

## The Short-run and Long-run Dynamics Between Liquidity and Real Output Growth: An Empirical Study in Indonesia\*

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### Abstract

The objectives of this research are to see if the phenomena of “demand following” and “supply leading” exist in the business cycle, as well as to look at how liquidity and output react to changes in credit risk, investment-saving gap, inflation, exchange rate, and growth rate of real national output. Employing quarterly data of Maluku and North Maluku (2008–2019), this study utilizes VAR/VECM for inferential analysis. This research found three important findings. First, liquidity and output growth influenced each other in the long run. Second, the determinants of output growth for Maluku are liquidity, investment-saving gap, and inflation, while the determinants of liquidity are output-growth, the gap of investment-saving, and inflation. Third, the determinants of output growth for North Maluku are liquidity, credit risk, investment-saving gap, inflation, exchange rate, and the national output-growth, while the determinants of liquidity are output-growth, credit risk, investment-saving gap, inflation, exchange rate, and national output-growth. The findings of this study supported the hypothesis of *demand following* and *supply leading* theory in the Maluku and North Maluku business cycles. This study concludes that economic development would improve if supported by liquidity adequacy through increased deposit growth.

**Keywords:** Real Output Growth, Liquidity, Investment, Savings, Inflation, Exchange Rate

**JEL Classification Code:** E44, E61, F63, G28, G32

### 1. Introduction

Maluku and North Maluku are two provinces from 34 provinces in Indonesia located in the eastern part of Indonesia. From 11 municipalities in Maluku, 8 municipalities

are still categorized as underdeveloped, which are West Southeast Maluku, Central Maluku, Buru, Aru Islands, West Seram, East Seram, Southwest Maluku, and South Buru. Meanwhile, North Maluku has 10 municipalities with 6 of them categorized as underdeveloped, which are West Halmahera, Sula Islands, South Halmahera, East Halmahera, Morotai Island, dan Taliabu Island.

Utilizing data from Statistics Indonesia, the regional gross domestic product (RGDP, constant price 2010 in billion IDR) of Maluku for the year 2015 to 2019 were 24,859.197; 26,284.228; 27,813.962; 29,465.362 and 31,108.759 respectively. Although the real output of Maluku was evidently growing, however, the share of Maluku's real output in the total national real output was relatively small and stagnant and contributed to an average of 0.29%. Meanwhile, the real output of North Maluku for the same period of observation were 20,380.304; 21,556.680; 23,210.865; 25,050.118; and 26,586.034 respectively. Similar to Maluku, the share of North Maluku's real output in the total national output was also small, with an average of 0.23%, but its share is slowly increasing.

On the other hand, the situation in the financial services sector in Maluku and North Maluku showed mixed results.

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Data taken from Provincial Economic and Financial Statistics (SEKDA) of Bank Indonesia disclosed that the total number of the loaned funds by banks in Maluku was growing from IDR 12,281 billion in 2015 to IDR 13,941 billion in 2019, an increase of 13.52%, while in North Maluku it was growing from IDR 6,054 billion in 2015 to IDR 9,809 in 2019, an increase of 62.03%. The loan-to-deposit ratio assesses a bank's liquidity by comparing a bank's total loans to its total deposits for the same period. The LDR (loan to deposit ratio) indicated a tight liquidity situation experienced by banks in the two provinces. The LDR of Maluku increased from 75.31% in 2015 to 111.71% in 2019, while the LDR of North Maluku increased from 95.90% in 2015 to 118.32% in 2019. Given the uptrends in the nominal loaned funds and LDR, however, the two provinces were still way from success to get the big chunk of the total loanable funds available in the national banking system. This could be seen by observing the share of the loaned funds going to Maluku and North Maluku compared to the total loaned funds nationally. In 2015, Maluku and North Maluku were only able to attract around 0.338 percent and 0.174 percent of total loaned funds, respectively, and these already low shares were unfortunately even lower in 2019, falling to 0.278 percent and 0.165 percent, respectively.

Despite data shows that the values of the real output and the total loaned funds received by the two provinces are rising, however, their proportions in either of the total national output or of the total loanable funds are small. The two province contributions to Indonesia's economy are almost unnoticeable. Thus, it brings several intriguing questions. What causes these two provinces to lag compared to other provinces in Indonesia? How is the process of economic development and the financial sector work in these two provinces? And what macro-financial theories could offer to solve these development problems in the two provinces?

Broadly, the objective of macroeconomic policies is to maximize the level of national income, providing economic growth to raise the utility and standard of living of participants in the economy. The macroeconomic theory states that the sources of output growth can be explained from the perspectives of the aggregate demand (AD) and the aggregate supply (AS). From the AD point of view, the sources of output growth are the level of household consumption spending ( $C$ ), the level of private investment ( $I$ ), the level of government spending ( $G$ ), and the net export ( $X-M$ ). While from the AS perspective, the level of output growth can be explained with the production function. In essence, the sources of output growth are any factor that can affect the relationship between input and output, such as the availability of the inputs (capitals, labors, natural resources, energy, physical and financial assets, etc.), entrepreneurship, technology, and socio-culture. Then, how does the relationship between the financial market and the output market in a region run?

Logically, an increase in the demand for bank loans, whether for the purpose of consumer credits, working capital, or investment especially direct investment, will encourage purchasing power and business activities. This activity in turn will enable the economy to produce greater output through a multiplier effect. For example, an increase in bank loans to finance a new plant would enable a firm to increase its production. The operation of the new plant in turn increases the demand for labor and other inputs and thus will cause the household income to rise. This additional income will then increase the consumer spending and tax payment received by the government. A greater level of household consumption spending will later encourage the firm to seek more loans to build more production capacity to satisfy the growing demand. The economic expansion induced by this increase in investment is not lasted forever though, as the marginal propensity to consume (MPC) theoretically will limit the process and eventually, the economy will reach a new level of equilibrium. Marginal Propensity to Consume is the proportion of an increase in income that gets spent on consumption. The Marginal Propensity to Consume (MPC) refers to how sensitive consumption in a given economy is to unitize changes in income levels.

Another factor that possibly determines output growth and liquidity in one region is the level of interest rate on loans. As the cost of capital, the interest rate negatively affects the demand for loans. Assuming other factors constant, when the interest rate falls the demand for loans increases, vice versa. The speed of loan transmission and its effect on output growth also depends largely on the characteristics of the economy and the relative scale of the financial sector to total output. The greater the ratio of loans to GDP, the greater the effect on the economic growth rate. However, it does not mean that when the relative ratio is small then the effect on the economy is insignificant as the growth of loans and output growth will stimulate each other in the long run.

Patrick (1966) gave the same conclusion about the relationship between the financial market and output growth of the real sector. According to them, there are at least two possible relationships between the two variables. First, the development of the financial market follows output growth. The impact of output growth has the potential to increase the demand for products in the financial market so that the volume of the financial market and credit activities increases. Therefore, the development of the financial sector is perceived as *demand-following*. Second, the financial market is one of the determinants of economic development or *supply leading*. The hypothesis of supply leading shows the causality derived from the development of the financial sector towards the growth of the real sector.

Moreover, Todaro and Smith (2015) also argued that economic development is a process towards continuous improvement of the general welfare of society. The GDP growth rate is a common metric used to assess how effective

economic development policies and initiatives have been implemented. A higher GDP growth rate indicates better development of economic activities in one region.

From a macro-finance point of view, Mishkin (2016) stated that a financial intermediary is an important economic activity as it facilitates the flow of funds from the surplus income unit (SIU) to the deficit income unit (DIU). The effectiveness of the financial intermediation process will encourage the economy to be more efficient and dynamic. Similarly, Nor (2015) also stated that the financial sector is the main catalyst that can contribute positively to output growth.

Motivated by the aforementioned problems, this research aims to study the relationship between the development of the financial sector and output growth in Maluku and North Maluku. Specifically, the study tries to elaborate on two main issues: 1) do Maluku and North Maluku exhibit that “supply-leading” or “demand-following” phenomena in both the short run and the long run? and 2) do the primary economic indicators such as credit-risk (NPLs), gap of saving-investment (GIS), inflation (INF), real effective exchange rate (REER) and real national output growth rate (NEG) significantly affect bank liquidity (LDR) and regional output growth (ROG)? This research is expected to clarify the exact relationship between liquidity and output growth in Maluku and North Maluku, and thus provides additional insights for the local governments and regulators to serve as inputs in managing regional economic liquidity and output.

## 2. Literature Review

The dynamics of financial and output market equilibrium should be the main focus to ensure the stability of economic development within a region. Developments in the real sector increase economic growth and financial markets are developing. The phenomenon of “demand following” and “supply leading” needs to be detected so that the direction for economic development stability is known. This requires adjustment and reformulation to update economic development strategies and policies by considering new ideas and local conditions. Furthermore, comparative studies to deepen the SWOT analysis of a region are also needed so that the proposed policy would have a high-level accuracy to improve general welfare and equity. At this juncture, the interrelatedness between the primary variables of economic development should be studied in depth to anticipate possible changes.

Several studies have been conducted to study the impact of the financial sector on output growth. Klein and Weill (2018) found that bank performance significantly affects GDP. Meanwhile, Abusharbeh (2017) and Olilingo and Putra (2020) found that the activities of lending and refinancing are positively and significantly affect GDP. Other empirical studies that found a positive and significant correlation

between the bank as a financial intermediary and output growth are, for example, Madichiel et al. (2014) analyzed the linkage between financial development and output growth in Nigeria. Adeniyi et al. (2015) examined the impact of financial reforms on output growth in Nigeria, and Bui (2020) explored the interdependency between financial sector development and its impact on output growth.

Jumono et al. (2019) argued that as GDP rises which means income rises, then the demand for money for transaction motive and the ability of people to save will also increase. Under such a situation, the total deposits in the banking system will also increase with which enhance the lending ability of banks. Output growth is an important factor that influences bank loans since the high level of output growth reflects the high rate of economic activities in the country. Thus, it will indirectly increase the demand for money. Rabab’ah (2015) argued that the GDP growth is expected to have a positive influence with fund mobilization proxied by the LDR. A long-run equilibrium relationship between output growth and financial sector development in China and this causal relationship between the two were influenced by the type of banks as well as the type of loans.

As the number of non-performing loans (NPLs) increases, banks would be forced to improve their capital structures (Firdaus, 2015). One of the potential options is for banks to raise their loan loss provisions (PPAP). As a consequence of capital restructuring, the ability of banks to provide credit to the real sector will automatically be lessened. The reduction in the capacity of banks to expand credit will have a negative impact on the economy. The problem of NPL is not only exclusive to the bank but also the case with portfolio investments in the capital market, foreign direct investment (FDI), and private investments that tend to experience a decrease in performance. In summary, the negative impact of rising NPLs causes some sources of capital that are meant to support output growth to drop. Jumono et al. (2019) argued that banks with low NPL have a low credit risk. This condition encourages banks to increase the volume of loans obtained from public funds.

To accelerate output growth requires adequate investment funds that can be sourced from domestic savings and in the event that domestic savings are inadequate to finance all investment projects (i.e., investment-saving gap), investment funding will be sought from attracting FDI (foreign direct investment) and foreign debts. Moreover, Mishkin (2016) stated that the increase in the interest rate directly affects the economy from two sides. First, a rising interest rate increases the cost of capital and thus it dampens investment. Considering that one of the components of investment expenditure is to renew the use of depreciated capital, then the drop in the investment expenditure may greatly affect the ability of the economy to maintain its full production capacity and consequently cause the aggregate supply to fall. Second, the rise in the interest rate also increases interest income to savers.

This, in turn, has two theoretical effects, on the one hand, more income can increase purchasing power (*income effect*) but on the other hand, it can also result in a decrease in consumption expenditure (*substitution effect*). Sabir et al. (2019), Baiashvili and Gattini (2020), and Nguyen (2020) found that the impact of FDI on output growth is positive especially in countries that have good economic performances.

Jumono et al. (2019) argued that when a country's exchange rate appreciates and its currency becomes more valuable, it can cause the profitability of banks and economic liquidity to become higher, while the opposite applies. As a country's exchange rate depreciates and its currency becomes worthless, it can lead to a loss of banks' profitability and economic liquidity. While Bruno and Shin (2015) indicated that if the effective real exchange rate increases either due to appreciation of the local currency or depreciation of the US dollar, loans by both the local and foreign banks will increase at the aggregate level and the cross-border flows will increase. This will have the same effect as decreasing credit risk. If the domestic currency exchange rate is depreciated, then the value of bank assets in the form of the domestic currency will decrease. This can make interest rates rise and the acceleration of mobilization of public funds to go down.

Jumono et al. (2019) argued that the value of a firm's assets in the local denomination will decrease when inflation occurs. This could make the interest rate in the banking system rise and thus lessen the ability of banks to channel funds. Meanwhile, the empirical studies on the relationship between inflation and output growth found mixed results. Rathnayake and Jayathileke (2013) found that the relationship between inflation and output-growth is negative in Sri Lanka in the long-run and negative in China in the short-run. Hazmi (2019) also found a similar finding that the increases in the inflation, exchange rate, and interest rate negatively affect output growth. Meanwhile, Manamperi (2014) found that in the long-run inflation and output growth have a positive relationship in India, while in the short-run it has a positive relationship to

output growth in 5 BRICS countries (Brazil, Russia, India, China, and South Africa). Dinh (2020) argued that inflation targeting has a positive effect on output growth. Azid (2015) concluded that while a volatile inflation rate curtails output growth, a low inflation rate indicates a stable economic environment that has a positive effect on output growth.

In a well-functioning economic system, the growth of the national output could drive the growth of regional economies. Under such circumstances, the regional economies will be more active and attractive for investment. The vigorous growth of the regional economies will have an impact on the financial sector as the financial sector is a derivation of the real sector.

Furthermore, since all sectors of the economy compete dynamically and strive for equilibrium, the response of regional output growth (ROG) to national output growth (NEG) is similar to the relationship between the composite and individual price indexes on the capital market. The change in the composite price index has the potential to affect sectoral and individual price indices.

### 3. Data and Methodology

#### 3.1. Data

This research uses quarterly data from 2008 to 2019. The sources of data are taken from various sources, such as the CSA (central statistics agency), RFES (regional financial economics Statistics), IBS (Indonesian banking statistics), FSA (financial services authority). The data transformation, their levels, and sources are summarized in Table 1.

#### 3.2. Research Model

The basic model of this research is:

$$Y_t = \alpha_0 + \sum_{i=1}^k \beta_i Y_{t-1} + e_t$$

**Table 1:** Types and Sources of Data

Labels	Definitions	Formula	Unit	Sources
ROG	Regional Output Growth	$= \Delta \text{RGDP}_{(t)} / \text{RGDP}_{(t-1)} * 100$	%	RFES, IBS
LDR	Loan to Deposits Ratio	$= \text{Loan} / \text{Deposits} * 100$	%	IBS, FSA
NPL	Non-Performing Loan	$= \text{Bad Debt} / \text{Loan} * 100$	%	IBS, FSA
GIS	Gap of Investment – Saving	$= (\text{Investment} - \text{Saving}) / \text{GDP} * 100$	%	IBS, CSA
REER	Real Effective Exchange Rate	$= \Delta \text{REER}_{(t)} / \text{REER}_{(t-1)} * 100$	%	IBS, CSA
INF	Inflation	$= \Delta \text{CPI}_{(t)} / \text{CPI}_{(t-1)} * 100$	%	IBS, RFES
NOG	National Output Growth	$= \Delta \text{GDP}_{(t)} / \text{GDP}_{(t-1)} * 100$	%	IBS, CSA

Note:  $\Delta \text{RGDP} = \text{RGDP}_{(t)} - \text{RGDP}_{(t-1)}$ ;  $\Delta \text{REER} = \text{REER}_{(t)} - \text{REER}_{(t-1)}$ ;  $\Delta \text{CPI} = \text{CPI}_{(t)} - \text{CPI}_{(t-1)}$ .

where,  $Y_t$ : endogenous variable vector (ROG<sub>t</sub>, LDR<sub>t</sub>, NPL<sub>t</sub>, GIS<sub>t</sub>, REER<sub>t</sub>, NEG<sub>t</sub>);  $\alpha$  = constant;  $\beta$  = matrix coefficient for lag-1;  $\varepsilon$  = residual;  $t$  = period;  $k$  = order of the VAR model. Based on the model above, by entering seven variables that will be used in this study, the VAR equation that will be formed according to the variable to be analyzed are:

$$\begin{aligned} \text{ROG}_t = & \alpha + \sum_{i=1}^k \beta \text{ROG}_{t-i} + \sum_{i=1}^k \delta \text{LDR}_{t-i} + \sum_{i=1}^k \theta \text{NPL}_{t-i} \\ & + \sum_{i=1}^k \eta \text{GIS}_{t-i} + \sum_{i=1}^k \psi \text{REER}_{t-i} + \sum_{i=1}^k \lambda \text{INF}_{t-i} \\ & + \sum_{i=1}^k \mu \text{NOG}_{t-i} + e_t \end{aligned}$$

where,  $\alpha$  = constant;  $\beta, \delta, \theta, \eta, \psi, \lambda, \mu$  = coefficient; ROG = regional output growth (constant price at 2010), LDR = loan to deposits ratio, NPL = non performing loan, GIS = gap of investment – saving, REER = real effective exchange rate, NOG = national output-growth (constant price at 2010).

## 4. Results and Discussion

### 4.1. Short-term VECM Analysis

Following the procedure, the unit root test, optimal lag selection, stability test, and cointegrated test were conducted with the data of Maluku and North Maluku. Utilizing Augmented Dickey-fuller and Phillip-Perron, the unit root tests indicated not all data are stationary in the *level* but stationary in the *first difference*. Looking for the optimal number of lags, the Akaike Information Criterion, Schwarz Criterion, Hanan-Quinn, and Likelihood Ratio concluded that the optimal lags are lag-3 and lag-2 for the data of Maluku and North Maluku, consecutively.

The VAR stability check indicated “no root lies outside the unit circle or VAR satisfies the stability condition” which means all roots of the polynomial function are inside the circle unit or the absolute modulus value is less than one, and hence, the Impulse Response Function and the Forecast Error Variance Decomposition are valid. This result indicated that the VAR systems are stable for both Maluku and North Maluku. The Johansen cointegration test showed the existence of cointegrations in both Maluku and North Maluku. Lastly, the Portmanteau test for residual autocorrelation also showed that there is no proof to suspect autocorrelation in the residuals from each lag. Therefore, all tests on data suggested that VECM is the most appropriate analytical tool for the inferential purpose (See Table 2).

Table 2 shows that the coefficients for error correction terms (*Coint\_Eq.*) in all the four proposed models are negative and significant. This result implies that the short-run dynamic transmission mechanism of the system gradually corrects any deviation from the long-run equilibrium in each period and the models will eventually converge with the long-run equilibrium. This result further strengthens the validity of the proposed models and is also indispensable for the VECM modeling to have any economic significance.

Table 2 also shows that for most of the models, the short-run transmission mechanism in the endogenous variables is derived from their own speed of adjustments and the corrections sourced from the exogenous variables. For the Maluku models, any divergence from the long-run equilibrium of regional output growth (ROG) is corrected via the correction in the lagged values of ROG (negative), liquidity (LDR, negative), investment-saving gap (GIS, negative), inflation (INF, negative) and national-economic growth (NEG, positive), while any deviation from the long-run equilibrium of LDR is corrected only from the correction in the lagged values of LDR (negative). Meanwhile, for the North Maluku models, any shock to the long-run equilibrium of ROG is adjusted from the real effective exchange rate only (REER, positive), while any shock to the long-run equilibrium of LDR is adjusted from the correction in the lagged values of LDR (negative), GIS and REER (both positives).

The Granger causality test is used to see whether endogenous variables should be treated as exogenous, and may allow the interaction between the two variables to be unidirectional, bidirectional, or have no relationship at all. The results of the test show a similar conclusion as in the previous discussions and further strengthens the previous analyses. Table 3 summarizes the Granger Causality test (See Table 3).

### 4.2. Long term VECM Analysis

Table 4 shows the overall results of the long-run equilibrium analysis in all models indicating bidirectional causality between liquidity and output. This can be inferred from observing that the LDR has positive and statistically significant coefficients to ROG, while at the same time, the ROG also has positive and statistically significant coefficients to LDR. Thus, it can be concluded that liquidity has a positive impact on output, and vice versa, the output has also a positive impact on liquidity. Therefore, this finding clearly shows that the financial sector performance affects the real sector performance, and vice versa, in both the Maluku and North Maluku datasets.

**Table 2:** The Short-Term VECM Results for Maluku and North-Maluku

	MALUKU		NORTH-MALUKU	
	D(ROG)	D(LDR)	D(ROG)	D(LDR)
	Coeff.	Coeff.	Coeff.	Coeff.
CoInt_Eq.	-1.61095 <sup>a</sup>	-0.05224 <sup>b</sup>	-0.34825 <sup>a</sup>	-0.29702 <sup>a</sup>
D(ROG(-1))	0.83159 <sup>a</sup>	0.28839	0.24892	0.49024
D(ROG(-2))	0.79591 <sup>a</sup>	0.17607	0.06083	0.56782
D(ROG(-3))	0.52728 <sup>a</sup>	0.16161	-	-
D(LDR(-1))	-0.58324 <sup>a</sup>	-0.63230 <sup>a</sup>	-0.01674	-0.40623 <sup>b</sup>
D(LDR(-2))	-0.50001 <sup>b</sup>	-0.67720 <sup>b</sup>	-0.05694	0.23978
D(LDR(-3))	-0.74286 <sup>a</sup>	-0.15795	-	-
D(GIS(-1))	-0.09268 <sup>a</sup>	0.04643	-0.02079	0.12590
D(GIS(-2))	-0.02757	0.03757	0.03877	0.22393 <sup>b</sup>
D(INF(-1))	0.08711	-0.02177	0.31688	0.12919
D(INF(-2))	0.08436 <sup>c</sup>	-0.05021	0.06471	0.15689
D(INF(-3))	-0.11424 <sup>b</sup>	-0.01891	-	-
D(REER(-1))	-0.08313	-0.01534	0.47537 <sup>a</sup>	0.53363 <sup>b</sup>
D(REER(-2))	0.01120	-0.02003	0.32472 <sup>a</sup>	0.01736
D(NEG(-3))	0.77717 <sup>c</sup>	-0.23108	-	-
C	0.60457 <sup>a</sup>	0.66897 <sup>a</sup>	0.11626	0.49447
R <sup>2</sup>	0.882612	0.570986	0.344366	0.582918
F-statistics	7.177003	1.270428	1.015467	2.702043

Note: <sup>a</sup>Indicates significant at  $\alpha = 1\%$ , <sup>b</sup>significant at  $\alpha = 5\%$  and <sup>c</sup>significant at  $\alpha = 10\%$ . The non-performing loan (NPL) is excluded from the table since it is insignificant in all models.

The long-run equilibrium result summarized in Table 4 also illustrates that some of the proposed independent variables can explain the changes in the dependent variables ROG and LDR. Specifically, GIS has a negative effect on both ROG and LDR while INF has a positive effect on both ROG and LDR in the Maluku model. Meanwhile, all proposed independent variables except GIS have positive effects on both ROG and LDR in the North Maluku model.

### 4.3. Discussion

Short-term VECM analysis shows that the short-run transmission mechanisms in the output and liquidity models for the Maluku and North Maluku datasets are valid, indicated by their negative and statistically significant coefficients of SOA (speed of adjustments). The relationship between liquidity and output is also observed to be unidirectional from LDR to ROG in the Maluku model only, while the reverse directional from LDR to ROG is found statistically insignificant in both

datasets. Meanwhile, long-term VECM analysis suggests the existence of bidirectional causality between liquidity and output in the sense that liquidity has a positive impact on output and output also has a positive impact on liquidity. These outcomes are observed in both datasets.

#### *Impact of ROG to LDR (regional output growth to liquidity/LDR)*

One of the vocal issues of this research is to examine the impact of ROG on LDR and the regression results showed the relationship is positive and statistically significant in Maluku and North Maluku datasets. This finding indicates the existence of positive synergy seeping from regional output growth to economic liquidity. The circular flow from the real sector to the financial sector strengthens the synergy in the regional financial intermediation function. This is solid evidence that income growth is causing an increase in the demand for money for transaction and precautionary motives in Maluku and North Maluku, and accordingly supporting the validity of the *supply leading* hypothesis. In line with this finding, Jumono et al. (2020) also found that

**Table 3:** Granger Causality Test

Excluded	Dependent Variable: D(ROG)					
	MALUKU			NORTH-MALUKU		
	Chi-sq	df	Prob.	Chi-sq	df	Prob.
D(LDR)	20.291 <sup>a</sup>	3	0.00010	0.335	2	0.84560
D(NPL)	2.457	3	0.48310	2.200	2	0.33290
D(GIS)	8.685 <sup>b</sup>	3	0.03380	0.690	2	0.70820
D(INF)	20.700 <sup>a</sup>	3	0.00010	2.914	2	0.23300
D(REER)	3.704	3	0.29520	8.749 <sup>b</sup>	2	0.01260
D(NEG)	7.660 <sup>c</sup>	3	0.05360	1.861	2	0.39440
All	67.590 <sup>a</sup>	18	0.00000	12.678	12	0.39290
	Dependent Variable: D(LDR)					
D(ROG)	2.792	3	0.42480	3.292	2	0.19280
D(NPL)	2.582	3	0.46060	0.765	2	0.68220
D(GIS)	5.845	3	0.11940	8.879 <sup>b</sup>	2	0.01180
D(INF)	0.785	3	0.85310	0.452	2	0.79770
D(REER)	0.202	3	0.97720	6.697 <sup>b</sup>	2	0.03510
D(NEG)	1.071	3	0.78420	0.504	2	0.77740
All	17.448	18	0.49250	19.438 <sup>c</sup>	12	0.07850

Note: <sup>a</sup>Indicates significant at  $\alpha = 1\%$ , <sup>b</sup>significant at  $\alpha = 5\%$  and <sup>c</sup>significant at  $\alpha = 10\%$ .

income growth is a crucial driver for bank loans because higher income growth, which represents increased economic development, increases money demand. Moreover, this result also supports the study conducted by Rabab'ah (2015) who argued that income growth has a positive impact on fund mobilization proxied with LDR and also found the existence of a long-run equilibrium between output growth and financial sector development in China, and this causal relationship was influenced by the type of banks as well as the type of loans.

**Impact of LDR to ROG (liquidity to regional output growth)**

Another vocal issue of this research is to examine the impact of LDR on ROG and the regression results are positive and statistically significant in Maluku and North Maluku datasets. This finding indicates the performance of the financial sector in mobilizing public funds provides positive synergy to the real sector. The circular flow from the financial sector can support the development of the output market. Like a heart that pumps blood throughout the body so that all parts of the body can perform their

respective functions, the intermediary function of the financial sector allows the mobilization of funds to support growing economic activities. As such, this finding is in accordance with the hypothesis of *demand following* and supports studies of Klein and Weill (2018) who argued that the banking industry has a positive impact on economic growth. It also supports the studies by Abusharbeh (2017), and Camba and Camba (2020) who analyzed the linkage between lending or refinancing activities to economic growth and found a positive relationship.

**The impact of credit risk (NPL)**

This study found that credit risk has a positive and significant impact on output growth and economic liquidity only in North Maluku. This finding indicates that the level of credit risk and regional output growth has a one-on-one relationship in North Maluku. Thus, it implies that an increase in loans is having correspondence with greater credit risk. So, what is the reason for banks to still have the confidence to provide bigger loans in such a situation? One possible reason is that banks continue to believe that any credit increase they offer will result in increased potential gains. Credit extension

**Table 4:** The Long-Term VECM Results for Maluku and North-Maluku

Coint_Eq.	MALUKU		NORTH-MALUKU	
	ROG	LDR	ROG	LDR
	Coeff.	Coeff.	Coeff.	Coeff.
ROG	–	10.1893 <sup>a</sup>		2.182754 <sup>a</sup>
LDR	0.09814 <sup>a</sup>	–	0.45814 <sup>a</sup>	–
NPL	0.03101	0.31597	2.43530 <sup>a</sup>	5.31565 <sup>a</sup>
GIS	–0.05854 <sup>a</sup>	–0.59650 <sup>a</sup>	–0.05499 <sup>a</sup>	–0.12002 <sup>a</sup>
INF	0.05781 <sup>c</sup>	0.58900 <sup>b</sup>	1.29670 <sup>a</sup>	2.83037 <sup>a</sup>
REER	–0.03385	–0.34491	1.71610 <sup>a</sup>	3.74583 <sup>a</sup>
NEG	–0.14589	–1.48647	2.66580 <sup>a</sup>	5.81879 <sup>a</sup>
C	–13.52549	–137.81530	–57.16688	–124.78120

Note: <sup>a</sup>Indicates significant at  $\alpha = 1\%$ , <sup>b</sup>significant at  $\alpha = 5\%$  and <sup>c</sup>significant at  $\alpha = 10\%$ .

is potentially feasible as long as the marginal return on credit is greater than the marginal credit risk. Moreover, the resulted credit expansion also increases the public funds' mobility as shown by data that LDR in North Maluku also increased during the period. Thus, the situation in North Maluku is unique since an increase in NPL does not impede but rather increases bank loans. Moreover, the greater level of liquidity also drives the aggregate demand up via an increase either in  $C$ ,  $I$ ,  $G$ , or  $NX$ , and results in a positive relationship between NPL and output growth. The positive relationship between NPL and LDR found in this study supports Ozili (2019) who found that NPL has a positive impact on the development of the financial sector which is measured by the presence of foreign banks and financial intermediation, while is contrary to the study conducted by Iqbal (2012). Concerning a positive effect of NPL on ROG found, this is also contrary to the findings of Son et al. (2020) who exploited international data and found that the impact of NPL on GDP is negative because an increase in consumption is accompanied by a decrease in investment.

#### ***The impact of GIS (gap of investment-saving gap)***

This study found that the effect of GIS on ROG or LDR is negative in both Maluku and North Maluku. The negative impact of GIS on ROG indicates that the role of foreign debts and FDI in investment in the two provinces is actually slowing down the output growth of both provinces. The inadequacy of domestic funds to finance all domestic investment projects is indicated by a positive investment-saving gap. Under this circumstance, the ability to attract foreign funds is indispensable. Considering fierce rivalry among developing countries in attracting foreign funds, keeping the domestic interest rates relatively high is one remedy to maintain the attractiveness of domestic

investment in foreign eyes. Thus, the negative relationship between GIS and ROG implies an indirect indication where the substitution effect is more dominant than the income effect and the net effect of interest rate to income is negative. The negative impact of GIS on ROG found in this study is contrary to studies conducted by Baiashvili and Gattini (2020) and Sabir et al. (2019) who found that the effect of FDI on output growth is positive especially in countries that have good economic performance. Meanwhile, the negative effect of GIS on LDR implies that the nature of the relationship between domestic funds and foreign funds is a substitution - a decrease in GIS will increase LDR, vice versa. This result indicates that the proportion of domestic funds in financing the investments in the two provinces increasingly dominates foreign funds. This is in line with the pecking order theory states that managers display the following preference of sources to fund investment opportunities: first, through the company's retained earnings, followed by debt, and choosing equity financing or external financing (i.e., FDI and foreign debts) as a last resort to reduce risk exposure.

#### ***The impact of REER (real effective exchange rate)***

A stable exchange rate is the benchmark of a successful industry in a country to boost economic growth. A high economic growth rate can help in maintaining a country's official reserves. A suitable exchange rate will help in increasing the market liquidity so that the number of foreign investors will increase. Export and import financing activities require a legal and internationally accepted means of payment, and it can even be argued that the contemporary economic condition and ability of a country is largely affected by the fluctuations in the exchange rate. This study found that there is a positive and significant relationship between

REER to ROG and REER to LDR for North Maluku. The positive effect of REER to LDR implies that the decrease in the relative value of Rupiah to USD which increases the credit risk does not cause the economic liquidity to decrease, as currency risk is already anticipated in determining the cost of funds and lending rate. The increase in economic liquidity synergizes with regional output growth. While the positive effect of REER to ROG indicates that the depreciation of Rupiah to USD increases regional output growth through its effect on exports.

#### ***The impact of INF (inflation)***

This study found that the effect of INF on ROG and LDR is positive and statistically significant. Thus, it implies that the inflation rate which may cause the credit risk to increase does not impede economic liquidity, and on the contrary, it helps increasing economic liquidity. Increased economic liquidity in turn has a parallel effect on output growth. Thus, it is a situation in which inflation essentially has induced output to grow (*demand-pull inflation*) and the inflation risk is already fully anticipated in firms' pricing policy. The phenomena of demand-pull inflation found in this study are in accordance with the studies of Hazmi (2019) and Manamperi (2014) who argued that inflation has a positive impact on GDP, and is also in line with the study conducted by Azid (2015) who concluded that a mild inflation rate which indicates stable economic environment has a positive effect on economic growth rate. However, this finding is contrary to the study conducted by Rathnayake and Jayathileke (2013) who found a negative long-run relationship between inflation and output growth in Sri Lanka and a negative short-run relationship between inflation and output growth in China. This study is also contrary to the study conducted by Bibi and Rashid (2014) who found a negative relationship between inflation and GDP growth in Pakistan.

#### ***The impact of NEG (national economic growth)***

In an open economic system, the national output growth can foster regional output growth. As the level of economic activities in the regional market flourishes, this will stimulate the development of the financial sector. The dynamic interaction among many sectors of the economy helps the economy to continue growing and progressing to reach a higher level of equilibrium. The response of ROG to NEG is analogous with the movement of the composite price index to individual stock price. VECM analysis showed that the impacts of NEG to ROG and LDR are both positive in North Maluku. This finding indicates that the national economic development has a positive effect on the North Maluku economy. Thus, this result implies that top-down economic development policies and central-regional financial balance management have a positive impact on regional output growth.

## **5. Conclusion and Implications**

### **5.1. Conclusion**

The short-term VECM analysis showed that the coefficients of the speed of adjustments on the models of regional output growth and economic liquidity for both Maluku and North Maluku are negative and statistically significant. This result implies the existence of a dynamic transmission mechanism that ensures any deviation that occurred in the short run will be corrected and the systems will be converted to their long-run equilibriums. Furthermore, the granger causality test revealed that the only place where statistically significant causality exists between regional economic growth and economic liquidity is Maluku, and the causality is unidirectional from economic liquidity to regional economic growth.

The short-term VECM analysis also showed that the determinants for short-run adjustment on regional output growth are the regional output growth's own lagged values, economic liquidity, investment-savings gap, inflation and national economic growth for Maluku, and the real effective exchange rate for North Maluku. While, the determinants for short-run adjustment on economic liquidity are the economic liquidity's own lagged values for Maluku and the economic liquidity's own lagged values, investment-savings gap, and real effective exchange rates for North Maluku.

The long-term VECM analysis revealed a long-run bidirectional causality between liquidity and output in both Maluku and North Maluku, as evidenced by a positive and significant effect of liquidity on output, vice versa. These results suggest that banks' ability to mobilize public funds is able to stimulate and promote regional economic activity, thus increasing regional output. As the regional output expands, the demand for money increases to accommodate the surging number of transactions in the regional economy. This cycle amplifies the bank's main function as a financial intermediary and improves the performance of the real sector. Thus, a mutual symbiosis occurs in the relationship between the financial sector and the real sector. Succinctly, the bidirectional causality between liquidity and output demonstrates the validity of the hypotheses of *supply leading* and *demand following*.

The long-run VECM analysis also showed that the determinants of the long-run output growth of Maluku are the level of economic liquidity and inflation rate (positive) and investment-savings gap (negative), while the determinants of the long-run economic liquidity of Maluku are output growth and inflation rate (positive) and investment-savings gap (negative). Meanwhile, the determinants of output growth of North Maluku are economic liquidity, credit risk, inflation, exchange rate and national output (positives), and investment-savings gap (negative) whereas the determinants

of economic liquidity of North Maluku are output growth, credit risk, inflation, exchange rate and national output (positives), and gap of investment-savings (negative).

## 5.2. Implications

From complete analysis on the dynamics and the determinants of liquidity and output growth in Maluku and North Maluku, this study proposes several general strategies for improving the effectiveness of liquidity and economic development policies in the two provinces, which are:

- a. *The establishment of an early warning system (EWS) for risk mitigation to improve the stability of regional economic development.* EWS functions as a tool to identify potential problems which can arise from the dynamics of economic development. The core variables on the EWS can adopt the seven independent variables of this study, namely: liquidity, output growth, credit risk, investment-saving gap, inflation, exchange rate, and national output.
- b. *The formulation and implementation of comprehensive macroeconomic policies conducive for the creation of effective sources and allocation of funds into regional economies.* Various approaches must be considered and adopted to improve regional economic liquidity, ranging from the application of high-tech to the usage of local wisdom. Furthermore, the functioning of the financial sector in the broad sense should also lead to an increase in financial inclusion and financial literacy. This is critical so that the advance in the financial sector can potentially sustain the long-run regional economic development.
- c. *The improvement in economic development policies and strategies to achieve more equitable and sustainable economic growth, especially for accelerating the development of backward regions.* This is important considering most of the districts in Maluku and North Maluku are still underdeveloped, while the fraction of the total national credits and savings go to these two provinces and the two provinces' outputs are still too small.
- d. *Encouraging institutional roles in attracting FDI.* Successful efforts in stimulating the inflow of FDI require coordination from multiple stakeholders of the economy to create a conducive investment climate. The government needs to have a strong commitment and clear developmental planning to attract the inflow of FDI. The involvement of NGOs to assist in the supervision of economic development, especially in the issues of sustainability, poverty and social inequality are also important. The roles of local investment authorities and labor unions as well as

creating conditions to persuade technology transfer from foreign firms are also essential to direct FDI as a productive investment for economic development.

- e. All of those institutions simultaneously can support the efforts to reap the maximum benefits of FDI (e.g., employment opportunities, income, technology transfer, and economic stability) and minimize the negative effects of FDI.

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