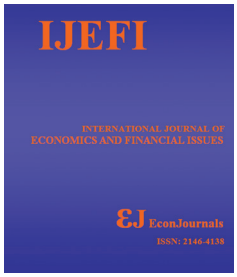

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The Impact of Macroeconomic and Internal Factors on Banking Distress

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ABSTRACT

The bank is a financial institution that collects funds from the surplus, distributing them to those in deficit as credit, as well as providing other banking services. The bank cannot be separated from external and internal factors which can cause banking distress such as liquidity problems and bank runs. This study aimed to examine the impact of economic growth, inflation, interest rate, exchange rate, capital, asset quality, management quality, earnings, liquidity, and sensitivity toward market risk for predicting banking distress using the banking stability index. The sample of the study is 27 conventional Banks in Indonesia, assessed from 2010 to 2014, and the method of analysis is an ordinal logistic. Results showed that economic growth was negatively significant for predicting banking distress. For internal banking factors, capital positively affected banking distress, while asset quality, management, and earnings have negative effects for predicting banking distress. However, inflation as well as interest rate, exchange rate, liquidity, and sensitivity to market risk did not significantly affect banking distress. These results indicate that the Indonesian banking system is mostly affected by macroeconomics and internal bank conditions in terms of probability of banking distress. These factors have consequences for policy makers, who have to be more careful in respect of the conditions of declining economic growth, the bank's capital, asset quality deterioration and decline in bank profits - as these can lead to the banking crisis.

Keywords: Banking Distress, Banking Stability Index, Macroeconomic Variable, Internal Bank
JEL Classifications: G21, E44

1. INTRODUCTION

Financial crises can occur in any country, having disastrous effects on the financial system. In Indonesia, this was exemplified by the ASEAN crisis of 1998. Elsewhere, examples include the subprime mortgage crisis in the United States in 2008, the European crisis in 2011, as well as the global economic slowdown due to economic conditions in China in 2015.

The bank is financial institutions that collect funds from society and distribute those funds for credit and providing other banking services (Kasmir, 2011. p. 2-3). As an important part of the financial system in Indonesia, the banking sector should receive attention - it is vulnerable to risks, both external and internal, including systemic risk (Ayomi and Herman, 2013). Early warnings of a banking crisis are a step toward preventing it, therefore minimizing negative impacts.

The economic conditions that occurred in Indonesia at 2015 were aw deceleration of economic growth, reflected by declining growth rate of gross domestic product (GDP) as an impact of the European crisis in 2011 and the global economic slowdown. Decline in GDP could be seen since 2010 until the first quarter in 2015. This decline was followed by weakening Rupiah exchange rates, because of the implementation of tapering-off policies and the speculation of United States (US) interest rate increases. Therefore, demand for US Dollar rose and domestic currency depreciated. As stated by Wong et al. (2010), economic conditions with a low fundamental such as the economic slowdown, high level of inflation and interest rates, and deteriorating trade balance would increase the probability of systemic banking distress.

Those conditions had an effect on banking performance in Indonesia. Based on statistical data of Indonesian banks, banking performance proxied by return on asset (ROA) fluctuated and

tended to decline since 2010 until the first quarter in 2015. Decreasing banking performance occurred in conventional as well as Islamic banking. However, Islamic banking conditions tend to be more stable than conventional banking conditions during the global financial crisis (Farooq and Zaheer, 2015; Beck and Demirgüç-Kunt, 2013). Early warnings in conventional banking are more necessary than in Islamic banking, as conventional banking conditions are more easily affected by the global economic conditions which lead to the distress conditions.

This study aimed to examine the influence of macroeconomic variables and internal banking factors in predicting banking distress in Indonesia. Prediction of banking distress was measured using banking stability index (BSI) and was based on the theory of financial crisis. The remainder of the article will be organized as follows; (1) literature review, (2) method, (3) findings and discussion, and (4) conclusion.

2. LITERATURE REVIEW

The financial crisis can be interpreted in some important ways: (1) A failure in financial markets, (2) financial institutions losing most of their assets, (3) banking panics, default credit, and recession, (4) and the collapse of the stock market and currency (Nezky, 2013). Generally, researchers split the financial crisis theory into 3 models; first-generation model, second-generation model, and third-generation model.

The first-generation model was first introduced by Krugman (1979). The first-generation model explained that financial crises occur due to fiscal and monetary instability which results from the Government's budget deficit and currency peg. This generation was characterized by a state budget deficit, high growth of money supply, high inflation rate, and overvaluing of domestic currency. According to this model, financial crises occur because of government mismanagement (Musdholifah et al., 2013; Musdholifah, 2015).

The second-generation model was first proposed by Obstfeld (1986). The second-generation model is also known as a self-fulfilling model (Musdholifah, 2015). Bank runs that lead to systemic risk are caused by customer concern because of asymmetric information about banking performance. This is called a self-fulfilling prophecy (Simorangkir, 2011). In the banking context, financial crises might occur due to the lack of liquidity and asymmetrical information, which causes liquidity holders to panic and bring about bank runs. Therefore, although fundamentally the economy isn't experiencing shock, banking crises can occur because of asymmetric information of banking performance.

The third-generation model is also known as the Asian crisis, which shows the correlation among corporate, banking, and government's macroeconomic dynamics (Musdholifah et al., 2013). The third-generation model points out the role of moral hazard and balance sheet effects. Moral hazard is a government guarantee for giving bailout in company or banks in problems. Therefore, banking sector control is necessary to prevent banking crises according to this model (Musdholifah, 2015).

Banking distress can be refined into two methods: The event-based method and the index method. Event-based identifies systemic banking distress after the occurrence of certain events, such as bank runs, mergers, banking closures, holidays, etc., and is therefore unable to predict crisis. The index method has some advantages over the event-based method: (1) It requires no apriority knowledge or assumption for identified banking crisis that can be predicted in advance, (2) various forms of threats in banking can be identified by this method, (3) this method uses the time series data to imply a more specified crisis (Bhattacharya and Roy, 2009).

Some researchers define banking distress based on the event-based method. Demirgüç-Kunt and Detragiache (2002; 2005), Wong et al. (2010) and Klomp (2010) defined bank experiencing distress when facing at least one of the following criteria: (1) Non-performing-loan ratio from banking sector more than 10%, (2) rescuing cost of the banking sector are larger than or equal to 2% of GDP, (3) there is large-scale nationalization of banks, (4) systemic bank runs. For Männasoo and Mayes (2009), the bank is defined as being distress when at least one of the following criteria happen: (1) Bankruptcy, (2) dissolution, (3) in liquidation, (4) with negative net worth.

A number of other researchers also define bank distress based on index method, such as Segoviano and Goodhart (2009) and Ghosh (2011), who developed the BSI. The BSI was first proposed by Segoviano and Goodhart (2009) and later modified into a simpler model by Ghosh (2011). There are three components in measuring BSI, namely ratio loan-loss provision (LLP) to total assets, capital adequacy ratio (CAR), and ROA. Each indicator represents an important dimension of bank operation: Stability, soundness, and profitability. The higher value of these indicators means an improvement of bank operation based on that dimension.

There are many factors that influence the occurrence of banking distress, which can be categorized into two groups, macroeconomic and internal banking factors. Macroeconomics are measured with 4 variables, economic growth, inflation, interest rate, and exchange rate. Economic growth has negatively affected the prediction of banking distress. Low economic growth indicates a decline in economic activity for real and financial sectors, such as the banking sector (Musdholifah et al., 2013; Musdholifah, 2015; Caggiano et al., 2014). This result was supported by Demirgüç-Kunt and Detragiache (2002; 2005), Beck et al. (2006), Davis and Karim (2008), Shehzad and Haan (2009), Wong et al. (2010), Sahut and Mili (2011), Büyükkarabacak and Valev (2012), Betz et al. (2013), Canicio and Blessing (2014), Mayes and Stremmel (2014), and Baselga-Pascual et al. (2015). However, Oktavilia (2008), Männasoo and Mayes (2009), Klomp (2010), Peltonen et al. (2015) found that economic growth did not affect the probability of banking distress.

In addition, Baselga-Pascual et al. (2015) found that macroeconomic conditions proxied by inflation positively affect the probability of banking distress. The increase in inflation rates shows the fragility of general economic conditions, therefore increasing Non-Performing Loan when it is not anticipated. These result

is supported by Demirgüç-Kunt and Detragiache (2005), Beck et al. (2006), Wong et al. (2010), Sahut and Mili (2011), as well as Musdholifah et al. (2013). Instead Musdholifah (2015), Davis and Karim (2008) found that inflation negatively affected banking distress. Demirgüç-Kunt and Detragiache (2002), Oktavilia (2008), Shehzad and Haan (2009), Klomp (2010), Ohwofasa and Mayuku (2012), Betz et al. (2013), Caggiano et al. (2014) and Peltonen et al. (2015) found that inflation had no effect on the probability of banking distress.

Higher interest rates can increase the probability of banking distress. Hence, higher interest rates will lead the bank to bear higher risks, especially default risk (Davis and Karim, 2008). Similar results were found in studies by Demirgüç-Kunt and Detragiache (2002; 2005), Shehzad and Haan (2009), Klomp (2010), and Sahut and Mili (2011). This was in contrast to the results found by Baselga-Pascual et al. (2015) who noted that interest rates negatively affected banking distress. Beck et al. (2006), Oktavilia (2008), Wong et al. (2010), Büyükkarabacak and Valev (2012), as well as Musdholifah (2015) found that interest rates did not affect banking distress.

Klomp (2010) found that depreciation of exchange rates was positively related to the probability of banking distress. Depreciation of exchange rates impacts on unforeseen risks, which can cause banking distress. These results were supported by Demirgüç-Kunt and Detragiache (2002), Oktavilia (2008), and Shehzad and Haan (2009), Wong et al. (2010), and Sahut and Mili (2011). Conversely, Demirgüç-Kunt and Detragiache (2002), Beck et al. (2006), Davis and Karim (2008), Wong et al. (2010), Klomp (2010), Ohwofasa and Mayuku (2012), Büyükkarabacak and Valev (2012), and Caggiano et al. (2014) found that exchange rates did not significantly affect the probability of banking distress.

Internal banking factors measured by CAMELS ratio for predicting banking distress include capital ratio, asset quality, management quality, earnings, liquidity, and sensitivity to market risk (SMR). Capital ratio has a positive effect on banking distress, meaning that higher capital ratio will increase the likelihood of banking distress (Boyaciouglu et al., 2009; Musdholifah, 2015; Messai and Gallali, 2015). Yet, Molina (2002), Almilia and Herdiningtyas (2005), Poghosyan and Čihák (2009), Tatom (2011), Sahut and Mili (2011), Betz et al. (2013), Mayes and Stremmel (2014), and Peltonen et al. (2015) found that capital ratio negatively affected the likelihood of banking distress. Meanwhile, Männasoo and Mayes (2009), Kurniasari and Ghozali (2013), Musdholifah et al. (2013), and Kowanda et al. (2014) found that capital ratio did not affect the probability of banking distress.

Poghosyan and Čihák (2009), Tatom (2011), Kowanda et al. (2014), Mayes and Stremmel (2014), Peltonen et al. (2015), as well as Messai and Gallali (2015) found that asset quality positively correlated with banking distress, where higher asset quality would increase the likelihood of banking distress. Different results were found by Musdholifah et al. (2013) with asset quality negatively affecting the probability of banking distress: In other words, higher quality of assets decreased the likelihood of banking distress. According to different results described by Almilia and Herdiningtyas (2005), Boyacioglu et al. (2009), Männasoo and Mayes (2009), Sahut and Mili (2011), Betz et al. (2013), as well as Musdholifah (2015), asset quality did not affect the probability of banking distress.

Almilia and Herdiningtyas (2005) used an efficiency ratio to measure the ability of bank's management, and found that management quality positively affected the likelihood of banking distress. A lower efficiency ratio would decrease the probability of banking distress. Similar results have been shown in studies by Tatom (2011), Kowanda et al. (2014), and Mayes and Stremmel (2014). Yet, Peltonen et al. (2015), Molina (2002), and Sahut and Mili (2011) found that management quality negatively affected banking distress. Different results found by Boyacioglu et al. (2009), Poghosyan and Čihák (2009), Betz et al. (2013), as well as Messai and Gallali (2015) where management quality did not affect the probability of banking distress.

Musdholifah (2015) showed the positive correlation between earning and the likelihood of banking distress, which meant that the lower profitability would decrease the probability of banking distress. Canicio and Blessing (2014) found that earning could reflect the efficiency and operational performance, therefore it had a negative correlation. These results were supported by Molina (2002), Poghosyan and Čihák (2009), Tatom (2011), Mayes and Stremmel (2014). According to the results found by Almilia and Herdiningtyas (2005), Boyacioglu et al. (2009), Sahut and Mili (2011), Kowanda et al. (2014), as well as Messai and Gallali (2015) profitability did not affect bank distress.

Liquidity has positive effect on banking distress, with higher loans increasing the probability of bank distress if it's not followed by higher deposits. These results were supported by Boyacioglu et al. (2009), Sahut and Mili (2011), Musdholifah et al. (2013), Kowanda et al. (2014), and Mayes and Stremmel (2014). Opposite results found by Molina (2002), Tatom (2011), and Musdholifah (2015) showed that liquidity had a negative correlation with the likelihood of banking distress. However, Poghosyan and Čihák (2009) found that liquidity did not affect the probability of bank distress.

Musdholifah et al. (2013) and Betz et al. (2013) found that SMR did not affect the probability of bank distress. Yet, Mayes and Stremmel (2014), Boyacioglu et al. (2009), Musdholifah (2015) found that SMR was positively related to the likelihood of banking distress; the more sensitive the bank to market conditions, the higher the probability of banking distress. Peltonen et al. (2015) found that SMR negatively affected the probability of banking distress.

3. METHODOLOGY

This study aimed to analyze the factors influencing banking distress in conventional banking in Indonesia during 2010-2014. The study used secondary data obtained from banks' annual reports published on the Indonesian stock exchange for internal banking factors data, world development indicators for macroeconomics variables such as real GDP, inflation, and interest rate, while exchange rate data was obtained from Yahoo Finance. The total

population of this study was 143 conventional banks, listed in the directory of Bank Indonesia, while samples were obtained using purposive sampling with the criterion of conventional banks listed on the Indonesia Exchange prior to the period of 2010. Therefore, the total sample of this research was 28 banks.

Dependent variables were measured using BSI to describe the condition of stability in the banking system. The conditions were divided into 3 groups: Banks predicted to not experience banking distress were given a 3 rating (high stability); banks needing more attention but not experiencing banking distress were given a 2 rating (moderate stability); and banks expected to encounter banking distress were given score 1 (low stability).

Indicators of BSI:

$$\text{LLP to total asset ratio}=\frac{\text{Loan-loss provission}}{\text{Total asset}}\times 100\% \quad (1)$$

$$\text{CAR}=\frac{\text{Total capital}}{\text{Total risk weighted asset}}\times 100\% \quad (2)$$

$$\text{ROA}=\frac{\text{Earning before interst and tax}}{\text{Total asset}}\times 100\% \quad (3)$$

The next step is calculating the representative indexes of indicators by the equation:

$$d_i=\frac{A_i-m_i}{M_i-m_i} \quad (4)$$

Where:
i: Indicators
d: Indexes of each indicator
A: Actual value of each indicator
M: Maximum value if each indicator
m: Minimum value if each indicator.

To measure BSI, the following indicators were used in the equation:

$$BSI_j=1-\frac{\sqrt{\sum_{i=1}^{n}(1-di)^2}}{\sqrt{n}} \quad (5)$$

Where n is dimensional space.

Based on the BSI score, banks are grouped into 3 categories:
- High stability (rank 3) if BSI scored over 90 percentiles.
- Moderate stability (rank 2) if BSI score lay between the median and 90 percentiles.
- Low stability (rank 1) if BSI score was less than median value.

Banks with category low stability were predicted to experience banking distress, while banks with category high stability were not predicted to experience any banking distress.

On the other hand, the independent variables are divided into two groups, macroeconomic variables consist of real economic growth, inflation, interest rate, and exchange rate. Meanwhile internal banking factors consist of CAMELS ratio (capital ratio, asset quality ratio, management quality ratio, earnings, liquidity, and SMR). Capital ratio is CAR; asset quality is loan to total assets ratio (LAR); management quality is cost-to-income ratio (CIR); earning is measured by return on equity (ROE); liquidity is loan-to-deposits ratio, and SMR was measured by SMR. This study used ordinal logistic analysis to develop a predictive model of banking distress.

Because the dependent variable is categorical data, we utilise a logistic model that could be derived through probabilistic function, as follows:

$$f(y_i)=\pi(X_i)^{y_i}(1-\pi(X_i))^{1-y_i} \quad (6)$$

If $y_i = 0$, then $f(0) = \pi(x_i)^0(1-\pi(x_i))^{1-0} = 1-\pi(x_i)$

If $y_i = 1$, then $f(1) = 1-\pi(x_i)^1(1-\pi(x_i))^{1-1} = 1-\pi(x_i)$

With $y_i = 0, 1$.

Logistic regression model is as follows:

$$\pi(x)=\frac{\exp(\beta_o+\beta_1x_i+\ldots+\beta_px_p)}{1+\exp(\beta_o+\beta_1x_1+\ldots+\beta_px_p)} \quad (7)$$

Where P = number of independence variables.

Equation 2 is transformed to be logistic equation so that is more easily in estimation of parameter purposes.

$$P_i = g(x) = \beta_0+\beta_1x_1 \ldots +\beta_px_{pi}+\varepsilon_i \quad (8)$$

Equation 3 logistic model with p of independent variables.

An alternative of logistic model is known as probit. The probit regression model was used to describe the relationship between the dependent variable and the independent variable, where the value of the dependent variable (Y) is assumed in the form of qualitative binary value 0 and 1. To resolve these, the cumulative normal distribution function for probit regression using the normal distribution was used.

The distribution is the probability of the applicable standard distribution format, namely:

$$f(y_i I\pi_i)=\pi_i^{yi}(1-\pi_i)^{1-y_i} \quad (9)$$

With $y_i = 0, 1$, and πi is the probability of event i occurring if Y = 1. Function transformation in probit model cumulative distribution function (CDF) of the standard normal distribution using normal CDF as a bridge function to generalized linear model.

$$P(y_i=1Ix_i)=\varnothing(\beta'x)=\int_{-\infty}^{\beta'x}\varnothing(z)dz \quad (10)$$

$$F(g)(x))=\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\beta X_i}e^{-\frac{z^2}{2}}dz \quad (11)$$

Generally, probit model can be expressed in the following equation:

$$P_i = F(Z_i) = F(\beta_0+\beta_1X_1+\beta_2X_2+\ldots+\beta_pX_{Pi}+\varepsilon_i) \quad (12)$$

F is the cumulative probability function and X_{ij} are independent stochastic variables. To obtain an estimation of the value probability function of probit (Z_i) we apply the inverse of the normal CDF as follows:

$$P_i = F^{-1}(Zi) = \beta_0+\beta_1X_1+\beta_2X_2+\ldots+\beta_pX_{Pi}+\varepsilon_i \quad (13)$$

4. RESULTS AND DISCUSSION

4.1. BSI

Table 1 shows the prediction of bank distress is measured using BSI, which divides banks into 3 categories. Banks with high stability category (rank 3) were predicted not to experience banking distress, while banks with moderate category (rank 2) were predicted to need more attention but had not experienced banking distress, then banks with low stability (rank 1) were predicted to experience bank distress.

Twenty eight banks are measured the stability index from year 2010 to 2014. Result shows that two banks are constant, three banks are decreasing, six banks are cyclical form and seventeen banks are increase. This result implied that the stability of Indonesian banking, the majority is quite stable.

4.2. Prediction of Banking Distress Based on Macroeconomic and Internal Factors

Logistic regression analysis results in Table 2 showed that in the model fitting information, the chi square value was 82.140 and significant at the level 0.000 or under α = 0,05, so it could be concluded that the model in this study was a good fit. Pseudo R-square value in this study was 28.3%, showing that ten independent variables could explain about 28.3% prediction of banking distress. Chi-square for test of parallel lines showed a value of 5.745, significant at 0.836, where the value of the >α = 0.05. It could be concluded that the model tested was parallel with the data.

t(p1) = −40,886-4,691 GROWTH+7,358 CAR-5,994 LAR-5,212 CIR-2,786 ROE+e

logit (p1+p2) = −39,705-4,691 GROWTH+7,358 CAR-5,994 LAR-5,212 CIR-2,8786+e

Economic growth proxied by real GDP was negatively and statistically significant at the 5% level to the likelihood of banking distress in Indonesia during 2010-2014. This means that the decline of economic growth will increase the probability of banking distress. The decline in economic growth indicates the condition of decreased productivity in the real sector, meaning difficulties in the repayment of credit form the real to the financial sector. Thus, non-performing loan of the financial sector will increase and the probability of banking distress will increase as well. This results are consistent with Demirgüç-Kunt and Detragiache (2002), Demirgüç-Kunt and Detragiache (2005), Beck et al. (2006), Davis and Karim (2008), Shehzad and Haan (2009), Wong et al. (2010), Sahut and Mili (2011), Büyükkarabacak and Valev (2012), Betz et al. (2013), Musdholifah et al. (2013), Musdholifah (2015), Caggiano et al. (2014), Canicio and Blessing (2014), Mayes and Stremmel (2014), Baselga-Pascual et al. (2015) who found a negative effect between economic growth and the likelihood of banking distress.

Table 1: BSI ranks

Banks	2010	2011	2012	2013	2014
	BSI index	BSI index	BSI index	BSI index	BSI index
AGRO	3	2	2	3	3
BABP	1	1	1	1	3
BACA	2	1	1	2	2
BBCA	1	1	1	3	3
BBKP	1	1	1	2	2
BBNI	2	2	3	3	3
BBNP	1	1	1	2	3
BBRI	1	2	3	3	3
BBTN	1	1	1	1	2
BCIC	3	3	1	1	1
BDMN	2	2	3	3	3
BEKS	3	1	1	1	1
BKSW	1	2	1	2	1
BMRI	1	2	3	3	3
BNBA	2	1	2	2	1
BNGA	1	1	1	2	3
BNII	1	1	1	1	3
BNLI	1	1	1	2	2
BSWD	2	2	2	2	2
BTPN	2	2	3	3	3
BVIC	1	1	2	3	3
INPC	1	1	1	2	2
MAYA	2	1	1	1	1
MCOR	1	1	1	1	1
MEGA	1	1	2	1	1
NISP	1	1	1	3	3
PNBN	1	1	1	2	2
SDRA	2	1	1	1	3

Source: Researcher

Table 2: Results for prediction of bank distress

Variables	Parameter	SEM	Significant
Threshold			
[BSI=1.00]	−40.886	17.297	018
[BSI=2.00]	−39.705	17.274	0.022
Location			
Growth	−4.691	1.967	0.017*
Inflation	0.264	0.143	0.065
Interest rate	−1.459	1.024	0.154
Exchange	7.326	3.948	0.064
CAR	7.358	3.063	0.016*
LAR	−5.994	1.180	0.000*
CIR	−5.212	1.434	0.000*
ROE	−2.786	1.026	0.007*
LDR	2.148	1.236	0.082
SMR	−0.587	1.791	0.743

Model fitting information: χ^2: 82.140 - significant: 0.000. Pseudo R-square: 28.3% - test of parallel lines: χ^2: 5.745 - significant: 0.836. *Significant in level 5%, SEM: Standard error mean, BSI: Banking stability index, CAR: Capital adequacy ratio, LAR: Loan to total assets ratio, CIR: Cost-to-income ratio, ROE: Return on equity, LDR: Loan-to-deposits ratio, SMR: Sensitivity to market risk

Inflation, proxied by real inflation, was positively and statistically insignificant in predicting banking distress during the period 2010-2014 in Indonesia. This means that an increase or decrease in the inflation rate in Indonesia was not related with the condition of distress in the Indonesian banking system. This results show that the inflation that occurred during the period did not affect the decline in the income of banks, neither did it lead to an increase in third party funds received by banks, therefore it could not affect the likelihood of banking distress. This result is supported by findings form Demirgüç-Kunt and Detragiache (2002), Oktavilia (2008), Shehzad and Haan (2009), Klomp (2010), Ohwofasa and Mayuku (2012), Betz et al. (2013), Caggiano et al. (2014), and Peltonen et al. (2015).

Interest rates were negatively and statistically insignificant in predicting banking distress during 2010-2014 in Indonesian conventional banks. This means that an increase or decrease in interest rates that occurred in Indonesia did not affect the condition of banking distress, because banks were predicted to be able to adapt and have good responses to the rate of inflation and interest rate changes. Basically, as high interest rates have an influence on the two sides, an increase in the interest rate would increase the default risk of loans. Such an increase would raise the amount of third party funds while decreasing the bank's income, as interest expenses would increase the bank's costs.

Exchange rates, proxied by nominal exchange rate, was positively and statistically insignificant for the prediction of banking distress during 2010-2014 in Indonesian conventional banks. This means that high or low fluctuation in exchange rates did not affect the stability in Indonesia. There is a possible explanation for this result: Hedging policies implemented by Bank of Indonesia can protect banks from foreign exchange risks, therefore fluctuation in exchange rates does not affect banking assets as well as customer credit. The results of this study are supported by Demirgüç-Kunt and Detragiache (2005), and Beck et al. (2006), Davis and Karim (2008), Wong et al. (2010), Klomp (2010), Büyükkarabacak and Valev (2012), Ohwofasa and Mayuku (2012), and Caggiano et al. (2014).

Capital proxied by CAR positively affected the probability of banking distress; an increase in CAR would increase the probability of banking distress in Indonesian banks. This result may be associated with ROA in BSI components, higher composition of CAR shows that banks do not allocate their capital for operational costs. As a result, the bank's profit and therefore their ROA will be low. A low ROA causes low BSI value that indicates the increased probability of banking distress. Furthermore, this shows that a high capital ratio can be a burden because it would reduce the profitability and increase the probability of banking failure. This research is also supported by Boyacioglu (2009) and Musdholifah (2015).

Asset quality proxied by LAR negatively affected the likelihood of banking distress in Indonesia during 2010-2014. This means that an increase in LAR will lower the probability of banking distress. A negative effect in this study may be associated with BSI components, LLP to total assets. An increase in loans will increase non-performing loans, therefore LLP will also increase. An increase in LLP to total assets ratio will make BSI value higher, and decrease the probability of banking distress. Poghosyan and Čihák (2008) in Musdholifah et al. (2013) found that asset quality has an important role in predicting banking distress. However, asset portfolios in banks also reflect the bank's profitability (Musdholifah et al., 2013). When banks have a high proportion of loans, they will have high interest revenue from the repayment of said loans, therefore banks will be more profitable, and the probability of banking distress would be reduced. These results are consistent with the findings of Männasoo and Mayes (2009), Sahut and Mili (2011) who found that asset quality negatively affected banking distress conditions.

Management quality proxied by CIR negatively affected the probability of banking distress. An increase in CIR will decrease the probability of banking distress. A negative correlation between management and prediction of banking distress in this study can be associated with ROA in the BSI components. The higher CIR shows that a bank's operating costs are also high, hence banks have higher expectations in terms of income; by increasing operational costs, banks will have high profits. High profit will affect an increase in ROA and therefore the BSI score will also increase, which means that profitability will lower the possibility of banking distress. These results are consistent with the results of Molina (2002) and Peltonen et al. (2015) who found negative effects between management quality and banking distress prediction. Molina (2002) analyzed the prediction of banking distress in Venezuela and found that management negatively affected the probability of banking distress. There were two explanations for this case. A negative association between CIR and banking distress prediction could not be seen as an efficiency indicator, but as an indicator for expense composition. This is because the most important aspect of cost management in Venezuelan banks was to keep financial expenses low without getting into an interest-rate war. Second, failed banks cut their operating expenses when they were in trouble.

Earning was negatively and statistically significant in predicting banking distress during 2010-2014 which means that an increase in ROE will decrease the likelihood of banking distress. High profitability will increase banking capital thus decreasing the probability of banking distress. The bank's inability to obtain and maintain profits caused bank losses and had a bad effect on asset quality and bank's capital, thus increasing the likelihood of banking distress (Mayes and Stremmel, 2014). Canicio and Blessing (2014) also suggested that earnings might reflect the level of a bank's efficiency and operational performance, therefore when earning was low the efficiency and operational performance of banks would also be low, thus negatively affecting the likelihood of banking distress. The result of this study was consistent with findings of Tatom (2011) and Baselga-Pascual et al. (2015), who suggested a negative effect between earning and banking distress prediction model.

The negative correlation between earnings proxied by ROE and banking distress prediction model may be associated with ROA in the BSI components. The higher profit received by banks will

increase ROE and ROA, therefore BSI value will also increase. High BSI value showed a lower probability of banking distress.

Variable liquidity proxied by loan to deposits was positively and statistically insignificant in predicting banking distress during 2010-2014. This means that the amount of loans has no effect on the condition of banking distress. These findings are supported by results from Poghosyan and Čihák (2009) and Messai and Gallali (2015). Often, only a short period of time is required for problems in the bank to turn into liquidity problems and lead to banking distress. The period of this study was long enough to conclude that this variable did not affect banking distress (Poghosyan and Čihák, 2009).

Variable SMR has no effect on banking distress prediction in Indonesian banks. It means that an increase or decrease in the variable SMR, which reflects the number of trading securities to total assets of banks, could not predict the condition of banking distress in the banking sector. This finding is not consistent with findings by Mayes and Stremmel (2014), who found that SMR positively affected banking distress prediction. Hence, SMR shows the fluctuation in the money market; banks that rely on financing from the market or have volatile assets will be vulnerable to market distortions that lead to distress conditions. However, the result of this study suggests that the composition of asset structure in Indonesian banks are not dependent on financing from the market, in other words the volume of trading securities on money market is relatively small. Therefore, the changes in interest rates and exchange rates have little influence on the composition of bank's assets. These findings are consistent with those by Betz et al. (2013) and Musdholifah et al. (2013) who showed that SMR did not affect banking distress.

5. CONCLUSION

This study showed that macroeconomic variables proxied by economic growth negatively affect the likelihood of banking distress. A decline in economic growth indicated decreased productivity in real sector, making repayment of credit to financial sector difficult, with non-performing loans in banking sector also increasing. In banking internal factors, variable capital proxied by CAR positively affected banking distress, which means that an increase in capital ratio will increase the probability of banking distress. High capital shows that banks do not allocate their capital for operational activities, therefore a bank's profits will be low and increase the probability of banking distress. Meanwhile, asset quality, management, and profitability were shown to negatively affect banking distress. Asset quality proxied with LAR had a negative effect on banking distress prediction. Higher loans would increase LLP as one BSI components and increase BSI value, therefore banking distress would decrease. Besides, high bank asset portfolios also reflect the expectation of loan returns and high profitability, therefore reducing the likelihood of banking distress.

Management proxied by CIR negatively affected banking distress. This result could be associated with ROA as one BSI component. When banks had expectations to generate higher incomes by increasing their operational costs, they were also expected to have higher profitability, therefore reducing the probability of banking distress. For the variable earning, proxied by ROE, a negative effect on banking distress was shown. Higher profits would increase the bank's performance, therefore it could reduce the probability of banking distress. However, inflation rate, interest rate, exchange rate, liquidity, and SMR did not affect the probability of banking distress in this study. This conveys the message that the banking sector should be more cautious when dealing with lower economic growth and higher capital reserve ratios.

REFERENCES

Almilia, L.S., Herdiningtyas, W. (2005), Analisis rasio CAMEL terhadap prediksi kondisi bermasalah pada lembaga perbankan perioda 2000-2002. Jurnal Akuntansi dan Keuangan, 7(2), 131-147.

Ayomi, S., Hermanto, B. (2013), Mengukur Risiko Sistemik dan Keterkaitan Finansial Perbankan di Indonesia. Buletin Ekonomi Moneter dan Perbankan.

Bank Indonesia. (2010), Indonesian Banks Statistic. Available from: http://www.bi.go.id. [Last accessed on 2015 Nov 30].

Bank Indonesia. (2011), Indonesian Banks Statistic. Available from: http://www.bi.go.id. [Last accessed on 2015 Nov 30].

Baselga-Pascual, L., Ponce, A.T., Riportella, C.C. (2015), Factors influencing bank risk in Europe: Evidence from the financial crisis. North American Journal of Economics and Finance, 34, 138-166.

Beck, T., Demirgüç-Kunt, A., Levine, R. (2006), Bank concentration, competition, and crises: First result. Journal of Banking and Finance, 30(5), 1581-1603.

Beck, T., Demirgüç-Kunt, A. (2013), Islamic versus conventional banking: Business model, efficiency, and stability. Journal of Banking and Finance, 37(2), 433-447.

Betz, F., Oprica, S., Peltonen, T.A., Sarlin, P. (2013), Predicting Distress in European Banks. European Central Bank Working Paper Series No. 1597. p1-34.

Bhattacharya, B., Roy, T.N.S. (2009), Forewarning Indicator System for Banking Crisis in India. Available from: http://www.ssrn.com/abstrack=1906576.

Boyacioglu, M.A., Kara, Y., Baykan, Ö.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 Application, 36, 3355-3366.

Büyükkarabacak, B., Valev, N. (2012), Credit information sharing and banking crises: An empirical investigation. Journal of Macroeconomics, 34(3), 788-800.

Caggiano, G., Calice, P., Leonida, L. (2014), Early warning systems and systemic banking crises in low income countries: A multinominal logit approach. Journal of Banking and Finance, 47, 258-269.

Canicio, D., Blessing, K. (2014), Determinants of bank failures in multi-currency regime in Zimbabwe (2009-2012). International Journal of Economics and Finance, 6(8), 229-245.

Davis, P.E., Karim, D. (2008), Comparing early warning systems for banking crises. Journal of Financial Stability, 4(2), 89-120.

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. International Monetary Fund Working Paper. p3-26.

Farooq, M., Zaheer, S. (2015), Are Islamic Banks More Resilient during Financial Panics? IMF Working Paper. p2-23.

Ghosh, S. (2011), A simple index of banking fragility: Application to

Indian data. The Journal of Risk Finance, 12(2), 112-120.
Kasmir. (2011), Bank dan Lembaga Keuangan Lainnya. Jakarta: Rajawali Pers.
Klomp, J. (2010), Causes of banking crises revisited. North American Journal of Economics and Finance, 21(1), 72-87.
Kowanda, D., Pasaribu, R.B., Firdaus, M. (2014), Financial Distress Prediction on Public Listed Banks in Indonesia Stock Exchange. Conference Paper, The 3rd International Congress on Interdisciplinary Behaviour and Social Science 2014. p364-370.
Kurniasari, C., Ghozali, I. (2013), Analisis pengaruh rasio CAMEL dalam memprediksi financial distress perbankan Indonesia. Diponegoro Journal of Accounting, 2(4), 1-10.
Krugman, P. (1979), A Model of balance-of-payment crises. Journal of Money, Credit and Banking, 11(3), 311-325.
Männasoo, K., Mayes, D. (2009), Explaining bank distress in European transition economies. Journal of Banking and Finance, 33(2), 244-253.
Mayes, D., Stremmel, H. (2014), The Effectiveness of Capital Adequacy Measures in Predicting Bank Distress. SUERF Study - The European Money and Finance Forum Vienna. p3-53.
Messai, A.S., Gallali, M.I. (2015), Financial leading indicators of banking distress: A micro prudential approach - Evidence from Europe. Asian Social Science, 11(21), 78-90.
Molina, C.A. (2002), Predicting bank failures using a hazard model: The Venezuelan banking crisis. Emerging Market Review, 3(1), 31-50.
Musdholifah, M. (2015), Using index for predicting banking crisis in six 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.
Nezky, M. (2013), Pengaruh krisis ekonomi Amerika serikat terhadap bursa saham dan perdagangan Indonesia. Buletin Ekonomi Moneter dan Perbankan, 15(3), 89-104.
Obstfeld, M. (1986), Rational and self-fulfilling balance-of-payment crises. The American Economic Review, 76(1), 72-81.
Ohwofasa, B.O., Mayuku, J.G. (2012), Determinants of bank distress and effect on Nigerian economy, 1986-2010: An empirical analysis. European Journal of Humanities and Social Sciences, 17(1), 865-880.
Oktavilia, S. (2008), Deteksi dini krisis perbankan indonesia: Identifikasi variabel makro dengan model logit. Jurnal Ekonomi dan Kebijakan (JEJAK), 1(1), 1-13.
Otoritas Jasa Keuangan. (2012), Indonesian Banks Statictic. Available from: http://www.ojk.go.id. [Last accessed on 2015 Dec 01].
Peltonen, T., Piloiu, A., Sarlin, P. (2015), Network Linkages to Predict Bank Distress. European Central Bank Working Paper Series Number 1828. p1-35.
Poghosyan, T., Čihák, M. (2008), Distress in European Banks: An Analysis Based on a New Data Set. International Monetary Fund Working Paper, 3-34.
Poghosyan, T., Čihák, M. (2009), Distress in European Banks: An Analysis Based on a New Data Set. International Monetary Fund Working Paper. p3-34.
Sahut, J.M., Mili, M. (2011), Banking distress in MENA countries and the role of mergers as a strategic policy to resolve distress. Economic Modeling, 28(1), 138-146.
Segoviano, M., Goodhart, C. (2009), Banking Stability Measures. IMF Working Paper. p2-54.
Shehzad, C.T., Haan, J.D. (2009), Financial Liberalization and Banking Crises. Working Paper. p1-31.
Simorangkir, I. (2011), Penyebab Bank Runs di Indonesia: Bad Luck Atau Fundamental? Buletin Ekonomi Moneter dan Perbankan. p51-78.
Tatom, J. (2011), Predicting Failure in the Commercial Banking Industry. Munich Personal RePEc Archive (MPRA) Paper No. 34608. p1-31.
Wong, J., Wong, T.C., Leung, P. (2010), Predicting banking distress in the EMEAP economies. Journal of Financial Stability, 6(3), 169-179.