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Effect of Internal and External Factors on Liquidity Resilience of Bank

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Abstract: ***As one of the banks in BUKU 3 that categorized into the Domestic Systemically Important Bank (DSIB), they must be more prudent in managing all aspects of the risk. The first thing that will be in the spotlight of the regulator is the liquidity position of the bank itself. Liquidity is vulnerable and can suddenly be drained from a bank so that liquidity difficulties in a bank can spread to other banks (contagion effect) which creates systemic risk. In accordance with Basel III, OJK requires the implementation of Liquidity Coverage Ratio (LCR) to monitor the ability of banks to meet their short-term obligations of less than 30 days. This ratio complements the existing liquidity ratio and is more long-term, namely Loan to Funding Ratio (LFR). Through the VECM estimation test, internal factors in the first model are Short Term Liquidity (SL) proved to have a negative effect and significant on LCR both for a short and long term, while Funding Gap (FG) and LFR had a negativebut not significant effect on LCR. Liquidity Creation (LC) is the only internal factor that has a positive and significant effect in the long run. Furthermore, for all external factors variables have a significant long-term effect. INF and ROR have a negative effect, while BIRATE and IPI have a positive effect. Finally, the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) tests show that for internal factors are LFR and SL which has the biggest contribution to changes in LCR and for external factors, sum of INF and BIRATE in the long run has the biggest contribution compared to other variables.***

Keywords: Risk Liquidity, LCR, VECM, IRF, FEVD

JEL Classification: C01, C32, G21

1. Introduction

The bank is an institution or business entity that collects funds from the people in the form of deposits and redistributes to the people in order to improve their standard of living. In carrying out its intermediation function, the bank will be exposed to 2 (two) main risks are liquidity risk and credit risk. International and national banking histories write that, almost all banks were said to have failed and eventually went bankrupt or closed by the Government because they had mismanagement of liquidity. Once the importance of liquidity resilience in the banking sector, the Basel Committee finally published the document entitled "Basel III: A Global Regulatory Framework for more Resilient Banks and Banking Systems" which was effective from 1 January 2019 by requiring the implementation of *Liquidity Coverage Ratio* (LCR) and *Net Stable Funding Ratio* (NSFR) in the banking industry worldwide. *The Financial Services Authority*/Otoritas Jasa Keuangan (OJK) has adopted this regulation by issuing Financial Services Authority Regulation No. 42/POJK.03/2015 concerning Obligation to Fulfill the Liquidity Adequacy Ratio (LCR) for Commercial Banks. The national banking industry is currently divided into 4 (four) clusters called Bank Umum Kelompok Usaha (BUKU). Indonesia Banking Statistics (SPI) for the period 2015-2017, BUKU 3 which consists of 24 banks with core capital of Rp. 5 Trillion up to Rp. 30 Trillion is a group of banks that have the highest average Loan to Funding Ratio (LFR) rate of 98.3%, followed by BUKU 2 of 96.9%, BUKU 1 90.4% and BUKU 4 of 86.1%. This means that BUKU 3 has the highest liquidity risk above the 92% threshold which makes the source of lending very limited. The average calculation of the national banking LFR can be seen in Table 1.

Table 1: Average National Banking Industry LFR Calculation for 2015-2017

No.	Years		BUKU 1 (Rp. trillion)	BUKU 2 (Rp. trillion)	BUKU 3 (Rp. trillion)	BUKU 4 (Rp. trillion)
1	2015	Loan	86,9	535,4	1.523,6	1.791,4
		Funding	99,8	539,9	1.517,4	2.080,9
		LFR (%)	87,07	99,16	100,40	86,08
2	2016	Loan	67,5	568,0	1.582,6	2.017,03
		Funding	70,9	571,7	1.633,4	2.354,1
		LFR (%)	95,20	99,36	96,88	85,68
3	2017	Loan	43,0	529,9	1.599,2	2.419,3
		Funding	48,2	573,7	1.638,01	2.791,01
		LFR (%)	89,21	92,36	97,63	86,68

Source:Indonesia Banking Statistics, OJK, processed (2018)

As one of the commercial banks that is included in the BUKU 3 category with total assets per December 2017 reaching Rp. 104.3 Trillion and on the basis of consideration of interconnectivity and asset capacity above Rp. 100 Trillion, making the Bank ABC in early 2018 determined by the OJK together with other members of the *Financial System Stability Committee*/Komite Stabilitas Sistem Keuangan (KSSK) as one of the *Domestic Systemically Important Banks* (DSIB). This predicate certainly means that Bank ABC is obliged to manage all existing aspects of risk more prudently and will become the main object of regulator monitoring in maintaining the stability of the banking industry. Regarding liquidity risk, Bank ABC has implemented LCR since the beginning of 2015 to complement the existing LFR ratio. If LFR sees globally the portion of loan as compared to funding, then LCR sees the ability of bank liquidity to be more rigid in meeting its short-term obligations of less than 30 days with high-quality liquid assets it has. For the above, changes in the value of LFR are indicated to have an effect on the value of LCR which must be kept at a minimum of 100%.

If BUKU 3 is the group of banks with the highest LFR, Bank ABC throughout 2015-2018 actually listed itself as a bank with a moderate average LFR of 82.16%. The ability of Bank ABC to meet the LCR is quite good in the range of 138.71%. However, the volume of deposits in year-on-year (yoy) continued to decline, where 2015 amounted to 16.34%, then 2016 at 9.67% and 2017 at 6.2%. Decreasing the volume of deposits means that there is a market share of funding business that has been eroded by competitors and the withdrawal of funds from customers. The decrease in the volume of deposits as a source of bank funds is closely related to an increase in liquidity risk and this has an impact on the limited lending, thus causing loan volumes to fall from 19.8% (2015) to 9.51% (2016) and 4.68% (2017). This is relevant to Berger and Bouwman's (2009) statement that bank liquidity is very important as a stimulus in encouraging nationaleconomic growth through loan by the banking industry (*Liquidity Creation*/LC).

The decline in the volume of loan and deposit that began in 2016 was in line with the decline experienced by the banking industry with an average monthly deposit growth of 1.32% (2015), 0.90% (2016) and 1.64% (2017). Entering 2016, the Government issued several policies which indicated significant implications for the portion of national banking liquidity. First quarter of 2016, OJK imposed of capping deposit interest rates for BUKU 4 and BUKU 3 which made deposits from depositors flow to BUKU 1 and BUKU 2, causing concern that outflow of funds would affect the value of bank liquidity risk. In order to strengthen the monetary operations framework, BI made changes to the instrument from the BI Rate to BI 7 Days Reverse Repo Rate (BI 7DRR). This is so that policy rates can quickly affect the money market, banking and the real sector. BI 7DRR instruments as a new reference have a stronger relationship to money market interest rates, are transactional or traded in the market and encourage financial market deepening (Bank Indonesia 2018). Even this policy is feared to have an impact on decreasing deposit interest rates which could trigger a flow of funds out.

The Tax Amnesty program and the issuance of Financial Services Authority Regulation No. 36/POJK.05/2016 concerning Investment in Government Securities for *Non-Bank Financial Services Institutions*/Industri Keuangan Non Bank (IKNB) are expected to strengthen the fundamentals of *Government Securities*/Surat Berharga Negara (SBN) through an investment allocation obligation on a predetermined portion. However, the obligation of investment portion excluding deposits which continued to increase until 2019 is feared to withdraw IKNB funds in banks so that it will affect the bank's liquidity risk.

Eight independent variables consisting of four variables which are internal factors and four variables which are external factors will be seen how strong the impact, how the impact of shocks on these variables and how much the shocks contribute to the *Liquidity Coverage Ratio* (LCR). The LFR variable is the first internal factor seen by its influence, as is Rani (2017) that the decline in FDR growth in Islamic banks or LDR in conventional banks is an initial representation of the level of liquidity of a bank. Surjaningsih (2014) explains that there are 4 early warning indicators to see a bank's liquidity risk are *Loan to Deposit Ratio* (LDR), *Funding Gap*, *Liquidity Creation* (LC) and *Short Term Liquidity* (SL). The LDR itself in Indonesia has been adjusted to become LFR through Bank Indonesia Regulation No.17/11/PBI/2015 concerning Amendments to Bank Indonesia Regulation No. 15/15/PBI/2013 concerning Statutory Reserves of Commercial Banks in Rupiah and Foreign Currencies for Conventional Bank.

While the variables in the form of external factors, inflation and Bank Indonesia's benchmark interest rates will become two external factors that will be seen as influencing. Genay (2004) shows that the increase in the benchmark interest rate which is a response to the inflation rate has a positive effect on the decline in bank deposits and loan growth. Altunbas (2014) in the working paper of the European Central Bank explains that the central bank must consider the possible side effects of monetary policy in the form of a reference interest rate increase that will have an impact on bank risk. Meanwhile, the value of *Gross Domestic Product* (GDP) and exchange rate according to Panorama (2017) that for the short and long term, the exchange rate of the USD / IDR shows a negative influence on bank performance.

2. Theory

Liquidity is the ability of the bank's management to provide sufficient funds to fulfill its obligations at any time include unpredictable withdrawals such as commitment loans and other unexpected withdrawals (Sofyan Basir, 2013). Liquidity can define as the ability of the bank to fulfill its debt obligations, can repay all its depositors, and be able to fulfill the credit requests submitted by the debtors without any delay. Liquidity management theory is basically a theory related to how to manage funds and bank funding sources in order to maintain a liquidity position and fulfill all liquidity needs in daily bank operations (Siamat, 2005).

Risk is the potential loss due to a certain event and liquidity risk is inability of banks to fulfill maturing obligations from cash flow funding sources and/or high quality liquid assets

that can be pledged without disrupting the Bank's activities and financial conditions (IBI, 2013). Jasiene et al (2012) stated that commercial bank liquidity risk management is divided into short-term liquidity planning and long-term liquidity planning. Short-term liquidity is the ability of banks to fulfill their short-term obligations in a period of 1 month. Meanwhile, long-term liquidity is the ability of banks to manage long-term liabilities for the next 1 year (Kancerevycilus, 2009). The analysis that eligible to see long-term liquidity resilience is Funding Gap analysis where this ratio provides an overview of the management of the difference between current and future assets and liabilities based on the tenor of each entity (Bessis 2008). Measuring the liquidity of the national banking industry, regulators use the LFR ratio, which is the ratio of loans to deposits with a range between 80%-92%. The commencement of Basel III implementation, OJK released Financial Services Authority Regulation No. 42/POJK.03/2015 concerning Obligation to Fulfill Liquidity Coverage Ratio for Commercial Banks with a minimum limit for LCR of 100%. Surjaningsih (2014) stated that there are 5 indicators that represent funding liquidity risk are LFR, *Liquidity Creation* (LC), *Net Stable Funding Ratio* (NSFR), *Funding Gap* (FG) and *Short Term Liquidity* (SL).

The bank's decision to save excess liquidity in maintaining the level of risk is influenced by fluctuations in currency needs, cost of fund, liquidity lag and economic growth (Bathaludin et al, 2012). Cost of fund and liquidity lags mostly are the effects of monetary policies carried out by central banks, which affect deposit interest rates (Altunbas, 2014). Changes and volatility in interest rates and exchange rates determine the fulfillment of conditions that are able to fund the withdrawal of obligations both suddenly and massively (G. Wuryandani, 2012).

3. Methodology

The research was carried out at the Head Office of one of the national private commercial banks included in the BUKU 3 category with asset levels above Rp. 100 Trillion. The research was carried out for 6 months starting in October 2017 - March 2018 with time series data collection from January 2015 to March 2018. The data uses secondary data, including LCR monthly reports, monthly financial reports, monthly data on Bank Reference Rates Indonesia (BI-7 Days RR Rate), Inflation data, USD / IDR Rate of Return and the value of Industrial Production Index (IPI) replace the GDP value for monthly data. Other types of literature used are in the form of books, journals, internet and literature studies related to this research.

The analytical tool used in the testing phase is data stationarity test, optimal lag determination and cointegration testing as part of the pre-estimation test. After conducting the testing phase, time series data analysis was carried out using *Vector Auto Regression* (VAR) or *Vector Error Correction Model* (VECM) by previously seeing the results of the cointegration test for determining the model. After processing the time series data, the next step is to review the response of a variable to certain shocks using the *Impulse Response Function* (IRF) and see how changes in a variable indicated by changes in error variance are influenced by other variables using *Forecast Error Variance Decomposition* (FEVD).

This research departs from previous research and Financial Services Authority Regulation related to the latest liquidity ratio benchmark for the banking industry using LCR. Baldan et al (2012)stated that liquidity risk is not only related to interest rate risk in the banking book, but also to the activities of the bank as a whole. Therefore, in this study the results of the synthesis of bank activities are included in the ratios which have implications for liquidity risk, including LFR, *Funding Gap*, LC and SL. Furthermore, Altunbas, et al (2014) in his research entitled "Does Monetary Policy Affects Bank Risk" shows that changes in the central bank's monetary policy have an influence on several bank risks, so this study includes the 7DRR BI Rate / BI as an external factor. Wibowo (2008) said that the exchange rate and inflation had a positive effect on deposits, where the rise and fall of deposits would have an effect on banking liquidity ratios.

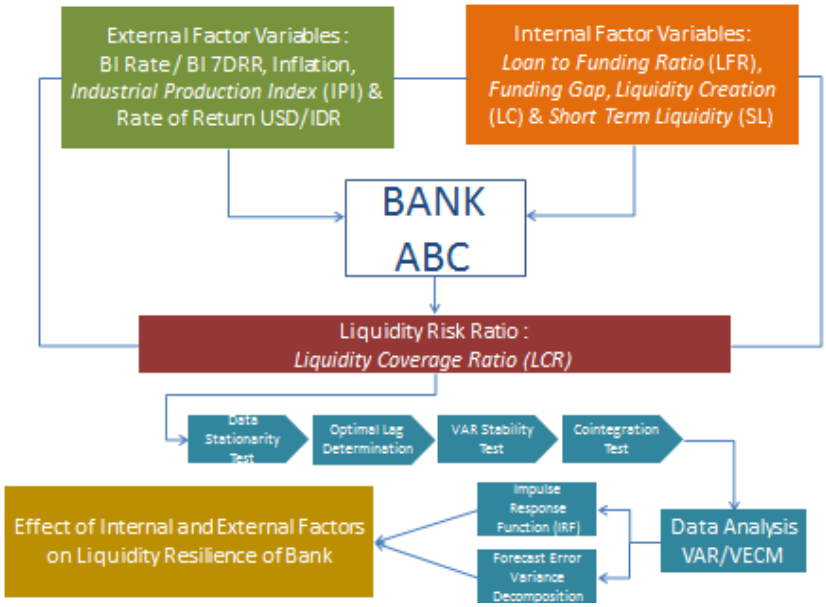

Figure 1: Research Framework

This study uses several macroeconomic models combined with previous research by including internal factors as a counterweight. The macroeconomic variables used in this case are BI-7 Days Reverse Repo Rate, Inflation, Rate of Return USD/IDR and IPI. Meanwhile, the internal variables used are LFR, *Funding Gap*, *Liquidity Creation* (LC) and *Short Term Liquidity*(SL) and NPL. In the equation, it is done separately between internal and external factor variables. Here's the formula for testing liquidity with LCR:

1) Internal Factors

$LCR_t=C_1+_{\alpha1}LCR_{t-1}+_{\alpha1}LFR_{t-1}+_{\alpha1}FG_{t-1}+ {}_{\alpha1}LC_{t-1}+_{\alpha1}SL_{t-1}$

2) External Factors

$LCR_t=C_1+_{\alpha1}LCR_{t-1}+_{\alpha1}INF_{t-1}+_{\alpha1}BIRATE_{-1}+_{\alpha1}IPI_{t-1}+_{\alpha1}ROR_{t-1}$

Keterangan :

LCR	= *Liquidity Coverage Ratio*
C	= Constants
LFR	= *Loan to Funding Ratio*
FG	= *Funding Gap*
LC	= *Liquidity Creation*
SL	= *Short Term Liquidity*
BIRATE	= BI-7 Days Reverse Repo Rate
ROR	= *Rate of Return USD/IDR*
INF	= Inflation
IPI	= *Industrial Production Index*

Based on the literature review, previous research and research framework, several hypotheses can be formulated in this study, including:

1) Changes in internal factors of *Loan to Funding Ratio* (LFR) have a negative effect on the ratio of bank liquidity risk (LCR).
2) Changes in internal factors such as *Funding Gap* (FG) have a positive effect on the ratio of bank liquidity risk (LCR).
3) Changes in internal factors such as *Liquidity Creation* (LC) have a negative effect on the bank liquidity risk ratio (LCR).
4) Changes in internal factors of *Short Term Liquidity* (LC) have a positive effect on the ratio of bank liquidity risk (LCR).
5) Changes in external factors of the benchmark interest rate of Bank Indonesia (BI Rate / BI 7DRR) have a positive effect on the ratio of bank liquidity risk (LCR).
6) Changes in external factors of *Industrial Production Index* (IPI) have a negative effect on the ratio of bank liquidity risk (LCR).
7) Changes in external factors of *Rate of Return*USD / IDR have a negative effect on the bank liquidity risk ratio (LCR).
8) Changes in external factors of Inflation have a negative effect on the ratio of bank liquidity risk (LCR).

4. Results and Analysis

4.1 Descriptive Statistics

The following below is a descriptive analysis of the data that will be used in this study. Descriptive analysis that will be conducted includes the amount of data, mean value, median value, maximum value, minimum value and standard deviation.

Table 2: Descriptive Analysis of Internal and External Variables

%	Amount of data	Mean	Median	Max.	Min.	Std. Deviation
LCR	39	138,71	132,69	214,46	78,29	35,18
LFR	39	82,16	82,32	93,72	71,49	5,68
FG	39	22,19	21,77	37,15	6,70	8,04
LC	39	44,01	44,48	48,74	38,33	3,13
SL	39	178,01	182,92	269,49	86,32	47,53
INF	39	4,47	3,82	7,26	2,79	1,46
BIRATE	39	5,76	5,25	7,75	4,25	1,35
IPI	39	4,60	4,97	8,77	(1,12)	2,56
ROR	39	(0,25)	(0,02)	6,98	(4,08)	2,01

Based on Table 2, the amount of data used in this study was 351 data with the quantity of each variable both external and internal as many as 39 data from January 2015 to March 2018. Throughout 2015-2018 recorded that the Bank ABC was able to maintain an average LCR value as the ratio of fulfillment of short-term liabilities for the next 30 days at 138.71%, although Bank ABC has also experienced the LCR value below the OJK limit of 100%, which is at the level of 78.29%. The standard deviation of the Bank ABC's LCR value is also recorded below the Mean value, which means that there is not too much fluctuation in the period.

Bank ABC recorded an average LFR of 82.16%, still quite moderate with BI regulations requiring the range of LFR to be at 80% -92%. Throughout the study, Bank ABC was also able to maintain the highest LFR value at 93.72% so that it was indicated to be able to carry out the intermediation function effectively and efficiently. While for *Funding Gap* (FG), Bank ABC is recorded at the level of 22.19% which means that to close the difference in loan distribution by total deposit, it is needed at 77.81% of loan so that deposits can return to their initial position avoiding the bank rush occurs. The lower FG value indicates a larger funding liquidity risk.

Furthermore, Bank ABC's *Liquidity Creation* (LC) value was recorded at 44.01%, which means that 44.01% of total assets were used for loan. The highest value of LC during 2015-2018 was recorded at 48.74%, the greater the value of LC indicated that credit was increasingly rising and had implications for Bank ABC's liquidity risk. Short-term Liquidity (SL) as the last internal factor, was recorded at 178.01% which means that Bank ABC has a capacity of 1.78 times in fulfilling short-term obligations of less than 1 year.

For external factors, inflation and Bank Indonesia's benchmark interest rates went an average of 4.47% and 5.76%. The values above reflect the objectives and functions of Bank Indonesia in exchange rate stabilization and inflation through monetary policy. Meanwhile, the value of IPI moves stably at an average of 4.60% per month, with the highest growth at the level of 8.77% and the lowest at -1.12%. It means that IPI moves parallel with GDP which stable at 5%. Finally, the *Rate of Return* (ROR) of the USD / IDR exchange rate in the period 2015-2018 on average gives a negative return at the level of -0.25%. Return moves fluctuatively as the standard deviation value is above the variable average with the highest value at 6.98% and the lowest at -4.08%.

4.2 Data Stationarity Test

Data stationarity test to find out whether the time series data to be used for analysis purposes have stationarity or not. Data that is not stationary must be avoided because it will cause false regression. The first test will be carried out at the level using the critical value of MacKinnon at 1%, 5% and 10%. However, because the stationary test at the level produces LFR, FG, INF, and BIRATE not stationary at the level that makes the absolute value of the 4th ADF the variable is smaller than the absolute value of MacKinnonn, the unit root test will be carried out on First Difference. The results of the test are presented in Table 3

Table 3: Unit Root Test on First Difference

Variables	ADF's Score	Critical Value of Mc Kinnon			Prob.*	Remarks
		1% level	5% level	10% level		
LCR	-7.624	-3.621	-2.943	-2.610	0.0000	Stasioner
LDR	-6.034	-3.621	-2.943	-2.610	0.0000	Stasioner
FG	-5.997	-3.621	-2.943	-2.610	0.0000	Stasioner
LC	-4.410	-3.621	-2.943	-2.610	0.0012	Stasioner
SL	-6.980	-3.621	-2.943	-2.610	0.0000	Stasioner
INF	-4.873	-3.621	-2.943	-2.610	0.0003	Stasioner
BIRATE	-5.152	-3.621	-2.943	-2.610	0.0001	Stasioner
GDP	-1.921	-3.639	-2.951	-2.614	0.3190	Stasioner
IPI	-7.018	-3.627	-2.946	-2.612	0.0000	Stasioner
ROR	-7.287	-3.632	-2.948	-2.612	0.0000	Stasioner

The results of data stationarity test at the first difference indicate that the eight variables used in the study were stationary at the level of first difference. This is because the absolute value of the ADF is greater than the absolute value of the MacKinnon Critical Values.

4.3 Optimum Lag Test

In VAR / VECM, determining lag length is very important because lags that are too short will lead to specification errors and lags that are too long will reduce the degree of freedom (Gujarati 2012). Based on the results of the optimum lag test for internal variables showing that the optimal lag of internal variables in Final Prediction Error (FPE) is in lag 1, the LR model is in lag 1, in the AIC model is in lag 4, in the SIC model in lag 0 and on Hannan-Quinn information criterion (HQ) model is in lag 0. The model will use lag 1 which means the VAR / VECM model to be used, the result will be affected by 1 month before.

Table 4: Optimum Lag Test –Internal Variable

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-467.9694	NA	832701.1	27.82173	28.04620*	27.89828*
1	-438.7902	48.05983*	663430.7*	27.57590	28.92268	28.03519
2	-420.8364	24.29053	1111850.	27.99037	30.45949	28.83241
3	-386.5465	36.30692	853328.7	27.44391	31.03535	28.66869
4	-359.6633	20.55774	1438625.	27.33314*	32.04690	28.94066

While the optimal lag test results for the external variables of the SIC and HQ models show the optimal lag number is 0, while the optimal lag of the LR, FPE and AIC models shows the optimal lag number is 2. The model will use lag 1 which means when the VAR / VECM model will be used, the results will be affected by the previous 2 months.

Table 5: Optimum Lag Test –External Variable

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-363.5277	NA	1787.904	21.67810	21.90256*	21.75465*
1	-337.3110	43.18043	1695.636	21.60653	22.95332	22.06582
2	-308.7026	38.70551*	1518.429*	21.39427*	23.86338	22.23631
3	-285.7453	24.30766	2269.740	21.51443	25.10587	22.73921
4	-261.4607	18.57059	4458.539	21.55651	26.27027	23.16404

4.4 VAR Stability Test

The VAR Stability Test is performed by calculating the roots of a polynomial function or known as roots of characteristic polynomials. If all the roots of the polynomial function are in a unit circle or if the absolute value is <1 then the VAR model is considered stable so that the *Impulse Response Function* (IRF) and the resulting *Forecast Error Variance Decomposition* (FEVD) are considered valid (Firdaus, 2012). To test the VAR stability of all external and internal factors, the VAR equation can be said to be stable because the modulus values of all polynomial roots of characteristic are <1.

4.5 Cointegration Test

The cointegration test results from the trace statistics test and the Max-eigenvalue test as in Table 6, show there are cointegrated equations at $\alpha = 5\%$. This can be seen from the value of the Prob. > 0.05 as many as 1 piece on the trace test

and 1 piece at Max-Eigenvalue, which means there is cointegration between variables, so the model used for internal factors is the *Vector Error Correction Model* (VECM).

Table 6: LCR Cointegration Test with Internal Factors

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.588202	71.72763	60.06141	0.0038
At most 1	0.436189	38.90038	40.17493	0.0668
At most 2	0.243999	17.69807	24.27596	0.2687
At most 3	0.165495	7.348711	12.32090	0.2917
At most 4	0.017542	0.654797	4.129906	0.4786
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.588202	32.82725	30.43961	0.0247
At most 1	0.436189	21.20231	24.15921	0.1196
At most 2	0.243999	10.34936	17.79730	0.4491
At most 3	0.165495	6.693914	11.22480	0.2773
At most 4	0.017542	0.654797	4.129906	0.4786
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Meanwhile, for the results of external factors as in Table 7, the cointegration test of the test statistics trace statistics and the Max-eigenvalue test shows that there is a co-integration equation at $\alpha = 5\%$. This can be seen from the value of the Prob. <0.05, which means there is cointegration between variables, so the model used is VECM.

Table 7: LCR Cointegration Test with External Factors

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.813264	108.5810	60.06141	0.0000
At most 1 *	0.457414	46.49272	40.17493	0.0102
At most 2	0.329940	23.87063	24.27596	0.0562
At most 3	0.180015	9.056288	12.32090	0.1658
At most 4	0.045240	1.712918	4.129906	0.2240
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.813264	62.08823	30.43961	0.0000
At most 1	0.457414	22.62209	24.15921	0.0796
At most 2	0.329940	14.81434	17.79730	0.1330
At most 3	0.180015	7.343371	11.22480	0.2211
At most 4	0.045240	1.712918	4.129906	0.2240
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

4.6 Estimation of the VECM Model and Internal Variable Structural Relations

The purpose of the study was to look at the factors that influence Bank ABC liquidity represented by LCR. Using the VECM model estimation, this research will see the influence of internal factors. Based on the optimum lag test, the best results are based on trial and error methods of various lags, for external factors are subject to lag 1 in analyzing the effect of LCR due to shocks from other variables.

The output estimation of the VECM model is the error correction vector of all internal factor variables in the first degree. The significant error correction variable is internal factor against the LCR ratio of 0.2261%, which means that there is an adjustment of the current condition towards a long term of 0.2261%. Or with a simpler language that for each month, the error is corrected by 0.2261% towards the long-term balance.

Table 8: Estimation of the VECM Model Internal Factors

Short Term		
Variables	*Coefficient*	*T-Statistic*
CointEq1	0.226102	[0.46191]
D(LDR(-1))	-13.02794	[-1.65528]
D(FG(-1))	-8.929847	[-1.54141]
D(LC(-1))	-8.529151	[-1.52928]
D(SL(-1))	-1.253713	[-1.88844]
Long Term		
LDR(-1)	-1.601475	[-0.25569]
FG(-1)	1.026787	[0.22399]
LC(-1)	3.391406	[3.27762]
SL(-1)	-0.916247	[-10.2334]

From the table above, it is explained that the LFR ratio both in the long and short term has a negative effect, that is, when there is a one percent increase in the LFR ratio, it will reduce the LCR ratio by 1.60% and 13.02%. This is because when there is an increase in LFR, credit is channeled as well as outflows of deposits that reduce the level of liquidity.

The LC in the long run has a positive and significant effect on the LCR ratio, if there is an increase in LC of one percent, it will increase the LCR by 3.39%. This is because the majority of deposits in the balance sheet structure obtained by Bank ABC are in the form of long-term deposits, which on average are shareholders' affiliated funds. Thus, expansion of loan, although not large, can still be met by deposits that enter to meet liquidity inventories.

The SL in the long run has a negative and significant effect on the LCR ratio, that is, when there is an increase in SL of one percent it will decrease LCR 0.91%. This is because the increase in SL was due to a decrease in short-term liabilities in the form of <1 month deposits, liabilities to other banks <1 year and securities <1 year, but there was a slight increase in the portion of deposits outside LCR calculations, which total deposits based on management policies in the LCR formula are set at 15%.

4.7 Estimation of VECM Models and External Variable Structural Relations

For external variables, INF in the long term is negative and significant, that is, when there is an increase of one percent INF, it will reduce the LCR ratio by 97.5%. This is because when inflation occurs, the amount of money is abundant and stimulatethe purchasing power. This will be responded by riil sector to expand production capacity which in turn requires additional funds from banks. The rise of loan will automatically reduce the ability of bank liquidity.

The BIRATE as a symbol of the long-term Bank Indonesia benchmark interest has a positive and significant effect on the LCR ratio, i.e if there is a BIRATE increase of one percent, it will increase LCR by 87.29%. This is in line with the previous paragraph, that the increase in inflation will be responded to by rising interest rates because the amount of money circulating in the community is abundant. The increase in the benchmark interest rate will result in an increase for deposit rates that will attract the people to place their funds in banks.

Fluctuations of the inflation are usually not directly dampened by the response to the increase or decrease in the benchmark interest rate and the long-term inflation rate since the change in the benchmark interest rate can be kept stable at ± 3.5%. Other external variables based on the above test, have no significant effect on LCR.

Table 9: Estimation of the VECM Model External Factors

Short Term		
Variables	*Coefficient*	*T-Statistic*
CointEq1	0.008912	[0.06214]
D(INF(-1))	-2.953982	[-0.21612]
D(BIRATE(-1))	9.087558	[0.32920]
D(IPI(-1))	-1.067896	[-0.44743]
D(ROR(-1))	1.097860	[0.14624]
Long Term		
INF(-1)	-97.50150	[-7.83442]
BIRATE(-1)	87.29612	[7.75151]
IPI(-1)	9.771154	[2.46943]
ROR(-1)	-75.61789	[-8.05871]

4.8 Impulse Response Fuction (IRF) Analysis

The IRF analysis showed that the LFR responded negatively to 9.8 standard deviations by LCR, the negative response dropped at third and fourth month to 5.5 and achieved stability of 6.8 standard deviations in twelfth month The LFR is a ratio that calculates the ratio between loan and fundingon consolidated basis. The greater LFR value means the higher bank's liquidity risk in fulfilling its obligations. LFR standards according to Bank Indonesia Regulations are 80% -92%. The results of the IRF analysis show that the shocks that occur in the LFR have a negative effect on LCR which means if there is an increase on LFR, it will decrease the value of the Bank ABC's LCR. This is also in accordance with the previous research conducted by Wuryandani (2012) states when the LFR rises, the bank's portfolio in channeling loans also increases. Loans source from public funds called deposit/funding. Decreasing in deposits will certainly reduce the value of bank LCR on an ongoing basis.

Then, the FG responded negatively at 7.4 standard deviations in the second month and positive at 0.71 standard deviations in the third month. In the fourth month, the response was negative 4.3 and finally reached stability in the tenth month of 2.9 standard deviation. In the long run where it enters the fourth and subsequent months, FG responded negatively on LCR. Looking at the dynamics above and in accordance with the internal conditions of theBank ABC, that the average growth in deposits has continued to decline since 2016 but the LCR is maintained at levels above 100%. It means that declining in deposits much greater than decreasing ofloansare the strategy to maintain a balance of liquidity conditions.

Meanwhile, the value of LC in the short term is negatively responded to LCR. In line with previous research conducted by Wuryandani (2012) which explains that the increase in LC will be followed by a decrease in LCR. LC is the ability of banks to create liquidity in the market through loan. The greater the LC, the greater of loan issued so that it will reduce LCR. Reducingloan portfolio so that of course it was followed by a declining in LC which eventually raised the LCR value.

The SL has a negative effect on LCR. This is contrary to the initial hypothesis based on the research of Surjaningsih (2014) and Berger (2009) which states that SL has a positive effect on LCR. When a shock in the SL occur, means that short term liquidity getting less and LCR get a rise. This is because the increase in SL was due to a decrease in short-term liabilities in the form of <1 month deposits, liabilities to other banks <1 year and securities <1 year, but there was a slight increase in the portion of deposits not included in LCR calculations, where total deposits based on management policies in the LCR formula are set at 15%.

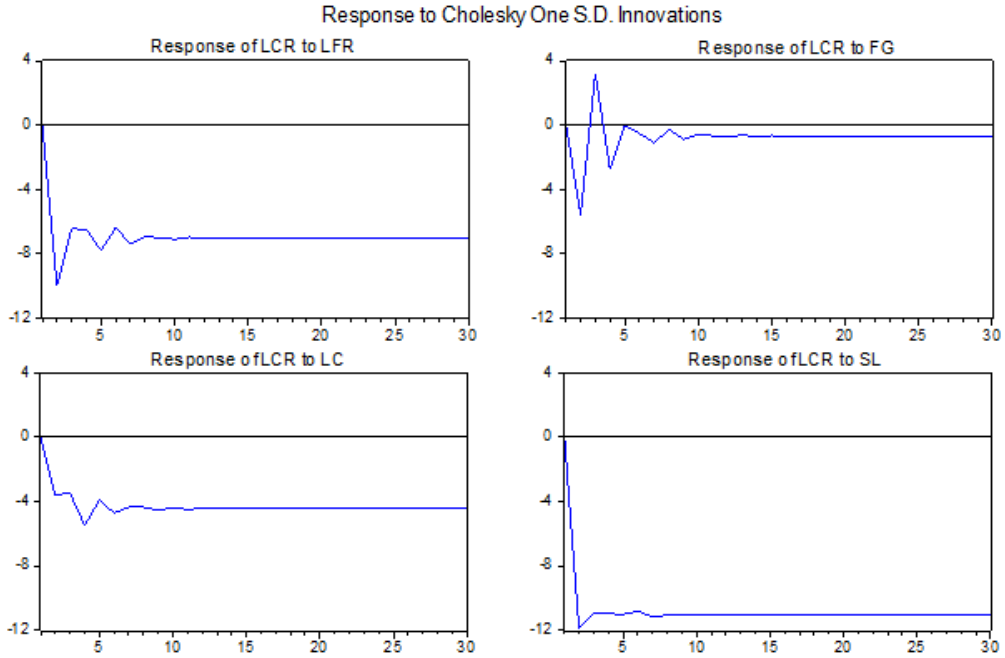

Figure 2: Respon Variabel LCR Terhadap *Shock*LDR, FG, LC, dan SL

While for external variables, INF has a long-term negative response to LCR. Inflation results in general price increases, so customers will need additional funds to maintain business volume and business capacity. Increase in inflation, makes liquidity will tend to decline in response to that.

The BIRATE is responded positively to achieving long-term stability towards LCR. BIRATE which rises will be responded positively by Bank ABC with increasing deposit balance so that it affects the existing LCR value.

The IPI was responded negatively in the first and second months, but began to respond positively to the third month. IPI can be responded positively and approach the zero standard deviation in the long run when entering the twelfth month. LCR's response to IPI in the first and second months is in accordance with Berger and Sedunov's (2017) study that there is a relationship between GDP and the value of liquidity which when GDP rises will cause liquidity to decline due to a healthy business climate that encourages businesses to utilize loan facilities.

The ROR was responded negatively on the third month by LCR but entering the seventh month began to show stability in the long term with a positive response. A positive response means that there is a positive return from a non-reference currency, Rupiah. This positive advantage encourages people to sell USD and buy Rupiah. The purchase of Rupiah will encourage an increase in deposits in banks, which has implications for the increase in LCR in the long run.

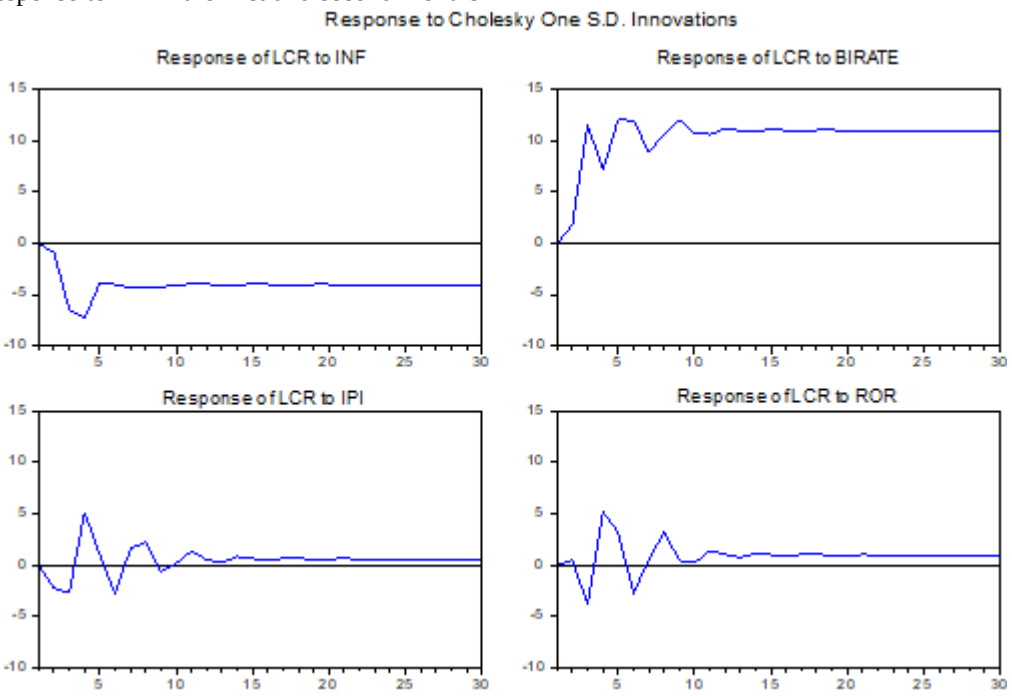

Figure 3: Respon Variabel LCR Terhadap *Shock*INF, BIRATE, IPI dan ROR

4.9 Forecast Error Variance Decomposition (FEVD)

Fluctuations in each variable due to the occurrence of shocks, can be analyzing the role of each shock in explaining the fluctuations of macroeconomic variables through FEVD analysis or also called variance decomposition analysis, where in this analysis the contribution of variable shocks in the system to changes in certain variables can be identified.

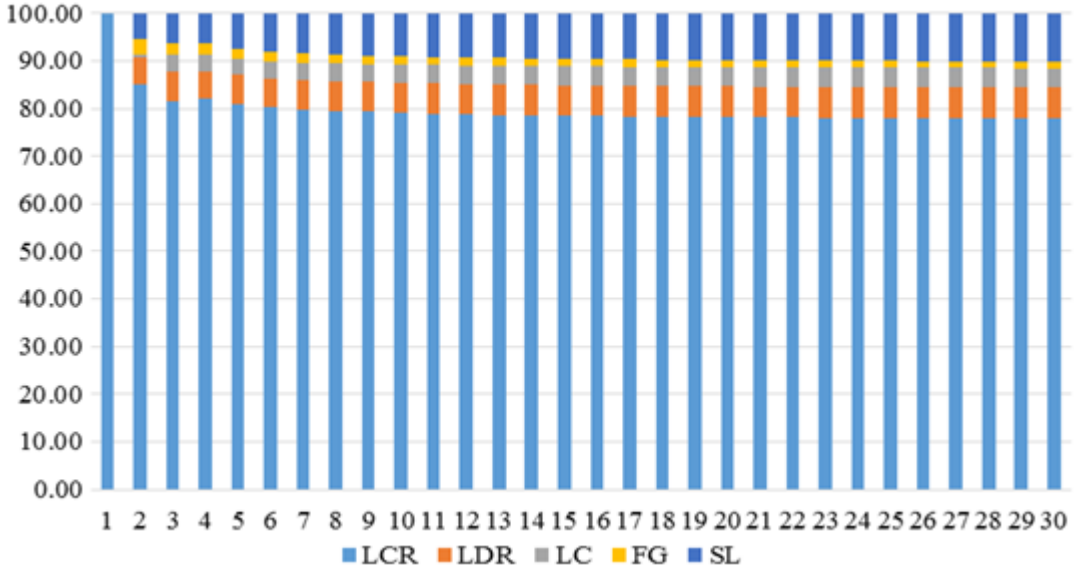

Figure 4: Graph of Internal Variable Contributions to LCR

From the Figure 4 above, the conclusion can be drawn that the fluctuations for the value of LCR in the first month are still influenced by the LCR variable itself but entering the second month up to the thirtieth month, it appears that other variables begin to take effect. In the first year, SL was the most stable in influencing the LCR value with a range of 10%. The smallest contribution was shown by FG, due to the adjustment volume of loan to maintain the LCR value. This LCR since the calculation is implemented is always above 100%, which means that the Bank ABC is very capable of covering short-term liabilities for the next 30 days.

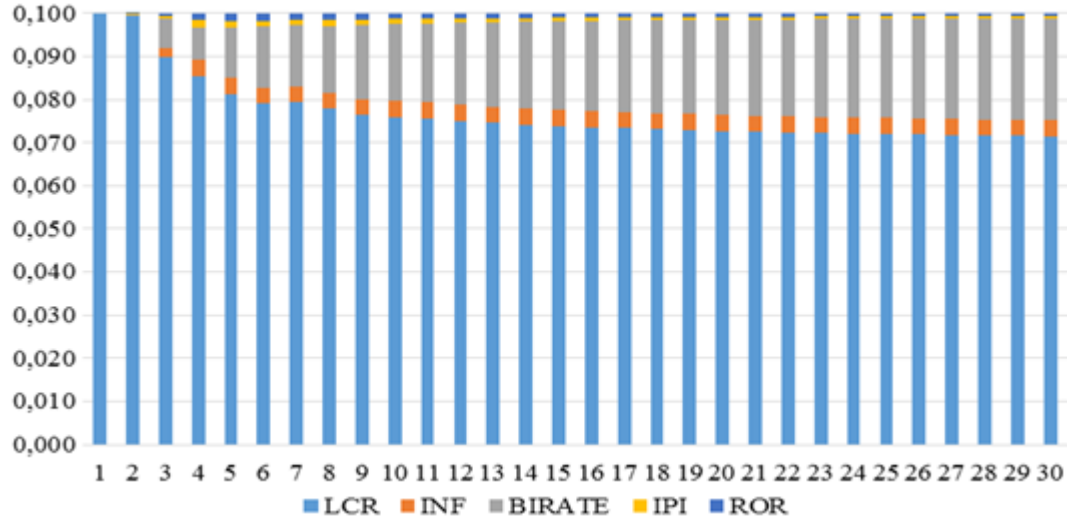

Figure 5: Graph of External Variable Contributions to LCR

While for the external variables, it shows that the fluctuations in the LCR for the first month are still influenced by the LCR variable, but enter the second month up to the thirtieth month BIRATE and INF begin to influence dominantly. Government efforts to maintain economic growth and inflation through measurable and planned monetary policy make the three variables above move moderately. This is because the influence of monetary policy through the benchmark interest rate has the fastest impact on the movement of interest rates which will affect the level of liquidity. This was also one of Bank Indonesia's successes in transforming the interest rate policy from the BI Rate to BI 7DRR because the growth of BIRATE contributions began to increase from 6.60% in the third month to 19.10% in the 12th month and stable at 20 % since the 14th month or since April 2016 when BI 7DRR was officially introduced as the benchmark interest rate of Bank Indonesia replacing the BI Rate.

5. Conclusion

Based on the results of the study, it turns out that for internal factors SL has a negative and significant influence in the short and long term. While LC has a positive and significant effect in the long run. For LFR it has a negative effect but not significantly for the long and short term and FG has a negative but not significant effect for the short term. Meanwhile, all external factors have a significant long-term effect. INF and ROR have a negative effect, while BIRATE and IPI have a positive effect.

LCR response to the overall variable shock for the long term was responded negatively. Meanwhile, for external factor variables, it shows that the LCR response to BIRATE, IPI and ROR shocks for the long term is positively responded. Only INF which in the long term was responded negatively because the shock at INF would be responded by the Central Bank with monetary policy with BIRATE adjustments. For the contribution of shocks to internal factor variables, in the long run LFR and SL dominate with amounts up to 15%. Meanwhile, for external factors, BIRATE and INF in the long run will dominate with the composition reaching 25%.

Suggestions that can be put forward in the study, for Bank ABC to be able to diversify liquidity through retail funds in the form of demand deposits and savings to mitigate risks in the long term. Empowering for the retail funding business for getting good amount of capital account and saving account (CASA) and empowering treasury working unit to cover short term funding through interbank call money market. The relatively new LCR ratio implemented since 2015 made the data shown to be limited, so it became a suggestion for further research to be able to analyze with a much longer time frame and upgrading the scale of research into the entire banking industry in Indonesia or the banking sub-industry based on BUKU.

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Attachments

A. Test on Level Data Stationarity

1. LCR

Null Hypothesis: LCR has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.22229	0.0263
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

2. LFR

Null Hypothesis: LDR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.141495	0.2303
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

3. Funding Gap (FG)

Null Hypothesis: FG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.131296	0.2341
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

4. Liquidity Creation (LC)

Null Hypothesis: LC has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.195284	0.0285
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	
*MacKinnon (1996) one-sided p-values.			

6. Short Term Liquidity (SL)

Null Hypothesis: SL has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.904698	0.0541
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

7. Inflation

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.610557	0.4675
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

8. Birate

Null Hypothesis: BIRATE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.955875	0.7590
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

9. GDP

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.977533	0.0472
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	
*MacKinnon (1996) one-sided p-values.			

10. IPI

Null Hypothesis: IPI has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.369808	0.0001
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

11. ROR

Null Hypothesis: ROR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.125665	0.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

LDR, FG, INFLATION and BIRATE are not stationary at the level because all of ADF's absolute value is smaller than the critical value of Mac Kinnon. As for the variables LCR, LC, SL, GDP, IPI and stationary ROR at the level.

B. Stationary Test on First Difference

1. LCR

Null Hypothesis: D(LCR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.125665	0.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	
*MacKinnon (1996) one-sided p-values.			

B. Stationary Test on First Difference

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.623926	0.0000
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

2. LFR

Null Hypothesis: D(LDR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.033608	0.0000
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

3. FG

Null Hypothesis: D(FG) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.997004	0.0000
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

4. LC

Null Hypothesis: D(LC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.409539	0.0012
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

5. SL

Null Hypothesis: D(SL) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.980498	0.0000
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

6. Inflation

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.873401	0.0003
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

7. BIRATE

Null Hypothesis: D(BIRATE) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.151809	0.0001
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
*MacKinnon (1996) one-sided p-values.			

8. GDP

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.921372	0.3190
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	
*MacKinnon (1996) one-sided p-values.			

9. IPI

Null Hypothesis: D(IPI) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.017977	0.0000
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	
*MacKinnon (1996) one-sided p-values.			

10. ROR

Null Hypothesis: D(ROR) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.289159	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	
*MacKinnon (1996) one-sided p-values.			

All stationary variables are at the first difference root unit test because the ADF value is above the critical value of Mac Kinnon.

C. VAR Stability Test for Internal Variables Model

Roots of Characteristic Polynomial
Endogenous variables:
D(LCR) D(LFR) D(FG) D(LC) D(SL)
Exogenous variables: C
Lag specification: 1 4
Date: 12/17/18 Time: 10:42

All stationary variables are at the first difference root unit test because the ADF value is above the critical value of Mac Kinnon.

Root	Modulus
0.883006 + 0.410445i	0.973738
0.883006 - 0.410445i	0.973738
-0.948043	0.948043
-0.805040 - 0.452289i	0.923393
-0.805040 + 0.452289i	0.923393
-0.398460 + 0.830608i	0.921238
-0.398460 - 0.830608i	0.921238
0.040948 + 0.883224i	0.884173
0.040948 - 0.883224i	0.884173
0.650801 + 0.542130i	0.847023
0.650801 - 0.542130i	0.847023
0.842490	0.842490
0.507295 - 0.588030i	0.776613
0.507295 + 0.588030i	0.776613
-0.551919 - 0.543877i	0.774865
-0.551919 + 0.543877i	0.774865
-0.734227	0.734227
0.037575 + 0.601369i	0.602542
0.037575 - 0.601369i	0.602542
-0.435300	0.435300
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

D. VAR Stability Test For External Variables Model

Roots of Characteristic Polynomial
Endogenous variables: D(LCR) D(INF) D(BIRATE) D(IPI) D(ROR)
Exogenous variables: C
Lag specification: 1 4
Date: 12/17/18 Time: 10:51

Root	Modulus
-0.460629 + 0.826366i	0.946076
-0.460629 - 0.826366i	0.946076
-0.069245 - 0.906477i	0.909118
-0.069245 + 0.906477i	0.909118

0.220613 + 0.860934i	0.888751
0.220613 - 0.860934i	0.888751
-0.771287 - 0.270948i	0.817494
-0.771287 + 0.270948i	0.817494
0.756836 + 0.297368i	0.813160
0.756836 - 0.297368i	0.813160
-0.666103 - 0.457656i	0.808172
-0.666103 + 0.457656i	0.808172
-0.805441	0.805441
0.528773 - 0.603176i	0.802136
0.528773 + 0.603176i	0.802136
0.583954	0.583954
-0.316468 + 0.373085i	0.489229
-0.316468 - 0.373085i	0.489229
0.086529 - 0.464952i	0.472935
0.086529 + 0.464952i	0.472935

No root lies outside the unit circle.
VAR satisfies the stability condition.

E. Test the Optimum LAG Internal Variables

VAR Lag Order Selection Criteria
Endogenous variables:
D(LCR) D(LFR) D(FG) D(LC) D(SL)
Exogenous variables: C
Date: 11/24/18 Time: 16:12
Sample: 2015M01 2018M03
Included observations: 34

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-467.9694	NA	832701.1	27.82173	28.04620*	27.89828*
1	-438.7902	48.05983*	663430.7*	27.57590	28.92268	28.03519
2	-420.8364	24.29053	1111850.	27.99037	30.45949	28.83241
3	-386.5465	36.30692	853328.7	27.44391	31.03535	28.66869
4	-359.6633	20.55774	1438625.	27.33314*	32.04690	28.94066

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

F. Test The Optimum Lag External Variables

VAR Lag Order Selection Criteria
Endogenous variables: D(LCR) D(INF) D(BIRATE) D(IPI) D(ROR)
Exogenous variables: C
Date: 12/17/18 Time: 10:59
Sample: 2015M01 2018M03
Included observations: 34

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-363.5277	NA	1787.904	21.67810	21.90256*	21.75465*
1	-337.3110	43.18043	1695.636	21.60653	22.95332	22.06582
2	-308.7026	38.70551*	1518.429*	21.39427*	23.86338	22.23631
3	-285.7453	24.30766	2269.740	21.51443	25.10587	22.73921
4	-261.4607	18.57059	4458.539	21.55651	26.27027	23.16404

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

G. Internal Variables Cointegration Test

Date: 12/08/18 Time: 20:58					
Sample: 2015M01 2018M03					
Included observations: 37					
Series: LCR LFR FG LC SL; Lags interval: 1 to 1					
Selected (0.05 level*) Number of Cointegrating Relations by Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	Trend	No Trend	No Trend	Trend	Trend
Trace	1	0	1	1	1
Max-Eig	1	0	0	1	1
*Critical values based on MacKinnon-Haug-Michelis (1999)					
Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
	Log Likelihood by Rank (rows) and Model (columns)				
0	-496.8137	-496.8137	-495.6189	-495.6189	-490.1038
1	-480.4000	-480.4000	-479.2256	-466.9373	-462.1023
2	-469.7989	-469.2362	-468.6738	-456.2118	-452.6206
3	-464.6242	-464.0456	-463.6241	-449.5131	-445.9290
4	-461.2772	-460.1298	-459.8176	-444.7167	-441.7980
5	-460.9498	-459.7994	-459.7994	-441.7965	-441.7965
Akaike Information Criteria by Rank (rows) and Model (columns)					
0	28.20614	28.20614	28.41183	28.41183	28.38399
1	27.85946	27.91351	28.06625	27.45607	**27.41093***
2	27.82697	27.90466	28.03642	27.47091	27.43895
3	28.08779	28.21868	28.30401	27.70341	27.61779
4	28.44742	28.60161	28.63879	28.03874	27.93503
5	28.97026	29.17835	29.17835	28.47549	28.47549
Schwarz Criteria by Rank (rows) and Model (columns)					
0	29.29460	29.29460	29.71798	29.71798	29.90783
1	29.38330	29.48089	29.80778	**29.24114***	29.37016
2	29.78619	29.95096	30.21334	29.73490	29.83356
3	30.48240	30.74390	30.91631	30.44633	30.44778
4	31.27741	31.60576	31.68647	31.26058	31.20040
5	32.23564	32.66141	32.66141	32.17624	32.17624

Date: 12/08/18 Time: 21:04				
Sample (adjusted): 2015M03 2018M03				
Included observations: 37 after adjustments				
Trend assumption: No deterministic trend				
Series: LCR LFR FG LC SL				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.588202	71.72763	60.06141	0.0038
At most 1	0.436189	38.90038	40.17493	0.0668
At most 2	0.243999	17.69807	24.27596	0.2687
At most 3	0.165495	7.348711	12.32090	0.2917
At most 4	0.017542	0.654797	4.129906	0.4786
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.588202	32.82725	30.43961	0.0247
At most 1	0.436189	21.20231	24.15921	0.1196
At most 2	0.243999	10.34936	17.79730	0.4491
At most 3	0.165495	6.693914	11.22480	0.2773
At most 4	0.017542	0.654797	4.129906	0.4786
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05				

level
* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

H. External Variables Cointegration Test

Date: 12/17/18 Time: 13:48					
Sample: 2015M01 2018M03					
Included observations: 36					
Series: LCR INF BIRATE IPI ROR					
Lags interval: 1 to 2					
Selected (0.05 level*) Number of Cointegrating Relations by Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	3	2	3	2	3
Max-Eig	3	2	3	2	2
*Critical values based on MacKinnon-Haug-Michelis (1999)					
Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of Ces	No Trend	No Trend	No Trend	Trend	Trend
	Log Likelihood by Rank (rows) and Model (columns)				
0	-328.9919	-328.9919	-327.0660	-327.0660	-326.3636
1	-310.8362	-306.6193	-305.0460	-304.3214	-303.9075
2	-295.8922	-288.5058	-287.6350	-285.6004	-285.2213
3	-285.4970	-277.4860	-276.7868	-274.4257	-274.1215
4	-283.7557	-272.3608	-271.8043	-269.0805	-268.8293
5	-283.3027	-270.9166	-270.9166	-266.0592	-266.0592
	Akaike Information Criteria by Rank (rows) and Model (columns)				
0	21.05510	21.05510	21.22589	21.22589	21.46464
1	20.60201	20.42329	20.55811	20.57341	20.77264
2	20.32734	20.02810	20.14639	20.14447	20.29007
3	20.30539	20.02700*	20.09927	20.13476	20.22897
4	20.76421	20.35338	20.37802	20.44892	20.49052
5	21.29459	20.88426	20.88426	20.89218	20.89218
	Schwarz Criteria by Rank (rows) and Model (columns)				
0	23.25443	23.25443	23.64516	23.64516	24.10384
1	23.24121	23.10648*	23.41724	23.47653	23.85170
2	23.40641	23.19514	23.44539	23.53144	23.80900
3	23.82432	23.67789	23.83813	24.00558	24.18777
4	24.72300	24.48812	24.55675	24.80359	24.88918
5	25.69326	25.50285	25.50285	25.73071	25.73071

Date: 12/17/18 Time: 13:51				
Sample (adjusted): 2015M04 2018M03				
Included observations: 36 after adjustments				
Trend assumption: Linear deterministic trend				
Series: LCR INF BIRATE IPI ROR				
Lags interval (in first differences): 1 to 2				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.705753	112.2988	69.81889	0.0000
At most 1 *	0.619882	68.25871	47.85613	0.0002
At most 2 *	0.452656	33.43682	29.79707	0.0182
At most 3	0.241801	11.74041	15.49471	0.1698
At most 4	0.048117	1.775263	3.841466	0.1827
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.705753	44.04010	33.87687	0.0022
At most 1 *	0.619882	34.82189	27.58434	0.0049
At most 2 *	0.452656	21.69641	21.13162	0.0416
At most 3	0.241801	9.965146	14.26460	0.2142
At most 4	0.048117	1.775263	3.841466	0.1827

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

I. VECM (Internal Model)

Vector Error Correction Estimates					
Date: 12/08/18 Time: 21:26					
Sample (adjusted): 2015M03 2018M03					
Included observations: 37 after adjustments					
Standard errors in ( ) & t-statistics in [ ]					
Cointegrating Eq:	CointEq1				
LCR(-1)	1.000000				
	-1.601475				
	(6.26330)				
LFR(-1)	[-0.25569]				
	1.026787				
	(4.58411)				
FG(-1)	[0.22399]				
	3.391406				
	(1.03472)				
LC(-1)	[3.27762]				
	-0.916247				
	(0.08953)				
SL(-1)	[-10.2334]				
C	-15.29177				
Error Correction:	D(LCR)	D(LDR)	D(FG)	D(LC)	D(SL)
	0.226102	-0.063124	0.089664	-0.104447	0.993100
	(0.48950)	(0.06003)	(0.08384)	(0.02608)	(0.61258)
CointEq1	[0.46191]	[-1.05158]	[1.06950]	[-4.00490]	[1.62117]
	0.970056	-0.120346	0.215781	-0.001285	0.657560
	(0.82367)	(0.10101)	(0.14107)	(0.04388)	(1.03079)
D(LCR(-1))	[1.17772]	[-1.19144]	[1.52956]	[-0.02927]	[0.63792]
	-13.02794	-0.237282	-0.511778	-0.195297	-13.23821
	(7.87055)	(0.96518)	(1.34801)	(0.41933)	(9.84960)
D(LFR(-1))	[-1.65528]	[-0.24584]	[-0.37965]	[-0.46573]	[-1.34403]
	-8.929847	0.230783	-1.056883	0.126159	-9.905892
	(5.79331)	(0.71045)	(0.99224)	(0.30866)	(7.25004)
D(FG(-1))	[-1.54141]	[0.32484]	[-1.06515]	[0.40873]	[-1.36632]
	-8.529151	1.547041	-2.519836	0.711209	-10.43989
	(5.57722)	(0.68395)	(0.95523)	(0.29715)	(6.97962)
D(LC(-1))	[-1.52928]	[2.26193]	[-2.63794]	[2.39345]	[-1.49577]
	-1.253713	0.111965	-0.179934	-0.005413	-0.979957
	(0.66389)	(0.08141)	(0.11371)	(0.03537)	(0.83082)
D(SL(-1))	[-1.88844]	[1.37525]	[-1.58244]	[-0.15302]	[-1.17950]
	1.511581	-0.149315	0.417087	-0.025189	2.146651
	(5.30810)	(0.65094)	(0.90914)	(0.28281)	(6.64283)
C	[0.28477]	[-0.22938]	[0.45877]	[-0.08907]	[0.32315]
R-squared	0.304647	0.189073	0.231883	0.436926	0.278462
Adj. R-squared	0.165576	0.026887	0.078260	0.324311	0.134154
Sum sq. resids	30435.28	457.7046	892.8041	86.39439	47665.61
S.E. equation	31.85136	3.905998	5.455285	1.697001	39.86043
F-statistic	2.190587	1.165780	1.509429	3.879829	1.929642
Log likelihood	-176.6809	-99.03389	-111.3945	-68.18882	-184.9801
Akaike AIC	9.928695	5.731562	6.399705	4.064260	10.37730
Schwarz SC	10.23346	6.036330	6.704473	4.369029	10.68207
Mean dependent	-0.638378	0.069189	0.049497	0.026773	0.025404
S.D. dependent	34.86861	3.959592	5.682158	2.064471	42.83726
Determinant resid covariance (dof adj.)	349165.6				
Determinant resid covariance	122357.1				
Log likelihood	-479.2256				
Akaike information criterion	28.06625				
Schwarz criterion	29.80778				

J. VECM (EXTERNAL MODEL)

Vector Error Correction Estimates
Date: 12/17/18 Time: 13:30

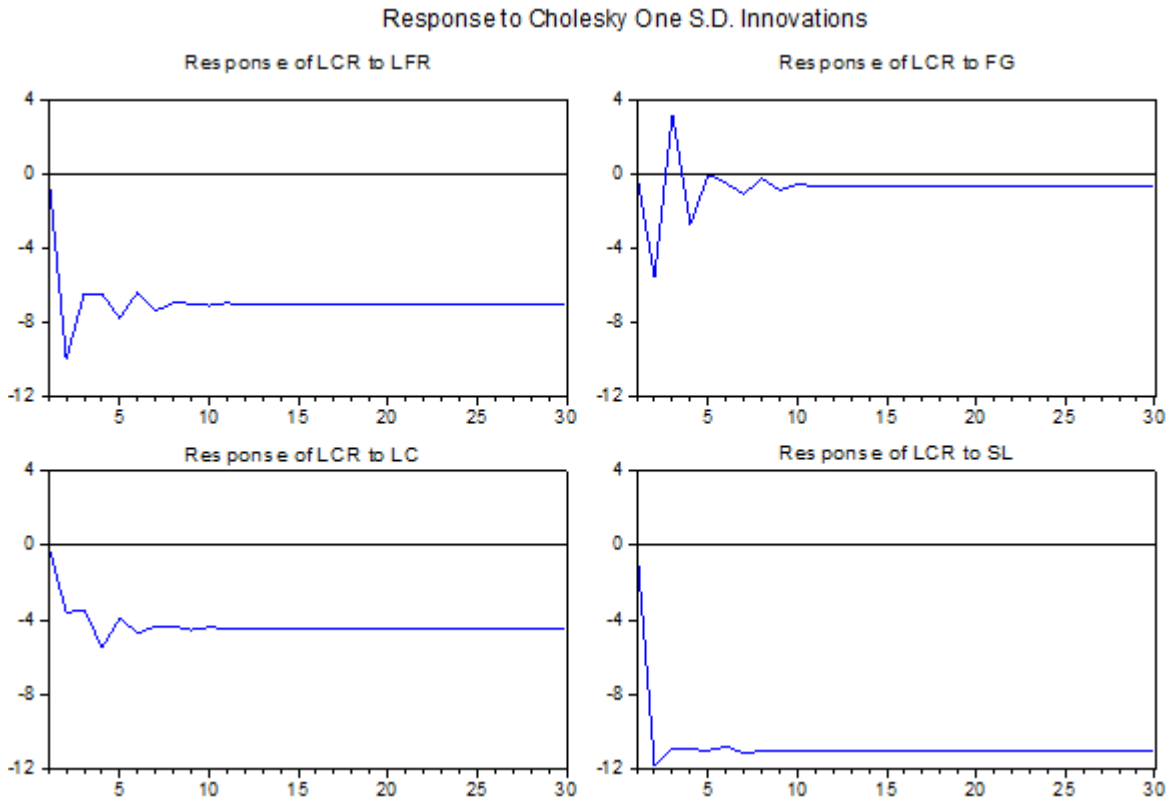
Sample (adjusted): 2015M04 2018M03
Included observations: 36 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1				
LCR(-1)	1.000000				
INF(-1)	-97.50150				
	(12.4453)				
	[-7.83442]				
BIRATE(-1)	87.29612				
	(11.2618)				
	[7.75151]				
IPI(-1)	9.771154				
	(3.95685)				
	[2.46943]				
ROR(-1)	-75.61789				
	(9.38338)				
	[-8.05871]				
C	-266.9044				
Error Correction:	D(LCR)	D(INF)	D(BIRATE)	D(IPI)	D(ROR)
CointEq1	0.008912	0.001115	-0.000487	-0.007490	0.035813
	(0.14342)	(0.00176)	(0.00105)	(0.01327)	(0.00772)
	[0.06214]	[0.63194]	[-0.46338]	[-0.56425]	[4.63915]
D(LCR(-1))	-0.330678	0.005241	0.000704	-0.016186	-0.048372
	(0.27045)	(0.00333)	(0.00198)	(0.02503)	(0.01456)
	[-1.22269]	[1.57565]	[0.35554]	[-0.64661]	[-3.32280]
D(LCR(-2))	-0.280857	-0.001376	-0.001125	-0.001421	-0.010118
	(0.21433)	(0.00264)	(0.00157)	(0.01984)	(0.01154)
	[-1.31042]	[-0.52194]	[-0.71723]	[-0.07166]	[-0.87708]
D(INF(-1))	-2.953982	0.274306	0.018315	1.790977	1.170020
	(13.6683)	(0.16810)	(0.10007)	(1.26509)	(0.73572)
	[-0.21612]	[1.63178]	[0.18303]	[1.41569]	[1.59030]
D(INF(-2))	-18.89373	0.021825	0.007177	-2.604619	0.146754
	(14.3732)	(0.17677)	(0.10523)	(1.33033)	(0.77366)
	[-1.31451]	[0.12346]	[0.06821]	[-1.95787]	[0.18969]
D(BIRATE(-1))	9.087558	0.102041	0.123643	-3.679808	2.755512
	(27.6046)	(0.33950)	(0.20210)	(2.55499)	(1.48587)
	[0.32920]	[0.30056]	[0.61180]	[-1.44024]	[1.85448]
D(BIRATE(-2))	39.10315	0.022082	0.282292	-0.487283	1.141183
	(34.6777)	(0.42649)	(0.25388)	(3.20966)	(1.86659)
	[1.12762]	[0.05178]	[1.11192]	[-0.15182]	[0.61137]
D(IPI(-1))	-1.067896	-0.018104	0.021585	-0.126490	-0.216389
	(2.38671)	(0.02935)	(0.01747)	(0.22091)	(0.12847)
	[-0.44743]	[-0.61675]	[1.23530]	[-0.57259]	[-1.68436]
D(IPI(-2))	0.028390	0.008217	0.001689	-0.334495	-0.227503
	(2.20787)	(0.02715)	(0.01616)	(0.20435)	(0.11884)
	[0.01286]	[0.30260]	[0.10452]	[-1.63685]	[-1.91432]
D(ROR(-1))	1.097680	0.021542	-0.031312	-0.394716	1.071060
	(7.50596)	(0.09231)	(0.05495)	(0.69473)	(0.40402)
	[0.14624]	[0.23335]	[-0.56982]	[-0.56816]	[2.65100]
D(ROR(-2))	-2.088224	-0.080546	-0.019763	-0.298856	0.503970
	(4.47090)	(0.05499)	(0.03273)	(0.41381)	(0.24065)
	[-0.46707]	[-1.46484]	[-0.60378]	[-0.72220]	[2.09417]
C	2.438480	-0.040093	-0.050522	-0.564781	0.537275
	(6.90490)	(0.08492)	(0.05055)	(0.63909)	(0.37167)
	[0.35315]	[-0.47212]	[-0.99943]	[-0.88372]	[1.44558]
R-squared	0.383698	0.513450	0.183742	0.428740	0.784111
Adj. R-squared	0.101226	0.290448	-0.190376	0.166913	0.685162
Sum sq. resids	26942.03	4.075205	1.444040	230.8055	78.05962
S.E. equation	33.50499	0.412068	0.245292	3.101112	1.803464
F-statistic	1.358358	2.302447	0.491133	1.637493	7.924404
Log likelihood	-170.2044	-11.86703	6.807548	-84.52680	-65.01296
Akaike AIC	10.12247	1.325946	0.288470	5.362600	4.278498
Schwarz SC	10.65031	1.853786	0.816309	5.890440	4.806337
Mean dependent	-0.437222	-0.082778	-0.090278	-0.146667	0.026389
S.D. dependent	35.34144	0.489189	0.224824	3.397600	3.214137
Determinant resid covariance (dof adj.)	119.6942				

Determinant resid covariance	15.76220
Log likelihood	-305.0460
Akaike information criterion	20.55811
Schwarz criterion	23.41724

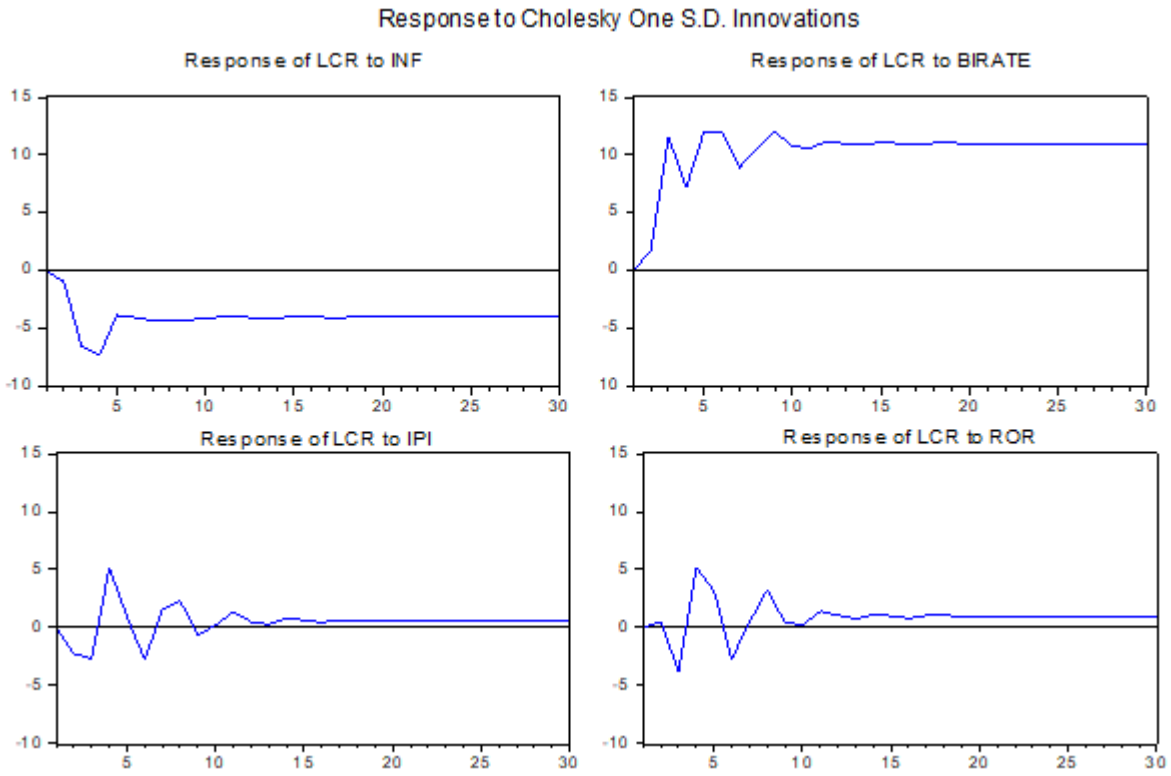
K. Internal Model Of Impulse Response Function (IRF)

Period	LFR	FG	LC	SL
1	0.000000	0.000000	0.000000	0.000000
2	-9.986958	-5.576531	-3.605362	-11.82293
3	-6.429959	3.204131	-3.455858	-10.92173
4	-6.466711	-2.739076	-5.483346	-10.95862
5	-7.785389	-0.034656	-3.905065	-11.01436
6	-6.362176	-0.509837	-4.703758	-10.79765
7	-7.378133	-1.081568	-4.351894	-11.17346
8	-6.930655	-0.263920	-4.353166	-11.04686
9	-6.993754	-0.881875	-4.532350	-11.05781
10	-7.089807	-0.569576	-4.385194	-11.03818
11	-6.953354	-0.655908	-4.473268	-11.01020
12	-7.059396	-0.692082	-4.426102	-11.04819
13	-7.008409	-0.617077	-4.430092	-11.03855
14	-7.021403	-0.679305	-4.445274	-11.04331
15	-7.027225	-0.644275	-4.432202	-11.03965
16	-7.014434	-0.656760	-4.442026	-11.03604
17	-7.025134	-0.658158	-4.436334	-11.03936
18	-7.019483	-0.651574	-4.437066	-11.03860
19	-7.021485	-0.657682	-4.438162	-11.03956
20	-7.021687	-0.653848	-4.437029	-11.03914
21	-7.020529	-0.655463	-4.438120	-11.03872
22	-7.021571	-0.655373	-4.437489	-11.03895
23	-7.020955	-0.654830	-4.437599	-11.03887
24	-7.021225	-0.655415	-4.437652	-11.03902
25	-7.021209	-0.655005	-4.437553	-11.03898
26	-7.021110	-0.655200	-4.437672	-11.03894
27	-7.021208	-0.655167	-4.437607	-11.03895
28	-7.021142	-0.655127	-4.437622	-11.03894
29	-7.021175	-0.655181	-4.437621	-11.03896
30	-7.021170	-0.655138	-4.437612	-11.03896
Cholesky Ordering: LCR LDR FG LC SL				



L. Eksternal Model of Impulse Response Function (IRF)

Period	LCR	INF	BIRATE	IPI	ROR
1	33.50499	0.000000	0.000000	0.000000	0.000000
2	21.25487	-0.919495	1.797140	-2.259706	0.530921
3	16.30332	-6.499875	11.56218	-2.676450	-3.812285
4	17.58099	-7.307381	7.183280	5.165585	5.190843
5	13.22130	-3.829808	12.05193	0.957028	3.173476
6	19.16146	-4.012741	11.96904	-2.771805	-2.714454
7	20.66208	-4.295079	8.920740	1.592456	0.490400
8	15.66988	-4.332412	10.59026	2.295646	3.258384
9	15.88218	-4.202107	12.02033	-0.617012	0.463794
10	18.81485	-4.158485	10.72809	0.199348	0.232382
11	17.94639	-3.899847	10.62492	1.381296	1.414512
12	16.87428	-3.959018	11.18909	0.486120	1.066218
13	17.53077	-4.130895	10.97895	0.277328	0.754000
14	17.65307	-4.072936	10.88349	0.839004	1.172547
15	17.37594	-3.943030	11.12023	0.650479	1.006581
16	17.57664	-3.986205	10.99268	0.455882	0.825460
17	17.57539	-4.040411	10.89202	0.665008	1.045615
18	17.38651	-4.021766	11.03325	0.666760	1.079989
19	17.48774	-3.998148	11.05053	0.542643	0.921468
20	17.58899	-4.002484	10.95729	0.603226	0.958991
21	17.48998	-4.007732	10.97839	0.644114	1.028236
22	17.46009	-4.011709	11.01783	0.593056	0.989316
23	17.51892	-4.010571	10.99662	0.594164	0.971948
24	17.51712	-4.005261	10.98788	0.620002	0.994663
25	17.49391	-4.005090	10.99955	0.606992	0.989576
26	17.50242	-4.009431	10.99597	0.600599	0.983571
27	17.50534	-4.009313	10.99341	0.610722	0.991592
28	17.50026	-4.006817	10.99835	0.608529	0.989566
29	17.50440	-4.006918	10.99671	0.604003	0.984488
30	17.50534	-4.008076	10.99370	0.607825	0.988561
Cholesky Ordering: LCR INF BIRATE IPI ROR					



M. Forecast Error Variance Decomposition (FEVD) Of Internal Model

Period	S.E.	LCR	LFR	FG	LC	SL
1	31.85136	100.0000	0.000000	0.000000	0.000000	0.000000
2	43.31773	84.88523	5.315391	1.657284	0.692734	7.449358
3	50.27477	81.54518	5.581832	1.636530	0.986789	10.24967
4	57.98578	80.19438	5.439708	1.453349	1.636018	11.27655
5	63.70287	78.73085	6.000765	1.204219	1.731327	12.33284
6	69.37919	78.34067	5.899934	1.020632	1.919271	12.81949
7	74.59030	77.67754	6.082781	0.904030	2.000868	13.33478
8	79.35767	77.27650	6.136623	0.799780	2.068594	13.71850
9	83.96224	76.96978	6.175833	0.725496	2.139321	13.98958
10	88.24513	76.68980	6.236390	0.660948	2.183643	14.22922
11	92.36764	76.49697	6.258828	0.608309	2.227610	14.40828
12	96.30746	76.31090	6.294519	0.564721	2.260295	14.56956
13	100.0871	76.15989	6.318409	0.526675	2.288719	14.70631
14	103.7374	76.02882	6.339696	0.494551	2.314109	14.82283
15	107.2564	75.91294	6.359777	0.466240	2.335513	14.92553
16	110.6670	75.81390	6.375555	0.441466	2.354885	15.01419
17	113.9748	75.72446	6.390787	0.419549	2.371690	15.09351
18	117.1890	75.64535	6.403812	0.399941	2.386731	15.16417
19	120.3181	75.57415	6.415624	0.382397	2.400269	15.22756
20	123.3671	75.50981	6.426366	0.366538	2.412442	15.28485
21	126.3430	75.45167	6.435973	0.352166	2.423531	15.33667
22	129.2502	75.39857	6.444824	0.339072	2.433604	15.38393
23	132.0935	75.35005	6.452872	0.327090	2.442825	15.42716
24	134.8769	75.30547	6.460277	0.316091	2.451293	15.46687
25	137.6040	75.26439	6.467106	0.305952	2.459093	15.50346
26	140.2780	75.22642	6.473408	0.296580	2.466309	15.53728
27	142.9021	75.19121	6.479260	0.287890	2.472998	15.56865
28	145.4788	75.15847	6.484697	0.279810	2.479217	15.59781
29	148.0107	75.12795	6.489767	0.272279	2.485014	15.62499
30	150.4999	75.09944	6.494503	0.265241	2.490430	15.65039
Cholesky Ordering: LCR LDR FG LC SL						

N. Forecast Error Variance Decomposition (FEVD) of External Model

Period	S.E.	LCR	INF	BIRATE	IPI	ROR
1	33.50499	100.0000	0.000000	0.000000	0.000000	0.000000
2	39.79720	99.40250	0.053382	0.203919	0.322403	0.017797
3	45.24649	89.88433	2.104968	6.687705	0.599325	0.723675
4	50.14939	85.45830	3.836706	7.495670	1.548848	1.660473
5	53.48521	81.24139	3.885774	11.66729	1.393690	1.811857
6	58.32873	79.10105	3.740511	14.02077	1.397659	1.740014
7	62.68944	79.34240	3.707637	14.16297	1.274506	1.512480
8	65.74436	77.82102	3.805332	15.47209	1.280739	1.620819
9	68.82810	76.32856	3.844724	17.16675	1.176583	1.483377
10	72.27575	75.99695	3.817718	17.77129	1.067772	1.346268
11	75.35160	75.59163	3.780263	18.33828	1.015982	1.273841
12	78.13352	74.96880	3.772608	19.10643	0.948793	1.203368
13	80.93468	74.56097	3.776494	19.64691	0.885428	1.130191
14	83.66105	74.23293	3.771376	20.07961	0.838717	1.077373
15	86.26551	73.87539	3.756012	20.54716	0.794523	1.026916
16	88.81607	73.60972	3.744820	20.91586	0.752180	0.977420
17	91.28902	73.38225	3.740570	21.22159	0.717286	0.938301
18	93.67761	73.13248	3.736564	21.54037	0.686240	0.904353
19	96.02374	72.91920	3.729569	21.82501	0.656310	0.869910
20	98.32241	72.74971	3.722933	22.05839	0.629745	0.839223
21	100.5547	72.58080	3.718321	22.28185	0.606198	0.812832
22	102.7372	72.41817	3.714500	22.49535	0.584049	0.787938
23	104.8816	72.27718	3.710381	22.68418	0.563619	0.764634
24	106.9820	72.14802	3.706283	22.85708	0.545064	0.743549
25	109.0393	72.02522	3.702662	23.02033	0.527789	0.723992
26	111.0595	71.91232	3.699514	23.17074	0.511687	0.705736
27	113.0439	71.80767	3.696556	23.31011	0.496798	0.688870
28	114.9937	71.70923	3.693672	23.44109	0.482894	0.673112
29	116.9114	71.61776	3.690957	23.56313	0.469851	0.658303
30	118.7981	71.53235	3.688481	23.67702	0.457664	0.644483
Cholesky Ordering: LCR INF BIRATE IPI ROR						