

The Influence of Liquidity and Deposit Insurance on Market Discipline at Regional Development Bank in *Indonesia*

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Abstract: The purpose of this study is to determine the effect of liquidity on the influence of overhead, short term debt, inflation and regional growth of gross domestic product on deposit growth and interest rates as market discipline variables. In the research also use dummy variable in the form of policy of deposit insurance either implicitly or explicitly by Government of Indonesia as variable which moderate influence of liquidity to growth of deposit and interest rate. This study used 19 regional development banks in the region during the period of 2002-2014. In testing the influence of independent variable to dependent variable, this research use multiple linear regression fixed effect model. While the data in this research is secondary data sourced from annual report published by Bank Indonesia. The results show that liquidity is a variable that can mediate the influence of short term debt and regional growth of gross domestic product on the growth of deposits and also can mediate the influence of overhead, short term debt, inflation and regional growth of gross domestic product against interest rate. The results also show that the implementation of the deposit insurance policy explicitly is a variable that strengthens the effect of liquidity on deposit growth and interest rate.

1 INTRODUCTION

Based on the last two decades in the banking world, there has been a series of crises that systematically caused bankruptcy of banks that culminated in 1997 in Asian countries such as Thailand, Indonesia, Malaysia and Korea. The crisis not only resulted in bankruptcy of banks but also resulted in economic downturn and devaluation of currencies in countries that experienced the crisis. In addition, the banking crisis also affected the decline in public confidence in the banking industry. This is due to moral hazard perpetrated by banking actors who have harmed the public in general and ultimately impacted the public panic to withdraw their funds from the banks due to lack of confidence in the community to the bank at that time.

The incidence of banking crisis in Asian countries especially in Indonesia resulted in Bank Indonesia adopting Basel II on the Banking Architecture which explicitly emphasized the strengthening of market discipline as stated in Pillar 3 within the Indonesian Banking Architecture (API) which was enacted in 2004. This is done to improve banking stability in Indonesia, as well as to avoid

bank failures in the future and to restore public confidence to banks.

Market discipline is an act by customers, creditors, and investors in disciplining banks that take the risk are too big. Market discipline currently used in banking literature includes two components: the ability of market actors to precisely judge the condition of a company and the supervision and ability of market participants to influence the actions of corporate management as a way of reflecting judgments (Flannery, 2000). To achieve these objectives, in the banking context, adequate information is needed for the community regarding the condition of the bank and the ability of the community itself to assess the condition of the bank through analysis of available information. In this case the role of banks as financial institutions to be trusted by the public is required to provide correct information about their conditions to customers or investors.

Based on this, it can be concluded that banks that have a high risk tend to make customers feel worried about their deposits. The action taken by the customers is to discipline the bank, that is by demanding higher interest rates. This phenomenon

may still be overcome by the banking sector by maintaining bank liquidity. But if the customer withdraws the deposit and is not something that is impossible, based on fear and to avoid losses due to risk taken by the bank, the customer may withdraw all deposits to the bank.

According to Murata and Hori in Taswan that banks have a negative correlation relationship between the growth rate of deposits with bank risk and have a positive correlation relationship between the interest rate demanded and bank risk (Murata and Hori, 2013). This leads to a decrease in deposit growth in the bank resulting from market discipline by customers through interest rates, even worse than bankruptcy or bank failure, if the customer withdraws all deposits to the bank. The consequence of this problem is the decreasing of public confidence, especially the customers to the bank and it is not impossible that will have an impact on the banking crisis.

As already mentioned in the previous phenomenon that bank liquidity can overcome market discipline conducted by the customer through the interest rate demanded by the customer. Good liquidity management can give confidence to depositors or savers that they can take funds at any time or at maturity. The bank's liquidity also has a negative effect on the market discipline; the better the management of bank liquidity, the market discipline undertaken by the customers can be overcome by the banks.

However, market discipline does not always carry out its duties to monitor risk. Market discipline will weaken when customer deposits are fully guaranteed by the government (Yaling and Yingzi, 2012). As Dermiguc-Kunt and Huizinga, who say that the deposit insurance program is one indication that the banking system in the country is in a systemic crisis (Dermiguc-Kunt and Huizinga, 1998). This guarantee has a positive influence on the banking sector, the flow of public funds has gradually re-entered the banking sector, the panic has been eased and the recovery of public trust in banking has taken place. But market discipline becomes relatively lower or weaker when full guarantee is carried out (Preat and Stix, 2011). The same was stated by Dermiguc-Kunt and Huizinga, who said that deposit insurance did indeed weaken market discipline through deposit rates (Dermiguc-Kunt and Huizinga, 2004).

Yan, et al. said that the condition of market discipline cannot happen, because all the risks caused by the bank's decision have been borne by the deposit guarantee. However, if the guarantee is

done in a limited way and enforced in general, then the customer can still perform market discipline or act on bank risk (Yan et al. 2011). The same thing was also expressed by Berger and Turk-Ariss, who say that market discipline will decrease when the government takes full or implicit deposit insurance (Berger and Turk-Ariss, 2012). In contrast to Distinguin said that market discipline is more effective if there is an explicit deposit insurance (Distinguin et al. 2011).

Moreover, Distinguin finds that market discipline is stronger when an explicit deposit insurance is applied, whereas when the insurance is implicit, market discipline cannot function (Distinguin et al. 2012). Market discipline performed by the customer when the implicit period of implied deposit insurance applies by controlling through the withdrawal of the deposit because of the bank taking a high risk. This shows the higher the risk taken by the bank, the lower the bank's savings.

Conversely, in an explicit deposit insurance period, market discipline is more sensitive than when the insurance period is implicit. Market discipline that customers make when an explicit deposit insurance period applies is to demand a higher interest rate or withdraw their savings. This shows the higher risk taken by the bank, the higher the interest rate demanded by the customers.

Based on the above problem, firstly, this paper examines whether banking liquidity affects market discipline by using the indicator deposit growth and interest rates. This test includes control variables consisting of overhead, short term debt, inflation and regional gross domestic product (RGDP). The use of these four control variables is due to having an effect on the growth of deposits. In this test, the liquidity variable is used as an intermediate variable to see whether the liquidity variable is an intermediate variable of indirect relationship between the control variable to the deposit growth and interest rates variable as an indicator of market discipline.

Secondly, our test is done to see the influence of the effect of deposit insurance on the relationship between banking liquidity to deposit growth and interest rates by making deposit insurance variable as a moderating variable to test whether insurance deposit is a variable that strengthens or weakens the effect of liquidity on deposit growth and interest rates.

The research sample used is the Regional Development Bank located within the Province of Indonesia. The use of Regional Development Bank as a sample of this study is due to have a less competitive level of competition against national

banks located in the territory of Indonesia in terms of technology, marketing, etc. Therefore, the Regional Development Bank which is a bank owned by the Regional Government in Each Province in Indonesia has average interest rate higher than national bank. Therefore, the research questions in this research are:

1. How does bank liquidity mediate the effect of overhead cost, short term debt, inflation and regional gross domestic product growth on deposit growth and interest rates?
2. What is the effect of deposit insurance on the relationship between liquidity and deposit growth and interest rates?

2 LITERATURE REVIEW

The results of research conducted by Taswan through the results of estimation and testing conducted between the banking risk to interest rate, indicating that the risk of banking has a positive and significant impact on interest rates (Taswan, 2013). These results indicate that the higher the risk of banking, the higher the interest rate demanded by customers as market discipline against banks that take high risks. This result is consistent with research conducted by Dermiguc-Kunt and Huizinga who found that depositors can discipline banks involved in excessive risk taking by demanding higher interest rates (Dermiguc-Kunt and Huizinga, 2004).

Taswan found that bank risk negatively affects changes in deposit growth in banks. Customers conduct market discipline in banks by punishing banks through withdrawal of funds because of taking high risk banks. Depositors prefer to withdraw their funds rather than keep their deposits in the bank (Taswan, 2013).

Furthermore, Dermiguc-Kunt and Huizinga found out that bank liquidity is the most appropriate attempt by banks to overcome market discipline by customers by asking for higher interest rates. While higher government interest rates lead to lower liquidity.

Dermiguc-Kunt and Huizinga also found that the existence of an explicit deposit guarantee reduces the market discipline of the bank by the customers (Dermiguc-Kunt and Huizinga, 2004). In contrast to research conducted by Taswan suggests that market discipline in the period of implicit deposit guarantees and explicit deposit guarantee periods is not statistically different (Taswan, 2013). The effect of risk taking on changes in deposits in the explicit

underwriting period and the effect of risks on changes in deposits in the implicit guarantee period apply equally. Each has a negative effect on the deposit changes. The similarity of these influences indicates that market discipline applies regardless of the difference in the deposit guarantee scheme. Market discipline applies because solely banks take high risks.

Based on the research questions and literature review above, the researchers draw their hypothesis as follows:

1. H₀1: There is no significant effect overhead cost, short term debt, inflation and regional gross domestic product growth on deposit growth through liquidity.
2. H₀2: There is no significant effect deposit insurance on the relationship between liquidity and deposit growth.
3. H₀3: There is no significant effect overhead cost, short term debt, inflation and regional gross domestic product growth on interest rate through liquidity.
4. H₀4: There is no significant effect deposit insurance on the relationship between liquidity and interest rate.

Hypothesis description of the above research is presented as follows:

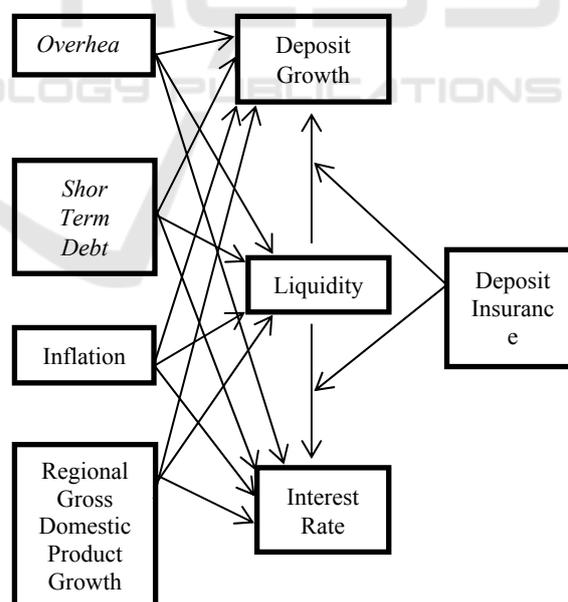


Figure 1: Hypothesis description.

3 METHODOLOGY

3.1 Research Data

The data used in this study is the data of Regional Development Bank located in each Province in Indonesia. The population used in this research is 26 Regional Development Banks registered with Bank Indonesia for the period of 2002-2014. In this study used a way to determine the sample data with non-probability sampling that the data used as a sample must meet the specific criteria. The selection of banks through criteria based on purposive sampling which is a group of subjects based on certain characteristics believed to have close connection with the characteristics or properties of the population. In the selection of this criterion is the Regional Development Bank registered with Bank Indonesia by including the following sample bank criteria

1. Regional Development Bank which has been operational within the period of 2002 - 2014.
2. The Bank publishes its annually financial statements from period 2002 to 2014 completely.

The total sample used in this research is 19 Regional Development Banks in Indonesia that have been operating in the period 2002-2014. Data collection is sourced from the financial statements of Regional Development Banks published by Bank Indonesia.

Table 1: Sample Research.

No.	Bank
1.	PT. Bank Aceh
2.	PT. BPD Bengkulu
3.	PT. Bank DKI
4.	PT. BPD Jambi
5.	PT. BPD Jawa Barat dan Banten, Tbk
6.	PT. BPD Jawa Timur
7.	PT. BPD Kalimantan Barat
8.	PT. Bank Kalimantan Tengah
9	PT. BPD Kalimantan Timur
10.	PT. BPD Lampung
11.	PT. BPD Maluku
12.	PT. BPD Papua
13.	PT. BPD Riau, Kepri
14.	PT. BPD Sulawesi Tenggara
15.	PT. BPD Sulawesi Utara
16.	PT. BPD Sumatera Barat
17.	PT. BPD Sumatera Selatan dan Bangka Belitung
18	BDP Sumatera Utara
19	BPD Yogyakarta

3.2 Variable and Definition

Operational definitions of each variable in this study are as follows:

Table 2: Research Variable and Definition.

Variable	Definition
<i>Dependent Variable:</i>	
Deposit Growth	Percentage growth in real deposits
Interest Rate	The ratio of interest expense to interest paying debt
<i>Intervening Variable:</i>	
Liquidity	Liquid assets to total assets
<i>Independent Variable:</i>	
Overhead Cost	Personnel expenses and other non-interest expenses over total assets
Short Term Debt	Short term funding to total interest paying debt
Inflation	The annual inflation rate from the Regional Gross Domestic Product deflator
Regional Gross Domestic Product	Regional gross domestic product per capita each province in Indonesia
Deposit insurance	The period of the government's deposit insurance policy which comprises three periods consisting of an implicit period of deposit insurance, an explicit deposit insurance period with up to 100 million guarantees and an explicit deposit guarantee period of up to 2 billion. Variables used in differentiating this period using dummy variables.

4 RESULT

4.1 Hypothesis Test

4.1.1 Hypothesis 1

Depositors in applying market discipline will withdraw their savings from high risk banks. In reducing the risk of high withdrawal of customer deposits, most banks will increase their investment in assets with high liquidity. Therefore, bank liquidity can be endogenous variable as banks can try to avoid market discipline to some extent by increasing their liquidity (Dermiguc-Kunt and

Huizinga, 2004). In this study, the use of liquidity as a variable that mediate the influence of controlling variables such as overhead cost, short term debt, inflation and regional gross domestic product. As an intervening variable, liquidity will be treated as an exogenous and endogenous variable. In the first stage, we examine the effect of all exogenous variables on the endogenous variables with the following equations:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 Z_{it} + \epsilon_{it} \quad (1)$$

Where Y_{it} is deposit growth, X_{1it} is overhead cost, X_{2it} is short term debt, X_{3it} is inflation, X_{4it} is regional gross domestic product and Z_{it} is liquidity. The result of the panel data regression equation is as follows:

Table 3: Test for Hypothesis 1.

Variables	Coefficient
Overhead	-5.360008
Short Term Debt	-6.001317***
Inflation	-3.715142
RGDP Growth	-4.027879*
Liquidity	-3.018555**
No. Of Obs	247
No. Of Banks	19
Adj. R^2	0.279069
F value	5.140236***

***, ** and * indicate statistical significant at 1, 5 and 10 percent, respectively.

In the second stage, in testing liquidity as an intervening variable then we do the regression as follows:

$$Y_t = \alpha + \beta_1 X_{it} + \beta_2 Z_{it} \quad (2)$$

$$Z_t = \alpha + \beta_3 X_{it} \quad (3)$$

Where: Y_{it} is deposit growth, X_{it} is each control variable consist overhead cost, short-term debt, inflation, regional gross domestic product and Z_{it} is liquidity

To determine whether the magnitude of the direct effect or through the mediation (intervening) is significant or not, it is necessary to test with Sobel test between each control variable with liquidity to deposit growth with the following equation (Ghozali, 2011):

$$Sp_2\beta_3 = \sqrt{\beta_2^2 Sp_2^2 + \beta_3 Sp_3^2 + Sp_2^2 Sp_3^2} \quad (4)$$

Where β_2 is coefficient control liquidity on interest, β_3 is coefficient each control variable on

liquidity, Sp_2 is Standard error β_2 , Sp_3 is standard error β_3 . The result of the Sobel test of each control variable to the growth of deposit as follows:

Table 4: Sobel Test for Hypothesis 1.

Variables	Coefficient	T-test
Overhead	14.489664	0.391089
Short Term Debt	-1.349224***	-3.94707***
Inflation	-0.435502	-1.09030
RGDP Growth	-1.023942***	-2.93556***

***, ** and * indicate statistical significant at 1, 5 and 10 percent, respectively.

From the result of regression of fixed effect model shows that short term debt is significant to the growth of deposits with statistically significant 1 percent, while the liquidity and regional gross domestic product (RGDP) have a statistically significant effect of 5 percent and 10 percent, respectively. While liquidity has an indirect effect between short term debt and regional gross domestic product (RGDP) on the growth of deposits. These results indicate that increased investment in liquid assets in banks with high risk does not make depositors to increase the deposit of funds at the Regional Development Bank. The increase in RGDP in each province provides bank motivation to increase liquid asset investment but does not attract customers to increase their savings.

4.1.2 Hypothesis 2

The Indonesian Government implements the deposit insurance policy implicitly before 2005, the adoption of an explicit deposit insurance policy began in 2005 through the establishment of Deposit Insurance Agency/Lembaga Penjamin Simpanan (LPS) by pledging savings not exceeding Rp 100 million in the period 2005 to 2007. Period 2008 and so on, the Government increased its deposit guarantee to Rp 2 billion. Therefore, to test the impact of deposit insurance on the effect of liquidity on deposit growth using the dummy variable. Where the dummy variable is used to provide the difference consisting of the period prior to 2004 which is the period of the deposit insurance policy implicitly, the 2005-2007 period is an explicit period with deposit insurance up to Rp 100 million and the period 2008-2014 which is an explicit period with the deposit insurance until with Rp 2 billion. The dummy variables for each period of deposit insurance are (1,0,0), (0,1,0) and (0,0,1). Regression model used to test the variable of influence of deposit insurance in moderating liquidity relation to growth of deposit is as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 Z_{it} + \beta_7 (X_{5it} * Z_{it}) + e_{it} \quad (5)$$

Where Y_{it} is deposit growth, X_{1it} is overhead cost, X_{2it} is short term debt, X_{3it} is inflation, X_{4it} is regional gross domestic product, X_{5it} is liquidity and Z_{it} is Dummy Variable Period. The results of multiple linear regression equations are as follows:

Table 5: Test for Hypothesis 2.

Variables	Implicit Period	Explicit Period <100Million	Explicit Period <2Billion
Overhead	11.999	-4.7756	-12.159
Short Term Debt	2.097**	-5.157***	4.038**
Inflation	-4.765*	-4.749	0.106
RGDP Growth	-9.614***	-2.660	-2.570
Liquidity	-3.406***	-6.861***	4.398***
Dummy Implicit Periode	-5.019***		
Dummy Explicit <200 Mil		-2.091**	
Dummy Explicit <2Bil			6.660***
Liquidity x Dummy Implicit	4.276**		
Liquidity x Dummy Explicit <100Mil		7.478**	
Liquidity x Dummy Explicit <2Bil			-10.942***
No. Of Obs	247	247	247
No. Of Banks	19	19	19
Adj. R^2	0.464	0.315	0.638
F value	31.468***	5.526***	18.417***

***, ** and * indicate statistical significant at 1,5 and 10 percent, respectively.

From the above results indicate that the implicit period, the customer retains at high risk Bank with the overall guarantee by the Government for the saving in the Bank but when the explicit deposit guarantee is applied the customer starts to choose the bank which has low risk as the storage of funds. In the 2008 and subsequent periods, customers withdrew their savings to Banks with high liquidity risk.

4.1.3 Hypothesis 3

Depositors can discipline Banks that take excessive risk action by requesting high interest rates, therefore, to avoid high demand for interest rates, the Bank will lower its liquidity by reducing its investment in liquid assets. Because generally liquid assets have a low rate of return. In general, the Regional Development Bank pays higher interest expense compared to the national commercial banks in Indonesia. This is because the national commercial banks provide more income from other services than the Regional Development Bank. In addition, the Regional Development Bank in its industrial competition tends to offer higher interest rates to attract customers to keep their funds in the Bank. The use of liquidity as an intervening variable in mediating the effects of overhead cost, short term debt, inflation and regional gross domestic product on interest rates is based on a strategy by banks to invest in providing higher returns to cover higher interest expenses. As with hypothesis 1, then in testing hypothesis 3 using the liquidity variable as exogenous and endogenous variable with the following equation:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 Z_{it} + e_{it} \quad (6)$$

Where Y_{it} is interest rate, X_{1it} is overhead cost, X_{2it} is short term debt, X_{3it} is inflation, X_{4it} is regional gross domestic product and Z_{5it} is liquidity. The result of the panel data regression equation is as follows:

Table 6: Test For Hypothesis 3.

Variables	Coefficient
Overhead	-0.079211
Short Term Debt	-0.015333
Inflation	0.000178
RGDP Growth	-0.025820*
Liquidity	-0.003430
No. Of Obs	247
No. Of Banks	19
Adj. R^2	0.394068
F value	7.955922***

***, ** and * indicate statistical significant at 1,5 and 10 percent, respectively.

Same as testing on hypothesis 1, then in testing the indirect effect of overhead cost, short term debt, inflation, regional gross domestic product against interest rate through liquidity variable by doing the Sobel test. The result of the test is as follows:

Table 7: Sobel Test For Hypothesis 3.

Variables	Coefficient	T-test
Overhead	0.016464***	12.444***
Short Term Debt	-0.001533***	-134.367***
Inflation	-0.000494***	-140.985***
RGDP Growth	-0.001163***	-152.291***

***, ** and * indicate statistical significant at 1,5 and 10 percent, respectively.

From the regression results shown in Table 6, only regional gross domestic product affects the interest rate with statistically significant 10 percent. The result of the Sobel test shows that short term debt, inflation and regional gross domestic product have indirect relationship to the interest rate through liquidity. Regional Development Banks will raise investment in liquid assets when there is an increase in short term debt, inflation and regional gross domestic product. This is done because an increase in interest expense on short-term debt will make additional funds by customers. Therefore, additional short-term investments are needed to avoid liquidity risk. An increase in inflation will have an impact on increase of interest rate, therefore the Bank will increase liquidity to reduce interest rates. The same strategy is also carried out when regional gross domestic product increases, which will lead to an increase in deposits and the Bank will invest in liquid assets to justify interest rates. Short term debt that increases (decrease) will be followed by andecrease (increase) in interest rates, therefore the bank will undertake a strategy to increase (decrease) investment in liquid assets to offset the decrease (increase) in interest rates

4.1.4 Hypothesis 4

As with the tests on hypothesis 2, we will examine the effect of three different periods of different deposit insurance policies on the relationship between liquidity and interest rates. Regression model used to test the variable of influence of deposit insurance in moderating liquidity relation to interest rates is as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 Z_{it} + \beta_7 (X_{5it} * Z_{it}) + e_{it} \quad (7)$$

Where Y_{it} is interest, X_{1it} is overhead cost, X_{2it} is short term debt, X_{3it} is inflation, X_{4it} is regional gross domestic product, X_{5it} is liquidity and Z_{it} is Dummy Variabel Period. The results of multiple linear regression equations are as follows:

Table 8: Test For Hypothesis 4.

Variables	Implicit Period	Explicit Period <100Million	Explicit Period <2Billion
Overhead	-0.026	-0.014	-0.056
Short Term Debt	-0.073***	-0.062***	-0.073***
Inflation	0.012	0.008	-0.019
RGDP Growth	-0.001	-0.017	-0.021
Liquidity	0.008	0.023**	-0.025***
Dummy Implicit Period	0.019***		
Dummy Explicit <200 Mil		0.013**	
Dummy Explicit <2Bil			-0.025***
Liquidity x Dummy Implicit	-0.009207		
Liquidity x Dummy Explicit <100Mil		-0.044***	
Liquidity x Dummy Explicit <2Bil			0.042***
No. Of Obs	247	247	247
No. Of Banks	19	19	19
Adj. R ²	0.366	0.244	0.352
F value	21.336***	12.355***	20.094***

***, ** and * indicate statistical significant at 1,5 and 10 percent, respectively.

The regression results show that when the deposit insurance policy is explicitly applied it gives significant effect on the interest rate through liquidity. This explains that the existence of an explicit deposit insurance policy makes the customer to act reduction deposit at banks at risk. Therefore, the risky bank will raise the interest rate to withdraw the customer's deposit and the bank will act to improve the liquidity. The deposit insurance policy in full or implicitly does not impact the market discipline behaviour because the customer does not request higher interest rate payment to the Bank having the risk high. On the other hand, the customer is only interested in the bank offering high interest rate, thereby lowering the investment in

liquid assets to transfer funds to portfolios that provide higher returns in order to pay for the increase in interest to increase the deposits of funds customers. The explanation can be illustrated by the regression result indicating that liquidity has negative and statistically significant effect on the interest rate in the explicit period.

5 CONCLUSIONS

In the face of banking competition in Indonesia, Regional Development Banks with limited ability to provide other services, generally use high interest rates to attract customer deposits. This condition is particularly vulnerable for the Regional Development Bank to disburse loan funds to customers because the loans granted will require high interest to cover the interest expense to deposit customers. This will cause some loans to be channelled to customers who are at risk of failing to repay the loan. This problem can be seen from this research where the indirect effect of short-term debt and regional gross domestic product on the growth of deposits and interest rates through liquidity has a negative and significant effect.

This result is also supported by the result of the research which shows the liquidity has a negative and statistically significant effect on the growth of savings in the period of deposit insurance with the guarantee of up to Rp 2 billion. Likewise, the liquidity of the interest rate which gives a positive and statistically significant relationship to the interest rate in the deposit insurance period explicitly with the guarantee of maximum fund of Rp 2 Billion.

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