Banking Funds and the Industrial Sector in Indonesia

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Abstract

Banking, the blood of any economy, recorded strong growth over the last 5 years in Indonesia, particularly in terms of the volumes of funds collected. The purpose of this research is to examine the indicators of banking, banking technology indicators namely Bank Indonesia-Real Time Gross Settlement (BI-RTGS), industrial sector and services in the Indonesian economy as measured by the nation's Gross Domestic Product (GDP). This study uses time series data covering 2000 (fourth quarter) to 2014. Testing of time series data using the unit root test and cointegration test indicated that variables were not stationary at the current level and that the Vector Error Correction Model (VECM) can be applied provided that there is co-integration. The results showed that the GDP responded positively to shocks arising from third-party funds, assets, and BI-RTGS. The Negative response was indicated by the loan variables, industry, and services. An analysis of variance decomposition indicated that the third party funds had the largest percentage contribution compared with those attributable to five other variables.

Keywords

Introduction

Indonesia's economy has been experiencing a slowdown in recent time. Since the structural reforms implemented were not optimal, the global economic slowdown and economic stabilization policy encouraged a slowdown of the domestic economy in 2014. The Indonesian economy grew by 5.0% in 2014, down from 5.6% in 2013 and lower than the forecast at the beginning of 2014. In 2014 it was forecast that the growth would be between 5.5 and 5.9% (Bank Indonesia, 2014). Several financial factors, especially related to the banking sector, seem to explain the slowdown. The development of banking in Indonesia in terms of the development of assets, deposits, and loans increased rapidly over the last 3 years. Total banking assets by the end of 2014 reached more than Rp. 5544198.29 billion, representing an increase of 12% compared to the Rp. 4,937,627.15 in

year 2013. Total third-party funds in 2014 reached Rp. 4590058.37 billion, up 14% compared to the year 2013 when it reached Rp. 4,033,078.21 billion. Meanwhile, the increase in lending reached Rp5,495,902.77 billion, an increase of 13% compared to the Rp. 4845658.67 billion in 2013. One technological feature of this economic growth was the rapid advancement in Indonesia's banking system as a result of the implementation of electronic-based transactions. In 2000, Bank Indonesia introduced facilities for the final settlement of transactions payments were made per transaction, and in real-time, called the Real Time Gross Settlement, also known as the BI-RTGS (Bank Indonesia Real Time Gross Settlement). In terms of payment system (PS), Bank Indonesia subsequently implemented policies directed at modernizing the PS, policies, and infrastructure through the PS infrastructure through the strengthening and expansion of non-cash transactions by the launching of the National Movement of Non-Cash (GNNT) to enhance the operational efficiency of the national economy (Indonesia Economic Report, 2014). The use of BI-RTGS yielded increase returns year after year. The total nominal value of transactions through the BI-RTGS in 2014 reached Rp. 11,013,882, 48billion, an increase of 34% compared to that Rp. 8193700.42 billion in 2013.

Literature Review

An important measure of the condition of the economy in a country in a given period is the Gross Domestic Product (GDP), at current prices and at constant prices. GDP is basically the added value generated by all business units within a particular country, other total value of final goods and services produced by all economic units (Central Bureau Statistics-CBS, 2015). In terms of macroeconomics, economic growth refers to the increase in GDP, which also means the addition of national income. According to Pass and Lowes (1994), economic growth is the growth of real output of the economy over time. There are three major factors or components of economic growth of any country (Todaro, 2004). The first is the accumulation of capital, which includes all forms or types of new investments in the form of land, physical equipment, capital and human resources; The second is population growth over the next few years it will increase the labor force available; The third factor refers to advances in technology. According to Todaro (2004), there are three types of technological progress, namely (1) a neutral technological progress; (2) labor-saving technological progress; and (3) capital-saving technological progress. Neutral technological progress occurs if the technology allows nations to achieve higher production rates while keeping the number and combinations of input factors the same. The use of technology leads to higher output even though the amount of labor or capital inputs are the same. As a payment system, BI-RTGS belongs to the neutral type of technological progress. Example of the labor-saving technological progress, is the use of electronic computers, ATM machines, and other modern equipment.

Research on the role of banks in the Indonesian economy and economic growth include, research by Nasrudin (2004); Medyawati (2010); Medyawati, Nopirin, Sutopo and Hermana (2010);

Medyawati and Hermana, (2010); Medyawati, Nopirin, and Sutopo (2010) research which uses the basic concepts and model proposed by Levine, Loayza and Beck (2000). Levine (1997), stated that economic activity and technological innovation impact the structure and quality of the banking system. Sharma and Mamta Ranga (2014) examined the impact of the growth of savings and deposits at India's commercial banks to the nation's GDP. The results revealed a strong relationship between the savings and deposits of commercial banks and GDP. Boulilla and Trabelsi (2003) found that there were strict controls in the financial sector in countries of MENA (Middle East and South Africa) over long periods of time, led to the delayed implementation of financial reforms in these countries. They also found that the issues that developed in the implementation of reforms (especially the bad loans), and the fact that information and transaction costs remained high, were preventing the implementation of promotional resources and financial deepening. Mehmood (2012) examined the influence of thirteen selected factors (independent variables) of GDP in Pakistan and Bangladesh, with the objective of comparing the two countries, identifying which country was in a better position and its cause. Economic growth in terms the GDP was measured in this study using time series data for the thirty-four year period 1976-1977 to 2008-2009. The study found that in Pakistan the gross national expenditure, exports of goods, the gross savings and final consumption expenditure had a positive effect on GDP. But factors such as external debt, total stock, and export services had a negative effect.

In the case of Bangladesh, the study found that factors such as gross national expenditures, external debts stock total, goods imports and exports had positively affected GDP of Bangladesh whereas the factors such as final consumption expenditure had negatively impacted the nation's GDP.

As for China, Liang (2006) stated that the development of banking and rapid economic growth in China was accompanied by widening the income gap between the people living on the coast and the island. Other research by Luintel et.al, 2008 focused on 16 countries covering Asia, Europe, and the United States and found that the estimation of the panel data cannot show specific results that describe the characteristics of the countries studied. The study's findings suggest that the financial structure and financial sector development play a significant role determining the level of output and economic growth. The conditions in Malaysia are different, although economic growth there has affected the development of banking in the long term, the expected feedback relationships were found to be absent (Ang and Mc Kibbin, 2007). Researchers from another country, Abu-Badr, and Abu-Warn (2006) incorporated Vector Auto Regression (VAR) in their estimation method and state that there had been a weak relationship for a long period between the development of the financial sector to economic growth. The financial sector plays a very significant role in triggering the economic growth of a country, so it could become the locomotive of the real sector growth via capital accumulation and technological innovation (Ingrid, 2006). Levine, Loayza, and Beck (2000)

found a positive relationship between the development of banking and economic growth, but in this study, they had put more emphasis on the influence of exogenous components of banks, the influence varied greatly between countries. Kar and Pentecost (2000) found a positive correlation between the stability of the banking sector and the growth of real output. This study adopted a VAR methodology with a sample of 18 OECD countries. The purpose of the study was to analyze the contributions of banking through indicators of assets, loans, deposits, and BI-RTGS, as well as economic indicators in Indonesia, namely the contributions industrial sectors and services to GDP. The difference between this research and Medyawati (2015) lies in the addition of separate variables for industry sectors and services variables. All the variables were expressed in logarithms.

The indicators of banking technology in this study emulate Medyawati and Ega Hegarini (2011) and Medyawati and Muhammad Yunanto (2013, 2014) and Medyawati (2015) by using the BI-RTGS as measured by the nominal transaction. This study extends a previous study by Medyawati (2015), a development on Medyawati (2010), Medyawati and Ega Hegarini (2011), Medyawati and Muhammad Yunanto (2013, 2014) to analyze the banking indicators related to the Indonesian economy.

Methodology

Data used in this research was secondary (quarterly) from various sources in the time period of 2000 through 2014. In November 2000 the first time BI-RTGS was implemented. Quarterly data usage

in this study differs from previous researchers such as Medyawati, and Ega Hegarini 2011, Medyawati, and Muhammad Yunanto, 2013, 2014 and Medyawati (2015) which had relied on monthly data. The difference arises from the fact that CBS releases quarterly data. The data source is the publication of Bank Indonesia (BI) in the form of Indonesian Financial Statistics (SEKI), publications BPS (Central Bureau of Statistics). The forms of the equations used in this study follow the model used by Levine, Loayza and Beck (2000) and Nasrudin (2004) with a few modifications. The following is one such basic equation:

$$g_t = \alpha + \beta \,[\text{principal indicator of banking}]_t + \gamma[\text{setconditions}]_t + \varepsilon_t$$

g_t = GDP, principal indicator of banking = bank assets, loans, funds, set conditions = adopted to be one of the variables in the economic growth, that is a technological resources. In this research, the BI-RTGS is used for measuring technological resources.

Banking data include information on third-party funds consisting of the nominal amount of savings, current accounts and loan data across banks (commercial banks, rural banks and Islamic banks), the assets held by of all banks, the GDP contributions due to different industrial and services sectors, and the overall GDP at constant 2000 prices. The research model is estimated using VECM (Vector Error Correction Model) because the data are in a time series form. The indicators used to analyze the development of banking in Indonesia refers to the standard from Directorate of Banking Research and

Regulation, published by Bank Indonesia in the section listing the principal indicators of the banking system. All data are expressed in logarithmic form, as recommended by Medyawati (2015). VAR and VECM model specification includes the selection of variables and the number of intervals used in the given model. The estimation process can only be done on overidentified condition and just identified data (Widarjono, 2007). The identification of the equation in this study is done by using the formula: Kk>= <m-1 (Gujarati, 2003), so over-identified conditions are obtained because the amount of information held exceeds the number of estimated parameters. Secondary data were tested with the stage namely unit roots test, co-integration test, determination of the optimal level of inaction, the stability test of the VAR model, impulse response analysis, and variance decomposition.

Results and Discussion

Empirical Results

The results from the unit tests as determined from the stationary data showed that all variables were nonstationary at the prevailing levels. The results were further processed so that differences between all the variables were stationary to the same degree. Table 1 shows the results.

Table 1. Stationarity Data Test Result

Variable/Unit Root Test		Critical Value			ADF-Test Statistics
		1%	5%	10%	
LOG(FUND) DLOG(FUND)	Level First Difference	-3.5527	-2.9145	-2.5950	-1.7862 -6.6835
LOG(CREDIT) DLOG(CREDIT)	Level First Difference	-3.5575	-2.9188	-2.5961	-1.6968 -7.0813
LOG(ASSET) DLOG(ASSET)	Level First Difference	-3.5575	-2.9145	-2.5950	0.3968 -6.9385
LOG(RTGS) DLOG(RTGS)	Level First Difference	-3.5527	-2.9188	-2.5950	-1.3095 -6.6456
LOG(PDB) DLOG(PDB)	Level First Difference	-3.5575	-2.9145	-2.5961	-1.5136 -4.9002
LOG(INDUS) DLOG(INDUS)	Level First Difference	-3.5527	-2.91452	-2.59503	-0.5304 -3.5793
LOG(SERV) DLOG(SERV)	Level First Difference	-3.5575	-2.91451	-2.59612	-2.1813 -8.9082

In circumstances when both t and xt both have unit root (i.e. each exhibits a trend) et usually contains a unit root (the stochastic trend) as well. In such a situation, spurious regression may arise. But this often occurs when it does not contain the trend, the value is not too large oral though yt and xt contain a trend, the value do not diverge too much. This condition is often referred to as a case where yt and x tco-integrated (Rosadi, 2012).

Johansen co-integration test results with reference to the results of the trace test and maximum eigenvalue and α = 5% are shown in Table 2 below. The table reveals a coexistence of co-integrating equation. When all the variables containing unit roots are cointegrated, VECM models can be applied. A VECM model is a model that restricts VAR (restricted VAR), because of co-integration points to a long-term relationship between the variables in the VAR system (Widarjono, 2007). Addressing the problem of determining the length of inaction in the VAR system

is important in the estimation of VAR. Length inaction optimal variables need to capture the effect of each variable on other variables in the VAR system. Based on the results shown in our AR Roots Table obtained with a maximum lag of 2, the modulus values are seen to range between 0.254143 and 0.99974. In the next process, the results obtained on the basis of lag length criteria are shown with an asterisk. On this basis, the candidate interval determining FPE (Final Prediction Error), LR (Likelihood Ratio), and AIC (Akaike Information Criteria) are 2 quarters.

Table 2. Johansen Cointegration Test Results

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.63305	153.3376	125.6154	0.0003
At most 1 *	0.418946	98.1985	95.75366	0.0336
At most 2	0.351864	68.33837	69.81889	0.0652
At most 3	0.283109	44.48733	47.85613	0.1001
At most 4	0.216099	26.18159	29.79707	0.1234
At most 5	0.207472	12.79064	15.49471	0.1227
At most 6	2.95E-05	0.001622	3.841466	0.9656

Analysis

High economic growth and sustainable processes are the main conditions for the sustainability of economic development (Tambunan, 2001). Since the population has continued to grow so far, the economy also needs continues to grow

so as to provide the additional revenue needs in each year. This can only be done, by increasing the aggregate output (goods and services) or GDP each year. Indonesia's GDP growth and the growth of its industry sector during the period of last 5 years (2011 to 2014) are presented in Figure1 below.
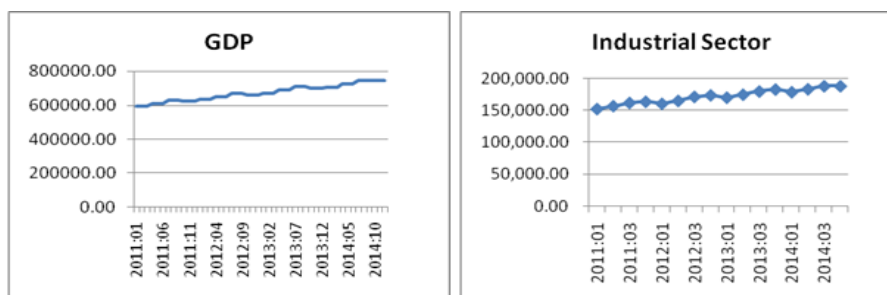

Figure 1. GDP Growth and the Growth in the Industrial Sector of Indonesia in the Period 2011-2014

Medyawati and Nopirin (2009) showed that banks influence economic growth with a lag time of 10 quarters in the absence of a variable BI-RTGS. Medyawati (2010) demonstrated that the role of banks in determining economic growth is relatively small. The factor causing the relatively small role is that the quality of the banking structure is not good. However, research by Medyawati and Ega Hegarini (2011) conducted after the incorporation of variable BI-RTGS obtained yielded a shorter lag equaling two months. In contrast to the previous study using monthly data, the present study has utilized quarterly GDP data presented by BPS and SEKI. The optimal lag obtained in this research is two quarters. The explanation is that the banking sector, the industrial sector, and the service sector impact Indonesian economy with a time lag of two quarters (6 months). These lend support to the contention that banking is an important factor in the economy. Almost all sectors related to various financial activities always require the services of the bank (Kasmir, 2002: 2).

The next analysis examined the use of two properties of VAR namely the impulse response function and variance decomposition. The impulse response function of the estimated model is helpful in confirming the dynamic responses of all variables on the shock of one standard deviation in the variables in the system. The following is the response of GDP to the shock of loan, funds, assets, BI-RTGS, the industrial sector, and the service sector.
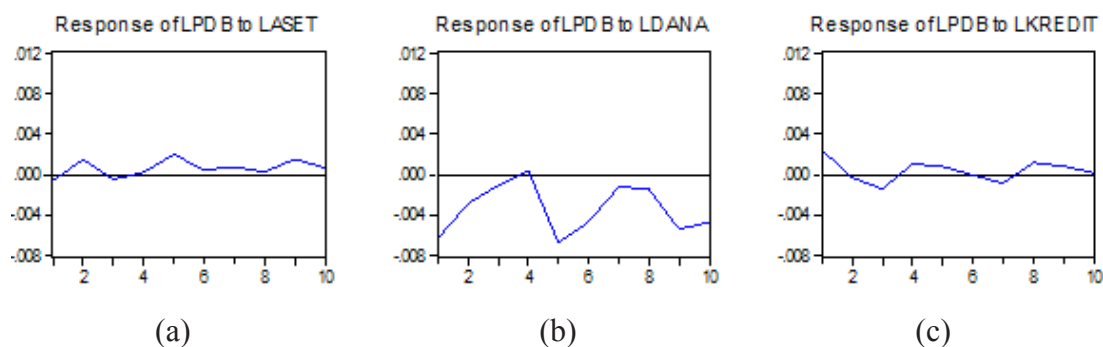

(a)   (b)   (c)

Figure 2. GDP Response to the Shock of Assets, Deposits and Loan

Based on Figure 2(a), 2(b) and 2(c) above, it can be concluded that the shocks arising from assets, and third-party funds, in the first and second quarters, had received positive responses from the economy. This suggests that the increase in bank assets and third-party funds did affect the GDP. These results support the research by Sharma and Mamta Ranga (2014), Levine, Loayza and Beck (2000), Ingrid (2006), Kar and Pentecost (2000), Liang (2006), Medyawati and Muhammad Yunanto (2013), which found a strong relationship between the savings and deposits of commercial banks with the GDP. By contrast, the shock arising from loans as seen in Figure 2 (c) has a negative impact on the economy. This can be explained by the fact that the economic conditions during

the study period experienced structural challenges mainly related to the sources of financing (Bank Indonesia, 2014). Banks tend to be careful in lending because of fears that there will be an increase in non-performing loans.

Our next analysis addressed variance decomposition, the analysis that describes the relative importance of each variable in the VAR system because of the shock.
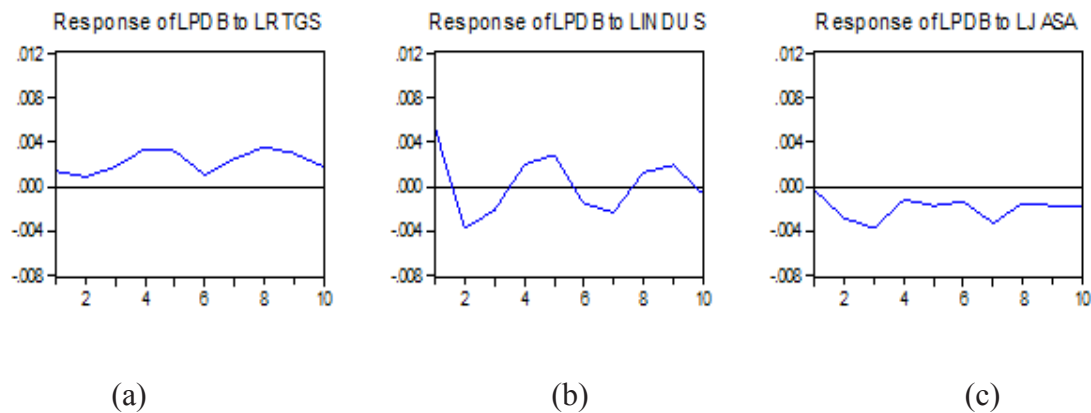

(a)   (b)   (c)

Figure 3. GDP Variable Response to the Shock of BI-RTGS, Industry and Services

The positive response of the Indonesian economy to the shock of the BI-RTGS can be seen in Figure 3(a). In the period from the second quarter on, the economy experienced a slight decrease first but did not reach zero, and immediately increased until the fourth quarter. The opposite happens when the shock attributable to industry variables is considered. The economy experienced a sharp decline in the second quarter which then rose again and continued to rise until the fourth quarter. This is consistent with the real economic conditions in which the industrial sector was experiencing challenges. In the Indonesian Economic Report (2014) it was mentioned that there were other challenges being faced by the weakening of the competitiveness of industry and trade in the face of global competition. The structure of domestic production

was still dominated by resource-based commodities and a labor-intensive industry that is low-tech. Economic conditions also decreased as a result of the shock variable service until the third quarter.

Meanwhile, the domestic economy was still facing a number of structural challenges mainly related to food and energy sovereignty, the competitiveness of industry and trade, sources of development finance, and economic inclusion. Subsequent analysis using another VAR property through the analysis of variance decomposition yielded the results presented in Table 3. Note that the table lists the percentage variance prediction contribution to changing economic variables, assets, loans, deposits, BI-RTGS transaction, the industrial sector and the service sector to GDP.

Table 3. *Variance Decomposition* **of GDP**

Period	L.ASSET	L.FUND	L.CREDIT	L.RTGS	L.INDUS	L.SERV	L.PDB
1	0.15317	20.7479	3.01961	0.94732	14.42827	0.06219	60.64149
2	1.01269	19.4209	2.36177	1.01762	16.89585	3.29293	55.99825
3	0.92076	16.6754	2.66137	1.90716	15.74727	7.61655	54.47147
4	0.87132	15.5781	2.83474	5.43774	15.91377	7.52081	51.84364
5	1.46362	20.7199	2.07362	5.96547	12.72684	5.84263	51.20795
6	1.35837	22.9415	1.86492	5.57788	11.88662	5.62956	50.74112
7	1.34437	21.3229	1.84966	6.22206	11.86707	7.10305	50.29082
8	1.27944	20.4958	1.97928	7.98766	11.47569	7.10615	49.67604
9	1.44806	21.9761	1.80462	8.22469	10.46641	6.60234	49.47781
10	1.38671	23.2023	1.65957	7.96895	9.682823	6.50369	49.59592

Table 3 provides the insight that the Indonesian economy (as measured by GDP) was influenced by GDP in previous periods with an interval between 49.5959% - 60.6415% through the period of 10th. Variable BI-RTGS shows the increase in the percentage contribution until the period to 9. The most interesting observation concerns the fact that the BI-RTGS variable is the first month of the BI-RTGS and it accounted for 0.947%, but up to a period of nine experienced a consistent increase up to 8.225%. This indicates that people are more trusting positive and comfortable in using technology as a medium for carrying out the transaction. Specifically, until the 10th month, the percentage of loan contribution tended to decline with an average decrease of 0.1%. It can be concluded that a relatively small percentage of the loan caused by the consistency of the cautious attitude of banks in lending is in accordance with the principles of prudential regulation.

Conclusion

The results have shown that the banking sector, banking technology, the industrial sector and the service sector have been affecting the economy of Indonesia. Response variations arising from shocks related to other variables on the Indonesian economy are indicated by the six variables in this study. The positive response was shown by the Indonesian economy due to the variable shock of the third-party funds, assets, and BI-RTGS. However, a negative response occurred because of the shocks arising from variables of industry, services, and loans.

Limitation

This study has not included any control variables in the research model, for example, the variable application of the Indonesian Banking Architecture (API), and the variable global crisis in 2008. This can be addressed by future researchers.

Notes on Contributors

Henny Medyawati currently serving as Head of Banking and Insurance Development Laboratory in Gunadarma University. She has research papers published in various journals such as International Journal of Trade, Economics, and Finance (IJTEF), Journal of Internet Banking and Commerce (JIBC), Journal of Theoretical and

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