

Banking and Technology in Indonesia: Contribution to Indonesia Economy

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ABSTRACT: Research on the role of technology in banking is still an interesting topic. This paper aims to analyze the banking indicators, economic growth indicators and banking technology indicators to economic growth in Indonesia. Data processing results indicate that BI-RTGS has positive response to the shock of the economic growth. The percentage contribution of the BI-RTGS variables also showed consistency ranging from period to six months until the eleventh. Overall it can be concluded that the BI-RTGS variables show the effect on economic growth indicated by optimum lag of VAR models obtained in the two months.

1 INTRODUCTION

Intermediation role of banks in Indonesia continues to increase. Bank's role as a financial intermediary is also improved with accelerated credit growth compared with the growth of third-party funding (TPF) (Bank Indonesia, 2010). The financial sector plays a very significant in triggering the economic growth of a country and a locomotive of real sector growth via capital accumulation and technological innovation (Ingrid, 2006).

Economic growth in 2011 increased to 6.5%, compared to the previous year of 6.1% and is the highest growth rate in the last ten years (Bank Indonesia, 2011). Studies that link between the financial sector and economic growth are as follows. Economic growth affects the development of the banking sector in the long term but the feedback relationship that is not found (Ang & Mc Kibbin, 2007) Deepening financial development and rapid economic growth in China have been accompanied by widening income disparity between coastal and inland regions. Levine (1997), stated that the economic activity and technological innovation will no doubt impact the structure and quality of the banking system.

One aspect of technology that is growing rapidly in Indonesia's banking system is the application of electronic-based transactions. In 1995, Bank Indonesia as the monetary authority has issued a Public User Control Technology Information Systems (TSI) based on SK DIR. No. BI. No. 27/164/KEP/DIR and SE BI. 27/9/UPPB dated March 31, 1995 on the Use of Information Technology Systems by Bank Indonesia in 1995. Essentially it establishes the principles that need to be consi-

dered in the TSI bank management, whether conducted by the bank itself or by another party. In Indonesia, the use of information and communication technologies in the banking industry is relatively more developed than the other sectors (Hermana et.al 2010). Since 2000, Bank Indonesia also introduce people to a process for settlement of payment transactions made per transaction and real-time, which is called the Real Time Gross Settlement, known as BI-RTGS. The use of ICT in banking poses a high risk, requiring a mechanism or procedure that the application of ICT in banking can be done safely. Regulations issued by Bank Indonesia related to the management or operation of risk management activities of E-banking is the Bank Indonesia Regulation No. 9/15/PBI/2007 about the Application of Risk Management in the use of information technology by the bank. In addition to these regulations, the Indonesian Banking Architecture (API) which consists of six pillars, one of the pillars mentioned that API target is to realize the empowerment and protection of banking services.

The purpose of this research is to analyze the role of banking development indicators including technology indicator namely the BI-RTGS, economic growth indicators represented by the industry sector, and economic growth in Indonesia. This study analyzes in detail: (1)How many level of the optimal lag obtained from the VAR models? (2) How are the percentage contribution of the banking indicators represented by assets, loans, funds, technology indicators that is BI-RTGS and the industrial sector to economic growth?

2 RELATED RESEARCH

Levine, et.al (2000), found a positive relationship between banking development and economic growth, but in this study Levine put more emphasis on the influence of exogenous component of banking varies greatly between countries. The results Kar & 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. Levine (1997) stated that the economic activity and technological innovation will no doubt impact the structure and quality of the banking system. The long-run relationship between financial development and economic growth is examined in a multivariate vector auto regression (VAR) framework using 10 sample countries (Luintel & Mosahid Khan, 1999).

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

The application of BI-RTGS provides shocks, resulting in economic growth in Indonesia has decreased in the first and second quarter. This is caused by the application of BI-RTGS not fully benefit for the customer (Medyawati et.al 2010a); (Medyawati, & Hermana, 2010); (Medyawati et.al 2010b). Banking development affects economic growth in a span of 10 quarters (Medyawati & Nopirin 2009). Data used in the previous study are quarterly data and does not include control variables and the indicators of economic growth such as agriculture and industry. In the next study, the results of research Medyawati & Hegarini (2011) showed that the lag obtained from the VAR model that is 2 months shorter. The use of the data in the study is monthly data. Another difference is the variable measured by the BI-RTGS nominal transaction. The limitation of the study by Medyawati & Hegarini (2011) is, that the non-banking indicators not entered in VAR models. Based on those limitations that this research work has been done to develop Medyawati & Ega Hegarini (2011) which include industry variables in the model and the addition of one year of data is data in 2011. This study modifies the model used Levine, Loayza & Beck (2000) which is also used by Nasrudin (2004) who studied banking topics linked to economic growth with a regional approach.

3 METHODOLOGY

3.1 Data

The data used in this study is secondary data with the period from 2000 to 2011 in the form of monthly data. Sources of data are publications of Bank Indonesia (BI) in the form of the Indonesian Financial Statistics (IFS) and Statistics of Indonesia (SI,) publication of BPS (Central Bureau of Statistics). The data bank includes deposits, namely, the nominal amount of savings, current accounts, deposits and credit data across banks (commercial banks, rural banks and Islamic banks), the amount of assets of all banks, industrial sector GDP and the rate of GDP per capita at constant 2000 prices. GDP of the industrial sector which has not been included in previous research by Medyawati & Ega Hegarini (2011), included in this study on the basis that the industrial sector contributes a relatively large on the Indonesian economy, especially in the year 2012 with source of growth 1.47% and percentage of growth rate 5.73% (BPS, 2012).

3.2 Research Model

General form of the equations used in this study is to adopt the model used Nasrudin (2004) and Levine, Loayza & Beck (2000) and has been adopted also by Medyawati & Ega Hegarini (2011), Medyawati, et.al (2010a). Primary forms adopted general equation is as follows:

$$g_t = \alpha + \beta [\text{banking indicators}]_t + \gamma [\text{condition set}]_t + \varepsilon_t$$

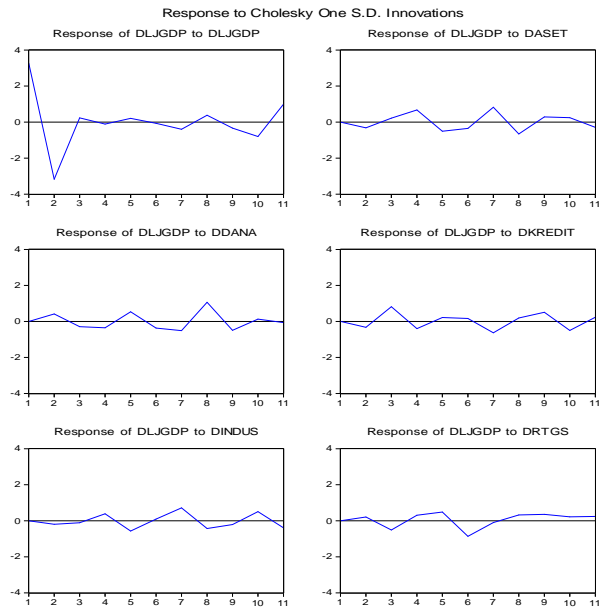
In this case, g is the growth rate, which is calculated as the magnitude of the growth rate of per capita income at constant 2000 prices. Indicators are used to analyze the development of banking in Indonesia refers to the standard Directorate of Banking Research and Regulation, Bank Indonesia banking core indicator section. This study did not use a linear regression with least squares approach (Ordinary Least Square-OLS), but using the approach of Vector Auto Regression (VAR). The reason for choosing this approach is the consideration of data used in this study is time series data, and the properties of the VAR that support the goals of this research is the analysis through variance decomposition and impulse response.

VAR model specification includes the selection of variables and the number of time lags used in the model. In accordance with the methodology of Sims, the variable used in VAR model is selected based on relevant economic model. Selection of the optimal time lags used information criteria such as Akaike Information Criteria (AIC) and Schwarz Criteria (SC) is the most minimum (Widarjono, 2007). Stages of the research include the identification of the equation, the unit root test, the optimal lag, test of the stability of the model (AR roots table), impulse

response analysis and variance decomposition. VAR system stability can be seen from the table value of the modulus in AR-roots i.e. if the entire value of AR-roots below 1, then the system is stable (Ooms, 2009)

4 RESULT AND DISCUSSION

The equation in this study identify by using the formula: $Kk > < m-1$ (Gujarati, 2003), so the conditions obtained over identified because the amount of information held exceeds the number of estimated parameters. Stationary test results of data indicate that there are two variables, which are stationary at the level. The variables are economic growth and industry sector variable. The next process is the difference so that all variables are stationary in the same



degree.

Figure 1. Impulse Response of Economic Growth

These results also simultaneously determine the form of VAR to be estimated later that VAR in difference form. In the VAR method, determination of the optimal level of inertia is importance, it is because the independent variables used nothing but the inertia of the endogen variable.

Based on the results of AR Roots Table, obtained the maximum lag is 11, with a range of modulus values 0.268-0.966. The next process is to determine the optimal lag through Lag length criteria, the result that in accordance with an asterisk, then the candidate interval is 2. Selection criteria used in this study is based on the smallest AIC value, then obtained the optimal lag 2 (2 months). VAR estimation results in the form of difference will be discussed below.

4.1 Impulse Response Function

Impulse response function of the model confirms the estimated dynamic response of all variables to one standard deviation shock to the variables in the system.

Based on Figure 1, it can be concluded that the shock of third-party funds and variable BI-RTGS in the first and second received positive responses from economic growth. This means that both variables affect economic growth. This result is consistent with the results of Nasrudin (2004) which states that credit variable has negative effect on economic growth. This indicates that the banking disintermediation occurs, that the role of banking as a financial intermediary is not running properly. These results are not in line with the research Levine et.al (2000), Ingrid (2006), Kar & Pentecost (2000), Liang (2006), Medyawati, et.al (2010a), Medyawati, et.al (2010b), Medyawati & Ega Hegarini (2011), and Medyawati & Nopirin (2009) which states that economic growth gives a positive response.

4.2 Variance Decomposition

The variance decomposition analysis illustrates the importance relative of each variable in the VAR system because of the shock. Table 1 below illustrates the percentage contribution of predicted economic growth variants variables to changes in variable assets, loans deposits, BI-RTGS transactions and industry sector.

Table 1. Variance Decomposition of Economic Growth

Period	dljgdp	Daset	Ddana	Dkredit	Dindus	drtgs
1	100	0	0	0	0	0
2	97.809	0.474	0.819	0.510	0.180	0.205
3	93.096	0.664	1.157	3.488	0.225	1.368
4	89.165	2.580	1.647	4.027	0.856	1.722
5	85.0243	3.495	2.727	4.028	2.132	2.591
6	81.587	3.835	3.150	3.969	2.079	5.378
7	76.200	6.008	3.858	5.117	3.795	5.019
8	71.454	7.050	7.425	4.885	4.159	5.023
9	69.780	7.118	8.017	5.604	4.186	5.292
10	69.014	7.023	7.750	6.156	4.823	5.231
11	69.196	6.997	7.448	6.071	5.089	5.196

The results in Table 1 above provides the information that the overall economic growth can be explained or influenced by economic growth themselves, from the first of the month until the eleventh month with the percentage 69% - 97%. The percentage value of banking variables namely assets, deposits, loans, relatively similar to each other, and in the range of 1% -7%. Variable BI-RTGS and industry sector in the range of 2% to 5%. Until the sixth month, the percentage of loans do not exceed 5%, the maximum percentage of credit variables over a span of prediction is for 10 months is 6.15%. It can

be concluded, that the Bank in lending to the public is still relatively cautious in order to prevent the occurrence of bad debts.

The third party funds show that the percentage contribution of third-party funds to economic growth achieve highest in the ninth month is equal to 8.01%. On month the tenth experienced a slight a decrease 0.26% compared with percentage previous month. This can be understood that the third party funds which is exist in a bank, has been channeled into society through channeling mechanism for credit.

In general, the role of BI-RTGS transactions to economic growth when seen from the percentage of variance decomposition, the equivalent of three other banking indicators is between 1% - 5.29%. The most interest phenomenon in this research, that ranging from the sixth to the tenth month, the percentage contribution of the BI-RTGS show stability. This describes the condition of the people who have been able to take advantage of BI-RTGS facility for the purposes of day-to-day transactions. The cost of using the BI-RTGS facility is no longer considered expensive by most people, because of the speed and accuracy of transactions provided by this facility. This condition describes the role of BI-RTGS transactions positively affect economic growth and strengthen the statement of Levine (1997) that economic activity and technological innovation give effect to the structure and quality of the banking system. This result is also in line with the research Medyawati & Budi Hermana (2010) that the implementation of technology affects the development of banking and economic growth. This result also supports the main reason Bank Indonesia to process settlement through RTGS is a new awareness of the central banks in the world to manage the Large Value Transfer System (LVTS). The optimal lag length obtained in this study is similar to previous research that is 2 months (Medyawati & Ega Hegarini, 2011). The addition of industry sector in VAR model does not affect the optimal lag.

5 SUMMARY

BI-RTGS has a role and contribute to economic growth. This result is consistent with the statement of Levine (1997), Medyawati & Budi Hermana (2010) and Medyawati & Ega Hegarini (2011). The condition is clarified with data processed through the two properties of VAR, Impulse Response and Variance Decomposition, that the positive response occurs as a result of economic growth in the shock of BI-RTGS variable. The percentage contribution of the BI-RTGS variables tend to be stable over the last 6 months of prediction is the sixth month, up to the eleventh. This condition reflects that the use of technology in banking has become an important part and is felt by the wider community.

The limitations of this research that the control variables not included in the VAR model like API implementation in 2004. For further research, the control variables and other economic indicators such as agriculture and services can include into the VAR model.

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