



Banking Soundness: Comparison between Conventional and Sharia Banking in Indonesia

Musdholifah Musdholifah^{1*}, Ulil Hartono²

¹Department of Management, Faculty of Economics, Universitas Negeri Surabaya, Surabaya, Indonesia, ²Department of Management, Faculty of Economics, Universitas Negeri Surabaya, Surabaya, Indonesia. *Email: musdholifah@unesa.ac.id

ABSTRACT

Banking is a business sector which has an important role in the economy. As an intermediary institution between the excess and needy funds, the role of banking in the payment traffic becomes very important. Banking soundness should always be control, so as not to bring negative impact on the whole economy. Economists argue that problems in the banking can cause problems in other industries. This study aims to assess banking financial stability both of conventional and Sharia banks with crisis and default index (CD index). CD Index assesses the vulnerability of the bank has difficulty (crisis) with four sides of the assessment are funding risks, credit risk, investment risk, and exchange rate risk. In addition, this study also using a macroeconomic and internal bank as a variable to the identification of banking financial stability. The results showed that during the period 2012 and 2015 are the best period for conventional banks because at that time only a few banks indicated the crisis, while for Sharia banks the period 2011 and 2013 which is the best period. For the conventional bank variables are CAR and NPL have a positive effect, while LCOST, ROA, and LDR have a negative effect on banking soundness. For Sharia banks, variables are LCOST and BOPO which positive affecting to banking soundness.

Keywords: Banking Soundness, Crisis and Default Index, Conventional Bank, Sharia Bank

JEL Classifications: F45, G2, H12

1. INTRODUCTION

The bank is a service company to improve the economy. As an institution that intermediates between household finance and corporate finance, the banking system also has market risks associated with its transactions (Chan-Lau et al., 2004). Kaufman (1997) argues that the banking industry should get more attention because banks are a major part of payment traffic. Economists argue that banking's problem can cause problems in other industries. If the bank in crisis condition, it has a relationship with some companies, the crisis will be shown in the companies. This is called the snowball effect (Mehrez and Kaufmann, 2000). This is why banking financial stability is important because the collapse of a bank can bring negative effects on a macroeconomy.

Now, the bank has a big connection with all party. If the bank in trouble, then the connected party may be affected by the banking crisis (Wheelock and Wilson, 2000). Bhattacharya and Roy (2009) show that there are two identifying banking crisis's methods,

that are event-based methods (based on annual data) and index method (based on monthly or quarterly data). Event-based methods identify systemic banking crisis only after certain events such as bank runs, closures, mergers, unusual long holidays, significant recapitalization and non-performing assets (Demircug Kunt and Detragiache, 1998; Kaminsky and Reinhart, 1998; Caprio and Klingebiel, 2002, and World Economic Outlook 1997). Critics of this method that event-based crisis identification can lead to delayed recognition of crisis events (Von Hagen and Ho, 2007).

Indonesia has undergone several periods of financial and banking crisis. The global crisis during 1997-1998 which called Asia currency depreciation, cause liquidity difficulty of several banks. The change in currency value causes the bank to balance the balance sheet with own capital. Besides, the people who withdrew their funds from banks simultaneously and the uncontrolled inflation rate resulted in the loss of public confidence in banking (Bank Indonesia, 2010).

The global crisis in America at 2008 is one of the causes of the banking crisis in Indonesia. Stiglitz (2000) show there are unhealthy indications of economic development in America. He sees that there will be a problem with low-interest rates in the US making property developers interested. In addition, poor supervision of default risk causes low-income communities to easily purchase mortgage property. Too dependent on US economic growth on property businesses and loose financial industry settings, plus government decisions that do not bail-out Lehman Brothers Financial Institutions during financial distress.

The phenomenon of economic can be seen from Graph 1 showing the gross domestic product (GDP) decline since 2012. This decline can be a signal of crisis. The economic slowdown, decreasing exchange rate, IHSG decline, and the general decline in banking performance will likely affect the health of banking sector in Indonesia.

GDP decline occurred during 5 last years has an impact on the decrease in people's purchasing power. Developing countries are vulnerable to fluctuating GDP changes. For that reason, the role of financial institutions to stabilize the growth rate becomes very important. According to Demirgüç-Kunt and Detragiache (1998, 2002) and Sufian (2009) explain the GDP decline may trigger a potential domestic crisis.

Glick and Hutchison (2000) supported by Beck et al. (2006), Angkinand (2009), Arena (2008), Bhattacharya and Roy (2009) explains that an uncontrolled exchange rate can trigger a banking crisis. For example, Rupiah depreciation in July 2013 from Rp 10,000 to Rp 14,733 in September 2015 represents the decrease amount of 50% within 2 years. This incident becomes a burden on companies, governments, and banks that have foreign debt. According to Indrawati (2012), the weakening of exchange rate will affect Indonesian economy foundation. This condition is due to increasing debt value, government bonds value will fall directly reduce the state budget. The impact of exchange rate changes on government bonds price resulted in balance adjustment for each banking and making banks reduce funds to channel credit to prevent future value changes. Therefore, the depreciating rupiah condition resulted in an adjustment to the liabilities of each business.

In Indonesia, the banking system used the dual banking system, which operates two types of bank business namely Sharia and conventional bank (Armereo, 2015). In UU No. 21/2008, Sharia banking is all about Sharia bank and business unit, covering the institution and its business activities. While the conventional bank is a bank that operates the business in a conventional way. Sharia banking has proven its existence as a financial institution that can survive in the midst of the financial crisis that occurred in Asia at 1998, America in 2008 and Europe in 2011. The monetary crisis affects economy including the bank experiencing an imbalance in the intermediary function and bad credit, it affects the investment climate in banking sector either directly or indirectly. The monetary crisis in Indonesia can be said to be the impact of the weakness banking system quality.

Graph 2 shows the decline in banking profitability both conventional and Sharia in Indonesia. Profitability projected with ROA decreased from 3% in 2012 to 2% in 2015. Banking performance continues to decline to make banks vulnerable to a crisis (Dabós and Escudero, 2004; Poghosyan and Čihák, 2009). Banking performance decline can be seen from the increase in credit risk to the banking system. Demirgüç-Kunt and Detragiache (1998, 2005) explained that rising Non Performing Loans banks could increase the chances of crisis. NPL increase will have an impact on bank liquidity. So NPL increase should get serious attention to avoid a systemic banking crisis.

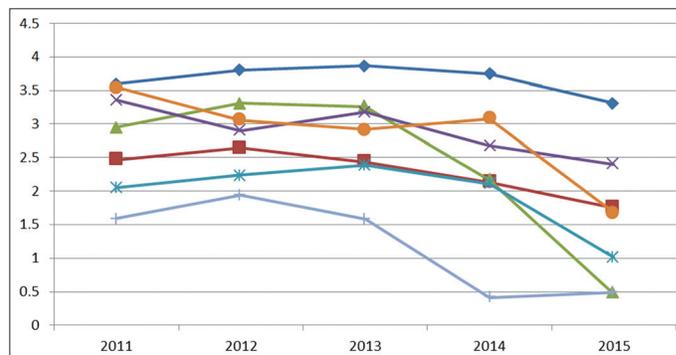
Financial Services Authority of Indonesia Indonesian (OJK) stated the national banking industry's profit in the fourth quarter of 2015 decreased compared to the same period in 2014, as reflected in the industry's lower ROA indicators in 2014. December 2014 banking ROA by 2.85%, while in 2015 the ROA by 2.30% to 2.35%, the decline was due to more cautious banking in business, with more form of reserve financial loss (CKPN) losses in line with rising NPL. The NPL increase is in line with the slowing of bank lending that grew by 10.26% from October 2014 amounting Rp 3,558.07 trillion to Rp 3,923.43 trillion. In addition to domestic economic slowdown, credit growth slowed again due to the influence of write-offs by banks and asset sales of several banks to related groups. Based on the phenomenon, this paper will explain the banking financial stability of Conventional and Sharia Banks in Indonesia by crisis and default index (CD Index) method and the factors that influence it.

Graph 1: Indonesia gross domestic product data year 2007-2015



Source: <http://www.tradingeconomics.com/indonesia/gdp>

Graph 2: Indonesian banking financial performance by ROA 2011-2015



Source: Indonesian banking statistics OJK (2015)

This paper is prepared with the initial systematical form of preliminary, book review, then research methods, results and discussion and closed with a conclusion.

2. THEORITICAL FRAMEWORK

2.1. Banking Financial Stability

Standards for conducting bank appraisals have been determined by the government through Bank Indonesia in the regulation of OJK No.4/POJK.03/2016 on the Rating of Commercial Banks, which requires commercial banks to conduct self-assessment of bank soundness using risk-based bank rating (RBBR) either individually or consolidative. Measuring instrument used to determine the health condition of a bank is the RGEC analysis method that assesses the bank soundness of the risk profile, good corporate governance, revenue and CAMEL assessed by Capital, Asset Quality, Management, Earning, Liquidity, and Sensitivity to Market Risk. Assessment of health in Sharia banks is measured by capital adequacy ratio (CAR), financing to deposit ratio (FDR), third party fund (DPK), and liquid asset to deposit (LAD).

According to the regulation of OJK No.18/POJK.03/2016, risk management is a set of procedures and methodologies used to identify measuring, monitoring, and controlling risks arising from non-specific business activities. The risk in the banking context is a predictable or unexpected potential event that negatively impacts the bank's income and capital.

According to Kibritçioğlu (2002) banks are at risk because of changes in assets and liabilities that depend entirely on financial systems and markets. All banks have potential crisis based on existing market risks such as liquidity risk or instantaneous withdrawal in a short period of time by customers, credit risk is default risk from NPL, and exchange rate risk if the bank has a liability in the form of foreign currency.

Kibritçioğlu (2002) uses three important indicators to measure the fragility of the banking, namely the level of external debt of the banking sector, credit level, savings rate. This is because these three indicators are related to exchange rate risk, credit risk, and liquidity risk. The formulation index Kibritçioğlu (2002) as follows:

$$BSF_t = \frac{\left(\frac{FL_t - \mu_{FL}}{\delta_{FL}} \right) + \left(\frac{CR_t - \mu_{CR}}{\delta_{CR}} \right) + \left(\frac{DP_t - \mu_{DP}}{\delta_{DP}} \right)}{3}$$

Where:

FL_t = foreign debt of the banking sector

CR_t = credit disbursed by banks

DP_t = deposits in banking

Kibritçioğlu (2002) explains that timing of a crisis or pressure in the banking sector is that if the pressure index set in t period has a value above the average plus 3 standard deviations over the last 24 months then the period is considered a crisis. Bhattacharya and

Roy (2009) modified Index of banking sector fragility (BSF Index) developed by Kibritçioğlu (2002) into Banking Sector Level Health Index (BSS Index). The index is structured to recognize the precise months of the banking crisis in India. The BSS index uses monthly data on monthly aggregate deposits, credit and investment of monthly banks as a proxy for liquidity risk, credit risk, and interest rate risk which are the three major risks faced by banks in India. Exchange rate risk has not been included due to the relatively insignificant proportion of the bank's international assets and liabilities in India. BSS3 is defined as the average standardized value of the real credit, real-time deposits and real investment of Indian commercial banks, BSS2 built excluding bank deposits.

$$BSS3_t = [(Dep_t - \mu_{Dep})/\sigma_{Dep} + (Cred_t - \mu_{Cred})/\sigma_{Cred} + (Inv_t - \mu_{Inv})/\sigma_{Inv}]/3$$

$$BSS2_t = [(Cred_t - \mu_{Cred})/\sigma_{Cred} + (Inv_t - \mu_{Inv})/\sigma_{Inv}]/2$$

Where:

$$Dept = (rD_t - rD_{t-12})/rD_{t-12}$$

$$Cred_t = (rCr_t - rCr_{t-12})/rCr_{t-12}$$

$$Inv_t = (rI_t - rI_{t-12})/rI_{t-12}$$

Time-series data on deposits, loans and investments are defined using the consumer price index (CPI). RD_t , rCr_t , and rI_t represent real deposits, real credit and real investment of Indian commercial banks at time t, while Dep_t , $Cred_t$ and Inv_t are respectively annual changes. A 12-month percentage change is considered data-oriented. The weight of each component of the BSS index is calculated as the inverse of its standard deviation. During the normal life of real deposits, real credit and real investment have increased that BSS index value also increases gradually. However, some of the risk factors inherent in each component, which, if not properly managed, contribute to the fragility of the bank. When the BSS value falls below 0, it is a fragile situation in the banking sector. Based on ψ , the standard deviation of the index BSS, it can be distinguished conditions of the fragility in middle and high-level banks:

Medium fragility phase if $-\psi < BSS < 0$

High Fragility Phase if $BSS < -\psi$

Based on this perspective it is said to experience a systemic banking crisis if it is in the phase of the fragility of medium and high until the last month the fragility of middle phase is not followed by the phase of high fragility. The banking system is considered to have fully recovered from the crisis when the value of $BSS = 0$. Based on the continuum of the values borne by the BSS index, we get a binary crisis dummy that assumes a value 1 when there is a crisis ($BSS < 0$) and a value of 0 ($BSS > 0$) when there was no crisis (Bhattacharya and Roy, 2009).

Musdholifah (2015) developed a new method of measuring the banking crisis. CD Index is a combination of BSF and BSS. This is because the BSF index uses liquidity risk, credit risk, and

exchange rate risk in determining the crisis. BSS indexes use liquidity risk proxy, credit risk, and interest rate change risk in the market. Therefore, the index CD combines liquidity risk with the size of the change in the number of deposit, credit risk with the percentage of credit change, the exchange rate risk is measured by the use of foreign currency debt, while the interest rate change risk is calculated from the investment of the financial assets held. The differences in the formulas used in the index CD are as follows:

$$CDI = \frac{\left(\frac{Cr_t - \mu_{credit}}{\delta_{credit}} \right) + \left(\frac{Inv_t - \mu_{Inven}}{\delta_{Investment}} \right) + \left(\frac{Dept_t - \mu_{de}}{\delta_{Deposit}} \right) + \left(\frac{FXDebt_t - \mu_{F.debt}}{\delta_{F.debt}} \right)}{4}$$

Information:

$$r = \frac{Cr_t - Cr_{t-1}}{Cr_{t-1}}$$

$$Inv = \frac{Inv_t - Inv_{t-1}}{Inv_{t-1}}$$

$$Dept = \frac{Dept_t - dept_{t-1}}{Dept_{t-1}}$$

$$FDebt = \frac{FXDebt_t - FXdebt_{t-1}}{FXDebt_{t-1}}$$

The use of more risk measurements will increase the accuracy of a measurement method. The use of CD index can be analyzed by logistic regression like the previous index using dummy variables. Assessment of the crisis based on the CD index. Bank declared a crisis in certain period if CD index value < 0 , then there is no crisis or managed to recover from a crisis.

2.2. Factors Affecting the Health Bank Ratings

2.2.1. Macroeconomics

Macroeconomic factor in this study is defined by BI Rate. The BI Rate is a policy rate reflecting the stance of monetary policy stipulated by Bank Indonesia. BI Rate announcement by Bank Indonesia is done by managing the liquidity in the money market to achieve the operational target of monetary policy. The operational targets of monetary policy are reflected in the development of the Overnight Interbank Money Market Rate. The reference for banks in Indonesia in determining the rate of interest is the BI Rate. The size of the interest rate will affect the condition of the national economy and affect the rhythm of economic activity (Mukhlis, 2015. p. 94).

GDP growth and the potential for crisis have a negative significant relation (Demirgüç-Kunt and Detragiache, 1998; Demirgüç-Kunt and Detragiache, 2000; Eichengreen and Arteta, 2000; Kaminsky and Reinhart, 2000; Demirgüç-Kunt and Detragiache, 2002; Lestano et al., 2003; Chan-Lau et al., 2004; Čihák, 2007; Arena, 2008; Männasoo and Mayes, 2009; Musdholifah, 2015). Other

studies have found no significant results in Nurazi and Evans, 2005; Schaeck and Čihák, 2007; Poghosyan and Čihák, 2009 are more emphases on the influence of the crisis on each individual bank.

Changes in local and foreign currency exchange rates can also lead to a crisis (Barrell et al, 2010). Research conducted by Glick and Hutchison (2000), Arena (2008), Oktavilia (2008), Wong et al. (2010) shows a positive significant relation between currency exchange rate changes. While Von Hagen and Ho (2007), Bhattacharya and Roy (2009) showed a negative relationship between changes in exchange rates and the potential for crisis. Beck et al., (2006); Poghosyan and Čihák (2009) show insignificant results between the relation of currency value changes with the potential for a banking crisis.

2.2.2. Internal bank

CAMELS describe the bank's internal condition as a result of external fluctuations. There are several researchers using CAMELS as an analytical tool, such as Čihák, et al. (2012) to analyze the determinants of predictive banking predictions and Reinhart, et al. (2000) to build crisis predictions by creating a signal model. CAMELS is assessed by six factors: (1) Capital indicates the bank's ability to maintain sufficient capital and the bank's management capability in identifying, measuring, controlling and controlling risks that may affect the amount of bank capital (2) asset quality is the productivity of banks in managing customer funds. Good asset quality can improve performance and estimate the risk, (3) management is a measure of the quality of management shows the management efficiency on banking performance, (4) earning shows the proportion of income and can be compared with other banks despite having a far difference in assets, (5) liquidity is a description of the bank's ability to meet its obligations, and (6) market sensitivity is an assessment of some market components such as traded shares and assets in the form of foreign exchange.

Measurement of CAMELS variable is used to see the performance or financial distress experienced by banking (Boyacioglu et al., 2009). Dabós and Escudero (2004), Wheelock and Wilson (2000), Boyacioglu et al. (2009) and Klomp (2010) stated that positive relationship between capital and the potential for banking crisis as measured by own capital divided by total assets. In contrast to the research of Nurazi and Evans (2005) Schaeck and Čihák (2007), Kick and Koetter (2007), Arena (2008), Cole and Wu (2009), Männasoo and Mayes (2009) are negatively related.

The negative relationship between asset quality and the potential for banking crisis are shown in Dabós and Escudero (2000), Nurazi and Evans (2005), Lanine and Vennet (2006), Boyacioglu et al. (2009), Männasoo and Mayes (2009), and Musdholifah et al. (2013). Unlike the results of Wheelock and Wilson's (2000) research, Arena (2008), Poghosyan and Čihák (2009), and Cole and Wu (2009) mentioned a positive relation between asset quality and the potential for banking crisis.

Canicio and Blessing (2014) showed a positive relation between managerial quality and crisis, in contrast to Kick and Koetter

(2007), and Poghosyan and Čihák (2009) found a negative relation. The insignificant results occurred in the study of Dabós and Escudero (2004), Boyacioglu et al. (2009), Cole and Wu (2009), Männasoo and Mayes (2009), and Musdholifah (2015).

Dabós and Escudero (2004), Kick and Koetter (2007), Schaeck and Čihák (2007), Arena (2008); Cole and Wu (2009), Poghosyan and Čihák (2009), Musdholifah (2015) show a negative relationship between earnings with the banking crisis. In contrast to Nurazi and Evans (2005) Boyacioglu et al. (2009) which resulted a positive relationship. Whereas Von Hagen and Ho (2007), Cole and Wu (2009), and Männasoo and Mayes (2009) found insignificant results.

Dabós and Escudero (2004), Oktavil'ia, (2008), Musdholifah et al. (2013) and Musdholifah (2015) state that the liquidity of a banking system has a negative relation with the possibility of a banking crisis. In contrast to Männasoo and Mayes (2009) and Caggiano et al. (2014) showed a positive relation. And insignificant results were found by Arena researchers (2008) and Boyacioglu et al. (2009).

Boyacioglu et al. (2009), Männasoo and Mayes (2009) show a negative relationship between market sensitivity and the crisis. In contrast to Musdholifah (2015) which shows a positive relationship. The insignificant relationship was generated by researchers Nurazi and Evans (2005).

3. METHODS

This type of research is quantitative with causal research design. According to Sekaran and Bougie (2011. p. 19), quantitative research is a research by processing data in the form of numbers or data that is suspected and causal research is the study of the cause and effect relationship between variables (Sekaran and Bougie, 2011. p. 21). The population of this research is all Indonesia conventional and Sharia banks in 2010-2015. While the sample research are conventional and Sharia banks registered in OJK in 2010-2015. The type of data is nominal and ratio data. The data collection technique used documenting the bank's financial statements. Secondary data sources are obtained from individual bank reports on the Indonesian Stock Exchange and each sample website. Macroeconomic variable data is obtained from the website of Bank Indonesia and Central Bureau of Statistics (BPS).

The dependent variable of this research is bank soundness by CD Index. CD Index has 4 components used for banking crisis identification, namely debt in foreign currency, deposit, loans, and securities investments by banks. CD Index can be formulated as follows:

$$CDI = \frac{\left(\frac{Cr_t - \mu_{credit}}{\delta_{credit}} \right) + \left(\frac{Inv_t - \mu_{Inven}}{\delta_{Investment}} \right) + \left(\frac{Dept_t - \mu_{de}}{\delta_{Deposit}} \right) + \left(\frac{FDebt_t - \mu_{F.debt}}{\delta_{F.debt}} \right)}{4}$$

Information:

$$Cr = \frac{Cr_t - Cr_{t-1}}{Cr_{t-1}} \text{ or } \frac{Loans_t - Loans_{t-1}}{Loans_{t-1}}$$

$$Inv = \frac{Inv_t - Inv_{t-1}}{Inv_{t-1}} \text{ or } \frac{investment_t - investment_{t-1}}{investment_{t-1}}$$

$$Dept = \frac{Dept_t - dept_{t-1}}{Dept_{t-1}} \text{ or } \frac{Deposit_t - Deposit_{t-1}}{Deposit_{t-1}}$$

$$FDebt = \frac{Debt_t - Fdebt_{t-1}}{FDebt_{t-1}} \text{ or } \frac{Foreign borrowing_t - Foreign borrowing_{t-1}}{Foreign borrowing_{t-1}}$$

A bank is said to be a crisis if CDI score of ≤ 0 or a negative value, and CDI score ≥ 0 is said to be no crisis. The logit value of the crisis is 1 and no crisis is 0. The independent variable in this study consists of 10 proxies with operational definitions in Table 1.

This study uses logistic regression to see the magnitude of the effect of independent variables on the dependent variable. The logit model is a non-linear regression model that produces an equation in which the dependent variable is binary which gives the numbers 1 and 0. Here is the logistic regression equation.

$$L_i = Ln \left(\frac{P_i}{1 - P_i} \right) = Z_i = \beta_1 + \beta_2 X_i$$

Where:

L_i = log odds ratio

P_i = probability

β_1 = intercept

β_2 = value of contribution of independent variable

X_i = independent variable

4. RESULTS

The banking soundness of conventional bank with CDI can be seen in Table 2. The results indicate that some banks are indicated by the crisis and not indicated by the crisis.

Similarly, in conventional and Sharia banks also performed CDI calculations. Table 3 shows the result of CDI in Sharia bank.

Based on data collection generated Table 4 which denotes the descriptive value of the independent variable. Graph 3 shows data from macroeconomic factors such as GDP, BI rate, and US dollar exchange rate.

The standard deviation value is smaller than the average dividend shows that dividend policy variable is homogeneous and is said to be good (Sekaran and Bougie, 2011. p. 217). The standard deviation value of GDP, BI rate, and dollar exchange rate is less than the mean value so that the homogeneity research data. The maximum value of GDP is in 2011 and the lowest value by 2015.

Table 1: Operational definition of variables

No	Operation definition	Literature source
1	Economic Growth=GDP Growth annual (%)	Wong et al (2010)
2	SBI=3 Month SBI Rate	Musdholifah (2015)
3	Exchange Rate Rp/US\$=Middle exchange rate and closing rupiah exchange rate against US Dollar	Zhuang and Dowling (2002)
4	$CAR = \frac{Total\ equity}{Total\ asset}$	Poghosyan and Čihák (2009)
5	$LAR = \frac{Total\ loans}{Total\ asset}$	Boyacioglu et al. (2009)
6	$NPL = \frac{Non\ Performing\ Loan}{Total\ loans}$	Boyacioglu et al. (2009)
7	$LCOST = \frac{Employee\ Cost}{Interest\ Income}$	Boyacioglu et al. (2009)
8	$ROA = \frac{Nett\ Income}{Total\ asset}$	Boyacioglu et al. (2009)
9	$BOPO = \frac{Operating\ Cost}{Operating\ Income}$	Boyacioglu et al. (2009)
10	$LDR = \frac{Total\ loans}{Total\ deposits}$	Boyacioglu et al. (2009)
11	$Sensitivity = \frac{Asset\ in\ forex}{Liability\ in\ foreign\ currency}$	Musdholifah (2015)

The minimum BI rate of 0.0575 in 2012 and the maximum value of 0.0775 in 2014. The US dollar exchange rate is minimum at 9.068 in 2011 and the maximum value in the year 2016 with a value of 13.785.

Based on data collection of independent variables can be considered in Graph 4. The standard deviation values of CAR, LAR, NPL, and LCOST are smaller than the mean values so that the homogeneity research data. The minimum value of CAR is in observation data to 118 which is at Bank Sinarmas year 2014. While maximum value of CAR equal to 0,248364 at Bank QnB Kesawan year 2011. The maximum value of LAR ratio is 0,931973 from Bank Permata in 2012. While the minimum value is 0, 401240 which is the data of Bank Mega 2016. Minimum and maximum value of NPL obtained from the data of Bank Permata of 0.001888 in 2013 and 0.550000 in 2011. Value 0.486783 is the maximum value of LCOST obtained from Bank QnB Kesawan in 2013 and the minimum value is 0.015397 obtained from Bank CIMB Niaga in 2011.

Data from the bank's internal ratios can be considered in Graph 5. The standard deviation value of ROA, BOPO, LDR is smaller than the mean value so that the homogeneity research data. The maximum ROA value of 0.068122 obtained from Bank Mega in 2015 and the minimum value is -0.076727 from Bank J Trust. The maximum value of BOPO is 9,104024 from Artha Graha International Bank in 2016 and the minimum value obtained from Bank Mega in 2016 is 0.281640. The minimum LDR of 0.477686 obtained from Bank Mega in 2012 and the maximum value of 1.169656 obtained from Bank Permata 2012. The last independent variable in this study is the sensitivity measured by using assets in foreign currency divided by the obligation in

the currency foreign. The mean sensitivity value is 13.525 with a standard deviation of 86.840 indicating heterogeneity data. The minimum value of liabilities in foreign currency amounting to 0.000000 is owned by some observational data from several banks, while the maximum value of 831,638181 is owned by Bank Permata in 2011.

The results of logistic regression test will explain how precisely the prediction of banking crisis conducted by the author. In addition, logistic regression will show an independent variable that has a significant influence on the likelihood of a crisis.

The summary model Table 5 explains the value of R² which can be seen from the column nagelkerke R². The value of R² is used to assess the fit model and explain the variability of the independent variable to the dependent variable (Hair et al., 2010. p. 336). The result of R² is 0.245 or 24.5%. Thus, the variability of the dependent variable that can be explained by the variability of the independent variable is 24.5% in this study.

In addition to using table summary model, goodness of fit research model can be seen in table hosmer and lemeshow's in Table 6.

To determine whether the research model meets the goodness of fit, the significance value of the Hosmer and Lemeshow test should be >0.05 or 5%. The significance value of the Hosmer and Lemeshow test in this study was 0.790. Thus the research model has met the goodness of fit.

Table 7 is a classification table that explains the estimated count correctly for a study. It can be seen that the prediction accuracy

Table 2: Calculation Result of Index CD of Conventional Bank

No	Bank name	2011	2012	2013	2014	2015	2016
1	Bank Mandiri	1	1	0	0	1	1
2	Bank BNI	1	1	0	1	0	0
3	Bank BRI	1	0	1	0	0	1
4	Bank BTN	0	0	0	1	0	0
5	PT. Bank Bri	0	0	1	0	0	0
6	Agroniaga Bank Artha Graha	1	1	1	1	1	1
7	Internasional Bank Bukopin	1	0	1	1	0	1
8	Bank MNC	1	1	1	1	0	1
9	Bank Central Asia	0	1	1	0	1	0
10	Bank Cimb Niaga	1	1	1	1	1	1
11	Bank Danamon	1	0	0	1	1	1
12	Bank Maybank Indonesia	0	0	1	1	0	0
13	Bank Qnb Kesawan	1	0	0	0	0	1
14	Bank Mega	0	1	1	1	0	1
15	Bank J Trust	0	1	1	1	1	0
16	Bank Nusantara Parahyangan	0	0	0	1	1	1
17	Bank OCBP NISP	0	0	0	1	0	0
18	Bank Pan Indonesia	1	0	1	1	1	1
19	Bank Permata	0	0	0	0	1	1
20	Bank Sinarmas	0	1	1	0	0	1

Source: Processed by author, 2017

Table 3: Result of Calculation CD Index of Sharia Bank

Nama Bank	CDI					
	2011	2012	2013	2014	2015	2016
Bank Mega Sharia	1	1	1	1	1	1
Bank Muamalat Sharia	0	0	0	0	1	1
Bank Panin Dubai Indonesia	0	0	0	0	0	0
Bank BRI Sharia	0	1	1	0	0	1
Bank Mandiri Sharia	1	1	1	1	0	0
Bank BCA Sharia	1	0	1	0	0	0
Bank Bukopin Sharia	1	0	0	1	1	0

Source: Processed researchers, 2017

of banks that are not indicated crisis is as much as 22 observed data. So that the prediction accuracy of 81.8% obtained from the division of the amount of data observation that did not experience a crisis with the observation of the bank data that experienced a crisis. While the bank indicated the crisis as much as 20 data observations. Thus, the percentage of accuracy of data prediction is 65%. Thus, the total overall prediction accuracy in this study was 73.8%.

Table results 8 shows that two significant variables are LCOST with the magnitude of influence (B) 0.742 and significance value 0.031 or <5% and BOPO with the magnitude of influence (B) equal to 3.125 and significance value 0.96 or <10%. The constant value of this study was -4.093. So the research equation is as follows:

$$\text{Ln} = \frac{P}{1-P} -4.093 + 0.742 \text{ LCOST} + 3.125 \text{ BOPO} + e$$

5. DISCUSSION

5.1. The Influence of GDP on Conventional and Sharia Banking Crisis

The results show no effect of conventional and Sharia bank GDP growth with a potential crisis. According to Mankiw (2008, p. 5), the absence of influence between GDP growth and banking crisis is considered inconsistent with the various literature on macroeconomics. The results of this study supported the research data of 2012 and 2013 Indonesia has decreased GDP from 6.17 to 6.03. It does not affect the condition of Bank Mega Sharia which remains indicated to experience crisis. Different results revealed by Bhattacharya and Roy (2009), Klomp and de Haan (2007) which states GDP growth is negatively related to the potential banking crisis. Supported by research data conducted by Bank BCA in 2012-2013 which shows the value of GDP of 0.060 and 0.056. However, for the calculation of CDI does not change that remains indicated crisis or logit value 1.

5.2. Influence of Interest Rate on Conventional and Sharia Banking Crisis

The results show no effect of BI rate on the potential occurrence of the banking crisis. In 2013 Indonesia's interest rate increased by 2%. Initially 6%-8%, it does not change the condition of Bank Mega identified crisis for the year 2012 and 2013. Meanwhile, Bank QnB Kesawan remain unidentified crisis in 2014 and 2015 despite rate cut by 1%. So the BI rate has no effect on the potential of the banking crisis. The absence of influence between the rupiah exchange rate against the dollar and the potential of Sharia bank crisis is supported by this research data Bank Muamalat Indonesia indicated no crisis in 2013 and 2013. In that year Rupiah depreciated against US dollar. Bank Mega Sharia in the same year that is in 2013 and 2014 indicated a crisis. The depreciation of the rupiah in 2013 and 2014 amounted to 215, which initially was worth Rp 12,170/USD to Rp 12,385/USD.

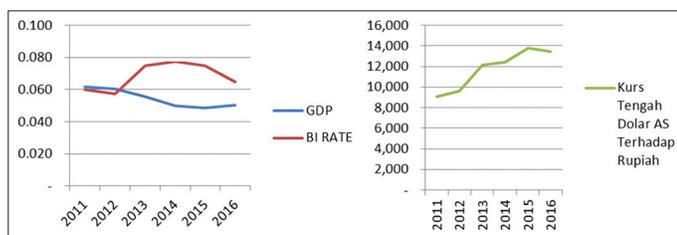
5.3. The Effect of Exchange Rates on Conventional and Sharia Banking Crisis

The results show no effect of BI rate on the potential occurrence of the banking crisis. In 2013 Indonesia's interest rate increased by 2%. initially 6% to 8% Bank Mega identified crisis for the year 2012 and 2013. Meanwhile, Bank QnB Kesawan remains unidentified crisis in 2014 and 2015 despite rate cut by 1%. So the BI rate has no effect on the potential of the banking crisis. The absence of influence between the rupiah exchange rate against the dollar and the potential of Sharia bank crisis is supported by this research data Bank Muamalat Indonesia indicated no crisis in 2013 and 2013. In that year Rupiah depreciated against US dollar. Bank Mega Sharia in the same year that is in 2013 and 2014 indicated a crisis. The depreciation of the rupiah in 2013

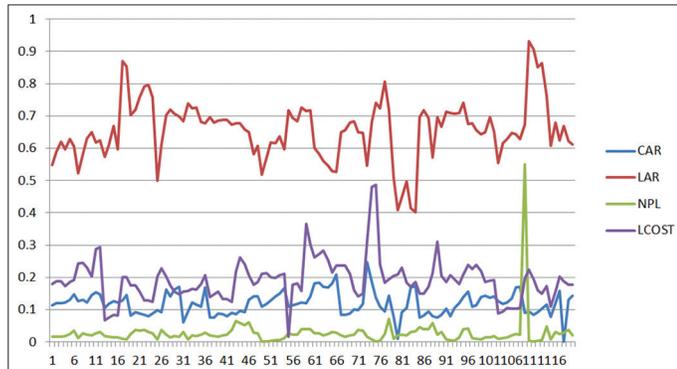
Table 4: Descriptive statistics of conventional banks

Variable	n	Minimum	Maximum	Mean±SD
GDP	120	0.04900	0.06200	0.0545000±0.00517752
BI_RATE	120	0.0575	0.0775	0.068333±0.0078946
KURS	120	9068	13785	11753.05±1803.067
CAR	120	0.000149	0.248364	0.11943785±0.036196709
LAR	120	0.401240	0.931973	0.65728683±0.092274259
NPL	120	0.001888	0.550000	0.02775727±0.050062356
LCOST	120	0.015397	0.486783	0.19200913±0.066075646
ROA	120	-0.076727	0.068122	0.01276611±0.018890632
BOPO	120	0.281640	9.104024	0.85997435±0.996545065
LDR	120	0.477686	1.169656	0.84012161±0.121181724
SENSITIVITAS	120	0.000000	831.638181	13.52512583±86.840424137
Valid N (listwise)	120			

Source: SPSS Output Appendix. SD: Standard deviation

Graph 3: Data on gross domestic product, BI Rate, and US Dollar Exchange

Source: Processed author, 2017

Graph 4: CAR, LAR, NPL, and LCOST data conventional banks

Source: Processed author, 2017

and 2014 amounted to 215 which initially was worth Rp 12,170/USD to Rp 12,385/USD.

5.4. The Influence of CAR on Conventional and Sharia Banking Crisis

The results show that there is a positive influence of CAR on the potential of the conventional banking crisis. According to Musdholifah (2015), the higher funds saved for the reserves show the prudent behavior of the bankers. Positive influence is also supported by data of 2014 Bank Mandiri indicated no banking crisis with CAR level of 0.122. However, in the next 2015 Bank Mandiri indicated crisis it also affects the rise of CAR level of 0.131. Different results between conventional

and Sharia banks the relation of the small capital of Sharia banking does not affect the post-crisis banking. The increase and decrease of CAR value in a Sharia bank in this study cannot show the risks that really faced by banks. This is supported by research data at Bank Mega Sharia in 2012 the value of CAR has decreased from 0.078 in 2011 to 0.076. Despite the decline in value of CAR does not change the identification of banking crisis in Bank Mega Sharia.

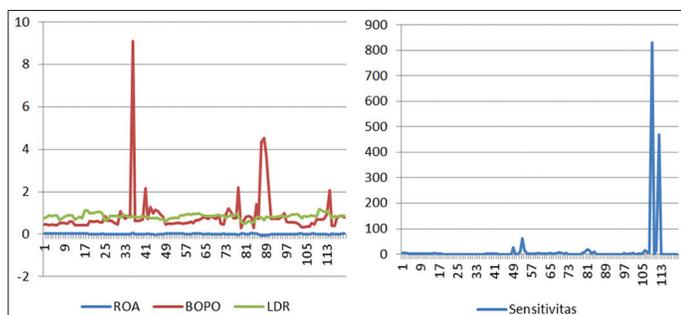
5.5. The Effect of LAR on Conventional and Sharia Banking Crisis

The results show no LAR effect with potential bank crisis. The absence of LAR influence in this study is supported by data of Bank Artha Graha International in 2014 and 2015 has LAR value of 0.72 and 0.68 respectively. Although the value of LAR Bank Bukopin Sharia decreased but did not affect the condition of Bank Bukopin Sharia which is still indicated a crisis. So that the small value of LAR does not affect the potential of the banking crisis. This is supported by existing research data at Bank BRI Agroniaga. In 2011 the LAR value of 0.499 with CDI was not indicated by the crisis. In 2012 LAR increased to 0.6123 and CDI remains unindicated crisis. It shows the LAR at the bank indicated crisis and not indicated that the crisis tends to be the same and has no difference. The absence of influence between Sharia bank LAR with potential Crisis supported by Bukopin Sharia Bank data in 2012 and 2013 has LAR values of 0.71 and 0.74 respectively. Although the value of LAR Bank Bukopin Sharia has increased, it does not affect the condition of Bank Bukopin Sharia which is not indicated by the crisis. So that the small value of LAR does not affect the potential crisis in Sharia banks.

5.6. Effect of NPL/NPF on Conventional and Sharia Banking Crisis

The results show a positive effect of NPL with the potential of the conventional banking crisis. Supported by Bank BNI data which has an NPL value of 0.130 in 2012 and indicated a crisis. However in 2013 the value of NPL decreased to 0.123 and not indicated by the crisis. It shows that rising NPLs lead to increased crisis probability and lower NPL levels lowering the likelihood of crisis indications. The absence of NPF relation to

Graph 5: ROA, LDR, BOPO, and sensitivity data of conventional banks



Source: Processed authored, 2017

Table 5: Model Summary

Step	-2 Log likelihood	Cox and Snell R Square	Nagelkerke R Square
1	46.148 ^a	0.248	0.331
2	46.153 ^a	0.248	0.331
3	46.173 ^a	0.248	0.331
4	46.259 ^a	0.246	0.329
5	46.442 ^a	0.243	0.324
6	46.511 ^a	0.242	0.322
7	46.963 ^b	0.233	0.312
8	47.667 ^b	0.221	0.294
9	48.771 ^b	0.200	0.267
10	49.614 ^b	0.184	0.245

Source: SPSS Output Appendix, 2017

Table 6: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	14.471	8	0.070
2	12.071	8	0.148
3	11.953	8	0.153
4	11.283	8	0.186
5	9.044	8	0.339
6	13.485	8	0.096
7	10.913	8	0.207
8	6.798	8	0.559
9	10.294	8	0.245
10	4.690	8	0.790

Source: SPSS output appendix, 2017

the Sharia banking crisis indicates that larger NPF condition of one period does not directly provide a decrease in profit over the same period. Supported by the data of Bank Mega Sharia NPF value in 2015 increase from 0.025 in 2014 to 0,032 in 2015. Although NPF decreased, Bank Muamalat Indonesia indicated a crisis. Likewise with Bank Panin Dubai in 2013 experiencing a decline in the value of NPF from 0.0078 to 0.0039 in 2014 it did not affect the condition of Panin Bank Dubai is not indicated a crisis.

5.7. The Effect of LCOST on Conventional and Sharia Banking Crisis

The test results show there is negative influence between conventional bank LCOST with the potential banking crisis. It shows the higher the value of LCOST then the possibility indicated bank crisis will decline. Negative influence is also supported by

research data. In 2012 BRI has LCOST value of 0.076 and not indicated a crisis. However, the increase of LCOST in 2013 to 0,084 caused BRI to indicate a crisis. The positive result between LCOST of Sharia bank with the potential of banking crisis shows that the bigger ratio of labor cost with total assets owned hence the greater the potential of crisis experienced by the bank. The result of the research showing the positive effect of LCOST on the potential of the crisis is supported by the research data of 2014 Mandiri Sharia has been identified as having a crisis by Index CD method with LCOST value of 2.88. However, in the following year, Mandiri Sharia was not identified as crisis and followed by the decline in LCOST value of 1.81.

5.8. Influence of ROA on Conventional and Sharia Banking Crisis

The results show there is negative influence between conventional bank ROA with the potential banking crisis. This is because ROA is profitability ratio which is one of the bank’s income and is connected with banking performance. Supported by Mandiri data in 2014 and 2015. In 2014 Mandiri has not indicated crisis with ROA level of 0.025. While in 2015 the level of ROA decreased to 0.022 and CDI calculations indicate the occurrence of the probability of the crisis. The absence of Sharia bank ROA relationship with the potential of the banking crisis in this study indicates the large or small value of ROA can not indicate crisis that occurred in Sharia banking. The results of this study are supported by data from 2014 and 2015 Bukopin Sharia increased ROA value of each of 0.0017 and 0.0050. Although an increase in ROA did not make the state of Bukopin Sharia better. Bukopin Sharia is still indicated by the crisis. Judging from the data the small value of ROA does not affect the potential of the crisis in Sharia banks.

5.9. The Effect of BOPO on Conventional and Sharia Banking Crisis

The results of logit testing show that the absence of influence BOPO conventional banks with a potential crisis. Results indicate the value of BOPO in the bank indicated crisis and not indicated crisis has no difference. The results of this study are supported by data of Artha Graha International has BOPO of 1.092 in 2011. In 2012 BOPO decreased to 0.901. However 2011-2012 remains indicative of the crisis at Artha Graha International. This shows there is no difference BOPO between banks that have possibility to crisis with banks that have no possibility of crisis. The positive influence of BOPO of Sharia bank against the potential of banking crisis means that if BOPO in big bank then the possibility of bank in problem condition is getting bigger too (Almilia et al., 2009). The positive influence of BOPO in this research is supported by data of Bukopin Sharia not indicated crisis in year 2013 this happened because BOPO value in year 2013 equal to 0,55. Meanwhile, in 2014 Bukopin Sharia indicated crisis supported by an increase of BOPO value of 0.93. From the increase of BOPO can cause bank condition is not good so BOPO have positive effect to potential crisis.

5.10. The Effect of LDR on Conventional and Sharia Banking Crisis

Test results show there is negative influence between conventional bank LDR against potential banking crisis. Supported by the data

Table 7: Classification table

Step 10	CDI_1	NOT CRISIS	18	4	81.8
		INDICATION OF CRISIS	7	13	65.0
	Overall Percentage				73.8

Source: SPSS output appendix, 2017

Table 8: Variables in the equation

Step 10 ^a	LCOST	0.742	0.345	4.637	1	0.031	2.100
	BOPO	3.125	1.875	2.778	1	0.096	22.758
	Constant	-4.093	1.757	5.425	1	0.020	0.017

Source: SPSS output appendix

of BTN in 2013 has LDR value of 1.029 and not indicated crisis. While in 2014 the value of LDR has increased to 1.062 and make BTN indicated crisis in 2014. The insignificant influence between the LDR of Sharia banks and the potential for banking Crisis is because banks are quite conservative and act cautiously in the face of liquidity risk. This insignificant result is supported by the results of research conducted by Hutagalung, et al., (2013) which shows that LDR results are not significant to the performance of banks in Indonesia. The results are not significant in this study supported Maybank Indonesia in 2015-2016. LDR values in 2015-2016 amounted to 0.864 and 0.887 but still not indicated crisis. So it shows that the LDR in the bank indicated crisis with the bank that did not indicated the crisis has no difference or the same.

5.11. The Effect of Sensitivity on Conventional and Sharia Banking Crisis

The results of logit testing show there is negative influence between the sensitivity of conventional banks to the potential banking crisis. Supported by data of Bukopin in 2011 and 2012. In 2011 the level of sensitivity of Bukopin of 0.775 with CDI results indicated a crisis. While in 2012 the level of sensitivity decreased to 0.509 and CDI calculation results are not indicated a crisis. These results support the results of the study. The absence of any sensitivity influence on the banking crisis is shown in Sharia banking. According to Kristanti (2014), the reason sensitivity has no effect because the banks that become samples of research indicated crisis may improve the conditions and not in accordance with the results of the study. The results are not significant in this study supported by data of Muamalat Indonesia in 2015-2016 which has sensitivity value of 1.047 and 0.717. However, CDI results in 2015-2016 remain indicated crisis with the value of logit 1. This indicates that the sensitivity of the bank indicated crisis with the bank that did not indicate the crisis has no difference.

6. CONCLUSION

The results of the study and discussion can be concluded Banking Financial Stability which counted by CDI in 2012 and 2015 is the best year with the number of banks indicated the least crisis with the number of 9 conventional banks. CAR and NPL have a positive influence on the indication of the crisis in conventional banks. LCOST, ROA, LDR, and sensitivity have a negative effect

on the indication of a crisis in conventional banks. Variables that have an influence on the Banking Financial Stability of Sharia banks there are LCOST and BOPO. Both of these variables have a positive influence on the indication of a crisis in Sharia banks.

Suggestions for further research are to categorize banks as samples based on the size of the bank as measured by the total asset value. Conventional Banks should maintain the internal ratio of banks measured using CAR, NPL, LCOST, ROA, LDR, and sensitivity. Sharia banks also have to maintain other internal bank ratios such as CAR, LAR, NPL, LCOST, ROA, LDR and sensitivity and macro ratios as measured by GDP, BI rate, and US dollar exchange rates to maintain the health of Sharia banks.

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REFERENCES

- Almilia, L.S., Shonhadji, N., Angraini, A. (2009), Faktor-faktor yang mempengaruhi financial stability ratio pada bank umum swasta nasional non devisa periode 1995-2005. *Jurnal Akuntansi dan Keuangan*, 11(1), 42-52.
- Angkinand, A.P. (2009), Banking regulation and the output cost of banking crisis. *Journal of International Financial Markets, Institutions and Money*, 19, 240-257.
- Arena, M. (2008), Bank failures and bank fundamentals: A comparative analysis of Latin America and East Asia during the nineties using bank-level data. *Journal of Banking and Finance*, 32(2), 299-310.
- Armereo, C. (2015), Analisis faktor-faktor yang mempengaruhi profitabilitas bank syariah yang terdaftar di bursa efek Indonesia. *Jurnal Ekonomi Global Masa Kini*, 6(1), 48-56.
- Bank Indonesia. (2010), *Krisis Global dan Penyelamatan Sistem Perbankan Indonesia*. Jakarta: Bank Indonesia. Available from: http://www.bi.go.id/id/publikasi/artikel-kertas-kerja/artikel/Pages/buku_krisis_global_180110.aspx.
- Barrell, R., Davis, E.P., Karim, D., Liadze, I. (2010), Bank regulation, property prices and early warning systems for banking crisis in OECD countries. *Journal of Banking and Finance*, 34(9), 2255-2264.
- Beck, T., Demirguc-Kunt, A., Levine, R. (2006), Bank concentration, competition, and Crisis: First results. *Journal of Banking and Finance*, 30(5), 1581-1603.
- Bhattacharya, B., Roy, T.N.S. (2009), Forewarning Indicator System for Banking Crisis in India. Working paper Available from: <https://www.ssm.com/abstract=1906576>.
- Boyacioglu, M.A., Kara, Y., Baykan, O.K. (2009), Predicting bank financial failures using neural networks, support vector machines and multivariate statistical methods: A comparative analysis in the sample of savings deposit insurance fund (SDIF) transferred banks in Turkey. *Expert Systems with Applications*, 36(2), 3355-3366.
- Caggiano, G., Calice, P., Leonida, L. (2014), Early warning systems and systemic banking crises in low income countries: A multinomial logit approach. *Journal of Banking and Finance*, 47, 258-269.
- Canicio, D., Blessing, K. (2014), Determinants of bank failures in multiple-currency. Regime in zimbabwe (2009-2013). *International Journal of Economics and Finance*, 6(8), 229-246.

- Caprio, G., Klingebiel, D. (2002), Episodes of Systemic and Borderline Financial Crises. World Bank Discussion Paper No 428. Available from: <http://www.documents.worldbank.org/curated/en/104481468184143887/pdf/multi0page.pdf#page=41>.
- Chan-Lau, J.A., Jobert, A., Kong, J. (2004), An option-based approach to bank vulnerabilities in emerging markets. IMF Working Paper, 4(33), 1-20.
- Čihák, M., Demirgüç-Kunt, A., Peria, M.S.M., Mohseni-Cheraghlo, A. (2012), Bank regulation and supervision around the world: A crisis update. Policy Research Working Paper, 6286, 1-52.
- Cole, R.A., Wu, Q. (2009), Predicting Bank Failures using a Simple Dynamic Hazard Model. 22nd Australasian Finance and Banking Conference. p1-29.
- Dabos, M., Escudero, S. (2004), Walter, explaining and predicting bank failure using duration models: The case of Argentina after the Mexican crisis. *Revista de Analisis Economico*, 19, 31-49. Available from: <https://www.ssrn.com/abstract=1244511>.
- Demirgüç-Kunt, A., Detragiache, E. (1998), The determinants of banking crisis in developing and developed countries. IMF Staff Papers, 45(1), 81-109.
- Demirgüç-Kunt, A., Detragiache, E. (2000), Monitoring banking sector fragility: A multivariate logit approach. *The World Bank Economic Reviews*, 14(2), 287-307.
- Demirgüç-Kunt, A., Detragiache, E. (2002), Does deposit insurance increase banking system stability? An empirical investigation. *Journal of Monetary Economics*, 49(7), 1373-1406.
- Demirgüç-Kunt, A., Detragiache, E. (2005), Cross-Country Empirical Studies of Systemic Bank Distress: A Survey. IMF Working Paper, 05/96.
- Eichengreen, B., Arteta, C. (2000), Banking Crises in Emerging Markets: Presumptions and Evidence. UC Berkeley: Recent Work, Center for International and Development Economics Research, Institute of Business and Economic Research.
- Glick, R., Hutchison, M.M. (2000), Banking and Currency Crises: How Common are the Twins? HKIMR Working Paper No. 01/2000. Available from: <https://www.ssrn.com/abstract=1009506>.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010), *Multivariate Data Analysis*. 7th ed. New Jersey: Pearson Prentice Hall.
- Hutagalung, E.N., Djumahir, R., Ratnawati K. (2013), Analisis rasio keuangan terhadap kinerja bank umum di Indonesia. *Jurnal Aplikasi Manajemen*, 2(1), 122-130.
- Indrawati, S.M. (2012), Pemparan Bail-out Bank Century. Available from: https://www.youtube.com/watch?v=tj6L-4_rghU.
- Kaminsky, G.L., Reinhart, C.M. (1998), Financial crisis in Asia and Latin America: Then and now. *American Economic Review*, 88(2), 444-449.
- Kaminsky, G.L., Reinhart, C.M. (2000), On crisis, contagion, and confusion. *Journal of International Economics*, 51(1), 145-168.
- Kaufman, G. (1997), Preventing banking crisis in the future lessons from past mistakes. *The Independent Review*, 2(1), 55-77.
- Kibritçiöglu, A. (2002), Excessive Risk-Taking, Banking Sector Fragility, and Banking Crises. U of Illinois, Commerce and Bus. Admin. Working Paper No. 02-0114. Available from: <https://www.ssrn.com/abstract=317491>. [Last accessed on 2002 Jun 24].
- Kick, T., Koetter, M. (2007), Slippery slopes of stress: Ordered failure events in German banking. *Journal of Financial Stability*, 3(2), 132-148.
- Klomp, J. (2010), Causes of banking crisis revisited. *North American Journal of Economics and Finance*, 21(1), 72-87.
- Klomp, J., de Haan, J. (2007), Central bank independence and financial instability. *Journal of Financial Stability*, 5(4), 321-338.
- Kristanti, F.T. (2014), Prediksi kebangkrutan bank-bank yang terdaftar di bursa efek Indonesia. *Jurnal Keuangan dan Perbankan*, 18(1), 130-138.
- Linane, G., Vennet, R.V. (2006), Failure prediction in the Russian bank sector with logit and trait recognition models. *Expert Systems with Applications*, 30(3), 463-478.
- Lestano, J., Jan, P.A.M., Kuper, G.H. (2003), Indicators of Financial Crises Do Work! An Early-Warning System for Six Asian Countries. Available from: <https://www.ssrn.com/abstract=480021>; <http://www.dx.doi.org/10.2139/ssrn.480021>.
- Männasoo, K., Mayes, D.G. (2009), Explaining bank distress in Eastern European transition economies. *Journal of Banking and Finance*, 33(2), 244-253.
- Mehrez, G., Kaufmann, D. (2000), Transparency, Liberalization, and Financial Crisis. World Bank Policy Research Working Paper No. 2286. Available from: <https://www.ssrn.com/abstract=258976>.
- Mukhlis, I. (2005), *Ekonomi Keuangan dan Perbankan Teori dan Aplikasi*. Jakarta: Salemba Empat.
- Musdholifah, M. (2015), Using index for predicting banking crisis in Asian countries. *International Journal of Empirical Finance*, 4(3), 170-183.
- Musdholifah, M., Ismail, M., Kaluge, D., Maskie, G. (2013), Predicting banking crisis in six Asian countries. *European Journal of Business and Management*, 5(28), 176-184.
- Nurazi, R., Evans, M. (2005), An Indonesian study of the use of CAMEL(S) ratios as predictors of bank failure. *Journal of Economic and Social Policy*, 10(1), 1-23.
- OJK. (2015), *Statistik Perbankan Indonesia*. Available from: <http://www.ojk.go.id/data-statistik-perbankan-Indonesia>.
- Oktavilia, S. (2008), Deteksi dini krisis perbankan Indonesia: Identifikasi variabel makro dengan model logit. *Jurnal Ekonomi dan Kebijakan*, 1(1), 1-13.
- Poghosyan, T., Čihák, M. (2009), Distress in European Banks: An Analysis Based on a New Dataset. IMF Working Paper, WP 09/9.
- Reinhart, C., Goldstein, M., dan Kaminsky, G. (2000), Early Warning System: An Assessment of Vulnerability. MPRA Paper No. 24579. Available from: <https://www.mpra.ub.uni-muenchen.de/id/eprint/45128>.
- Schaeck, K., Čihák, M. (2007), Banking Competition and Capital Ratios. IMF Working Papers, WP 07/216.
- Sekaran, U., Bougie, R. (2011), *Research Methods for Business A Skill Building Approach*. 5th ed. New jersey: John Wiley and Sons Ltd.
- Stiglitz, J.E. (2000), Capital market liberalization, economic growth, and instability. *World Development*, 28(6), 1075-1086.
- Sufian, F. (2009), Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia. *Research in International Business and Finance*, 23(1), 54-77.
- Von Hagen, J., Ho, T.K. (2007), Money market pressure and the determinants of banking crises. *Journal of Money, Credit and Banking*, 39(5), 1037-1066.
- Wheelock, D.C., Wilson, P.W. (2000), Why do banks disappear? The determinants of US bank failures and acquisitions. *Review of Economics and Statistics*, 82(1), 127-138.
- Wong, J., Wong, T.C., Leung, P. (2010), Predicting banking distress in the EMEAP economies. *Journal of Financial Stability*, 6(3), 169-179.
- World Economic Outlook. (1997), *World economic outlook: A survey by the staff of the International Monetary Fund*, 27, 6.
- Zhuang, J., Dowling, J.M. (2002), Causes of the 1997 Asian Financial Crisis: What Can an Early Warning System Model Tell us? ERD Working Paper Series. No. 26. Available from: <http://www.hdl.handle.net/11540/2065>.