THE DETERMINANT OF BANK CREDIT RISK: COMPARATIVE ANALYSIS OF CONVENTIONAL AND ISLAMIC BANKS IN INDONESIA

Miftahul Farika[1], Noer Azam Achsani[1], Suwinto Johan[2]

[1]School of Business – Bogor Agricultural University, Indonesia

[2]STIE Wiyatamandala, Jakarta, Indonesia

ABSTRACT: *Credit/financing is bank's core business following with credit/financing risk. Increasing and decreasing of credit/financing risk affected by external factor such as macroeconomic variables also internal banking factor. The aim of this research is to analyse which macro (GDP, exchange rate, consumer price index, Bank Indonesia Certificates/Sharia & money supply) and micro (loan/financing to deposit ratio, capital adequacy ratio, operational efficiency ratio) variables the most affecting to credit/financing growth and credit/financing risk. This research utilized Vector Error Correction Model (VECM). The result of this research showed Bank Indonesia Certificates and money supply as macro variables have the most influence, and CAR as internal factor has the biggest contribute to credit growth. For financing growth, macro variables that have biggest influence are exchange rate and Bank Indonesia Certificates Sharia, as for micro variable CAR has the biggest contribution. Credit risk affected by Bank Indonesia Certificates, and for micro variable, LDR has the biggest influence. For financing risk, Bank Indonesia Certificates Sharia has the biggest influence, and OER has the biggest contribution.*

KEYWORDS: Credit Risk, Credit Growth, Financing Risk, Financing Growth, VECM

JEL Classification: G21, G32, N15

INTRODUCTION

A country economic condition has influence to credit/financing growth in the country, whereas high credit/financing growth showed there is increasing in financial deepening in economy. Increasing in lending growth affected by macroeconomic condition. Credit/financing growth has correlation with banking role, as collectors and funders for community. Fluctuating macroeconomic condition will increasing or decreasing credit/financing growth, with economic growth as one factor that affect it. Indonesia economic growth decreasing in 2015 with 4.88% and increasing in 2016 become 5.02% following with the increasing of financing growth but the decreasing of credit growth. When GDP is declining, credit/financing risk will increasing. Previous research also proved that countries with low rate of NPL have strong and stable economy (Mileris, 2014). Korkmaz (2015) said that bank credit didn't affect inflation, but affecting economic growth.
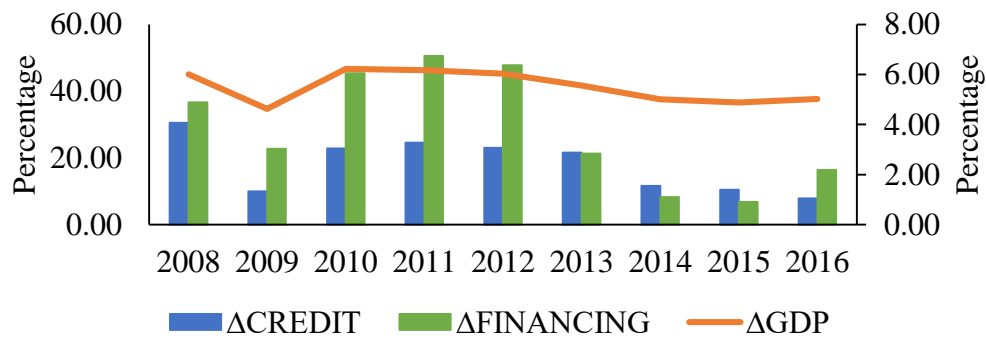
Figure 1. Credit, Financing, and GDP

Capital adequacy is an important factor to accommodate credit/financing risk of bad loans. According to Purwanto (2011) credit risk is a risk faced by bank because of distributing money into credit loans to customers. Credit risk is one of biggest problem for bank, where unpaid debt become bad loans. The increasing of credit risk will affect bank performance, one indicator to measure bank performance stability for conventional bank is *Non Performing Loan* (NPL) and *Non Performing Financing* (NPF) for Islamic Bank. Based on Central Bank Regulation (PBI) No. 13/3/2011, determined maximal NPL ratio is 5% from total amount of credit.

Bad loans have negative impact to bank performance and will increasing NPL/NPF, to improve bank performance, especially state banks usually execute the practice of write-off for bad loans. In 2016, write-off bad loans value from four state banks attained Rp 24.78 trillion which is increasing 41.73% compared to previous year. Write-off is following with increasing NPL of state banks in the previous year.

Bad loans of state banks following with the increasing of Islamic bank's NPF, where NPF percentage more than 5% and reached 29.31% by Maybank Syariah, even Bank Syariah Mandiri has reached 5.58%. Financing risk faced by Islamic bank caused by financing agreements distributed by Islamic bank. In financing distributing, Islamic bank used *murabahah* principal where in one of the principal in the assumption can decreasing financing risk, because it has the most low risk compared to *musyarakah* and *mudharabah* financing. Financing distribution in Islamic banks in Indonesia, *murabahah* has the biggest portion of distribution because it brings more profit.

The increasing of credit/financing growth which is fluctuating from 2008 until the lowest in 2016 gave impact to credit/financing risk for banks in Indonesia. Those things caused questions which macro and micro variables give more impact to credit/financing growth, and how those also affect credit/financing risk faced by banks in Indonesia. Therefore, the objectives of this research are:

1. Analyse of macro and micro variables that affect credit/financing growth.

2. Analyse of macro and micro variables that affect credit/financing risk.

3. Analyse of the ability of Indonesian banking in manage credit/financing risk.

LITERATURE REVIEW

According to Purwanto (2011) credit risk is a risk faced by bank for channelling funds in the form of loans to customers. Due to various reasons, customers are unable to fulfill their obligations such as principal and interest payments, thus the bank suffers losses due to interest expense incurred for customer deposits. The increase in non-performing loans caused revenues and profits to decline, ROA and ROE also declined. According to Ali (2008) credit risk is the risk of loss suffered by the bank, related to the possibility that at maturity, the counterpart fails to fulfill its obligations to the bank. Credit risk is the risk of loss for the bank because the debtor does not repay the loan principal (plus interest). This risk is inevitable given that the strategic function of banking is as a channel of funds to the community in need for the sustainability of the country's economy and the welfare of society.

Financing risk if often associated with the risk of default. The risk refers to the potential losses faced by banks when bad loans happened. The objective of credit risk management is to limit or reduce credit risk, classify assets and periodically evaluate the quality of the collectability of the financing portfolio, define provisions, and provide capital reserves to absorb possible losses. In managing credit risk, the bank should pay attention to the potential failure customer to pay their obligations, decreasing of financial quality, financial concentration, and risk arising from settlement activities and transaction clearing. The bank must conduct a check on customers before deciding what financing instruments are appropriate for them. Risk mitigation techniques are required in accordance with Sharia principle, and, of course the characteristics of these financing instruments (Wahyudi *et al.* 2013).

There are three forms of Islamic banking products according to Waseem (2014). First is *mudarabah,* an equity-based contract offered by Islamic banks, which is based on the Islamic Shari'ah. *Mudarabah* is a special kind of partnership, where one partner provides money to another and the latter manages the money by investing it in commercial projects in order to earn profit which is shared among the two in a predetermined ratio. Second is *musharakah,* a partnership-based contract or an investment product with a partnership structure for sharing profit and losses, which is based on Islamic Shari'ah. It involves investment from all the partners and an agreement to share profits in a predetermined ratio and to share losses in the ratio of contribution. The last is *murabahah,* it refers to the sale of goods at a price which includes a profit margin. This product is predominantly offered by Islamic banks in asset financing, property, microfinance and commodity import and export. The contract has an honest declaration of cost and the expenses incurred on the product, along with the profit mark up being taken by the seller, which is the bank in this case.

Research conducted by Lin et al. (2016) using OLS method to analyze macroeconomic factors affecting credit risk in conventional and Islamic banks shows that sharia banks are more stable during financial crisis in Indonesia and only two variables significantly affect credit risk ie exchange rate and money supply . The exchange rate has a greater impact on sharia banks than conventional banks. Poetry and Sanrego (2011) indicate that in the short term there are no variables significantly affecting NPLs and NPFs, but in the long run the variables affecting NPLs and NPFs are exchange rate, GDP, inflation, SBI, FDR of Sharia Bank, and CAR.

Seolaksono (2013) analyzed the dynamic behavior of conventional and sharia banking credit with the effect of macroeconomic condition indicating that SBI had an effect on credit distribution in two conventional and sharia banking credit model with one-way relationship. Trad et al. (2017) examines the risks and benefits of sharia banking shows that the main factor

17

to reduce credit risk is with the capital and reputation of the bank. Macroeconomic factors such as exchange rate, inflation, and GDP growth have a positive and highly significant effect on credit risk, but inflation has a negative and significant relationship. The exchange rate and GDP growth variables support the stability of sharia banking. Yurdakul (2014) assumes that improved macroeconomic conditions will reduce credit risk. The results show that an increase in the money supply, exchange rate, inflation and interest rates increase credit risk.

METHODOLOGY

This research used conventional and Islamic banking as research object. Research data is secondary data and collected from monthly report of conventional bank and Islamic bank, also macro economy variables from April 2008 until December 2016. Before running data, descriptive analysis is required to describe the object to be studied, after that the analysis using econometrics method. In summary econometrics can be interpreted as the application of static methods to solve economic problems. According to Verbeek in Firdaus (2012) econometrics as the interaction between economic theory, data and statistical methods. Econometrics are important because economists are interested in the relationships of various variables. Using statistical techniques, the available data can be used to explain the economic problems being studied. The problem is poured in the economic model, the expression in the form of mathematical equations or graphs of relationships between economic variables observed. Table 1 shown macro economy variables and Table 2 shown micro economy variables used in the research.

Table 1. Macro economy variable

| Variable	Symbol	Description
GDP Real	GDP	Value-added of goods and services calculated using the prevailing price for a given year as the base year (BI).
Exchange Rate	ER	Price level agreed by the people of both countries to trade each other (Mankiw, 2005).
Consumer Price Index	CPI	An indicator that provides information on the prices of goods and services paid by consumers (BI).
Bank Indonesia Certificates	BIC	Securities in the form of debt instruments in short-term Rupiah currency with discount system (BI).
Bank Indonesia Certificates Sharia	BICS	Securities based on short-term Shari'a principles in rupiah currency issued by Bank Indonesia (BI).
Money Supply	M2	M1 plus savings deposits, time deposits in rupiah and foreign currency, demand deposits in foreign currencies, and securities issued by monetary systems owned by the domestic private sector with remaining term time up to one year (BI)

Table 2. Micro economy variables

| Variable	Symbol	Description
Loan to Deposit Ratio	LDR	The ratio to measure the composition of the loan amount given compared to the amount of public funds and the capital used (Kasmir, 2013).
Financing to Deposit Ratio	FDR	A comparison between the financing provided by the bank and the third party funds successfully mobilized by the bank (Muhammad, 2005).
Capital Adequacy Ratio	CAR	The bank's performance ratio to measure the capital adequacy of banks to support assets that contain or generate risks (Dendawijaya, 2005).
Operational Efficiency Ratio	OER	The ratio used to measure the level of efficiency and ability of banks in conducting their operations (Rivai *et al.*, 2013).

Macro data which are GDP, exchange rate and money supply also total amount of credit and financing, are real data transformed into natural logarithm (NL). Data in percentage such as CPI, BIC/BICS, NPL/NPF, LDR/FDR, CAR, and OER didn't need to be transformed. GDP Real data from BPS website are quarter data, so interpolation data is needed to make it into monthly data using *E-Views* 9. Running data also used *E-Views* 9 software with VECM method, pre-estimation and Granger test were tested before VECM, IRF and FEVD test were tested   after   VECM.
VECM is a terrestrial VAR form model used for nonstationary variables but has the potential to be cointegrated. This additional restriction must be given because of the existence of non-stationary data forms at the level, but cointegrated. Time series data tend to have stationarity at the first differences level. VECM data can provide information about the short-term behavior of a variable over its long-term due to permanent changes (Firdaus, 2012).

RESULT
The Augmented Dickey-Fuller (ADF) test was conducted on the research data, the stationaryity test data showed some data was stationary at the level level such as CPI, OER and CAR of Islamic Banks. The other variable is stationary at the first difference level. The selected lag candidates in this study were the length of lag according to AIC and HQ criteria on credit risk model and based on SC and HQ criteria on credit growth model, financing growth, and financing risk. All models have optimal lag 1. Based on VAR stability test results indicate that the VAR system is stable in all four research models, lag 1 on loan growth, financing growth, credit risk and financing risk. The credit growth model has three cointegration, while the growth of financing has four cointegration. Credit risk has two cointegrations and the risk of financing has four cointegrations.

Impulsive Response Function result in the credit growth model, GDP, CPI, and BIC give positive responses while the other two macro variables ER and M2 give negative responses. Positive responses is shown from CAR and negative responses from LDR and OER variables on credit growth. GDP is responded positive shown an optimistic response to economic growth by increasing lending. Increased lending is expected to provide benefits but will also increase risks. Increased credit growth is also due to people who choose to borrow capital from banks to improve their business and needs. Currently most customer also prefer to pay in intallments when buying something rather than pay directly. Credit growth responded CAR positively shown that state banks have sufficient capital so that lending is given loosely.
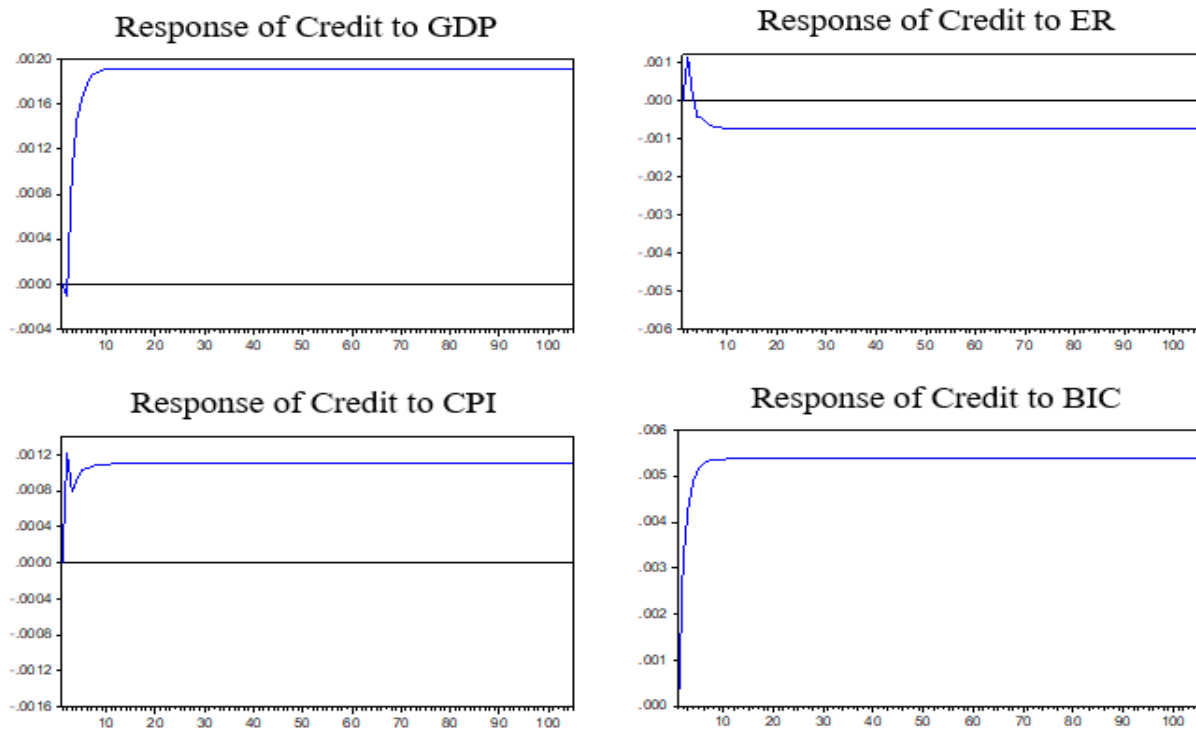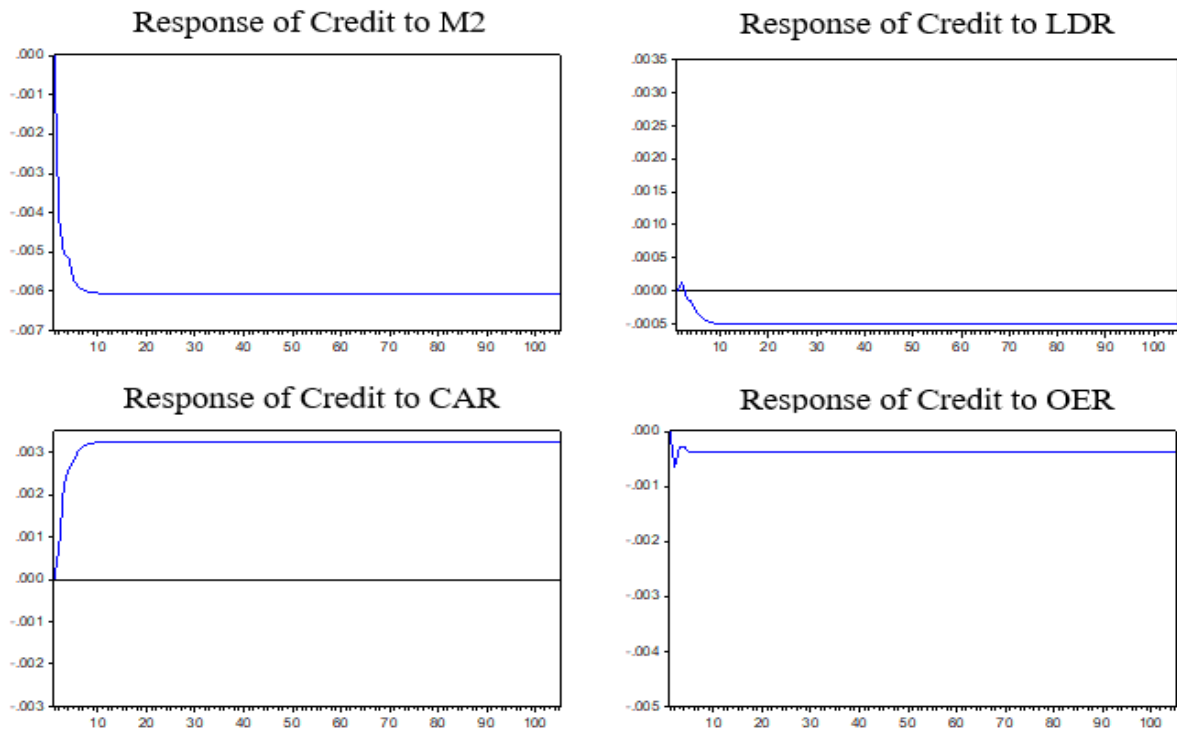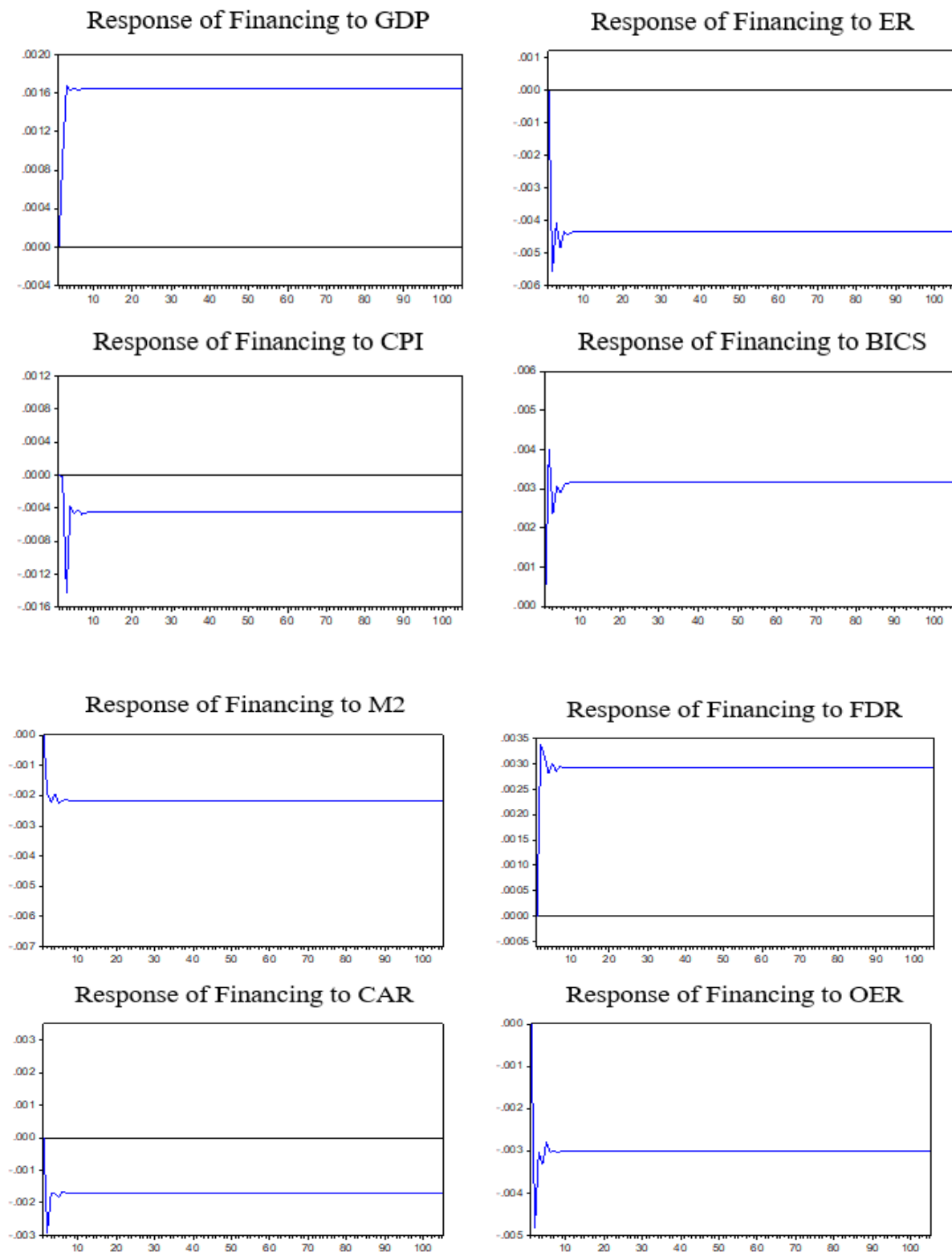
Figure 2. Response of credit growth

GDP and SBIS variables gave positive responses to the shock of financing growth, and ER, CPI, and M2 provide negative responses. Positive response is indicated from FDR, and CAR and OER responded negatively. CPI shocks are negatively responded by financing growth which means that when the CPI variable increases, it does not affect the financing grotwh because the financing/lending can be paid with specified time in the agreement between the customer and Islamic bank who will bear the loss together. FDR responded positively by financing growth indicating that the financing distribution provided by Islamic banks have good quality and giving increased returns so that customers will choose to getting loan which will increase financing growth.

Figure 3 Response of financing growth

There are two variables that are positively responded by credit risk shock, GDP and M2, and there are three negative responses, from ER, CPI, and BIC. At credit risk, OER shocks responded positively, LDR and CAR responded negatively. Credit risk responded negatively to BIC shocks which can be indicated that with the increasing of BIC, lending rates will decline.

High interest rates will increase the bank's capital, so it can cover credit losses and NPL to decline. This is supported by the research result of Haryati (2009) that the interest rate of BI has a negative and significant effect, it is because people would prefer to keep funds in banks with higher interest rates.
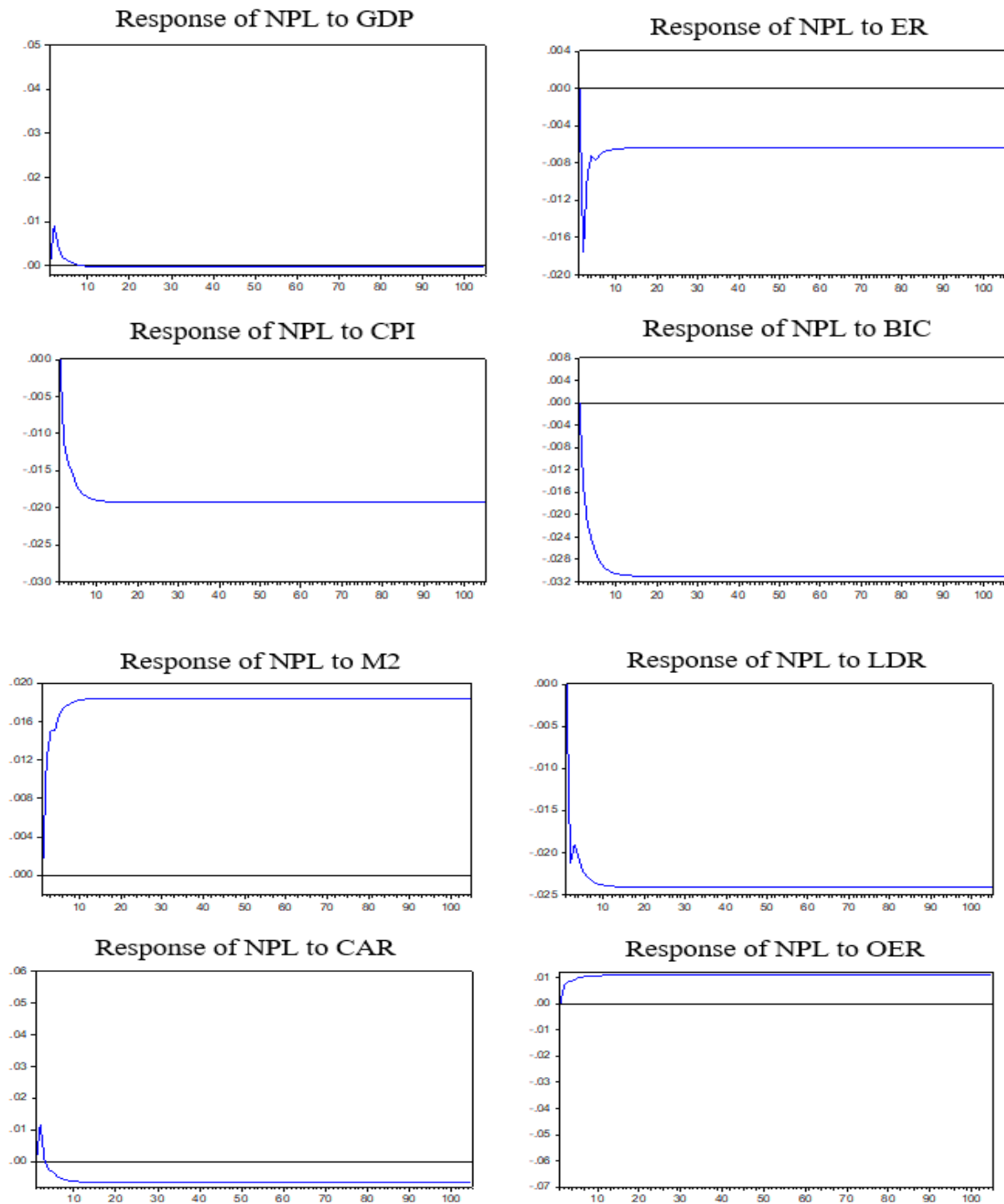
**Figure 4. Response of credit risk**

Financing risk also posed two positive responses and three negative responses. GDP and M2 shocks are also give positive responses, and negative responses are given by ER, CPI, and BICS. In the financing risk shock, CAR gave positive response, and negative responses given by FDR and OER. The increasing in money supply, the income will increase so that customer's purchasing power will increase, so financing growth will decrease due to the ability of customers to pay the loan at the bank. However M2 shocks cause an increase in NPF as increasing money supply leads to a decrease in the banking portfolio so that NPF rises. Nursechafia and Abduh (2014) proved that the money supply has a positive relationship to financing risk. OER responded negatively by financing risk, indicated that Islamic banks are efficient in managing financing distribution, bad financing will decrease, and NPF will decline.

Response of NPF to GDP

Response of NPF to ER

Response of NPF to CPI

Response of NPF to BICS
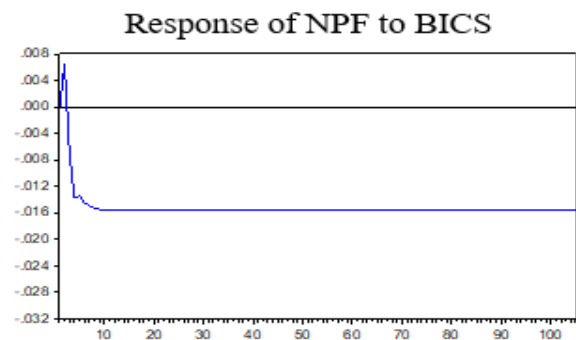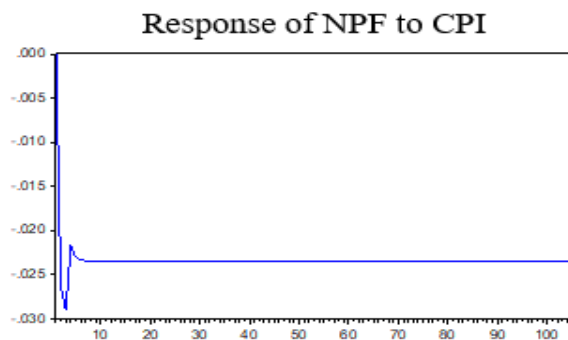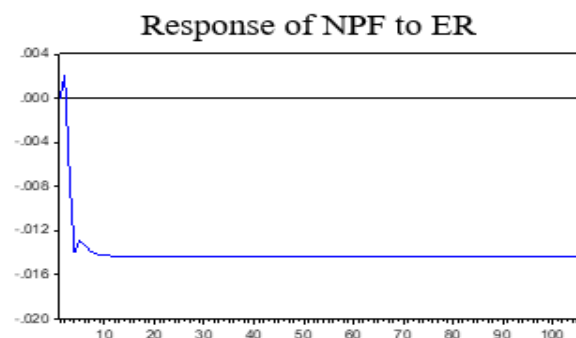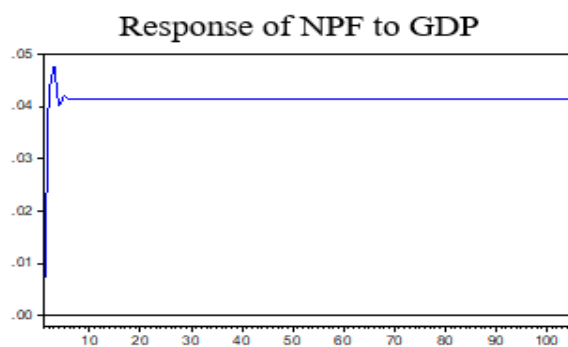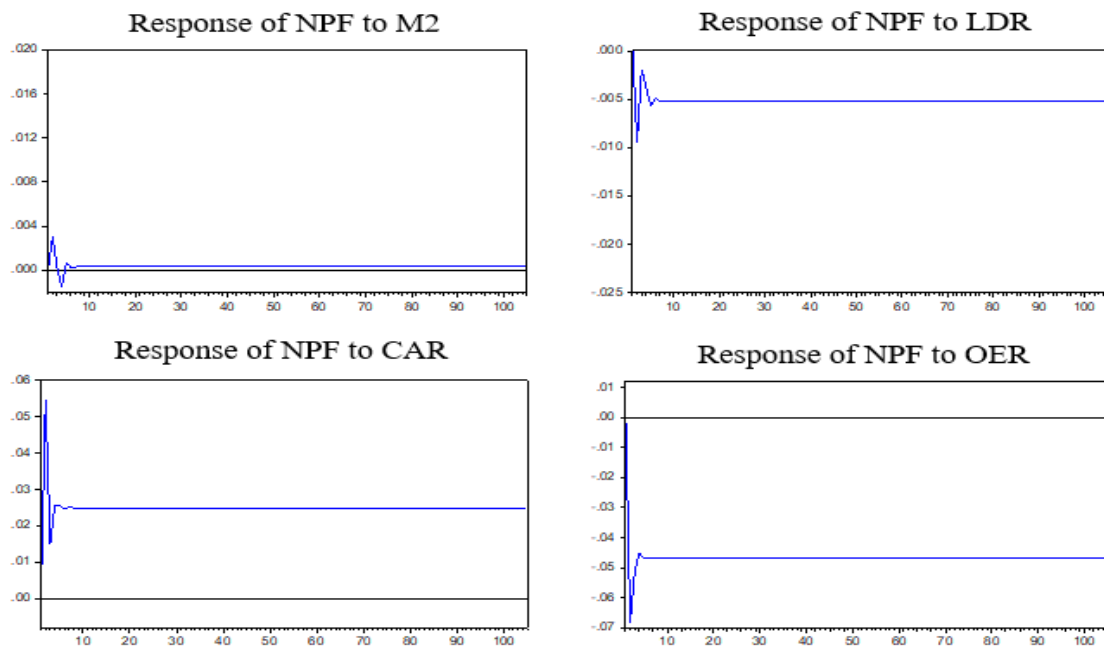
Figure 5. Response of financing risk

The last test is *Forecast Error Variance Decompotition* (FEVD), to analyse the contribution of each variables. For credit growth model, in the long-term period, CREDIT contribution still has the greatest effect, M2 variable contributes to 14% and SBI at 11% and CAR range of 4%. Economic growth accompanied by strong credit growth will created imbalances when economic growth slows down. Macroeconomic dynamics have an important additional and independent contribution why firms default, and at the micro level are ultimately driven by firm's financial specific situation (Bonfim, 2009). CAR has large contribution to credit growth, but a research showed contrast result, where the ratio of capital adequacy is negatively associated with credit risk (Zribi & Younas, 2011).
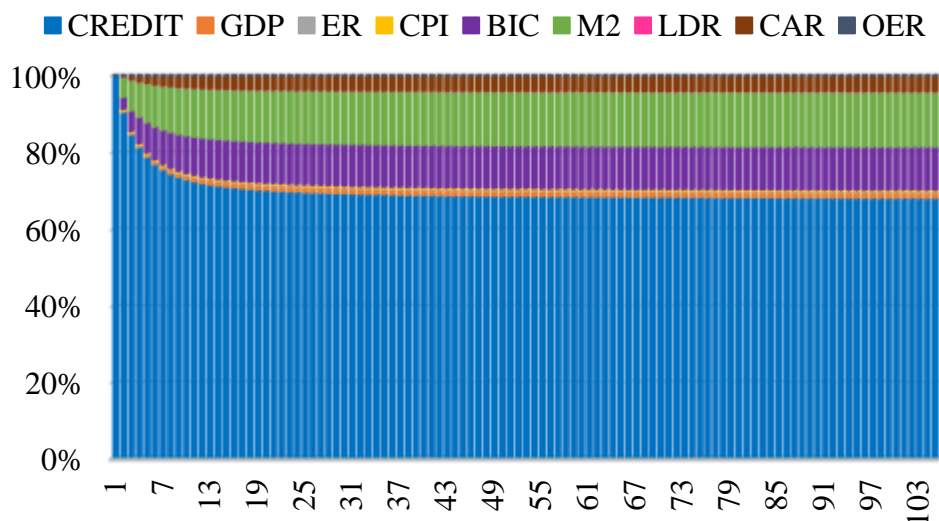
Figure 6. FEVD result of credit growth

Until the long-term period of financing growth is still has the largest contribution. Islamic banking has a unique financing character so that the influence of the funding is very big contribution. The exchange rate gives a big influence compared to other variables because the composition of Islamic banking financing is dominated by murabhahah scheme, so the fluctuating exchange rate condition is very influential. Those results has the same result with research from Zameer & Siddiqi (2010), they found that one of the main determinants of economic instability is the exchange rate volatility. The appreciation of foreign currencies against the national one generates higher prices for imported inputs which affects the prices of the final goods. The result of exchange rate depreciation, the demand for loans increases in order to support the additional expenditure (Ngerebo, 2012). But the result from Bucur & Dragomirescu (2014) research indicated that credit risk is significantly and negatively affected by the exchange rate fluctuation.
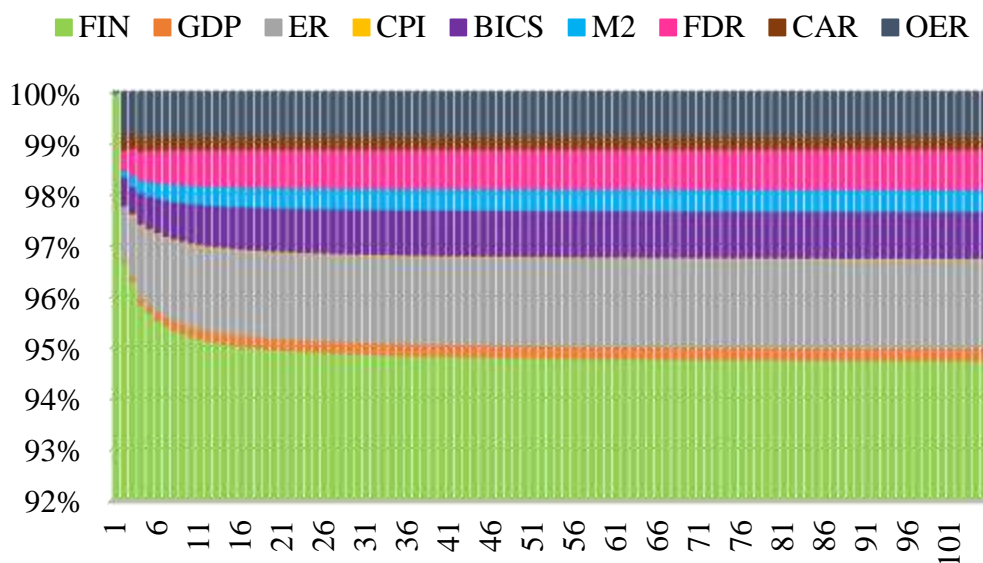

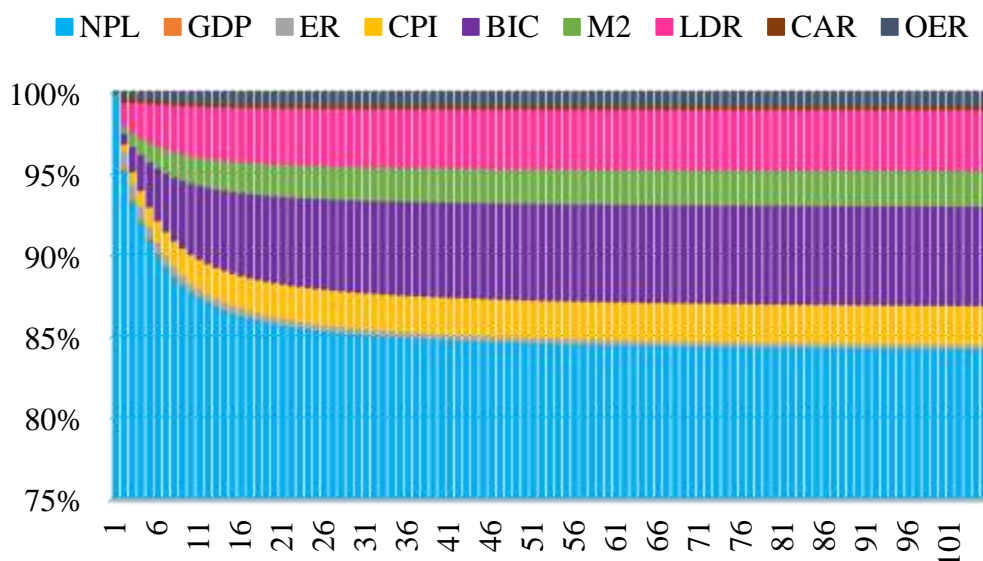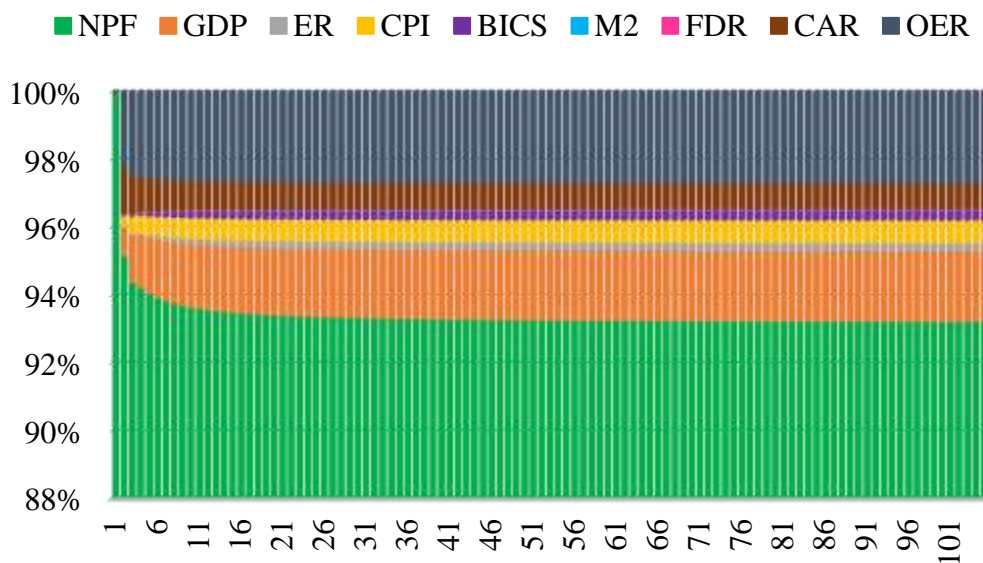**Figure 7. FEVD result of financing growth**

Figure 8. FEVD result of credit risk

In the long-term period, the variable that shows the largest contribution other than credit risk itself is BIC and LDR. The conventional LDR ratios of banks show a decline in 2016 compared to 2015, indicating the possibility of unmanaged third party funds so that credit risk increases.There is a positive relationship between money supply and credit risk. Increasing money supply will decrease the interest rate and create the opportunity of cheaper funds and also the ability of debtors to honor their financial obligations and will contribute to decreasing NPL (Ahmad & Ariff, 2007). Adebola *et* al. (2011) indicated that interest rate has a significant positive long-term impact on NPL. The increase payment of interest rates will increasing NPL. Changes in inflation also have a strong impact on borrowers' ability to repay loans. An increase in inflation is associated with a substantial rise in NPL ratio (Pilinko & Romancenco, 2014).

Figure 9. FEVD result of financing risk

In the long-term period, the variables that give the biggest influence are GDP and OER. In the variable OER simultaneously significantly affect the risk of financing where when credit risks increased then OER will decrease. The result is different from Bucur & Dragomirescu (2014) where there is no significant relationship between credit risk and GDP. Ghyasi (2016) also indicted that GDP is negatively significant to credit risk, because customers are better able to payback their loans by improvement of the economic conditions, so credit risk of bank decreases. Another research also found a significant and negative relationship between the growth rate of GDP and NPL (Messai & Jouini, 2013).

The increasing global and fast-moving economic development give challenges for companies/sectors in Indonesia to adjust conditions to make Indonesia's economy better. In an effort to adjust to the economic conditions, of course, following by risks. Financial institutions, especially banks should pay attention to the ways to mitigate risks to maintain profitability, competitiveness, and customer loyalty. It universally acknowledged that the banking industry plays a catalytic role in economic growth and development (Uwuigbe *et* al., 2014). Risk management is a set of methodologies and procedures used to identify, measure, mitigate, monitor, and control risks arising from all business activities of the bank. Efficient risk management is when banks are able to strategically positioning themselves, therefore a good

risk management is required in order not to reduce the potential of banks. Risk management is also one of the bank's strategy to achieve the goal and also the added value and for the opportunity to gain profit can be achieved in a sustainability.

One of the core business sources for the banking sector is the distribution of credit/financing, in the channeling of credit/financing banks can suffer losses, which in this case the risk that can happen is bad loans. The loss will certainly reduce the capital owned by the bank, if the loss due to credit risk/financing is large enough to have the capital owned by the bank is not enough to cover losses, then the customer funds are also likely to not be returned by the bank. This will certainly make the customer and the community do not trust the bank to save their money. Therefore, it is necessary to mitigate credit/financing risks so that credit/financing risks will not exceed the established limit level, less than 5%. Credit/financing risk management aims to minimize bank losses through restructuring or liquidation of the company.

Declined economic conditions usually lead to investors and business people shifting to Islamic banking, especially to rational investors who are profit-oriented. Errors in interest rate policy led to the shift of conventional banking customers into more profitable and competitive Islamic banking customers. Displaced commercial risk is one of the problems faced by Islamic banking when the customer focuses on profit, withdraw their stored money in the bank and save the money in conventional banking due to increased deposit rates. In dealing with that, Islamic banking needs to innovate products that stick to the Islamic Sharia to have more loyal customers (Hasanah et al., 2013).

Souza & Feijo (2011) found evidence from Brazilian banking system, the differences in the interactive process according to the type of banks. Private sector banks respond more actively to the impacts of the macroeconomic situation than public banks, enabling them to better mitigate the effects and manage their loans portfolios more efficiently. Public banks face greater institutional and legal barriers and often political pressures as well that hinder a more active risk management stance. Those results are differ from what happened in Indonesia where public banks are more efficient in managing credit risk which. Banks' characteristics are also important factors influencing the risk taken by the banks (Zribi & Younes, 2011).

MANAGERIAL IMPLICATION

Indonesian banking needs to adjust with fluctuating economic condition, with lending credit/financing as core business. From the research result, increasing of economic growth will affect increasing in credit/financing growth following with credit/financing risk. Credit risk management maximizes bank's measurement to adjust to credit risk by maintaining credit risk within acceptable limit in order to provide framework for understanding the impact of credit risk management on banks' profitability. To overcome credit/financing risk, improvement strategy is needed to confront with customers who have potential with bad loans. In managing credit/financing risk bank can sort out debtor to avoid bad loans, also restriction of credit/financing to one customer, and diversification credit/financing by the type of company such as industry or manufacturing, etc. If the credit/financing management failed, restructuring is required. Restructuring that bank can done are extension of credit/financing term, deduction of interest on loan interest, the addition of credit/financing facility, or credit/financing conversion into temporary capital participation.

In process of giving credit, conventional and Islamic bank need to concern external factors condition such as BCI/BICS, M2, GDP and inflation (CPI) to minimize credit risk. Conventional and Islamic banks also need to look after CAR value because it will affect credit/financing growth and risk barrier. In slow economic condition, conventional bank should be more careful in giving credit and aware with Islamic bank existence as competitor, because displaced commercial risk might happen.

CONCLUSION

This research is analysed macro and microeconomic variables that affect credit risk in Indonesia banking over April 2008 until December 2016. According to research objectives, for credit growth model, based on IRF test, GDP, CPI, and BIC give positive responses while ER and M2 give negative response. Positive responses is shown from CAR and negative responses from LDR and BOPO. For financing growth model, GDP and BICS variables shown positive responses, and ER, CPI, and M2 shown negative responses. Positive response is indicated from FDR, and CAR and OER responded negatively. Next is IRF result of credit risk model, positive response are given by GDP and M2, and there are three negative responses, from ER, CPI, and BIC. OER responded positively, LDR and CAR responded negatively. Last, financing risk model shown that GDP and M2 given positive responses, and negative responses are given by ER, CPI, and BICS. CAR gave positive response, and negative responses given by FDR and OER. Based on FEVD test results, variables that affect credit growth are BIC, M2, and CAR. ER, BICS, M2, FDR, and OER affected financing growth model. Credit risk model affected by CPI, BIC, M2, and LDR variables. GDP, CPI, CAR, and OER contributes as the biggest variables affected to financing risk.

The study also finds that conventional banks are more stable in managing credit risk from the ratio of NPL than Islamic banks. Islamic banks characteristics are of the reason why NPF ratio is higher than conventional banks. Those also triggered by displaced commercial risk where customers will shifted to Islamic banks when economy is declined, but they will withdraw their money when deposit rates is increased. To overcome credit/financing risk, improvement strategy is needed to confront with customers who have potential with bad loans, and central bank also has important role to managing fluctuating economic condition.

REFERENCES

Adebola, S. S., Sulaiman, W., Yusoff, W., Dahalan, J. 2011. An ARDL approach to the determinants of non-performing loans in Islamic banking system in Malaysia. *Arabian Journal of Business and Management Review*. 1(2): 20-30.

Ahmad, N. H., Ariff, M. 2007. Multi-country study of bank credit risk determinants. *The International Journal of Banking and Fianance*. 5(1): 135-152.

Ali M. 2008. *Manajemen Risiko: Strategi Perbankan dan Dunia Usaha Menghadapi Tantangan Globalisasi Bisnis*. Jakarta: Rajawali.

[BI] Bank Indonesia. Indeks Harga Konsumen [internet]. [2017 October 02]. Retrieved from: http://www.bi.go.id/id/statistik/metadata/seki/Documents/12.%20Inflasi-Indeks%20Harga%20Konsumen%20(IHK-IND)%202016.pdf.

[BI] Bank Indonesia. Informasi Kurs [internet]. [2017 March 26]. Retrieved from: http://www.bi.go.id/id/moneter/informasi-kurs/Contents/Default.aspx.

[BI] Bank Indonesia. Perkembangan Uang Beredar [internet]. [2017 March 26]. Retrieved from: http://www.bi.go.id/id/publikasi/perkembangan/Default.aspx.

[BI] Bank Indonesia. Produk Domestik Bruto [internet]. [2017 March 26]. Retrieved from: http://www.bi.go.id/id/statistik/metadata/seki/Documents/14.%20PDB-Produk%20Domestik%20Bruto%20(IND)%202016.pdf.

[BI] Bank Indonesia. Peraturan Bank Indonesia tentang Sertifikat Bank Indonesia [internet]. [2017 March 26]. Retrieved from: http://www.bi.go.id/id/peraturan/arsip-peraturan/Moneter2002/pbi04010-2002.pdf.

Bonfim, D. 2009. Credit risk drivers: Evaluating the contribution of firm level information and of macroeconomic dynamics. *Journal of Banking & Finance*. 33(2009): 281-299.

Bucur, I. A., Dragomirescu, S. E. 2014. The influence of macroeconomic conditions on credit risk: Case of Romanian banking system. *Studies and Scientific Researches, Economic Edition*. 19: 84-95.

Dendawijaya L. 2005. *Manajemen Perbankan*. Jakarta: Ghalia Indonesia.

Firdaus, M. 2012. *Aplikasi Ekonometrika untuk Data Panel dan Time Series*. Bogor: IPB Press.

Ghyasi, A. 2016. Effect of macroeconomic factors on credit risk of banks in developed and developing countries: Dynamic panel method. *International Journal of Economics and Financial Issue.* 6(4): 1937-1944.

Haryati S. 2009. Pertumbuhan Kredit Perbankan di Indonesia: Intermediasi dan Pengaruh Variabel Makro Ekonomi. *Jurnal Keuangan dan Perbankan*. 13(2): 299-310.

Hassanah H, Ahsani N A, Ascarya A. 2013. Displaced commercial risk: Empirical analysis on the competition between conventional and Islamic banking systems in Indonesia. *Advances in Natural and Applied Sciences*. 7(3): 292-299.

Kasmir, 2013. *Analisis Laporan Keuangan*, *Edisi 1, Cetakan ke-6*. Jakarta: Rajawali Press.

Korkmaz S. 2015. Impact of Bank Credits on Economic Growth and Inflation. *Journal of Applied Finance & Banking*. 5(1): 57-69.

Lin HY, Farhani NH, Koo M. 2016. The Impact of Macroeconomic Factors on Credit Risk in Conventional Banks and Islamic Banks: Evidence from Indonesia. *International Journal of Financial Research*. 7(4): 105-116.

Messai, A. S., Jouini, F. 2013. Micro and macro determinants of non-performing loans. *International Journal of Economics and Financial Issues*. 3(4): 852-860.

Mileris, R. 2014. Macroeconomic factors of non-performing loans in commercial banks. *Jurnal Ekonomi*. 93(1): 22-39.

Muhammad. 2005. *Manajemen Bank Syariah*. Yogyakarta: UPP AMP YKPN.

Ngerebo, T. A. 2012. The impact of foreign exchange fluctuation on the intermediation of banks in Nigeria (1970-2004). *African Journal of Business Management*. 6(11): 3872-3879.

Nursechafia, Abduh, M. 2014. The susceptibility of Islamic banks, credit risk toward macroeconomic variables. *Journal of Islamic Finance*. 3(1): 83-105.

Pilinko, V., Romancenco, A. 2014. A macro-financial model for credit risk stress testing: The case of Latvia. [Thesis]. Sweden: Stockholm School of Economics.

Poetry ZD, Sanrego YD. 2011. Pengaruh Variabel Makro dan Mikro terhadap NPL Perbankan Konvensional dan NPF Perbankan Syariah. *Islamic Finance & Business Review*. 6(2): 79-104.

Purwanto WH. 2011. *Risiko Manajemen Perbankan*. Jakarta: Cmb Press.

Rivai V, Basir S, Sudarto S, Veithzal AP. 2013. *Commercial Bank Management Manajemen Perbankan Dari Teori ke Praktik*. Jakarta: Rajawali Press.

Soelaksono, A. 2013. *Perilaku dinamis kredit perbankan konvensional dan syariah serta kaitannya dengan kondisi makroekonomi di Indonesia*. [Unpublished Master's Thesis]. School of Business-Bogor Agricultural University. Bogor.

Souza, G. J. G., Feijo, C. A. 2011. Credit risk and macroeconomic interactions: Empirical evidence from the Brazilian banking system. *Modern Economy*. 2: 910-929.

Trad N, Trabelsi M A, Goux J F. 2017. Risk and profitability of Islamic banks: A religious deception or an alternative solution?. *European Research on Management and Business Economics*. 23: 40-45.

Uwuigbe, U., Uwuigbe, O. R., Daramola, P. S. 2014. Corporate governance and capital structure: Evidence from listed firms in Nigeria Sock Exchange. *Advances in Management*. 7(2): 44-49.

Wahyudi I, Dewi MK, Rosmanita F, Prasetyo MB, Putri NIS, Haidir BM. 2013. *Manajemen Risiko Bank Islam*. Jakarta: Salemba Empat.

Waseem, M. 2014. Islamic Banking Products [internet]. [2017 December 11]. Retrieved from: http://islamicbanking.info/category/Islamic-banking-products.

Yurdakul F. 2014. Macroeconomic modelling of credit risk for banks. *Social and Behavorial Sciences*. 109: 784-793.

Zameer, S., Siddiqi, M. W. 2010. The impact of export, FD and external debt on exchange rate volatility in Pakistan. *International Journal of Contemporary Research in Business*. 2(7): 100 -110.

Zribi, N., Younes, B. 2011. The factors influencing bank credit risk: The case of Tunisia. *Journal odf Accounting and Taxation*. 3(4): 70-7.