Vulnerability of Islamic banking in ASEAN

Muhammad Iqbal

Faculty of Islamic Economics and Business, State Islamic University Raden Intan, Bandar Lampung, Indonesia and State Islamic University Sunan Kalijaga, Yogyakarta, Indonesia

Hadri Kusuma

Faculty of Business and Economics, Islamic University of Indonesia, Yogyakarta, Indonesia, and

Sunaryati Sunaryati

Faculty of Islamic Economics and Business, State Islamic University Sunan Kalijaga, Yogyakarta, Indonesia

Abstract

Purpose – This research evaluated the impact of credit risk, liquidity risk, profitability, economic growth and good governance on the vulnerability of the Islamic banking system in the Association of Southeast Asian Nations (ASEAN).

Design/methodology/approach – The panel regression analysis was used to obtain data from five ASEAN countries that had operated Islamic banks from 2010 to 2019.

Findings – The results obtained from the vulnerability model indicated that bank liquidity risk, profitability and good governance have significant impacts on vulnerability. Conversely, credit risk and economic growth showed an insignificant effect on susceptibility. Good governance helps increase investment attractiveness for economic growth and development in Islamic banks in ASEAN.

Research limitations/implications – Some of the limitations of this research include its focus on the vulnerability of Islamic banks in ASEAN countries. The average value of six indices is used as a single index per country with good governance. Therefore, further research needs to consider using all six indices of good governance as factors affecting the vulnerability of Islamic banks, such as control of corruption, government effectiveness, political stability, absence of violence, regulatory quality, the rule of law voice and accountability.

Practical implications – This research describes banking financial circumstances and their internal activities. Furthermore, it helps managers or banking practitioners in the proper management of finance, specifically at the vulnerability level, to aid in the early detection of crisis to enable early aversion or minimal impact.

Social implications – This research is expected to assist governments in ASEAN countries to establish public policies and build good governance to increase investment interest in the Islamic banking industry.

Originality/value – This research is the author's first attempt at discussing the issues of bank vulnerability related to good governance faced by the Islamic banking system in ASEAN.

Keywords Liquidity risk, Profitability, Good governance, Bank vulnerability

Paper type Research paper

Introduction

Several countries and institutions have evaluated the contagious effect of the subprime mortgage crisis, with the majority showing signs of recession. The crisis in Greece, Spain,

Turkey, and Southeast Asia, the decrease in China's economy and the conservative policy of raising interest rates in the USA led to an increase in international interest rates. In addition, the 2019 Coronavirus Disease (COVID-19) pandemic significantly affected the dynamics of the 2020 world economy, including countries in Southeast Asia. Some of these phenomena suggest a repetition of these crises.

The rapid and stable growth of the Islamic finance industry has made Southeast Asia an essential part of global Islamic finance, with countries in the Association of Southeast Asian Nations (ASEAN) region diverging variations towards its development. Malaysia and Indonesia are the top two countries in ASEAN aggressively establishing Islamic banks, followed by Brunei Darussalam. Furthermore, Singapore, a Muslim minority country, the Philippines and Thailand also have ambitions to build this industry. The increasingly fierce competition in the financial services industry negatively impacts Islamic banks' performance. Therefore, some issues such as limited capital, sources of funding and human resources have not constrained these banks. Several preliminary research have been conducted on banking vulnerabilities to the crisis by using event-based identification (Demirgüç-Kunt and Detragiache, 1998; Laeven and Valencia, 2012). Similarly, research identified vulnerabilities based on the continuous index development, specifically from the associated components (Eichengreen and Arteta, 2002; Aykut, 2002; Bhattacharya and Sinha Roy, 1998; Sevim et al., 2014; Musdholifah, 2015). These research studies only measured the potential for a banking crisis and identified its vulnerabilities without examining the associated potential factors. Therefore, this research aims to assist bank managers and policymakers identify bank vulnerabilities.

This research modifies the identification of bank vulnerabilities by adding the variable good governance as one of the determinants. According to Kaufmann et al. (2002), applying this variable in the banking world can improve wrong policies, protect the interests of stakeholders sector, and enhance compliance with applicable laws and general ethics to create a healthy banking system. This is in addition to the theory of financial intermediaries, which states that banks need to maintain the principle of prudence and profit-orientated. Research on bank vulnerability generally measures the potential for crises in the aggregate. Similarly, this research tries to measure a bank's exposure to avoid a systemic crisis by identifying and testing the factors capable of triggering the vulnerability of Islamic banks in ASEAN.

Literature review

Theory of intermediation

According to Gurley and Shaw (1956), the theory of financial intermediation indicates that banks play significant roles as dominant supporters in a country's economy to distribute funds to the needy. Banks play an essential role in the economy by facilitating the payment process, thereby achieving financial stability and implementing monetary policy.

The primary function of banking is financial intermediation, namely purchasing surplus funds from the business sector, government and households, which are channeled to deficit economic units. The financial intermediation function arises due to high monitoring, liquidity, and increased price risk associated with asymmetric information between fund owners and users. Saunders et al. (2006) stated that an intermediary financial function is as follows: (1) broker, (2) asset transformers, (3) delegated monitor, and (4) information producer.

The banking intermediation function has changed due to alterations in the economic environment and financial market, specifically in developed countries, such as the European Union (Bikker and Wesseling, 2003). The information technology, deregulation, liberalization, and internationalization results have made the theory of financial intermediation irrelevant to current business practices (Bikker and Wesseling, 2003). These factors reduce transaction

costs and information asymmetry between savers and investors, thereby contradicting the classical financial intermediation function.

Theory of financial instability
The theory of financial system stability is based on the approach created by Hyman Minsky (1986), a classical economist from the USA. According to Minsky, the cause of financial system instability does not only come from exogenous or external factors, such as wars or economic disasters, rather it is also obtained from endogenous or internal factors with a much greater dominance. Minsky further stated that when financial/economic conditions are stable, it promotes economic actors to be more daring to take risks. Financial crises emerge in conditions of overconfidence, and their impact is more significant. Endogenous factors come from internal management and the values of its financial ratios, while its exogenous counterpart comes from external banks, such as macroeconomic variables with a systemic impact.

Kaminsky *et al.* (1998) defined a banking crisis as a situation in which an attack on the exchange rate system causes a sharp depreciation on its rate, thereby leading to a significant decline in international and local reserves. According to Frankel and Rose (1996), a financial crisis significantly changes several potential or actual value indicators. Therefore, it is necessary to investigate the episode of massive depreciation to determine when it can be held or withdrawn by the authorities, the situations that increase them and factors responsible for making the problem difficult to control. Kaminsky and Reinhart (1999) stated that the crisis that hit countries was caused by several indicators, including the balance of payments, economic growth, inflation, exchange and interest rates, and the money supply. These indicators can be used as indicators for the early detection of crisis vulnerabilities.

Previous empirical research
Vulnerability is measured using the Z-score, a tool to assess the probability of a bank facing financial failure (Khasawneh, 2016). This research aims to evaluate and measure vulnerability using the Z-score analysis tool as the dependent variable to measure individual bank risk. Z-score reflects a bank's strength by calculating its financial ratios. Abedifar *et al.* (2013) stated that commercial banks' sensitivity to public response leads to liquidity-related problems and bankruptcy. The Z-Score level of vulnerability can be seen as a computed mean of return on assets (ROA) plus the capital to asset ratio (equity capital/total assets) divided by the standard deviation of returns on assets. In addition, the Z-score is used to measure a bank's default and assess its bankruptcy (Demirgiic and Huizinga, 1999; Khan *et al.*, 2017; Mokni *et al.*, 2016). It is also used to measure the ability of capital and income to cover losses over a certain period (Lepetit and Strobel, 2015). Khasawneh (2016) stated that the higher the *Z-score*, the lower the probability value of the bank experiencing financial failure. Therefore, an increase in *Z-score* implies a decrease in the probability of bankruptcy risk and better financial stability.

Research on bank vulnerability has been empirically proven with mixed internal and external factors. The bank's internal factors include profitability, credit, and liquidity risk, while their external factor consists of macroeconomic variables, including economic growth and good governance. One of the internal factors that affect bank vulnerability is credit risk. Al-Khouri and Arouri (2016), Demirgüç-Kunt and Detragiache (1998), Hardy and Pazarbaşioğlu (1999), Laeven and Valencia (2012), Ghenimi *et al.* (2017), Al-Khouri and Arouri (2016), and Ali and Puah (2018) stated that credit risk influences bank vulnerability significantly. Credit that has trouble means potential for failure to repay large amounts of praise from creditors. Failure to repay the loan can affect the bank in obtaining income in its operational activities, thereby increasing vulnerability.

Furthermore, liquidity risk also affects the vulnerability of banks in accordance with the research by Ali *et al.* (2019), Ali and Puah (2018), Trad *et al.* (2017) and Čihák and Hesse (2010). According to them, it stated that the higher the liquidity risk, the riskier the bank's condition. High liquidity risk is caused by increased funding; therefore, when small funds are collected, it increases the bank's vulnerability. Conversely, a decrease in liquidity risk lowers the bank's lack of effectiveness in channelling financing. This indicates the higher the number of this variable, the more significant the proportion of bank assets invested in the form of credit, thereby reducing its liquidity level, which in turn affects its stability.

Profitability also affects banks vulnerability, which is in accordance with the research conducted by Trabelsi and Trad (2017), Ghenimi *et al.* (2017), Ozili (2018), Hamza and Saadaoui (2013), and Ariefianto and Soepomo (2013). This means that increased funds due to a rise in profit decreases vulnerability. According to Gitman (2003), profitability is a factor that needs to receive significant attention because to carry on its life, companies need to be in favorable condition. This means that banks will find it difficult to attract external capital without profit. Creditors, company owners, and the company's management always try to increase profits for future survival.

The causes of bank vulnerability are influenced by internal and external factors, such as economic growth. Trabelsi and Trad (2017), Ghenimi *et al.* (2017), Trad *et al.* (2017), Srairi (2013), Rajhi and Hassairi (2013), Ariefianto and Soepomo (2013), and Wong *et al.* (2010) stated that higher economic growth is associated with an increase in credit and other banking activities.

The variable good governance is one of the determinants of bank vulnerability added in this research. In the banking world, the application of good governance is used to protect the interests of industry stakeholders and enhance compliance with applicable laws and general ethics. In addition, it helps to enhance investment attractiveness for economic growth and development in a country. Good governance is the effectiveness of high-level organizations, specifically in the performance of economic policies and their impact on the vulnerability of a country's banking industry. It also increases investors' confidence and affects banks' performance, reducing its system's vulnerability. This argument is based on Ali and Puah (2018), which stated that future research need to analyze the relationship between regulation and bank vulnerability using other advanced econometric statistical approaches. Ali *et al.* (2019) recommend further research to determine the role of risk and corruption in an integrated macroeconomic environment.

Bank vulnerabilities are generally related to the characteristic variables and economic situation of a country. For example, this survey was conducted only to predict factors influencing a bank's vulnerability. Most research use guide theory as a theoretical basis, while others attempt to develop or even refute its usage. This research shows that external factors of banks have an indirect effect on banks' vulnerabilities.

Furthermore, the previous empirical research focused on the analysis of profitability and efficiency, where the analysis of banking vulnerabilities was minimal. The existing literature differentiates past research according to their sample data, different methodological approaches and objectives. This research is also in line with several methods and theoretical assumptions used in preliminary research. It means consistency with the existing literature and differentiates itself by highlighting some relevant determinants of Islamic bank vulnerability in ASEAN. Therefore, it attempts to elucidate the relationship between the vital internal determinants of bank vulnerability.

In summary, previous research found mixed responses on how bank internal and external factors affect their vulnerability. Several research studies attempted to build consensus with insufficient data due to a lack of empirical support and demands clarity in the existing body of knowledge, specifically in developing countries in ASEAN. Therefore, due to the impact of factors that influence the vulnerability of Islamic banks in ASEAN, the following hypotheses were proposed.

H1. There is a significant impact of credit risk on bank vulnerability.

H2. There is a significant impact of liquidity risk on bank vulnerability.

H3. There is a significant impact of profitability on bank vulnerability.

H4. There is a significant impact of economic growth on bank vulnerability.

H5. There is a significant impact of good governance on bank vulnerability.

Methodology
Data
This research used the panel data type, which is a combination of time series and cross-section data from 2010 to 2019 in ASEAN that have implemented the Islamic banking system, namely Indonesia, Malaysia, Brunei Darussalam, Thailand and the Philippines. The good governance data were sourced from the WGI released by the World Bank and the country economy.

Estimating model
For a comprehensive analysis, a third empirical model that examines the factors affecting the bank's vulnerability was constructed. This is in accordance with the research by Trabelsi and Trad (2017), Ghenimi *et al.* (2017), Diaconu and Oanea (2014), Trad *et al.* (2017), Ozili (2018), Čihák and Hesse (2010), Korbi and Bougatef (2017) and Khasawneh (2016). Three types of variables, namely bank characteristics, economic conditions and good governance, were used to estimate banks' vulnerability as given in equation (1). The description of the research variables is shown in Table 1.

Name	Symbol	Measurement	Source
Vulnerability	VUL	*Z*-score is computed as the mean of return on assets (ROA) plus the capital to asset ratio (equity capital/total assets) divided by the standard deviation of ROA	Čihák and Hesse (2010), Beck *et al.* (2013), Khasawneh (2016)
Credit risk	CRISK	Non-performing financing	Demirgüç-Kunt and Detragiache (1998), Al-Khouri and Arouri (2016), Hardy and Pazarbaşioğlu (1999), Ghenimi *et al.* (2017)
Liquidity risk	LRISK	Total financing to total deposit	Ali *et al.* (2019), Ali and Puah (2018), Trad *et al.* (2017), Čihák and Hesse (2010)
Profitability	ROE	Return on equity	Trabelsi and Trad (2017), Ghenimi *et al.* (2017), Ozili (2018), Hamza and Saadaoui (2013)
Economic growth	GDP	The percent rate of increase in actual gross domestic product (GDP) or real GDP	Khasawneh (2016), Ghenimi *et al.* (2017), Ali and Puah (2018), Trad *et al.* (2017), Srairi (2013), Rajhi and Hassairi (2013), Wong *et al.* (2010)
Good governance	GGV	The combined average value of the six indices of good governance is the institutional quality	Olson *et al.* (2000), Kaufmann *et al.* (2013)

Table 1.
Description and
measurement variable

$$\text{VUL}_{it} = B_1\text{CRISK}_{it} + B_2\text{LRISK}_{it} + B_3\text{ROE}_{it} + B_4\text{GDP}_{it} + B_5\text{GGV}_{it} + e_{it} \tag{1}$$

Results and discussion

Table 2 shows the descriptive statistics of the sample data from the number of samples, average value, standard deviation, maximum and minimum of VUL, CRISK, LRISK, ROE, GDP and GGV.

Table 3 shows the correlation coefficient between independent variables, which indicates no multicollinearity in the regression model.

Table 4: Chow, Hausman and Lagrange multiplier (LM) tests, the best model for the vulnerability of Islamic banks in ASEAN is random effect.

The results show that LRISK, ROE and GGV significantly influence the vulnerability of Islamic banks in ASEAN, as opposed to CRISK and GDP. Credit risk has no significant impact on the vulnerability of Islamic banks in ASEAN, as reflected in the NPF because the nonperforming financing is not prominent in nominal terms with an average of 2.5%.

Liquidity risk has a significant positive effect on the Z-score of bank vulnerability because the increase in the number of loans provided is complementary to the rise in profit before tax. Conversely, a rise in the number of loans is followed by a profit before tax because the loan amount is converted more into bank assets. This indicates the higher the FDR, the greater the banks' profit which means that liquidity risk significantly affects bank vulnerability. According to Gurley and Shaw (1956), banking is a dominant supporter of a country's economy by intermediating funds between the needy and the rich. Banks play essential roles in the economy, such as facilitating the payment process, achieving financial stability, and implementing monetary policy to ensure stability. This research's results are in line with Ali et al. (2019), Ali and Puah (2018), Trad et al. (2017) and Cihák and Hesse (2010), which stated that liquidity risk has a significant effect on bank vulnerability.

Furthermore, this research indicates that ROE has a significant effect on the vulnerability of Islamic and conventional banks. This means that the higher the ROE, the lower the bank's vulnerability and ability to generate profit for common shareholders. Investors often use it in making decisions to purchase shares of a company. For instance, when the ROE to vulnerability ratio is higher, it is good because it shows the income received is getting better.

Variable	Observations	Mean	Maximum	Minimum	Std. dev
VUL	50	3.268	11.907	−3.713	4.711
CRISK	50	2.575	6.200	0.010	1.580
LRISK	50	76.398	104.555	42.540	20.020
PRO	50	1.798	24.060	−56.110	17.529
GRW	50	4.262	7.500	−2.500	2.611
GGV	50	0.013	0.714	−0.539	0.410

Table 2.
Descriptive statistics

	KRE	LIK	PRO	GRW	GGV
KRE	1.000				
LIK	−0.071	1.000			
PRO	0.115	0.101	1.000		
GRW	0.164	−0.257	0.478	1.000	
GGV	−0.440	0.219	−0.006	−0.595	1.000

Table 3.
Correlation matrix of an included variable vulnerability model

Variables	Common effect	Fixed effect	Random effect
C	−1.499 (−1.18)	2.246* (0.03)	−1.499 (−1.22)
CRISK	−0.281 (−1.50)	0.155 (1.04)	−0.280 (−1.56)
LRISK	0.057*** (5.01)	0.005 (0.55)	0.057*** (5.20)
ROE	0.104*** (7.09)	0.060*** (5.37)	0.104*** (7.35)
GRW	0.190 (1.41)	0.03 (0.34)	0.191 (1.46)
GGV	8.733*** (11.37)	−0.300 (−0.21)	8.733*** (11.80)
Chow test		$X = 64.33^{***} F = 26.20^{***}$	
		Ho: Fixed effect not consistent	
Hausman test		$X^2 = 6.85$	
		Ho: Fixed effect not consistent	
Lagrange multiplier (LM) test		Breusch–Pagan LM = 16.18*	
		Ho: Fixed effect consistent	

Note(s): *t*-statistic in brackets; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 4.
Results of estimating
vulnerability equations
of Islamic banks

These results support the research conducted by Trabelsi and Trad (2017), Ghenimi *et al.* (2017), Ozili (2018), Hamza and Saadaoui (2013) and Ariefianto and Soepomo (2013), which prove that profitability has a significant effect to bank vulnerabilities.

Economic growth has an insignificant effect on the *Z*-score banks that are a proxy of vulnerability Islamic banks in ASEAN. The empirical tests based on data from five ASEAN countries from 2010 to 2019 show that increased economic growth has no direct impact on rise in vulnerability of Islamic banks. Therefore, the increase in economic growth banks from 2010 to 2019 did not lead to bank loan payment due to the adjustments during the 2008 to 2009 crisis. The results of this research are supported by the studies of Khasawneh (2016) and Ali and Puah (2018), which prove that the variable economic growth has an insignificant effect on bank vulnerability.

Good governance has a significant positive effect on the vulnerability of Islamic banks and other nongovernmental business entities. Its implementation is considered appropriate to improve the previous lousy image of the banking industry, protect stakeholders' interests and enhance their compliance with applicable general laws and ethics for stability. In addition, good governance helps make a country's investment in economic growth more attractive. In terms of policy formulation and actual implementation, it has high organizational efficiency, specifically in terms of the performance of economic policies and their impact on the vulnerability of a country's banking industry. It can also increase investor confidence in investing, specifically in Islamic banks. The results of this research support the study of Olson *et al.* (2000), which stated that countries with good governance have higher productivity levels to promote better economic growth. According to Kaufmann *et al.* (2013), good governance plays a significant (positive) role in increasing economic growth in the long term.

Conclusions
In conclusion, the panel data regression results using the random-effects model show that LRISK, ROE and GGV significantly influence the vulnerability of Islamic banks in ASEAN, as opposed to CRISK and GDP. This research is expected to provide an academic contribution in determining the influencing factors originating from internal and external aspects of banks to determine and avoid a banking crisis.

Therefore, due to the significant effect of good governance on the vulnerability of Islamic banks in ASEAN, sustainable and synergized cooperation between the government, central banks, and all levels of society is needed to support efforts to accelerate the market share of

Islamic banks in ASEAN. However, Islamic banks need to always pay attention to internal and external factors affecting their stability, such as profit-sharing-based financing, which has a high-risk level. Islamic banks need to conduct stricter monitoring and assistance on the funding provided to avoid the risk of bad loans and reduce the burden of operational costs.

This research is expected to serve as input and recommendation for governments in ASEAN countries to establish public policies and build good governance to increase investment interest in the Islamic banking industry. The financial sector development is expected to bring positive changes to a country's economy because it plays an essential role in enhancing the economy. The role of intermediation banking institutions is very influential on economic growth and development.

Some of the limitations of this research include its focus on the vulnerability of Islamic banks in ASEAN countries. The average value of six indices is used as a single index per country with good governance. Therefore, further research needs to consider using all six indices of good governance as factors affecting the vulnerability of Islamic banks, such as control of corruption, government effectiveness, political stability, absence of violence, regulatory quality, the rule of law voice and accountability. In addition, it is necessary to consider using macroeconomic variables, such as inflation, interest rates, profit sharing equivalents, and investment levels in all countries, that have operated an Islamic banking system.

References

Ali, M., Sohail, A., Khan, L. and Puah, C.H. (2019), "Exploring the role of risk and corruption on bank stability: evidence from Pakistan", *Journal of Money Laundering Control*, Vol. 22 No. 2, pp. 270-288, doi: 10.1108/JMLC-03-2018-0019.

Al-Khouri, R. and Arouri, H. (2016), "The simultaneous estimation of credit growth, valuation, and stability of the Gulf Cooperation Council banking industry", *Economic Systems*, Vol. 40 No. 3, pp. 499-518, doi: 10.1016/j.ecosys.2015.12.005.

Ali, M. and Puah, C.-H. (2018), "Does bank size and funding risk effect banks' stability? A lesson from Pakistan", *Global Business Review*, Vol. 19 No. 5, pp. 1166-1186, doi: 10.1177/0972150918788745.

Abedifar, P., Molyneux, P. and Tarazi, A. (2013), "Risk in Islamic banking", *Review of Finance*, Vol. 17 No. 16, pp. 2035-2096, doi: 10.1093/rof/rfs041.

Ariefianto, M.D. and Soepomo, S. (2013), "Risk taking behavior of Indonesian banks: analysis on the impact of deposit insurance corporation establishment", *Bulletin of Monetary Economics and Banking*, Vol. 15 No. 3, pp. 1-20.

Aykut, K. (2002) "Excessive risk-taking, banking sector fragility, and banking crises", University of Illinois at Urbana-Champaign Working Papers, (02-0114).

Beck, T., Demirgüç-Kunt, A. and Merrouche, O. (2013), "Islamic vs. conventional banking: business model, efficiency and stability", *Journal of Banking and Finance*, Vol. 37 No. 2, pp. 433-447, doi: 10.1016/j.jbankfin.2012.09.016.

Bhattacharya, B. and Sinha Roy, T.N. (1998), "Forewarning indicator system for banking crisis in India", S. Ahmed, An Investigation into Banking Crisis into Developing Countries: Lending Booms in the Private Sector.

Bikker, J. and Wesseling, S. (2003), "Intermediation, integration and internalisation : a survey on banking in europe", *Occasional Studies De Nederlandsche Bank*, Vol. I, p. 3.

Čihák, M. and Hesse, H. (2010), "Islamic banks and financial stability: an empirical analysis", *Journal of Financial Services Research*, Vol. 38 Nos 2-3, pp. 95-113, doi: 10.1007/s10693-010-0089-0.

Demirgiic, A. and Huizinga, H. (1999), "Determinants of commercial bank interest margins and profitability: some international evidence", *The World Bank Economic Review*, Vol. 13 No. 2, pp. 379-408.

Demirgüç-Kunt, A. and Detragiache, E. (1998), "The determinants of banking crises in developing and developed countries", *Staff Papers*, Vol. 45 No. 1, pp. 81-109.

Diaconu, R.-I. and Oanea, D.-C. (2014), "The main determinants of bank's stability. Evidence from Romanian banking sector", *Procedia Economics and Finance*, Vol. 16, pp. 329-335.

Eichengreen, B. and Arteta, C. (2002), "Banking crises in emerging markets: presumptions and evidence", *Financial Policies in Emerging Markets*, pp. 47-94.

Frankel, J.A. and Rose, A.K. (1996), "Currency crashes in emerging markets: an empirical treatment", *Journal of International Economics*, Vol. 41 Nos 3-4, pp. 351-366.

Ghenimi, A., Chaibi, H. and Omri, M.A.B. (2017), "The effects of liquidity risk and credit risk on bank stability: evidence from the MENA region", *Borsa Istanbul Review*, Vol. 17 No. 4, pp. 238-248, doi: 10.1016/j.bir.2017.05.002.

Gitman, L.J. (2003), *Principles of Managerial Finance. International Edition*, Pearson Education, Boston.

Gurley, J.G. and Shaw, E.S. (1956), "Financial intermediaries and the saving-investment process", *The Journal of Finance*, Vol. 11 No. 2, pp. 257-276, doi: 10.2307/2976705.

Hamza, H. and Saadaoui, Z. (2013), "Investment deposits, risk-taking and capital decisions in Islamic banks", *Studies in Economics and Finance*, Vol. 30 No. 3, pp. 244-265, doi: 10.1108/SEF-Feb-2012-0016.

Hardy, D.C. and Pazarbaşioğlu, C. (1999), "Determinants and leading indicators of banking crises: further evidence", *IMF Staff Papers*, Vol. 46 No. 3, pp. 247-258, doi: 10.5089/9781451973686.024.

Kaminsky, G.L. and Reinhart, C.M. (1999), "The twin crises: the causes of banking and balance-of-payments problems", *American Economic Review*, Vol. 89 No. 3, pp. 473-500, doi: 10.1257/aer.89.3.473.

Kaminsky, G., Lizondo, S. and Reinhart, C.M. (1998), "Leading indicators of currency crises", *Staff Papers*, Vol. 45 No. 1, pp. 1-48, doi: 10.1596/1813-9450-1852.

Kaufmann, D., Kraay, A., Lora, E. and Pritchett, L. (2002), "Growth without governance [with comments]", *Economia*, Vol. 3 No. 1, pp. 169-229.

Kaufmann, D., Kraay, A. and Mastruzzi, M. (2013), "Governance matters IV: governance indicators for 1996-2004", World Bank Policy Research Working Paper. doi: 10.1596/1813-9450-3630.

Khan, M.S., Scheule, H. and Wu, E. (2017), "Funding liquidity and bank risk taking", *Journal of Banking and Finance*, Vol. 82, pp. 203-216, doi: 10.1016/j.jbankfin.2016.09.005.

Khasawneh, A.Y. (2016), "Vulnerability and profitability of MENA banking system: Islamic versus commercial banks", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 9 No. 4, pp. 454-473, doi: 10.1108/IMEFM-09-2015-0106.

Korbi, F. and Bougatef, K. (2017), "Regulatory capital and stability of Islamic and conventional banks", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 10 No. 3, pp. 312-330, doi: 10.1108/IMEFM-06-2016-0079.

Laeven, L. and Valencia, F. (2012), "Systemic banking crises database: an update", *IMF Iconomic Review*, Vol. 61 No. 2, pp. 225-270.

Lepetit, L. and Strobel, F. (2015), "Bank insolvency risk and Z-score measures: a refinement", *Finance Research Letters*, Vol. 13 No. C, pp. 214-224, doi: 10.1016/j.frl.2015.01.001.

Minsky, H.P. (1986), *Global Consequences of Financial Deregulation*, Department of Economics, Washington University, St. Louis, MO.

Mokni, R.B., Rajhi, M.T. and Rachdi, H. (2016), "Bank risk-taking in the MENA region: a comparison between Islamic banks and conventional banks", *International Journal of Social Economics*, Vol. 43 No. 12, pp. 1367-1385, doi: 10.1108/IJSE-03-2015-0050.

Musdholifah, M. (2015), "Using index for predicting banking crisis in six Asian countries", *International Journal of Empirical Finance*, Vol. 4 No. 3, pp. 170-183.

Olson, M., Sarna, N. and Swamy, A.V. (2000), "Governance and growth: a simple hypothesis explaining cross-country differences in productivity growth", *Public Choice*, Vol. 102 No. 3, pp. 341-364, doi: 10.1023/A:1005067115159.

Ozili, P.K. (2018), "Banking stability determinants in Africa", *International Journal of Managerial Finance*, Vol. 14 No. 4, pp. 462-483, doi: 10.1108/IJMF-01-2018-0007.

Rajhi, W. and Hassairi, S.A. (2013), "Islamic banks and financial stability: a comparative empirical analysis between MENA and Southeast Asian countries", *Région et développement*, Vol. 37 No. 1, pp. 1-31, doi: 10.2139/ssrn.2010126.

Saunders, A., Cornett, M.M. and McGraw, P.A. (2006), *Financial Institutions Management: A Risk Management Approach*, McGraw-Hill/Irwin, New York.

Sevim, C., Oztekin, A., Bali, O., Gumus, S. and Guresen, E. (2014), "Developing an early warning system to predict currency crises", *European Journal of Operational Research*, Vol. 237 No. 3, pp. 1095-1104, doi: 10.1016/j.ejor.2014.02.047.

Srairi, S. (2013), "Ownership structure and risk-taking behaviour in conventional and Islamic banks: evidence for MENA countries", *Borsa Istanbul Review*, Vol. 13 No. 4, pp. 115-127, doi: 10.1016/j.bir.2013.10.010.

Trabelsi, M.A. and Trad, N. (2017), "Profitability and risk in interest-free banking industries: a dynamic panel data analysis", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 10 No. 4, pp. 454-469, doi: 10.1108/IMEFM-05-2016-0070.

Trad, N., Rachdi, H., Hakimi, A. and Guesmi, K. (2017), "Banking stability ian the MENA region during the global financial crisis and the European sovereign debt debacle", *The Journal of Risk Finance*, Vol. 18 No. 4, pp. 381-397, doi: 10.1108/JRF-10-2016-0134.

Wong, J., Wong, T.-C. and Leung, P. (2010), "Predicting banking distress in the EMEAP economies", *Journal of Financial Stability*, Vol. 6 No. 3, pp. 169-179, doi: 10.1016/j.jfs.2010.01.001.

Corresponding author
Muhammad Iqbal can be contacted at: iqbalfebi@radenintan.ac.id