening Indian Financial Markets for Sustainable Development  
*Pradiptarathi Panda, Latha Chari, and Giorstan Smark*
- [PDF](#) Developing a Security Risk Assessment based Smart Beta Portfolio Model for Robo Advising  
*C. Vijaya, Koushik Hati, and M. Thenmozhi*
- [PDF](#) Unveiling the Relationship Between ESG Scores and Firm

Journal Home  
Aims & Scope  
Editorial Board  
Policies  
Open Access statement  
Journal impact and Download Figures  
Ethics & Malpractice

Most Popular Papers

Receive Email Notices or RSS

### SPECIAL ISSUES:

Special Issue from The Fourth Annual  
International Capital Markets Conference  
2023

Industrial Analysis from Multidimensional  
Perspectives

Sustainable Development Goals Aligned  
Business Practices

Special Issue: Sustainable Accountability,  
Circular Economy and Corporate Financial  
Performance

Select an Issue:

All Issues

Enter search terms:

in this journal

Advanced Search

ISSN : 1834-2019



[Home](#) > [Jab](#) > [AABFJ](#)

## Editorial Staff of the Australasian Accounting Business & Finance Journal

### Editors in Chief

[Dr Clorstan Smark](#) *University of Wollongong*

[Professor Montir Mir](#) *University of Canberra*

### Associate Editors

[Coordinating Professor Sandra Alves](#), *University of Aveiro, Portugal*

[Associate Professor Jane Andrew](#), *University of Sydney*

[Dr Angelo Aspris](#), *University of Sydney*

[Dr Vicky Beard](#), *Macquarie University*

[Professor Paolo Pietro Biancoone](#), *Università di Torino*

[Associate Professor Graham Bowrey](#), *University of the Sunshine Coast*

[Professor Mark Brimble](#), *Griffith University*

[Associate Professor Francesco Capalbo](#), *Seconda Università degli Studi di Napoli*

[Dr Bikram Chatterjee](#), *University of Tasmania*

[Professor Adam Clements](#), *Queensland University of Technology*

[Associate Professor Corinne Cortese](#), *University of Wollongong*

[Associate Professor Hadrian Djajadikerta](#), *Edith Cowan University*

[Associate Professor Omar Farooque](#), *University of New England*

[Professor Sandeep Goel](#), *Management Development Institute (MDI), Gurgaon, India*

[Associate Professor Himu Bindu Kota](#), *Amity University, Noida, India*

[Dr Ashtaq Khan](#), *University of New England, Australia*

[Associate Professor Maurizio La Rocca](#), *University of Calabria*

[Professor Andrew Lepone](#), *Macquarie University*

[Dr Vera Palea](#), *Università Luigi Bocconi, Milano*

[Dr Pradiptarathi Panda](#), *Indian Institute of Management (IIM), Raipur, India*

[Dr Grzegorz Michalski](#), *Wrocław University of Economics*

[Dr Krishna Reddy](#), *University of Waikato*

[Professor Eduardo Roca](#), *Griffith University*

[Professor Grant Samkin](#), *University of Waikato*

[Dr Reuben Segara](#), *University of Sydney*



Select an Issue:

All Issues

Enter search terms:

in this journal

Advanced Search

ISSN: 1834-2019



Dr Vicky Beard, Macquarie University

Professor Paolo Pietro Bianco, Università di Torino

Associate Professor Graham Bowrey, University of the Sunshine Coast

Professor Mark Brimble, Griffith University

Associate Professor Francesco Capaldo, Seconda Università degli Studi di Napoli

Dr Bikram Chatterjee, University of Tasmania

Professor Adam Clements, Queensland University of Technology

Associate Professor Corinne Cortese, University of Wollongong

Associate Professor Hadrian Djajadikerta, Edith Cowan University

Associate Professor Omar Farooque, University of New England

Professor Sandeep Goel, Management Development Institute (MDI), Gurgaon, India

Associate Professor Himu Bindu Kota, Amity University, Noida, India

Dr Ashfaq Khan, University of New England, Australia

Associate Professor Maurizio La Rocca, University of Calabria

Professor Andrew Lepone, Macquarie University

Dr Vera Palea, Università Luigi Bocconi, Milano

Dr. Pradiptarathi Panda, Indian Institute of Management (IIM), Raipur, India

Dr Grzegorz Michalski, Wrocław University of Economics

Dr Krishna Reddy, University of Waikato

Professor Eduardo Roca, Griffith University

Professor Grant Samkin, University of Waikato

Dr Reuben Segara, University of Sydney

Dr Rafal Siedlecki, Wrocław University of Economics

Assistant Professor Raffaele Stagliano, Montpellier Business School, France

Dr Aviral Kumar Tiwari, Research Fellow, University of Cambridge, United Kingdom; University of Economics, Ho Chi Minh City, Vietnam

Dr Shaista Wasiluzzaman, Universiti Teknologi Brunei

Dr Nitrosha Hewa Wellalage, University of Waikato, New Zealand

Dr Joakim Westerholm, University of Sydney

Associate Professor Prem Yapa, RMIT

#### International Standard Serial Number (ISSN)

ISSN 1834-2000 has been assigned to the print publication

ISSN 1834-2019 has been assigned to the online publication

Visit our Website:

[ro.uow.edu.au/aabf/](http://ro.uow.edu.au/aabf/)

Journal Home  
Aims & Scope  
Editorial Board  
Policies  
Open Access statement  
Journal Impact and Download Figures  
Ethics & Malpractice

Most Popular Papers

Receive Email Notices or RSS

### SPECIAL ISSUES:

Special Issue from The Fourth Annual International Capital Markets Conference 2023

Industrial Analysis from Multidimensional Perspectives

Sustainable Development Goals Aligned Business Practices

Special Issue: Sustainable Accountability, Circular Economy and Corporate Financial Performance

Select an Issue:

All Issues

Enter search terms:

in this journal

Advanced Search

ISSN : 1834-2019



[Home](#) > [AAB](#) > [AABFJ](#) > [Vol. 17 \(2023\)](#) > [Iss. 4](#)

[Previous Issue](#)

[Next Issue](#)

## Volume 17, Issue 4 (2023)

### Editorial

[Editorial Volume 17, Issue 4](#)  
*Clorstan Smark and Monir Mir*

### Academic articles

- [Could the Theory of Planned Behaviour Explain Market Discipline in Sharia Mutual Funds?](#)  
*Umi Widyastuti, Erie Febrian, Sultisna Sultisna, and Tetet Fitrijanti*
- [The Impact of IFRS 9 on Financial Reporting during Covid-19 from the Point of View of Experts in Europe](#)  
*Ilkko Orbán and Oday Tamim*
- [Do Shadow Banking Depositors Discipline the Market?](#)  
*Vera Intanle Dewi, Nury Effendi, Mokhammad Anwar, Sulaeman Rahman Nidar, Tetet Fitrijanti, and Benny Tjandrasa*
- [Moderation of Political Pressure on the Determinants of Audit Quality in the Public Sector: A Study of BPK Auditors for the Maluku and North Sulawesi Regions](#)  
*Surlana AR Mahdi, N. Nurkholis, Yenny Widya Prihatninglas, and Zaki Barlowan*
- [The Development of Small and Medium-sized Businesses and its Impact on the Trend of Unemployment in Kazakhstan](#)  
*Toty Bekzhanova, Mural Ailyev, Gulmira Tussibayeva, Mlyatbek Aitynbekov, and Algul Akhmetova*
- [Determinants of Pension Fund's Required Return: A Scenario-based simulation of Civil Service Pension Fund](#)  
*Muhammad Irfan and Wee-Yeap Lau*
- [Wealth Impact of Unit Rights Offerings to Debt Holders: Evidence from Australia](#)  
*Sti Nurhidayah Mohd Roslan, Cheng Fan Fah, and Norhuda Abdul Rahim*
- [Integrated Reporting Implementation in the Health Sector Industry](#)  
*Dini Wahjoe Hapsari and Khalisha Azzahra Khalrunnisa*
- [Joining or Exiting the Defined Benefit Division Superannuation Scheme of UniSuper](#)  
*John Christie*
- [The Moderating Role of Risk Monitoring Committee on the Effect of Risk Disclosure on Financial Performance in Islamic Banks](#)  
*Laely Aghe Africa and Dian Agustia*
- [Does Internal Control Promote Employee Engagement Drivers? A Systematic Literature Review](#)  
*Haryanto Haryanto, Harry Suharnan, Poppy S. Koeswayo, and Haryono Umar*
- [Transparency in International Anti-Corruption Helpdesk Answers: A Case Study in Timor-Leste](#)  
*Pascoal da Costa Oliveira, B. Basuki, and H. Hamidah*
- [Audit Quality Improvement and the Role of Risk: Audit as a Moderator](#)  
*Edy Sujana and Nyontan Ari Surya Dharmawan*





## Do Shadow Banking Depositors Discipline the Market?

Vera Intanie Dewi<sup>1</sup>, Nury Effendi<sup>2</sup>, Mokhamad Anwar<sup>3</sup>, Sulaeman Rahman Nidar<sup>4</sup>, Tettet Fitrijanti<sup>5</sup> and Benny Tjandrasa<sup>6</sup>

### 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.

**JEL:** G23, G40, G53

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

---

<sup>1</sup> Universitas Katolik Parahyangan, Indonesia

<sup>2</sup> Universitas Padjajaran, Indonesia

<sup>3</sup> Universitas Padjadjaran, Indonesia

<sup>4</sup> Universitas Padjadjaran, Indonesia

<sup>5</sup> Universitas Padjadjaran, Indonesia

<sup>6</sup> Universitas Kristen Maranatha, Indonesia



## 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



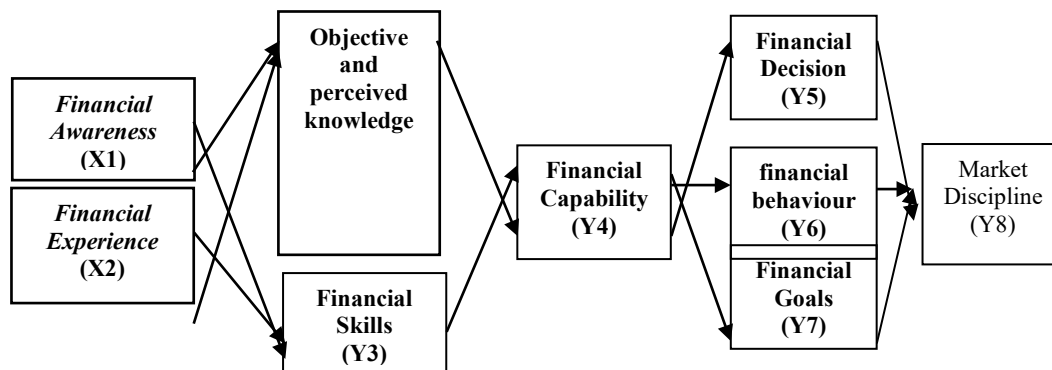
consequences. Financial literacy is defined by various concepts that have been continuously studied and developed over time. Previous studies have conceptualised financial literacy using multiple variables to build a theoretical foundation for developing the concept and method for financial literacy 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)<br>(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-Larker 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       | $Q^2$<br>(=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   |                                    | Moderate              |
| 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.

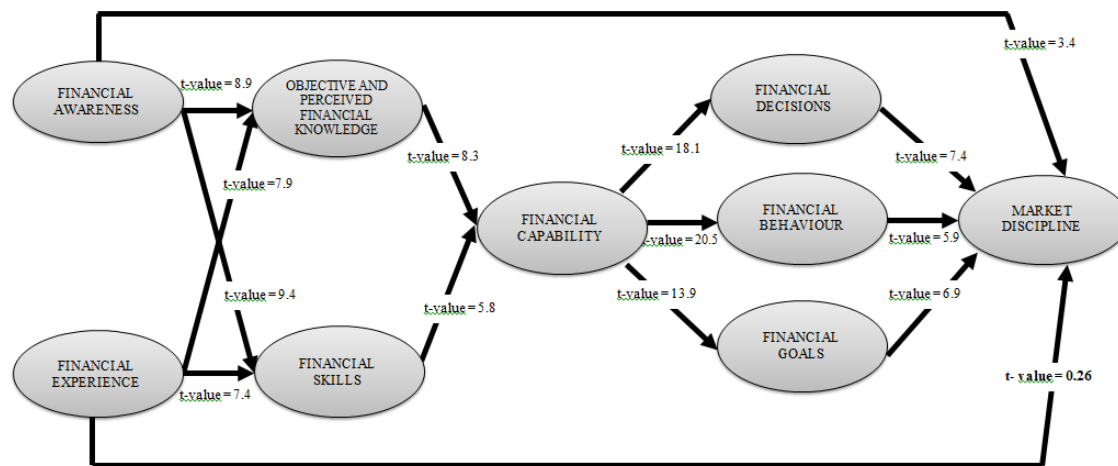
Note: SSO : Sum of the square Observation Error; SSE: Sum of the square Prediction Error

**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          |
| Financial Experience → Market Discipline | 0.013         | 0.260   | No  | 0.188           | 6.908   | Yes | Indirect-only mediation (full mediation) |

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.

## References

- Aaker, D. A., Kumar, V., Leone, R. P., & Day, G. S. (2019). *Marketing research* (11th edn.). New Delhi, India: John Wiley & Sons Inc.
- Adrian, T., & Shin, H. S. (2009). *The shadow banking system: Implications for financial regulation*. No. 382. Federal Reserve Bank of New York: Econstor.  
<https://doi.org/10.2139/ssrn.1441324>
- Alamsyah, H., Ariefianto, M. D., Saheruddin, H., Wardono, S., & Trinugroho, I. (2020). Depositors' trust: Some empirical evidence from Indonesia. *Research in International Business and Finance*, 54. doi:10.1016/j.ribaf.2020.101251  
<https://doi.org/10.1016/j.ribaf.2020.101251>
- Alanis, E., Beladi, H., & Quijano, M. (2015). Uninsured deposits as a monitoring device: Their impact on bond yields of banks. *Journal of Banking & Finance*, 52, 77-88.  
<https://doi.org/10.1016/j.jbankfin.2014.11.015>
- Albers, S. (2010). PLS and success factor studies in marketing. In *Handbook of partial least squares* (pp. 409-425). Berlin, Heidelberg: Springer.  
[https://doi.org/10.1007/978-3-540-32827-8\\_19](https://doi.org/10.1007/978-3-540-32827-8_19)
- Asaad, C. T. (2015). Financial literacy and financial behavior: Assessing knowledge and confidence. *Financial Services Review*, 24(2), 101-117.
- Atkinson, A., & Messy, F. (2012). *Measuring financial literacy: Results of the OECD/ International Network on Financial Education (INFE) Pilot Study*. OECD Working Papers on Finance, Insurance and Private Pensions No. 15, OECD Publishing.  
<http://dx.doi.org/10.1787/5k9csfs90fr4-en>  
<https://doi.org/10.1787/5k9csfs90fr4-en>
- Aysan, A. F., Disli, M., Duygun, M., & Ozturk, H. (2017). Islamic banks, deposit insurance reform, and market discipline: Evidence from a natural framework. *Journal of Financial Services Research*, 51(2), 257-282.  
<https://doi.org/10.1007/s10693-016-0248-z>
- Bengtsson, E. (2013). Shadow banking and financial stability: European money market funds in the global financial crisis. *Journal of International Money and Finance*, 32, 579-594.  
<https://doi.org/10.1016/j.jimonfin.2012.05.027>
- Bennett, R. L., Hwa, V., & Kwast, M. L. (2015). Market discipline by bank creditors during the 2008-2010 crisis. *Journal of Financial Stability*, 20, 51-69.  
doi:<https://doi.org/10.1016/j.jfs.2015.06.003>  
<https://doi.org/10.1016/j.jfs.2015.06.003>



Berger, A. N. & Turk-Ariss, R. (2015). Do depositors discipline banks and did government actions during the recent crisis reduce this discipline? An international perspective. *Journal of Financial Services Research*, 48, 103-126.

<https://doi.org/10.1007/s10693-014-0205-7>

Bliss, R. R., & Flannery, M. J. (2002). Market discipline in the governance of US bank holding companies: Monitoring vs. influencing. *Review of Finance*, 6(3), 361-396.

<https://doi.org/10.1023/A:1022021430852>

Busch, D., & van Rijn, M. B. (2018). Towards single supervision and resolution of systemically important non-bank financial institutions in the European Union. *European Business Organization Law Review*, 19(2), 301-363.

<https://doi.org/10.1007/s40804-018-0107-5>

Cardak, B. A., & Wilkins, R. (2009). The determinants of household risky asset holdings: Australian evidence on background risk and other factors. *Journal of Banking and Finance*, 33(5), 850-860. doi:10.1016/j.jbankfin.2008.09.021

<https://doi.org/10.1016/j.jbankfin.2008.09.021>

Carrión, G. C., Nitzl, C., & Roldán, J. L. (2017). Mediation analyses in partial least squares structural equation modeling: Guidelines and empirical examples. In *Partial least squares path modelling* (pp. 173-195). Cham: Springer.

[https://doi.org/10.1007/978-3-319-64069-3\\_8](https://doi.org/10.1007/978-3-319-64069-3_8)

Chen, H., & Volpe, R. P. (1998). An analysis of personal financial literacy among college students. *Financial Services Review*, 7(2), 107-128.

[https://doi.org/10.1016/S1057-0810\(99\)80006-7](https://doi.org/10.1016/S1057-0810(99)80006-7)

Chen, Z., He, Z., & Liu, C. (2020). The financing of local government in China: Stimulus loan wanes and shadow banking waxes. *Journal of Financial Economics*, 137(1), 42-71.

doi:10.1016/j.jfineco.2019.07.009

<https://doi.org/10.1016/j.jfineco.2019.07.009>

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, 295(2), 295-336.

Chin, W. W. (2010). How to write up and report PLS analyses. In *Handbook of partial least squares* (pp. 655-690). Berlin, Heidelberg: Springer.

[https://doi.org/10.1007/978-3-540-32827-8\\_29](https://doi.org/10.1007/978-3-540-32827-8_29)

Cubillas, E., Fonseca, A. R. & Gonzalez, F. (2012). Banking crises and market discipline: International evidence. *Journal of Banking & Finance*, 36, 2285-2298.

<https://doi.org/10.1016/j.jbankfin.2012.04.011>

Danes, S. M., & Hira, T. K. (1987). Money management knowledge of college students. *Journal of Student Financial Aid*, 17(1), 4-16.

<https://doi.org/10.55504/0884-9153.1435>

De Ceuster, M. J., & Masschelein, N. (2003). Regulating banks through market discipline: A survey of the issues. *Journal of Economic Surveys*, 17(5), 749-766.

<https://doi.org/10.1046/j.1467-6419.2003.00212.x>

Demirgüç-Kunt, A., & Huizinga, H. (2004). Market discipline and deposit insurance. *Journal of Monetary Economics*, 51(2), 375-399.

<https://doi.org/10.1016/j.jmoneco.2003.04.001>

Dumontaux, N., & Pop, A. (2013). Understanding the market reaction to shockwaves: Evidence from the failure of Lehman Brothers. *Journal of Financial Stability*, 9(3), 269-286.

doi:10.1016/j.jfs.2013.04.001

<https://doi.org/10.1016/j.jfs.2013.04.001>

Eling, M., & Schmit, J. T. (2012). Is there market discipline in the European insurance industry? An analysis of the German insurance market. *The Geneva Risk and Insurance Review*, 37(2), 180-207.

<https://doi.org/10.1057/grir.2011.8>

Elliott, D., Kroeber, A., & Qiao, Y. (2015). Shadow banking in China: A primer. *Economic Studies at Brookings*, 3(2015), 1-7.

Eniola, A. A., & Entebang, H. (2017). SME managers and financial literacy. *Global Business Review*, 18(3), 559-576.

<https://doi.org/10.1177/0972150917692063>

Fein, M. L. (2013). The shadow banking charade. (15 February). Available at SSRN 2218812.

<https://doi.org/10.2139/ssrn.2218812>

Fueda, I., & Konishi, M. (2007). Depositors' response to deposit insurance reforms: Evidence from Japan, 1990-2005. *Journal of Financial Services Research*, 31(2-3), 101-122.

<https://doi.org/10.1007/s10693-007-0010-7>

Gross, B. (2007). Beware our shadow banking system. *Fortune*, 11, 11-28.

Global Shadow Banking Monitoring Report 2014 (October 2014). Viewed 28 July 2021, [https://www.fsb.org/wp-content/uploads/r\\_141030.pdf?page\\_moved=1](https://www.fsb.org/wp-content/uploads/r_141030.pdf?page_moved=1)

Global Shadow Banking Monitoring Report 2017 (5 March 2018), <https://www.fsb.org/wp-content/uploads/P050318-1.pdf>

Hadad, M. D., Agusman, A., Monroe, G. S., Gasbarro, D., & Zumwalt, J. K. (2011). Market discipline, financial crisis and regulatory changes: Evidence from Indonesian banks. *Journal of Banking & Finance*, 35(6), 1552-1562.

<https://doi.org/10.1016/j.jbankfin.2010.11.003>

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: Sage.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40(3), 414-433.

<https://doi.org/10.1007/s11747-011-0261-6>

Hall, K. (2008). The importance of financial literacy. Paper presented at the Conference on Deepening Financial Capacity in the Pacific Region, Reserve Bank of Australia.

Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. *Annual Review of Economics*, 5(1), 347-373.

<https://doi.org/10.1146/annurev-economics-082312-125807>

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135.

<https://doi.org/10.1007/s11747-014-0403-8>

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In R. R. Sinkovics & P. N. Ghauri (Eds.), *Advances in international marketing* (pp. 277-320). Bingley: Emerald.

[https://doi.org/10.1108/S1474-7979\(2009\)0000020014](https://doi.org/10.1108/S1474-7979(2009)0000020014)

Hess, K., & Feng, G. (2005). Is there market discipline for New Zealand non-bank financial institutions? Waikato Management School, University of Waikato, Hamilton, New Zealand.

<https://doi.org/10.2139/ssrn.761264>

Hess, K., & Feng, G. (2007). Is there market discipline for New Zealand non-bank financial institutions? *Journal of International Financial Markets, Institutions and Money*, 17(4), 326-340.

<https://doi.org/10.1016/j.intfin.2005.11.003>

Hilgert, M. A., Hogarth, J. M. & Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Federal Reserve Bulletin*, 89, 309-322.

Huang, Y., & Wang, X. (2017). Building an efficient financial system in China: A need for stronger market discipline. *Asian Economic Policy Review*, 12(2), 188-205.

<https://doi.org/10.1111/aepr.12173>

Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs*, 44(2), 296-316.  
<https://doi.org/10.1111/j.1745-6606.2010.01170.x>

Iacobucci, D., Saldanha, N., & Deng, X. (2007). A meditation on mediation: Evidence that structural equations models perform better than regressions. *Journal of consumer psychology*, 17(2), 139-153.  
[https://doi.org/10.1016/S1057-7408\(07\)70020-7](https://doi.org/10.1016/S1057-7408(07)70020-7)

Kalra, V., Mathur, H., & Rajeev, P. (2015). Microfinance clients' awareness index: A measure of awareness and skills of microfinance clients. *IIMB Management Review*, 27(4), 252-266.  
<https://doi.org/10.1016/j.iimb.2015.09.002>

Kessler, O., & Wilhelm, B. (2013). Financialisation and the three utopias of shadow banking. *Competition and Change*, 17(3), 248-264.  
<https://doi.org/10.1179/1024529413Z.00000000036>

Khan, M. N., Rothwell, D. W., Cherney, K., & Sussman, T. (2017). Understanding the financial knowledge gap: A new dimension of inequality in later life. *Journal of Gerontological Social Work*, 60(6-7), 487-503.  
<https://doi.org/10.1080/01634372.2017.1317311>

Kobayashi, A. (2007), "Chapter 22 Market discipline by CD holders: Evidence from Japan with a comparison to the US", Kim, S.-J. and McKenzie, M.D. (Ed.) *Asia-Pacific Financial Markets: Integration, Innovation and Challenges* (International Finance Review, Vol. 8), Emerald Group Publishing Limited, Bingley, pp. 471-495.  
[https://doi.org/10.1016/S1569-3767\(07\)00022-2](https://doi.org/10.1016/S1569-3767(07)00022-2)

Kozłowski, Ł. (2016). Cooperative banks, the internet and market discipline. *Journal of Co-operative Organization and Management*, 4(2), 76-84.  
<https://doi.org/10.1016/j.jcom.2016.08.002>

Levitin, A. J. (2016). Safe banking: Finance and democracy. *University of Chicago Law Review*, 83(1), 357-455.

Llewellyn, D. T. (2005). Inside the 'black box' of market discipline. *Economic Affairs*, 25(1), 41-47.  
<https://doi.org/10.1111/j.1468-0270.2005.00538.x>

Llewellyn, D. T., & Mayes, D. G. (2003) The role of market discipline in handling problem banks. *Bank of Finland Discussion Papers 21/2003*. Suomen Pankki Bank of Finland  
Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52, 5-44.  
<https://doi.org/10.1257/jel.52.1.5>

Lusardi, A., Mitchell, O. S., & Curto, V. (2014). Financial literacy and financial sophistication in the older population. *Journal of Pension Economics and Finance*, 13(4), 347-366.

doi:10.1017/S1474747214000031

<https://doi.org/10.1017/S1474747214000031>

Lusardi, A., & Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics & Finance*, 14(4), 332-368.

<https://doi.org/10.1017/S1474747215000232>

Mason, C. L., & Wilson, R. (2000) Conceptualising financial literacy. Research Series Papers Vol. 7. Loughborough: Loughborough University.

Mandigma, M. B. S. (2013). Relationship of financial capability (FC) with knowledge, skills and attitude: Evidence from Philippine comprehensive university. *World*, 3(3).

McCulley, P. (2007). Teton reflections. *PIMCO Global Central Bank Focus*, 2.

McIntyre, M. L., & Zhang, Y. (2019). Depositors' discipline, banks' accounting discretion, and depositors' expectations of implicit government guarantees. *Journal of Banking Regulation*, 1-22.

<https://doi.org/10.1057/s41261-019-00110-3>

Min, D. (2014). Understanding the failures of market discipline. *Washington University Law Review*, 92(6), 1421-1501.

Moosa, I. A. (2017). The regulation of shadow banking. *Journal of Banking Regulation*, 18(1), 61-79.

<https://doi.org/10.1057/jbr.2015.8>

Murata, K., & Hori, M. (2006). Do small depositors exit from bad banks? Evidence from small financial institutions in Japan. *The Japanese Economic Review*, 57(2), 260-278.

<https://doi.org/10.1111/j.1468-5876.2006.00363.x>

Nitzl, C., Roldan, J. L., & Cepeda, G. (2016). Mediation analysis in partial least squares path modeling. *Industrial Management & Data Systems*, 116(9), 1849-1864.

<https://doi.org/10.1108/IMDS-07-2015-0302>

Önder, Z., & Özyildirim, S. (2008). Market reaction to risky banks: Did generous deposit guarantee change it? *World Development*, 36(8), 1415-1435.

<https://doi.org/10.1016/j.worlddev.2007.08.007>

Pozsar, Z., Adrian, T., Ashcraft, A., & Boesky, H. (2010). Shadow banking. Federal Reserve Bank of New York Staff Report 458, 3-9.



<https://doi.org/10.2139/ssrn.1645337>

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731.

<https://doi.org/10.3758/BF03206553>

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879-891.

<https://doi.org/10.3758/BRM.40.3.879>

Priyadharshini, S. H. (2017). From financial literacy to financial well being: A study of the level of financial literacy of women teaching faculty in educational institutions in Coimbatore region. Doctoral dissertation, Bharathiar University, Coimbatore.

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2018). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, 1-27.

<https://doi.org/10.1080/09585192.2017.1416655>

Robb, C. A., & Woodyard, A. S. (2011). Financial Knowledge and Best Practice Behavior. *Journal of Financial Counseling and Planning*, 22(1), 60-70.

<https://doi.org/10.4148/jft.v3i1.1453>

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105-115.

<https://doi.org/10.1016/j.jfbs.2014.01.002>

Sherraden, M. S. (2013). Building blocks of financial capability. *Financial education and capability: Research, education, policy, and practice*, 3-43.

<https://doi.org/10.1093/acprof:oso/9780199755950.003.0012>

Shahryar, S., & Tan, S. T. (2014). Spending behaviour of a case of Asian university students. *Asian Social Science*, 10(2), 64-69.

<https://doi.org/10.5539/ass.v10n2p64>

Sohn, S.-H., Joo, S.-H., Grable, J. E., Lee, S., & Kim, M. (2012). Adolescents' financial literacy: The role of financial socialisation agents, financial experiences, and money attitudes in shaping financial literacy among South Korean youth. *Journal of Adolescence*, 35(4), 969-980.

<https://doi.org/10.1016/j.adolescence.2012.02.002>

Soma, A. M., Primiana, I., Wiryono, S. K. & Febrian, E. (2016). Determinant analysis of financial literacy affecting market discipline performance. *International Journal of Economics, Commerce and Management*, IV, 75-97.

Stephanou, C. (2010). Rethinking market discipline in banking: Lessons from the financial crisis. Policy Research Working Paper 5227, World Bank.  
<https://doi.org/10.1596/1813-9450-5227>

Syarifuddin, F. (2020). The scope, prospects and implications of new forms of financial intermediation for monetary policy in ASEAN economies.

Thiratanapong, N. (2007). Market discipline in banking: Evidence from Thailand during the 1997 crisis. *Applied Economics Letters*, 14(8), 559-563.  
<https://doi.org/10.1080/13504850600592424>

Volpe, R. P., Kotel, J. E., & Chen, H. (2002). A survey of investment literacy among online investors. *Journal of Financial Counseling and Planning*, 13(1), 1-13.

Widdowson, D., & Hailwood, K. (2007). Financial literacy and its role in promoting a sound financial system. *Reserve Bank of New Zealand Bulletin* 70.

Wulandari, P. (2019). Enhancing the role of Baitul Maal in giving Qardhul Hassan financing to the poor at the bottom of the economic pyramid: Case study of Baitul Maal wa Tamwil in Indonesia. *Journal of Islamic Accounting and Business Research*, 10(3), 382-391.  
<https://doi.org/10.1108/JIABR-01-2017-0005>

Yilmaz, E., & Muslumov, A. (2008). Deposit insurance and moral hazard problem: The case of Turkish banking system. *Applied Economics*, 40(16), 2147-2163.  
<https://doi.org/10.1080/00036840600949306>

Zhao, X., Lynch Jr, J. G. & Chen, Q (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2) 197-206.  
<https://doi.org/10.1086/651257>