

The Role of Indonesia Banking Architecture and Banking Technology to Economic Growth in Indonesia

Henny Medyawati, and Muhammad Yunanto

Abstract—The role of the bank as an intermediary institution should be increased. The purpose of this research is to analyze the banking indicators, namely indicators of banking technology - Bank Indonesia Real Time Gross Settlement (BI - RTGS) and the role of the Indonesian Banking Architecture (IBA) to economic growth in Indonesia. This study uses the Vector Auto Regression (VAR) to analyze three indicators, namely banking assets, loans and deposits, the BI-RTGS and two dummy variables, namely the global crisis of 2008 and the implementation of the IBA 2004. The results of data processing show a negative response of the economic growth to the shock variable global crisis and the implementation of the IBA, while the technology indicator variables are represented by the BI - RTGS consistently affect economic growth. Overall it can be concluded that the global crisis and the implementation of the IBA show the effect on economic growth shown by the obtained optimal lag in the VAR model is eleven months.

Keywords—Economic growth, BI-RTGS, VAR

I. INTRODUCTION

ECONOMIC growth in Indonesia has increased over a period of almost 10 years. Indonesia's economic growth in 2012 can be maintained at a high enough level, i.e. 6.2% (Bank Indonesia, 2012). Compare to the previous year of 2011, this growth rate decrease slightly by 0.3%. However, the banks development continued to show improvement, especially from the volume of funds collected. Seen the development of a number of banking assets, the number of third-party funds and the amount of credit channeled showed rapid development in less than 20 years.

Banking development in Indonesia is significantly characterized by the deregulation policy in 1988 showed an increase in the number of rapid, both in terms of the number of banks and the number of branches.

The development of assets, deposits and bank credit in Indonesia can be seen in the picture below in Figure 1.

One aspect of technology that is growing rapidly in Indonesia's banking system is the implementation of an electronic-based transactions. In 1995, Bank Indonesia has issued General Guidelines for Control Systems Technology Information (TSI) based on SK DIR. No. BI 27/164/KEP/DIR and SE of BI. 27/9/UPPB dated March 31, 1995 on the Use of Information Technology Systems by Bank Indonesia in 1995.

Henny Medyawati, Faculty of Economics, Gunadarma University, Depok, Indonesia. Email Id: henmedya@staff.gunadarma.ac.id

Muhammad Yunanto, Faculty of Economics, Gunadarma University, Depok, Indonesia. Email Id: myunanto@staff.gunadarma.ac.id

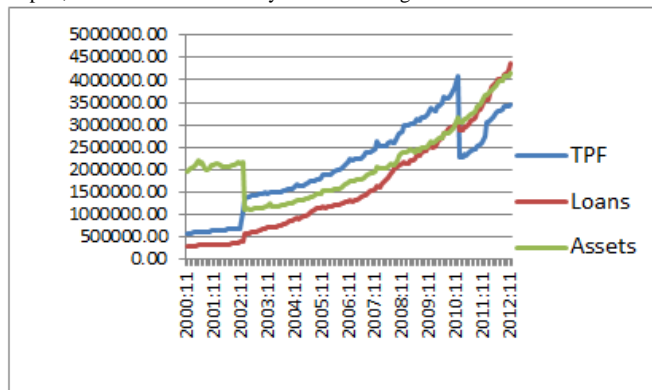


Fig. 1 Development of Banking Indicators

Bank Indonesia started in 2000, has facilities final settlement of transactions (settlement) payments made per transaction and real-time, which is called the Real Time Gross Settlement, known as the BI-RTGS. Use of BI-RTGS facility showed an increase from year to year.

Research on the role of banks in economic growth in Indonesia include, research by Nasrudin (2004), Medyawati (2010), Medyawati, Nopirin, Sutopo and Hermana (2010), Medyawati and Hermana (2010), Medyawati, Muhammad Yunanto, and Sutopo(2010) which use the basic concepts and models similar to Levine, Loayza and Beck (2000). Levine (1997), stated that the economic activity and technological innovation are no doubt give effect to the structure and quality of the banking system. Based on these studies, this research continues and expands previous research related to the development of the banking and economic growth. The purpose of this study is to analyze the development banks through asset indicator, credits, deposits and BI - RTGS, non-bank indicator that industry sector, on economic growth. The model in this study add two dummies as control variables of the model prior studies conducted by Medyawati and Ega Hegarini (2011), Medyawati and Muhammad Yunanto (2013), namely the implementation of the Indonesian Banking Architecture (IBA) and the events of the global crisis in 2008. API is the policy launched by Bank Indonesia in order to improve and enhance the performance of Indonesian banking industry. The global crisis of 2008 or known as the subprime mortgage crisis impact on the national economy. In general, Indonesia's macroeconomic condition shows weakening due to turmoil in the United States. However, macroeconomic condition is relatively much better than they were during the financial crisis impact on the economic crisis of the past decade (Hamid, 2012:139). Based on this, the IBA and the global crisis of 2008 selected as control variables to

see the impact of these two events on banking and the economy of Indonesia

II. RELATED RESEARCH

A. Indonesia Banking Architecture (IBA)

Indonesian Banking Architecture (IBA) is a basic framework of the Indonesian banking system that is comprehensive and gives direction, shape, and structure of the banking industry for a span of five to ten years into the future. API Vision is to achieve a healthy banking system, in order to create a strong and efficient financial system stability in order to help drive the growth of the national economy. Based on the need of national banking blue print and as a continuation of the bank restructuring program which has been running since 1998, Bank of Indonesia on January 9th, 2004 has been launched as an overall framework IBAs towards the development of policy for the Indonesian banking industry (Bank of Indonesia, 2013). IBA consists of six pillars: the first pillar about the sound banking structure, the second pillar of an effective regulatory system, the third pillar of the system is independent and effective oversight, the fourth pillar of the banking industry is strong, the fifth pillar of adequate supporting infrastructure, and pillar sixth on consumer protection. In the next 10 to 15 years, the expected number of banks are approximately 60 banks with strong capital structure.

B. Similar Research Studies

Here are some similar research studies on banking and economic growth. Boulilla and Trabelsi (2003) found that the strict control of the financial sector in MENA (Middle East and South Africa) countries during long periods, the lateness in the implementation of financial reforms in these countries, the persisting issues in reform implementation (non-performing loans especially), and the still high information and transaction costs, which prevent resources promotion and financial deepening. Studies in 16 countries across Asia, Europe and the United States found that for the majority of sample countries, financial structure and financial development appear significant in explaining output levels; this holds under both time-series and panel estimates. Tests also reveal that the panel estimates (parameters) do not correspond to country-specific estimates (Luintel et.al, 2008). Their findings imply that financial structure and financial development matter for output levels and economic growth. Liang (2006) stated that the development of the banking and the rapid economic growth in China caused the income gap is wide between the populations residing in the coastal areas located in inland China. Different conditions occur in Malaysia where economic growth affects the development of banking in a long period of time, but the feedback relationship that is not found (Ang and Mc Kibbin, 2007). Levine, Loayza and Beck (2000), found a positive relationship between banking development and economic growth, but in this study Levine put more emphasis on the effect of exogenous component of banking varies greatly between countries. The results of the study Kar and Pentecost (2000) showed that the direction of the causal relationship between banking development and economic growth in Turkey is sensitive to the choice of banking indicators are used as a measure of banking development. Using trivariate VAR framework, Abu-Badr

and Abu-Qarn (2006) found that there are weak support for a long run relationship between financial development and economic growth. Amaral and Quintin (2005) find that the effects of changes in those technological parameters on output are markedly larger when financial frictions are present.

Indicator of Technology (banking technology) in this study, refers to a previous study by Medyawati and Hegarini Ega (2011) and Medyawati and Muhammad Yunanto (2013) is using the BI - RTGS measured with a nominal transaction. The results of studies using these variables showed that shock given by the application of the BI - RTGS result in economic growth in Indonesia has decreased in the first quarter and the second caused by the application of the BI - RTGS is not entirely benefit the customer (Medyawati, Hermana, 2010; Medyawati, Nopirin, Sutopo and Hermana, 2010). This study develops previous research on the role of banking technology in economic growth and performed by Medyawati Hegarini Ega (2011), and Medyawati and Muhammad Yunanto (2013). Optimal lag obtained in these studies is 2 i.e. 2 months. In that study no control variables in the model so that the research in this study will add 2 dummies as control variables in the research model.

III. METHODOLOGY

Data used in this study are secondary data from various sources by the year 2000 time period (last quarter) to 2012 in the form of monthly data. The data source is the publication of Bank Indonesia (BI) in the form of Indonesian Financial Statistics (IFS), the publication of the BPS (Central Bureau of Statistics) a Statistics Indonesia (SI). The data bank includes deposits that is, the nominal amount of savings, current accounts, deposits and credit data of all banks (commercial banks, rural banks and the Islamic banks), the total assets of all banks and the rate of GDP per capita at constant 2000 prices.

The research model is estimated using a VAR because the data are time series. The indicator used to analyze the development of banking in Indonesia refers to the standard of the Directorate of Banking Research and Regulation, Bank Indonesia banking section the principal indicator. VAR model specification includes the selection of variables and the number of time intervals used in the model. Estimation process can only be done on the condition over identified and just-identified (Widarjono, 2007). Secondary data were tested with measures include unit root test, determination of the optimal level of inaction, the stability test of the VAR model, impulse response analysis and variance decomposition. The software used as a tool in data processing is Eviews ver. 6.

IV. RESULT AND DISCUSSION

Identification of the equation in this study is done by using the formula: $Kk > = < m-1$ (Gujarati, 2003), so the conditions obtained over identified because the amount exceeds the amount of information held wish estimated parameters. The results of stationarity test data indicate that the two variables are variables BI-RTGS and variable rate of economic growth has been stationary. The next process is the process of "difference" that all the variables stationary in the same degree. This result also simultaneously determines the shape of the VAR to be estimated later that VAR in difference form. In the VAR method, determination of the optimal level of inaction is important, because it is the independent variable

used is nothing but the slowness of the endogen variable. Based on the results of AR Roots Table, obtained the maximum lag is 11, with a range of modulus values 0.234622 - 0.96117. The next process, the results of the lag length criteria shown in asterisks, then the candidate interval by FPE, LR, and AIC is 11. The selection criteria used in this study is based on the smallest AIC value, the obtained optimal lag is 11 (11 months). The optimal lag result in this study is longer than previous studies. It can be concluded that the addition of two dummy variables in the research model, impact on economic growth over a long span of time i.e. within 11 months.

In the previous research, Medyawati and Nopirin (2009) show that banking affects economic growth in 10 quarters without BI-RTGS variable. Subsequent research, Medyawati and Hegarini Ega (2011) obtained a shorter lag is 2 months because of the variables have included BI-RTGS. The conditions of the global crisis and the implementation of the IBA causes the banking industry tend to be careful in its operations, banking disintermediation occurs, which ultimately have an impact on economic growth that tends to slow down. Economic conditions tend to slow down, among others, indicated by a decrease in the export performance of Indonesia. However, domestic demand is still strong so as to support the Indonesia economy (Bank of Indonesia, 2012). The implementation of the IBA result in increased performance of banking including lending strategy implementation to small and medium enterprises sector. This strategy is in accordance with one of the pillars of the IBA programs that improve access to credit and SME financing

The next analysis is the use of two properties of VAR namely, impulse response function and variance decomposition. The impulse response function of the model confirms the estimated dynamic response of all variables to shock of one standard deviation of the variables in the system. The following is response of growth to the shock of variable industrial sectors, credit, third party funding, and the BI-RTGS.

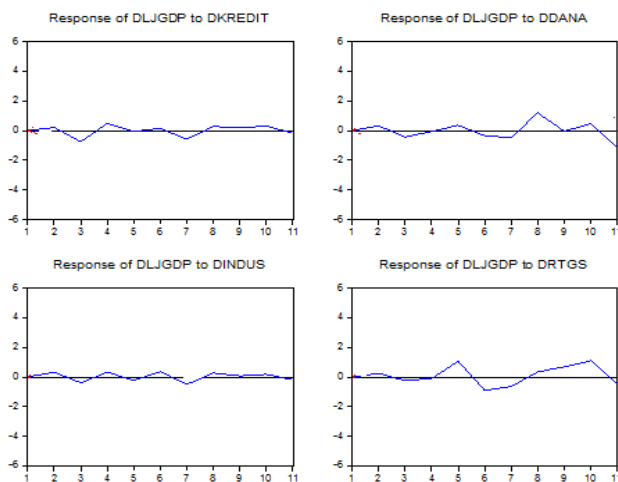


Fig. 2 Impulse Response of Economic Growth

Based on the picture in Figure 2 above, it can be concluded that the shock of variable credit, the third party fund, industrial sector and the BI-RTGS in the first month, getting a positive response from economic growth. This means that the

four variables affect the economic growth. The increase in the volume of credit will lead to economic growth rose in the second quarter, but after the second quarter to the third quarter of the impact decreases. These results support the results of the study Levine, Loayza and Beck (2000), Ingrid (2006), Kar and Pentecost (2000), Liang (2006), Medyawati and Muhammad Yunanto (2013). These results not in line with Nasrudin (2004) which states that the loan negatively affect economic growth. Global crisis dummy variable and application IBAs are equally showed a negative response to the second month. Entering the third month, the response of economic growth turned positive due to the shock of the global crisis. Shock of the application of the IBA causes the economic growth response up to four months. It can be explained that the implementation of the IBA that consists of 6 pillars are still experiencing a lot of problems, especially on the first pillars, about the banking structure and the 4th pillars, namely a strong banking industry. One example is about the Century Bank case. It can be seen from the relatively slow handling the case.

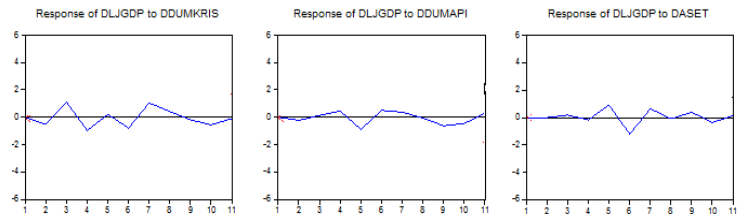


Fig. 3 Impulse Response of Economic Growth (cont.)

The next analysis is the analysis of variance decomposition. The analysis illustrates the relative importance of each variable in the VAR system because of the shock. The results of variance decomposition analysis can be presented in tables or graphs. In this study the results of data processing are presented in table form. Table I and Table II in the next page illustrates the percentage contribution of variants predicted economic growth variables to changes in variable assets, loans, deposits, and the industrial sector of the BI-RTGS transactions.

TABLE I
VARIANCE DECOMPOSITION FOR ECONOMIC GROWTH

Period	DLJGDP	DKREDIT	TPF	DASET
1	100.00	0.000	0.000	0.000
2	97.992	0.130	0.336	3.840
3	91.509	1.776	0.876	0.085
4	88.673	2.146	0.781	0.156
5	83.496	1.887	0.967	1.975
6	77.581	1.789	1.148	4.856
7	73.397	2.341	1.539	5.345
8	71.030	2.381	4.125	5.138
9	69.717	2.379	4.034	5.299
10	67.074	2.453	4.244	5.327
11	65.313	2.420	6.344	5.163

The results in Table I and II provide information that economic growth can be explained or influenced by economic growth itself. All variables showed increase in the percentage of contribution, up to 11 months, unless the rate of economic growth itself. Second largest percentage can be seen in the assets variable and the global crisis dummy variable.

TABLE II
VARIANCE DECOMPOSITION FOR ECONOMIC GROWTH (CONT.)

Period	DINDUS	BI-RTGS	X*	X**
1	0.000	0.000	0.000	0.000
2	0.316	0.184	0.867	0.173
3	0.734	0.350	4.448	0.218
4	0.898	0.336	6.295	0.712
5	0.903	2.778	5.611	2.380
6	1.097	4.296	6.491	2.738
7	1.503	4.842	8.210	2.821
8	1.570	4.852	8.192	2.708
9	1.545	5.610	8.066	3.346
10	1.535	7.488	8.290	3.584
11	1.544	7.601	8.006	3.604

As of the fourth month, the percentage contribution of credit increases, but in the fifth and sixth slightly decreased and became stable from month seven and eleven. It can be concluded, that a relatively small percentage of the credit cause the cautious of banks attitude, to extend credit due and after the global crisis in 2008 and the implementation of the IBA which have been running for about 8 years.

In general, the role of BI-RTGS variable in this study is still consistent to the previous research by Medyawati and Muhammad Yunanto (2013). The contribution percentage of BI-RTGS variable to economic growth is relatively small percentage i.e. below 2%. However, when referring to the previous research, in terms of the optimal lag obtained in this study is shorter lag length is only 2 months compared with the previous VAR models 8 quarter (Medyawati, and Budi Hermana, 2010). These results also support the principal reason of Bank of Indonesia to process settlement through RTGS that there is a new awareness of the central banks in the world to manage the Large Value Transfer System (LVTS).

V. SUMMARY

Based on the previous discussion, the results of these studies show the impact of technology, the global crisis and the implementation of the IBA to economic growth. These results are consistent with the results of the study Levine (1997), Medyawati (2010), Medyawati and Budi Hermana (2010). This condition is clarified with reference to the data processing through the two properties that the negative response occurs as a result of economic growth in the presence of the shock of the global crisis dummy variable, and the implementation of the IBA. The percentage contribution of the two dummy variables remained stable during the 3 end of the forecast period i.e. in the ninth, tenth and eleventh. Although it gave a negative response to economic growth, but according to the report of Indonesian Economy in 2012 financial performance particularly banks showed improved conditions (Bank of Indonesia, 2012).

REFERENCES

[1] Abu-Badr, Suleiman & Abu-Qarn, Aamer S., "Financial Development and Economic Growth Nexus: Time Series Evidence from Middle Eastern and African Countries", Discussion Paper No. 06-09. Monaster Center of Economic Research, Ben-Gurion University the Negev, 2006.

[2] Amaral, Pedro S., and Erwan Quintin, "Financial Intermediation and Economic Development: A Quantitative Assessment", Research Paper, Southern Methodist University, University of Texas at Austin, November 2005.

[3] Ang, James B., Warwick J. McKibbin, "Financial Liberalization, Financial Sector Development and Growth: Evidence From Malaysia". *Journal of Development Economics*. Vol. 84, 215-233, 2007.

[4] Bank of Indonesia, 2012. Laporan Perekonomian Indonesia Tahun 2012

[5] Bank of Indonesia, "Arsitektur Perbankan Indonesia", <http://www.bi.go.id/id/perbankan/arsitektur/Contents/Default.aspx>, accessed on December 2013

[6] Boulila, Ghazi and Mohamed Trabelsi, "The Causality Issue in the Finance and Growth Nexus: Empirical Evidence from MENA Countries", *Research Paper*, Faculté des Sciences Economiques et de Gestion de Tunis (FSEGT), October 2003.

[7] Gujarati, Damodar N., *Basic Econometrics*, McGraw Hill International Edition, 2003.

[8] Hamid, Edy Suandi, *Dinamika Ekonomi Indonesia*, UII Press, Yogyakarta, Indonesia, 2012

[9] Ingrid, "Sektor Keuangan dan Pertumbuhan Ekonomi di Indonesia : Pendekatan Kausalitas dalam Multivariate Vector Error Correction Model (VECM)". *Jurnal Manajemen dan Kewirausahaan* Vol. 8/No. 1/2006

[10] Kar, Muhsin, Eric J.Pentecost, "Financial Development and Economic Growth in Turkey : Further Evidence on the Causality Issue". *Loughborough University, Economic Research Paper* No. 0/27, 2000.

[11] Liang, Zhicheng, "Financial Development, Growth, and Regional Disparity in Post-Reform China". *Research Paper* No. 2006/90, 2006.

[12] Levine, Ross, Norman Loayza and Thorsten Beck, "Financial Intermediation and Growth: Causalities and Causes". *Journal of Monetary Economics* Vol. 46, pp. 31-77, 2000.

[13] Levine, Ross, "Financial Development and Economic Growth: Views and Agenda". *Journal of Economic Literature*. Vol.XXXV. pp.688-726, 1997.

[14] Luintel, Kul. B, Mosahid Khan, Philip Arestis and Constatinos Theodoridis, "Financial Structure and Economic Growth", *Journal of Development Economics*, 86, pp. 181-200, 2008.

[15] Medyawati, Henny, "Peran Perbankan dalam Pertumbuhan Ekonomi di Indonesia tahun 1988-2008". Dissertation, Gunadarma University, Jakarta, Indonesia, 2010.

[16] Medyawati, Henny and Ega Hegarini, "Pengaruh Teknologi Perbankan terhadap Pertumbuhan Ekonomi: Tinjauan dari Impulse Response dan Variance Decomposition", *Proceeding PESAT National Seminar*, Gunadarma University, October 2011.

[17] Medyawati, Henny, Budi Hermana, "Peran BI-RTGS dan Arsitektur Perbankan Indonesia (API) dalam Perkembangan Perbankan dan Pertumbuhan Ekonomi di Indonesia". *Jurnal Ekonomi dan Bisnis* No. 3 Vol. 15 Desember 2010 pp. 195-202, 2010.

[18] Medyawati, Henny, Muhammad Yunanto and Bambang Sutopo, "Contribution Analysis of Agricultural Sector, Banking, Technology, Industrial Sector and Services Sector in Economic Growth in Indonesia:Review From Lags and Variance Decomposition." *Proceeding of Malaysia-Indonesia International Conference on Economics, Management and Accounting (MIICEMA)*, Selangor, Malaysia, 2010

[19] Medyawati, Henny and Muhammad Yunanto, "Banking and Technology in Indonesia: Contribution to Indonesia Economy", *Proceeding of International Congress Interdisciplinary Business and Social Science (ICIBSOS)*, November 2013.

[20] Medyawati, Henny and Nopirin, "Dampak Perkembangan Perbankan terhadap Pertumbuhan Ekonomi Di Indonesia: Model Ekonometrika Runtut Waktu Dengan Pendekatan Vector Auto Regression (VAR)", *Proceeding of PESAT National Seminar*, Gunadarma University, 2009.

[21] Medyawati, Henny, Nopirin, Bambang Sutopo, Budi Hermana, "The Role of Banking in Economic Growth in Indonesia". *Proceeding The 5th International Conference on Business and Management Research*, Universitas Indonesia, 2010.

[22] Nasrudin, Rus'an, "Perkembangan Perbankan Indonesia: Analisis Dampak terhadap Pertumbuhan Ekonomi Regional Indonesia dan Penyebab-penyebabnya dengan Data Panel 1983-1999". *Jurnal Ekonomi dan Pembangunan Indonesia* Vol. 4 No. 1 pp. 141-160, 2004.

[23] Widarjono, Agus, "Ekonometrika Teori dan Aplikasi untuk ekonomi dan bisnis". *Ekonomia*, Yogyakarta, 2007.



Henny Medyawati, a lecturer in Gunadarma University. Birth in Jakarta, May 18th, 1970. Undergraduate Program in Computer Science, Master Program in Management, completed Doctoral Program majoring in Economics in Gunadarma University in 2010. Lecturer in Gunadarma since 1993. Member of IEDRC since 2011. Research interest in Banking, Information System, Economics



Muhammad Yunanto, a lecturer in Gunadarma University. Birth in Klaten, June 12, 1969. Undergraduate Program in Economics, Master Program in Management, and completed Doctoral Program majoring in Economics in Gunadarma University, Indonesia, in 2013. Lecturer in Gunadarma University since 1993, teaching subject in Macro Economics, Strategic Management, and Managerial Economics. Research Interest in

Economics, Strategic Management, Financial