



# “Assessing the Islamic banking contribution to financial stability in Indonesia: A non-linear approach”

## AUTHORS

Faaza Fakhrunnas   
Mohammad Bekti Hendrie Anto 

## ARTICLE INFO

Faaza Fakhrunnas and Mohammad Bekti Hendrie Anto (2023). Assessing the Islamic banking contribution to financial stability in Indonesia: A non-linear approach. *Banks and Bank Systems*, 18(1), 150-162.  
doi:[10.21511/bbs.18\(1\).2023.13](https://doi.org/10.21511/bbs.18(1).2023.13)

## DOI

[http://dx.doi.org/10.21511/bbs.18\(1\).2023.13](http://dx.doi.org/10.21511/bbs.18(1).2023.13)

## RELEASED ON

Monday, 27 March 2023

## RECEIVED ON

Saturday, 21 January 2023

## ACCEPTED ON

Tuesday, 21 March 2023

## LICENSE



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

## JOURNAL

"Banks and Bank Systems"

## ISSN PRINT

1816-7403

## ISSN ONLINE

1991-7074

## PUBLISHER

LLC “Consulting Publishing Company “Business Perspectives”

## FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

40



NUMBER OF FIGURES

3



NUMBER OF TABLES

5

© The author(s) 2023. This publication is an open access article.



## BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"  
Hryhorii Skovoroda lane, 10,  
Sumy, 40022, Ukraine  
[www.businessperspectives.org](http://www.businessperspectives.org)

**Received on:** 21<sup>st</sup> of January, 2023

**Accepted on:** 21<sup>st</sup> of March, 2023

**Published on:** 27<sup>th</sup> of March, 2023

© Faaza Fakhrunnas, Mohammad Bekti Hendrie Anto, 2023

Faaza Fakhrunnas, Ph.D., Assistant Professor, Faculty of Business and Economics, Department of Economics, Universitas Islam Indonesia, Indonesia. (Corresponding author)

Mohammad Bekti Hendrie Anto, Ph.D., Associate Professor, Faculty of Business and Economics, Department of Economics, Universitas Islam Indonesia, Indonesia.



This is an Open Access article, distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Conflict of interest statement:**

Author(s) reported no conflict of interest

Faaza Fakhrunnas (Indonesia), Mohammad Bekti Hendrie Anto (Indonesia)

# ASSESSING THE ISLAMIC BANKING CONTRIBUTION TO FINANCIAL STABILITY IN INDONESIA: A NON-LINEAR APPROACH

## Abstract

Islamic banks have become alternative intermediary institutions in the banking industry and are expected to play a significant role in the financial system. Therefore, this study aims to examine Islamic banks' contribution to financial stability, also focusing on the underlying contracts implemented in financing activities from the perspective of a non-linear relationship. The study employs time-series data from 2006m1 to 2021m11 and adopts non-linear autoregressive distributed lag (NARDL). The findings reveal that the presence of Islamic banks has a non-linear influence on financial stability. Overall financing has a symmetric effect on financial stability, but an asymmetric effect is evident when total financing is categorized based on underlying contracts. Moreover, in the short run, musharakah financing strengthens financial stability, while during a long-run relationship mudarabah financing plays the most pivotal role in increasing the level of stability in the banking system. The study proposes that the financial authorities should be concerned with the non-linear symmetric and asymmetric relationships with Islamic banks, particularly in the underlying contracts that the banks employ. This is considered to be important to avoid financial instability in the banking system.

## Keywords

Islamic bank, NARDL, financial stability, underlying contract

## JEL Classification

E60, G20, G21

## INTRODUCTION

As intermediary institutions, Islamic banks play a vital role in channeling funds from surplus to deficit units. The financing process is also expected to contribute to economic development and growth in society (Ahmed, 2010). At the same time, financial stability at the banking system levels needs to be achieved and maintained in order to make an optimum contribution to the financial system. However, stability in the financial system is not only the responsibility of a single financial institution, but also of all financial players within it. These include Islamic and conventional banks, together with the financial authority that develops monetary policy (Uddin et al., 2017).

With regard to their business model, Islamic banks are different from their counterparts, conventional banks. The Islamic banking business model is based on a free-interest paradigm and the promotion of transaction and profit-loss sharing (PLS) contracts (Ahmed, 2010; Miah & Suzuki, 2020). Many empirical studies have been conducted on Islamic banking stability from several perspectives. Firstly, recent studies on financial stability at the banking level have attracted many Islamic scholars, whose research findings vary. Olson and Zoubi (2017), Trad et al. (2017), Hassan et al. (2019), Louhichi et al. (2019), Asutay and Othman (2020), Safiullah (2021), and Bilgin et al. (2021)

found that Islamic banks are more stable than conventional ones. Conversely, Mohamad et al. (2018), Albaity et al. (2019), and Kasri and Azzahra (2020) explain that conventional banks are stronger than Islamic ones in terms of financial stability. However, Uddin et al. (2017) conclude that both types of banks show no differences in banking stability.

Secondly, studies have examined the contribution of Islamic banks to financial stability; for example, Rashid et al. (2017), Ghassan and Guendouz (2019), Rizvi et al. (2020), and Chen (2022). Generally, research has found that Islamic banks have contributed to financial stability to practically the same extent as conventional banks. However, most recent studies are only concerned with how Islamic banks strengthen or weaken financial stability, assuming that the effect of the influence is linear and symmetric.

As explained by Bussiere (2012) and Fakhrunnas et al. (2022), a non-linear effect is present when observing the relationship between economic variables. It indicates that the influence of certain variable to another variable does not increase or decrease constantly but it fluctuates in which in certain observation period the impact may be exponential. Therefore, the study aims to investigate the contribution of Islamic banks to financial stability from the perspective of a non-linear relationship.

The significance of the study is twofold. Firstly, for the Islamic banking practitioners, the study explains the contribution of Islamic banks to financial stability. Banks can identify and evaluate which factors strengthen or weaken the financial stability for the betterment of financial system. Secondly, the study is significant to financial authorities to select the factors that contribute or not contribute to financial stability, particularly from the Islamic banks' financing side. Hence, it is necessary to create suitable regulations to achieve and maintain financial stability with limiting and promoting the least and the most contributed factors respectively.

---

## 1. LITERATURE REVIEW AND HYPOTHESES

In the financial system, stability is a pivotal factor that provides many opportunities to financial institutions to grow and develop. Therefore, all financial players benefit from such conditions and must also consider their contribution to achieving and maintaining stability (Crockett, 1997; Borio, 2011). As mentioned by Atellu et al. (2021), financial stability is also essential in assessing the soundness of the economic system. Jokipii and Monnin (2013), Beck (2015), and Creel et al. (2015) found that an increase in the level of financial stability contributes positively to economic performance. However, such stability is affected by inflation in the economic system.

In the theory of macroeconomics of banking highlighted by Dia and VanHoose (2017), the banking sector contributes to financial stability. In addition, the financial authorities also attempt to achieve and maintain such stability through necessary monetary policies. Sy and Chan-Lau (2006) add that the authorities could also mitigate

any banking sector instability through the capital requirement policy to protect banks from the risk of default. This also aims to prevent adverse effects on banks during financial turmoil.

Using the theoretical frameworks of Jokipii and Monnin (2013) and Creel et al. (2015), through its financing activities, the banking system contributes to economic growth. In this case, according to the supply lending hypothesis (SLH), society can obtain access to finance in order to conduct business activities when banks provide financing schemes. However, banks must also have appropriate risk management in place to maintain financial stability. Such management should be effectively conducted, particularly in the case of large banks, because these face more risk than small ones (Diamond & Dybvig, 1983).

In the case of Islamic banks, Abedifar et al. (2013) state that their risk is different from their conventional counterparts. In PLS-based transactions such as *mudarabah* and *musharakah*, risk tends to be higher because the business process depends on business performance and financial circumstanc-

es. Therefore, risk and return are adjusted to the conditions being experienced in relation to business activities. This is different from a sale-based contract (*murabahah*), deferred sale or pre-paid sale (*salam* or *istishna*) or leasing contract (*ijarah*), in which the fixed profit can be agreed upon in the pre-determined contract.

Furthermore, the transactions performed by Islamic banks ascertain the use of money and the movement of tangible goods or services in the economic system. In PLS-based contracts such as *mudarabah* and *musharakah*, the parties involved, including the banks, must have underlying business activities and determine the return based on business performance. In a *murabahah* contract, banks first purchase and then take possession of the asset, before selling it to the customer at the agreed price and profit. Therefore, Ahmed (2010) and Chapra (2011) claim that the business model of Islamic banks makes a high contribution to financial stability in the economic system.

Regarding previous empirical findings, many studies have examined the issue of Islamic banking stability in the financial system. From the first viewpoint, most studies are predominantly only concerned with the issue of stability at the banking level. Adopting this perspective, Olson and Zoubi (2017) state that Islamic banks are slightly better than conventional ones regarding financial stability, particularly during economic turmoil. With reference to the Middle East, Africa and Southeast Asia, they conclude that Islamic banks are more stable because they have better characteristics in managing financial performance. Moreover, they believe that the main factor determining stability is financial performance, rather than the type of a bank. They emphasize that Islamic banks are more stable at the banking level than their conventional counterparts, as also argued by Trad et al. (2017), Hassan et al. (2019), Louhichi et al. (2019), Asutay and Othman (2020), Safiullah (2021), and Bilgin et al. (2021).

However, Kasri and Azzahra (2020) obtained different results, concluding that conventional banks are more stable than Islamic ones. This is supported by Mohamad et al. (2018) and Albaity et al. (2019). The different viewpoints are based on the findings that conventional banks are less

risky than Islamic ones because the latter tend to provide more financing compared to total assets (Mohamad et al., 2018). In addition, Islamic banks also employ certain financing contracts that need extra oversight due to the potential presence of asymmetric information, especially in PLS-based contracts. When banks face higher risk and the Islamic bank governance role in implementing oversight activity is not performed as it should be, instability at the banking level may quickly occur.

Furthermore, Uddin et al. (2017) reveal that Islamic and conventional banks have the same performance in terms of financial stability. The argument behind this conclusion relies on the implementation of both banks' business models in a relatively similar market. This is in line with the findings of Chong and Liu (2009), who conclude that Islamic and conventional banks still rely on interest rates to determine returns and prices. In funding and financing activities, a high reliance on interest rates means Islamic banks face the same risk as conventional ones; for example, interest rate movement may affect the pricing and profit-taking benchmark. Therefore, Aysan and Ozturk (2018) also emphasize that Islamic banks still do not have a robust mechanism to address financial risks during financial turmoil.

From the second perspective, some studies focus on Islamic banks' contribution to financial stability. However, all these adopt a linear and symmetric approach to investigating the stability of Islamic banks and their contribution to the financial system. For instance, Rashid et al. (2017) found that in the case of Pakistan, the levels of the contribution of Islamic and conventional banks were different. Islamic banks contribute more significantly for several reasons:

- 1) they adopt the shariah code of conduct, which prohibits interest-based financial transactions; and
- 2) Islamic banks find it more prudent due to avoid excessive risk (*gharar*), which is prohibited in Islamic principles.

The same findings were also made by Ghassan and Fachin (2016), who adopted a time-series approach in the case of the Saudi Arabian banking

industry, focusing on times of financial turmoil. Large Islamic banks contribute much more to financial stability than other banking types. Their unique business model is argued to be the reason for this. However, the heterogeneity of banking performance also plays a significant role in contributing or not to banking stability. In addition, Ghassan and Guendouz (2019) stress that the diversification of Islamic banking assets increases their contribution to financial stability. The similar results were also obtained by Ali et al. (2020) in the case of Indonesia and Malaysia, Hassan et al. (2021) in Pakistan, and Ashraf et al. (2016) in GCC region.

In the case of Indonesia, Rizvi et al. (2020) also found that Islamic banks contribute to financial stability. Even though the market share of such banks remains small, their growth and development are consistent and have significantly increased. Through lending and liability, Islamic banks increase the level of stability in the banking system. In other words, the growth and development of Islamic banks increase the financial stability of the banking system. Moreover, Chen (2022) adds that according to the financial cointegration theory, the interconnectedness of banks might endanger financial stability because bankruptcy in certain banks creates a negative effect on others.

With considering the development of current literatures above-mentioned as well as to provide a novel insight, the purpose of the study is to assess the non-linear relationship of Islamic banking contribution to financial stability. The study formulates the following hypotheses:

*H1a: Islamic banks' financing has significant relationship to financial stability.*

*H1b: Mudarabah, musharakah, murabahah and other financing contracts in Islamic banks have significant relationship to financial stability.*

## 2. METHODS

To examine the Islamic banking contribution to financial stability, data were retrieved from

the Indonesian Financial Service Authority/Otoritas Jasa Keuangan (OJK), the Central Bank of Indonesia, and the Indonesian Central Bureau of Statistics. Monthly time-series data were employed from January 2006 to November 2021. In addition, the ZSCORE was used as a dependent variable to measure financial stability. Independent variables comprised Islamic bank financing (IBFIN), *murabahah* financing (MUR), *musharakah* financing (MUS), *mudarabah* financing (MUD), and other Islamic contract financing (OTHER). Conventional bank financing (CBFIN), the interest rate (INT), inflation rate (INF), and production index (PI) were used as the complementary variables.

**Table 1.** Definition of variables

Variable	Definition	Data Source
ZSCORE	Log of the sum of return on assets and equity to total assets, all are divided by the standard deviation of return on assets	OJK
IBFIN	Log of Islamic bank total financing	OJK
MUR	Log of Islamic bank <i>murabahah</i> financing	OJK
MUS	Log of Islamic bank <i>musharakah</i> financing	OJK
MUD	Log of Islamic bank <i>mudarabah</i> financing	OJK
OTHER	Log of Islamic bank financing from other contracts	OJK
CBFIN	Log of conventional bank financing	OJK
INT	Percentage of the Central Bank of Indonesia's overnight interest rate	Central Bank of Indonesia
INF	Indonesian inflation rate	Indonesian statistics
PI	The number of the production index in Indonesia	Indonesian statistics

Adopting the theory of financial stability proposed by Crockett (1997) and Borio (2011), the general model of the study was as follows:

$$FS_t = a_0 + a_1 IB_t + a_2 X_t + e_t, \quad (1)$$

where  $a_0$  is a constant, and  $a_1$  to  $a_2$  is the coefficient of the exogenous variables. In addition,  $FS_t$  reflects the financial stability at time  $t$  proxied by the ZSCORE, while  $IB_t$  expresses the presence of Islamic banks at time  $t$ , as reflected by their financing activities.  $X_t$  refers to the complementary variables, consisting of conventional bank financ-

ing, the interest rate, inflation, and production index at time  $t$ , while  $\epsilon_t$  is the error term.

Furthermore, non-linear autoregressive distributed lag (NARDL), proposed by Shin et al. (2014), was adopted to examine the presence of non-linear symmetric or asymmetric movements on the impact of the independent variables on financial stability. In using the NARDL approach, the first equation assessed was as follows:

$$\begin{aligned} \Delta FS_t = & a_0 + a_1 \Delta FS_{t-1} + a_2 \Delta IB_{t-1} + \\ & + a_3 \Delta CBFIN_{t-1} + a_4 \Delta Int_{t-1} + a_5 \Delta Inf_{t-1} + \\ & + a_6 \Delta PI_{t-1} + \sum_{i=1}^n \theta_{1i} \Delta FS_{t-1} + \\ & + \sum_{i=1}^n \theta_{2i} \Delta IB_{t-1} + \sum_{i=1}^n \theta_{3i} \Delta CBFIN_{t-1} + \\ & + \sum_{i=1}^n \theta_{4i} \Delta Int_{t-1} + \sum_{i=1}^n \theta_{5i} \Delta Inf_{t-1} + \\ & + \sum_{i=1}^n \theta_{6i} \Delta PI_{t-1} + \mu_t, \end{aligned} \tag{2}$$

where

$$\Delta IB_{t-1} = \Delta POSIBFIN_{t-1} + \Delta NEGIBFIN_{t-1}. \tag{3}$$

POS stands for the accumulation of an additional increase in the change in variables, while NEG represents the accumulation of an additional decrease in the change.

Equation (2) was the first model for the study that aimed to examine the influence of Islamic banks on financial stability in terms of non-linear symmetric or asymmetric relationships. The study also utilized a second model that investigated the impact of different modes of financing contracts on financial stability, namely *musharakah*, *mudarabah*, and *murabahah*, and other financing contracts implemented in Islamic banking in order to deepen understanding.

$$\begin{aligned} \Delta FS_t = & a_0 + a_1 \Delta FS_{t-1} + a_2 \Delta IB_{t-1} + \\ & + a_3 \Delta CBFIN_{t-1} + a_4 \Delta Int_{t-1} + a_5 \Delta Inf_{t-1} + \\ & + a_6 \Delta PI_{t-1} + \sum_{i=1}^n \theta_{1i} \Delta FS_{t-1} + \\ & + \sum_{i=1}^n \theta_{2i} \Delta IB_{t-1} + \sum_{i=1}^n \theta_{3i} \Delta CBFIN_{t-1} + \\ & + \sum_{i=1}^n \theta_{4i} \Delta Int_{t-1} + \sum_{i=1}^n \theta_{5i} \Delta Inf_{t-1} + \\ & + \sum_{i=1}^n \theta_{6i} \Delta PI_{t-1} + \mu_t, \end{aligned} \tag{4}$$

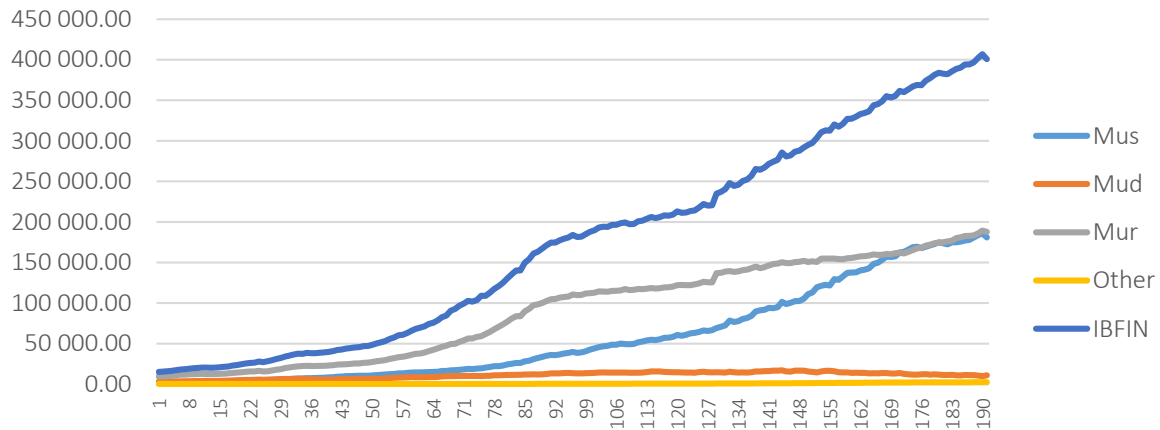
$$\begin{aligned} \Delta IB_{t-1} = & \Delta POSMUS_{t-1} + \Delta NEGMUS_{t-1} + \\ & + \Delta POSMUD_{t-1} + \Delta NEGMUD_{t-1} + \\ & + \Delta POSMUR_{t-1} + \Delta NEGMUR_{t-1} + \\ & + \Delta POSOTHER_{t-1} + \Delta NEGOTHER_{t-1} + \\ & + \Delta POSIBSIZE_{t-1} + \Delta NEGIBSIZE_{t-1}. \end{aligned} \tag{5}$$

As explained by Shin et al. (2014), NARDL analysis starts with a unit root test, in which augmented Dickey-Fuller (ADF) and Philip-Perron (PP) approaches, as proposed by Dickey and Fuller (1979) and Phillips and Perron (1988) respectively, can be adopted. The stationary level of the variables must be different in level or 1<sup>st</sup> level of difference. When the stationary level is achieved, it already fulfils the requirement to adopt the NARDL approach. Subsequently, the cointegration test is conducted, as proposed by Pesaran et al. (2001). The  $H_0$  cointegration test states that it has no cointegration. Finally, to examine non-linear symmetric or asymmetric influence, Sriyana and Ge (2019) suggest applying Wald-test statistics, in which the  $H_0$  explains the symmetric relationship. In addition, to examine the stability of the parameters, the CUSUM of squares stability test was conducted at the 5% level of significance.

### 3. RESULTS

Table 2 shows data descriptions from the observed variables. It is indicated that the average ZSCORE during the observation period was 5.56. Table 2 also shows that the financing and asset size of Islamic banks are much lower than conventional banks. This demonstrates that conventional banks still have a dominant share of the market and business activities in the Indonesian banking industry. In addition, Figure 1 shows that financing activities of Islamic banks are still dominated by sales-based financing (*murabahah*), which is higher than equity-based financing (*musharakah* and *mudarabah*).

Furthermore, as a preliminary step, a unit root test was conducted to examine whether or the requirement of NARDL proposed by Shin et al. (2014) could be fulfilled. According to Table 3, using the unit root approach proposed by Dickey and Fuller (1979) and Phillips and Perron (1988), MUR, INT, INF and PI variables are stationary in level, while the others are stationary in the first differ-



Note: The number on horizontal line explains the period of observation.

Figure 1. Islamic financing based on underlying contracts (in IDR billion)

Table 2. Data description

Variable	Mean	Med	Max	Min	Std. dev.
ZSCORE	5.56	5.36	11.87	1.81	1.42
IBFIN (IDR Bn)	131256	144981	250698	15042	76222.21
MUD (IDR Bn)	10882.04	11790	17090	3105	4016.21
MUR (IDR Bn)	92168.44	109803.1	189285.8	9456	58959.41
MUS (IDR Bn)	59416.34	38685	185938	1745	58043.9
OTHER (IDR Bn)	866.26	551.23	2453.28	282	688.02
CBFIN (IDR Bn)	3031819	3103492	5553170	663843	1647194
INF (%)	5.43	4.50	17.92	1.32	3.31
INT (%)	6.62	6.50	12.75	3.50	2.02
PI (Index)	125.34	126.36	158	92.32	12.75

ence. This means that there is a different level of stationary in the models, which indicates that the requirement of the NARDL test is fulfilled.

Table 4 shows that the independent variables can explain 49% to 58% of the dependent variables in all the models. Moreover, according to the Wald test statistics, the independent variables simultaneously have a non-linear symmetric relation-

ship with the dependent variables in model 1 and a non-linear asymmetric relationship in model 2. This means that an additional increase in the change in the independent variables does not have the symmetric influence on the dependent variables when it has an additional decrease in change in model 2. Moreover, a long-run relationship also exists with reference to the Wald cointegration test, which is significant in all the models.

Table 3. Unit root test results

Variable	In Level		1 <sup>st</sup> Difference		Conclusion
	ADF	PP	ADF	PP	
ZSCORE	-0.465	-0.698	-16.14***	-33.62***	1 <sup>st</sup> Difference
IBFIN	-0.84	-0.94	-12.29***	-12.39***	1 <sup>st</sup> Difference
MUR	-1.34	-5.27***	-11.41***	-98.24***	In Level
MUD	-0.36	-0.28	-11.55***	-11.22***	1 <sup>st</sup> Difference
MUS	-0.07	-0.21	-12.38***	-12.40***	1 <sup>st</sup> Difference
OTHER	-1.11	-1.22	-14.16***	-14.34***	1 <sup>st</sup> Difference
CBFIN	-0.30	0.89	-2.59	-14.55***	1 <sup>st</sup> Difference
INT	-2.75***	-2.52**	-7.44***	-7.83***	In Level
INF	-2.64***	-2.73***	-9.13***	-10.89***	In Level
PI	-1.75	-2.60*	-13.40***	-21.47	In Level

Note: \*\*\*, \*\* and \* indicate significance levels of 1%, 5% and 10%, respectively.

**Table 4.** Results of short-run relationships

Variable	Model 1		Model 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
D(ZSCORE(-1))	-0.119	-1.155	-0.123	-1.252
D(ZSCORE(-2))	0.006	0.064	-0.046	-0.523
D(ZSCORE(-3))	0.163**	2.192	0.124	1.644
D(IBFIN_POS)	-7.818	-1.147	-	-
D(IBFIN_POS(-1))	5.243	0.774	-	-
D(IBFIN_POS(-2))	8.749	1.283	-	-
D(IBFIN_POS(-3))	-23.733***	-3.560	-	-
D(IBFIN_NEG)	7.715**	2.163	-	-
D(IBFIN_NEG(-1))	-1.342	-0.371	-	-
D(IBFIN_NEG(-2))	3.224	0.887	-	-
D(IBFIN_NEG(-3))	-1.791	-0.515	-	-
D(LNMUS_POS)	-	-	6.208	1.168
D(MUS_POS(-1))	-	-	7.177	1.377
D(MUS_POS(-2))	-	-	13.092**	2.573
D(MUS_POS(-3))	-	-	-7.216	-1.347
D(MUS_NEG)	-	-	-29.087	-1.256
D(MUS_NEG(-1))	-	-	80.468***	3.197
D(MUS_NEG(-2))	-	-	22.793	0.902
D(MUS_NEG(-3))	-	-	24.231	0.950
D(MUD_POS)	-	-	-7.285	-1.077
D(MUD_POS(-1))	-	-	4.277	0.601
D(MUD_POS(-2))	-	-	-0.381	-0.058
D(MUD_POS(-3))	-	-	3.107	0.465
D(MUD_NEG)	-	-	9.812	1.203
D(MUD_NEG(-1))	-	-	5.989	0.701
D(MUD_NEG(-2))	-	-	8.217	0.955
D(MUD_NEG(-3))	-	-	10.682	1.312
D(MUR_POS)	-	-	11.868	1.422
D(MUR_POS(-1))	-	-	5.175	0.612
D(MUR_POS(-2))	-	-	-3.930	-0.489
D(MUR_POS(-3))	-	-	-21.532***	-2.768
D(MUR_NEG)	-	-	53.027**	1.976
D(MUR_NEG(-1))	-	-	-22.901	-0.857
D(MUR_NEG(-2))	-	-	-29.260	-1.068
D(MUR_NEG(-3))	-	-	38.817	1.434
D(OTHER_POS)	-	-	-10.117*	-1.819
D(OTHER_POS(-1))	-	-	6.938	1.207
D(OTHER_POS(-2))	-	-	-3.047	-0.552
D(OTHER_POS(-3))	-	-	-2.120	-0.379
D(OTHER_NEG)	-	-	13.942**	2.363
D(OTHER_NEG(-1))	-	-	-18.097***	-3.054
D(OTHER_NEG(-2))	-	-	-7.536	-1.263
D(OTHER_NEG(-3))	-	-	-12.837**	-2.014
D(CBFIN)	27.958***	3.696	-0.230	-0.276
D(CBFIN(-1))	5.673	0.763	-1.891**	-2.381
D(CBFIN(-2))	2.572	0.343	-1.636**	-2.082
D(CBFIN(-3))	1.296	0.169	-1.700	-2.170
D(INT)	-0.303	-0.496	0.152	0.233
D(INT(-1))	-0.763	-1.103	0.015	0.020
D(INT(-2))	1.345*	1.949	0.939	1.263
D(INT(-3))	-0.731	-1.205	-0.263	-0.412
D(INF)	-0.080	-0.668	-0.042	-0.346
D(INF(-1))	0.077	0.606	0.022	0.175
D(INF(-2))	0.010	0.078	-0.166	-1.237
D(INF(-3))	0.075	0.588	0.083	0.584
D(PI)	-0.013	-0.765	-0.019	-1.045
D(PI(-1))	-0.012	-0.724	-0.029	-1.476
D(PI(-2))	-0.008	-0.461	-0.019	-0.993
D(PI(-3))	0.012	0.764	-0.002	-0.134
CointEq(-1)*	-0.537***	-5.182	-0.661***	-6.539
R-squared		0.490		0.577
Cointegration Test		3.209***		2.757***
Asymmetric Test		0.499		1.830*

Note: \*\*\*, \*\* and \* indicate significance levels of 1%, 5% and 10%, respectively.



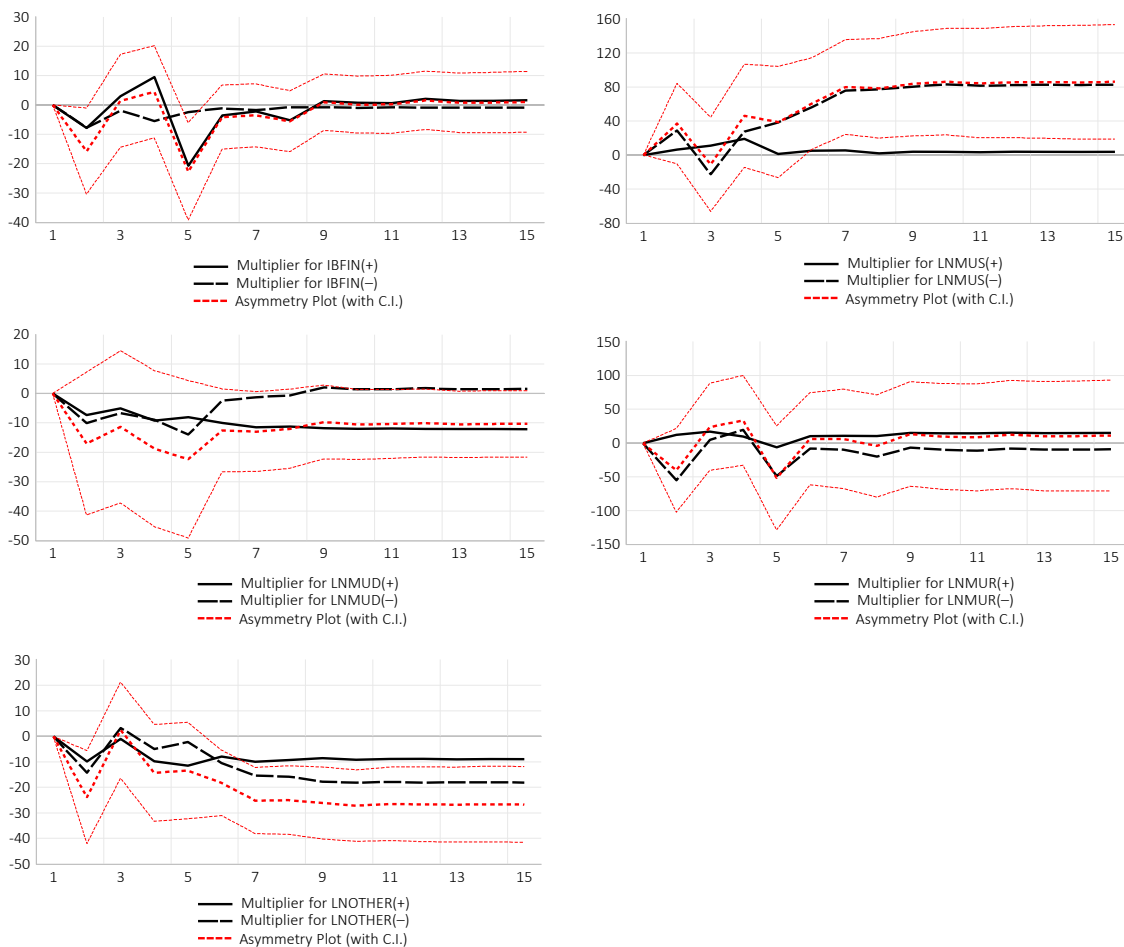
**Table 5.** Long-run relationships

Variable	Model 1		Model 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
IBFIN_POS	1.275	0.313	–	–
IBFIN_NEG	1.081	0.391	–	–
MUS_POS	–	–	3.710	0.773
MUS_NEG	–	–	-78.763**	-2.154
MUD_POS	–	–	-11.005	-1.485
MUD_NEG	–	–	-1.646	-0.537
MUR_POS	–	–	13.890***	2.415
MUR_NEG	–	–	8.551	0.201
OTHER_POS	–	–	-8.580**	-2.193
OTHER_NEG	–	–	17.552***	2.626
CBFIN	-1.752	-0.265	1.593*	1.682
INT	-0.145	-0.487	0.354	0.875
INF	0.031	0.204	-0.070	-0.451
PI	0.014	0.572	0.013	0.318
C	26.638	0.319	-10.238	-1.212

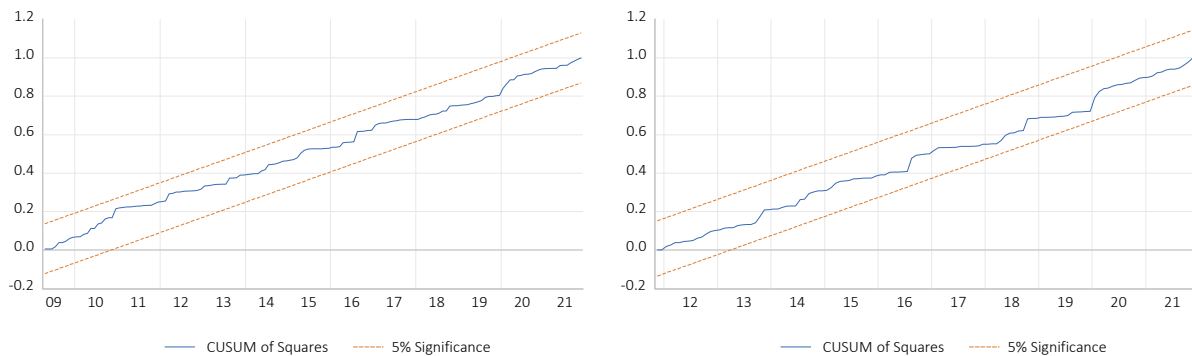
Note: \*\*\*, \*\* and \* indicate significance levels of 1%, 5% and 10%, respectively.

In the short-run relationship, the results of model 1 indicate that an additional increase in the financing of Islamic banks has a negative and significant relationship with financial stability. On the other hand, an additional decrease in the change

in Islamic bank financing has a positive and significant relationship with financial stability. This finding indicates that Islamic banks contribute to financial stability, which is in line with Ghassan and Guendouz (2019) and Rizvi et al. (2020).



**Figure 2.** Influence of Islamic bank financing on financial stability



**Figure 3.** CUSUM of the square stability test

In model 2, in the short-run relationship an additional increase in the change in *musharakah* financing increased financial stability. This influence is shown by a positive and significant relationship between LNMUS\_POS and ZSCORE, which also occurs with LNMUS\_NEG. Moreover, additional increases and decreases in the change in *murabahah* financing decreased and increased financial stability respectively. Other financing activities also experienced the same significant influences and directions.

In the long-run perspective, as shown in Table 5, it is demonstrated that in general an additional increase or decrease in the change in financing activities in Islamic banks does not have a significant relationship with financial stability. All complementary variables, including conventional bank financing, evidently do not influence financial stability. However, the results differ when financing activities are separated, as in model 2.

To examine the influence of independent Islamic bank financing and the types of underlying contracts used in financing activities, Figure 2 shows how financing activities affect banking system stability over the observed period. In the figure, it can be seen that the impact is non-linear. All of the figures also demonstrate that the influence of IBFIN on financial stability is symmetric, while others are asymmetric.

Furthermore, a CUSUM of Square Stability test (as shown in Figure 3), adapted from Sriyana and Ge (2019), was conducted to check the stability of the models. According to the results of the test with a 5% level of significance, as indicated in Figure 2, both models possess stable parameters, which shows that the results can be considered to be robust.

## 4. DISCUSSION

According to the short-run results, when banks add more financing to the deficit units, the level of financial stability worsens. This possibly indicates that although Islamic banks have a different business model, as explained by Rashid et al. (2017) and Olson and Zoubi (2017), financing activities continue to underperform. This may be caused by the performance of Islamic bank financing, which is still mimicking conventional banks by relying on the interest rate to be used as a benchmark (Chong & Liu, 2009). As a result, Islamic banks have more exposure to interest rate risks, which may increase financing risk. Moreover, as stated by Olson and Zoubi (2017), good governance is still an issue in Islamic bank performance. Therefore, this needs to be improved to ensure a level of banking performance which can finally contribute to financial stability in the banking industry.

To identify in detail which financing activities contribute to financial stability, it is necessary to investigate which contracts are used by Islamic banks in such activities as it is explained in model 2. The findings indicate that different financing contract characteristics affect financial stability in the banking system differently. This is in line with Abedifar et al. (2013), who state that different underlying contracts face their own risk, meaning that each contract has diverse risk exposure levels, particularly in financing activities. The results also demonstrate that PLS-based contracts, reflected by *musharakah* financing, increase financial stability in the short run, consequently increasing stability in the banking system. However, when the amount of *musharakah* financing decreases,

the financial system is more stable. This also means that an asymmetric effect is present in the impact of *musharakah* financing on financial stability.

This finding explains that some financing issues persist because banks may need to address the issue of governance in financing activities, as explained by Abedifar et al. (2013) and Olson and Zoubi (2017). The role of good governance, particularly the supervisory role in *musharakah* financing activities, remains necessary to address the issue of asymmetric information. When this issue is resolved, as stated by Ahmed (2010) and Chapra (2011), it is believed that PLS-based contracts can adjust risk during times of economic boom and turmoil.

Moreover, sales-based financing contracts, exemplified by *murabahah* and other types of financing, show that such financing tends to decrease financial stability in the short run. Therefore, a lower amount of sale-based financing in the short run will increase the stability of the financial system. As found by Chong and Liu (2009), the use of interest rates as a benchmark to determine the fixed profits may be a possible reason why sale-based financing has more exposure to more risk and increases instability in the banking system. As Chapra (2011) states, undertaking interest-based transactions makes financial institutions much more vulnerable to financial shock, which also worsens financial stability.

In the long run, an additional decrease in the change in *musharakah* financing has a significant negative relationship with financial stability. The findings reflect that PLS has influenced financial stability in the banking system, but the direction is negative, meaning that stability tends to worsen when PLS-based financing is

presence in the banking system. This is in line with Rashid et al. (2017), Ghassan and Fachin (2016), and Rizvi et al. (2020).

Chapra (2011) claims that by adopting PLS-based financing, banks can strengthen their financial stability because contracts are considered fairer and provide equitable profit and loss sharing. However, Abedifar et al. (2013) also argue that PLS-based financing is high risk, as asymmetric information is possibly prevalent among the contracting parties. Moreover, banks may suffer losses when sufficient oversight is not implemented during financial transactions. As Mohamad et al. (2018) stress, insufficient bank supervision during PLS-based contracts can worsen Islamic bank performance, resulting in a high percentage of non-performing financing and finally a shock to banking stability.

In another type financing contract, an additional increase in the change in *murabahah* financing has a positive and significant relationship with financial stability. This finding is similar to those of Rizvi et al. (2020), who argue that the financing activities of Islamic banks, in this case *murabahah* financing, tend to strengthen financial stability. This is possibly because such financing in the Indonesian banking industry is still dominant and is used as an underlying contract.

Moreover, a sale-based contract tends to be more efficient because the oversight activities are less complicated and there is less risk (Abedifar et al., 2013). Therefore, in terms of risk management, banks still tend to implement sale-based financing because profits can be pre-determined, and the method is operationally efficient in supervisory activities. With such advantages, Islamic banks possibly display better performance when performing sales-based financing, which has a positive effect on strengthening financial stability.

---

## CONCLUSION

While the growth of Islamic banking has increased steadily in recent years, its implications for financial stability still need to be investigated. Recognizing its significant role in the future, the study evaluated the contribution of Indonesian Islamic banking to financial stability and arrived at the following conclusions. First, the study found a non-linear and symmetric effect of Islamic banking total financing on financial stability. However, when the total financing is grouped based on the underlying contracts, a non-linear and asymmetric influence on financial stability in the banking system is evident.

Second, hypothesis H1a is accepted, while hypothesis H1b is partly accepted, since the *mudharabah* financing is evidently not significant to financial stability. Specifically, the study found that a positive change in the level of Islamic banking financing negatively affected the level of financial stability, and vice versa, but that this only occurred in the short-run relationship, not the long-run. In other words, the higher the level of financing, the worse the level of financial stability. This indicates that Islamic bank financing is still underperforming and needs better governance and monitoring to improve.

This study implies that when formulating and implementing Islamic bank regulation, financial authorities must consider non-linear symmetric or asymmetric relationships, particularly in underlying financing contracts. This is essential to avoid financial instability in the banking system. Besides recognizing the distinction between conventional and Islamic banks, further distinction between the range of products offered within Islamic banks is also needed. With a potential market of 230 million Indonesian population, Islamic banks in the country need to make continuous efforts, as conventional banks still enjoy the majority of market share and business activities.

## AUTHOR CONTRIBUTIONS

Conceptualization: Faaza Fakhrunnas, Mohammad Bektı Hendrie Anto.

Data curation: Faaza Fakhrunnas.

Formal analysis: Faaza Fakhrunnas.

Funding acquisition: Faaza Fakhrunnas, Mohammad Bektı Hendrie Anto.

Investigation: Faaza Fakhrunnas, Mohammad Bektı Hendrie Anto.

Methodology: Faaza Fakhrunnas.

Project administration: Faaza Fakhrunnas, Mohammad Bektı Hendrie Anto.

Software: Faaza Fakhrunnas.

Supervision: Faaza Fakhrunnas, Mohammad Bektı Hendrie Anto.

Validation: Faaza Fakhrunnas.

Writing – original draft: Faaza Fakhrunnas.

Writing – reviewing & editing: Faaza Fakhrunnas, Mohammad Bektı Hendrie Anto.

## ACKNOWLEDGMENT

The authors gratefully acknowledge the support from Direktorat Penelitian dan Pengabdian Masyarakat (DPPM) Universitas Islam Indonesia No.: 023/ Dir/ DPPM/ 70/ Pen.Unggulan/ XII/ 2022 and for providing a research grant for the study.

## REFERENCES

1. Abedifar, P., Molyneux, P., & Tarazi, A. (2013). Risk in Islamic banking. *Review of Finance*, 17(6), 2035-2096. <https://doi.org/10.1093/rof/rfs041>
2. Ahmed, A. (2010). Global financial crisis: an Islamic finance perspective. *International Journal of Islamic and Middle Eastern Finance and Management*, 3(4), 306-320. <https://doi.org/10.1108/17538391011093252>
3. Albaity, M., Mallek, R. S., & Noman, A. H. M. (2019). Competition and bank stability in the MENA region: The moderating effect of Islamic versus conventional banks. *Emerging Markets Review*, 38, 310-325. <https://doi.org/10.1016/j.ememar.2019.01.003>
4. Ali, M., Haroon, O., Rizvi, S. A. R., & Azmi, W. (2020). Stability versus fragility: New evidence from 84 banks. *Studies in Economics and Finance*, 38(2), 441-453. <https://doi.org/10.1108/SEF-04-2020-0109>
5. Ashraf, D., Ramady, M., & Albinali, K. (2016). Financial fragility of banks, ownership structure and income diversification: Empirical evidence from the GCC region. *Research in International Business and Finance*, 38, 56-68. <https://doi.org/10.1016/j.ribaf.2016.03.010>
6. Asutay, M., & Othman, J. (2020). Alternative measures for predicting financial distress in the case of Malaysian Islamic banks: assessing the impact of global financial crisis. *Journal of Islamic*

- Accounting and Business Research*, 11(9), 1827-1845. <https://doi.org/10.1108/JIABR-12-2019-0223>
7. Atellu, A. R., Muriu, P., & Sule, O. (2021). Do bank regulations matter for financial stability? Evidence from a developing economy. *Journal of Financial Regulation and Compliance*, 29(5), 514-532. <https://doi.org/10.1108/JFRC-12-2020-0114>
  8. Aysan, A. F., & Ozturk, H. (2018). Does Islamic banking offer a natural hedge for business cycles? Evidence from a dual banking system. *Journal of Financial Stability*, 36, 22-38. <https://doi.org/10.1016/j.jfs.2018.02.005>
  9. Beck, T. (2015). Cross-Border Banking and Financial Deepening: The African Experience. *Journal of African Economies*, 24(1), 32-45. <https://doi.org/10.1093/jae/eju028>
  10. Bilgin, M. H., Danisman, G. O., Demir, E., & Tarazi, A. (2021). Economic uncertainty and bank stability: Conventional vs. Islamic banking. *Journal of Financial Stability*, 56, 100911. <https://doi.org/10.1016/j.jfs.2021.100911>
  11. Borio, C. (2011). Rediscovering the macroeconomic roots of financial stability policy: Journey, challenges, and a way forward. *Annual Review of Financial Economics*, 3, 87-117. <https://doi.org/10.1146/annurev-financial-102710-144819>
  12. Bussiere, M. (2012). Exchange Rate Pass-through to Trade Prices: The Role of Nonlinearities and Asymmetries. *Oxford Bulletin of Economics and Statistics*, 75(5), 731-758. <https://doi.org/10.1111/j.1468-0084.2012.00711.x>
  13. Chapra, M. (2011). The global financial crisis: Some suggestions for reform of the global financial architecture in the light of Islamic finance. *Thunderbird International Business Review*, 53(5), 565-579. <https://doi.org/10.1002/tie.20435>
  14. Chen, Y. (2022). Bank Interconnectedness and Financial Stability: The Role of Bank Capital. *Journal of Financial Stability*, 61, 101019. <https://doi.org/10.1016/j.jfs.2022.101019>
  15. Chong, B. S., & Liu, M.-H. (2009). Islamic banking: Interest-free or interest-based? *Pacific-Basin Finance Journal*, 17(1), 125-144. <https://doi.org/10.1016/j.pacfin.2007.12.003>
  16. Creel, J., Hubert, P., & Labondance, F. (2015). Financial stability and economic performance. *Economic Modelling*, 48, 25-40. <https://doi.org/10.1016/j.econmod.2014.10.025>
  17. Crockett, A. (1996). The theory and practice of financial stability. *De Economist*, 144, 531-568. <https://doi.org/10.1007/BF01371939>
  18. Dia, E., & VanHoose, D. (2017). Banking in macroeconomic theory and policy. *Journal of Macroeconomics*, 54, 149-160. <https://doi.org/10.1016/j.jmacro.2017.07.009>
  19. Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*, 91(3), 401-419. <https://doi.org/10.1086/261155>
  20. Dickey, D. A., & Fuller, W. A. (1981). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74(366), 427-431. <https://doi.org/10.1080/01621459.1979.10482531>
  21. Fakhrunnas, F., Nuri, R., Nugrohowati, I., Haron, R., Bektı, M., & Anto, H. (2022). The Determinants of Non-Performing Loans in the Indonesian Banking Industry: An Asymmetric Approach Before and During the Pandemic Crisis. *Sage Open*, 1-13. <https://doi.org/10.1177/21582440221102421>
  22. Ghassan, H. B., & Fachin, S. (2016). Time series analysis of financial stability of banks: Evidence from Saudi Arabia. *Review of Financial Economics*, 31(1), 3-17. <https://doi.org/10.1016/j.rfe.2016.06.007>
  23. Ghassan, H. B., & Guendouz, A. A. (2019). Panel modeling of z-score: evidence from Islamic and conventional Saudi banks. *International Journal of Islamic and Middle Eastern Finance and Management*, 12(3), 448-468. <https://doi.org/10.1108/IME-FM-04-2018-0122>
  24. Hassan, M. K., Khan, A., & Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. *Research in International Business and Finance*, 48, 17-31. <https://doi.org/10.1016/j.ribaf.2018.10.006>
  25. Hassan, M.K., Ijaz, M. S., & Khan, M. H. (2021). Bank competition–stability relations in Pakistan: A comparison between Islamic and conventional banks. *International Journal of Business and Society*, 22(2), 532-545. <https://doi.org/10.33736/ijbs.3733.2021>
  26. Jokipii, T., & Monnin, P. (2013). The impact of banking sector stability on the real economy. *Journal of International Money and Finance*, 32(1), 1-16. <https://doi.org/10.1016/j.jimonfin.2012.02.008>
  27. Kasri, R. A., & Azzahra, C. (2020). Do Islamic banks more stable than conventional banks? Evidence from Indonesia. *Jurnal Ekonomi & Ekonomi Islam*, 6(2), 149-164. <https://doi.org/10.20885/jeki.vol6.iss2.art6>
  28. Louhichi, A., Louati, S., & Boujelbene, Y. (2019). Market-power, stability and risk-taking: an analysis surrounding the riba-free banking. *Review of Accounting and Finance*, 18(1), 2-24. <https://doi.org/10.1108/RAF-07-2016-0114>
  29. Miah, M. D., & Suzuki, Y. (2020). Murabaha syndrome of Islamic banks: a paradox or product of the system? *Journal of Islamic Accounting and Business Research*, 11(7), 1363-1378. <https://doi.org/10.1108/JIABR-05-2018-0067>
  30. Mohamad, A. A. S., Mohamad, M. T., & Hashim, S. A. (2018). Islamic versus conventional banking: Characteristics and stability analysis of the Malaysian banking sector. In *New Developments in Islamic Economics: Examples from Southeast Asia* (pp. 197-214). <https://doi.org/10.1108/978-1-78756-283-720181013>

31. Olson, D., & Zoubi, T. (2017). Convergence in bank performance for commercial and Islamic banks during and after the Global Financial Crisis. *Quarterly Review of Economics and Finance*, 65, 71-87. <https://doi.org/10.1016/j.qref.2016.06.013>
32. Phillips, P., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346. <https://doi.org/10.2307/2336182>
33. Rashid, A., Yousaf, S., & Khaleequzzaman, M. (2017). Does Islamic banking really strengthen financial stability? Empirical evidence from Pakistan. *International Journal of Islamic and Middle Eastern Finance and Management*, 10(2), 130-148. <https://doi.org/10.1108/IME-FM-11-2015-0137>
34. Rizvi, S. A. R., Narayan, P. K., Sakti, A., & Syarifuddin, F. (2020). Role of Islamic banks in Indonesian banking industry: an empirical exploration. *Pacific Basin Finance Journal*, 62, 101117. <https://doi.org/10.1016/j.pac-fin.2019.02.002>
35. Safiullah, M. (2021). Financial stability efficiency of Islamic and conventional banks. *Pacific Basin Finance Journal*, 68, 101587. <https://doi.org/10.1016/j.pac-fin.2021.101587>
36. Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. R. Sickels and W. Horrace (Eds.), *In Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications* (Vol. 44, Issue 0). Springer. [https://doi.org/10.1007/978-1-4899-8008-3\\_9](https://doi.org/10.1007/978-1-4899-8008-3_9)
37. Sriyana, J., & Ge, J. J. (2019). Asymmetric responses of fiscal policy to the inflation rate in Indonesia. *Economics Bulletin*, 39(3), 1701-1713. Retrieved from <http://www.accessecon.com/Pubs/EB/2019/Volume39/EB-19-V39-I3-P161.pdf>
38. Sy, A. N. R., & Chan-Lau, J. A. (2006). *Distance-To-Default in Banking: A Bridge too Far?* (IMF Working Papers No. WP/06/215). <https://doi.org/10.5089/9781451864755.001>
39. Trad, N., Rachdi, H., Hakimi, A., & Guesmi, K. (2017). Banking stability in the MENA region during the global financial crisis and the European sovereign debt debacle. *Journal of Risk Finance*, 18(4), 381-397. <https://doi.org/10.1108/JRF-10-2016-0134>
40. Uddin, A., Chowdhury, M. A. F., & Islam, M. N. (2017). Resiliency between Islamic and conventional banks in Bangladesh: dynamic GMM and quantile regression approaches. *International Journal of Islamic and Middle Eastern Finance and Management*, 34(10), 400-418. <https://doi.org/10.1108/mf.2008.00934jaa.001>