

The Liquidity Resilience of Islamic Banking in Indonesia

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ABSTRACT

Liquidity has always been one of the most important for banking industry resilience. Due to this importance, a study concerning the factors associated with Financing to Deposit ratio (FDR) needs to be done. This study will be devoted to analyze the structural relationship of internal performance of shariah banking industry indicator such liquid assets to short term funding ratio (STM), non performing financing (NPF), profit and the the external indicators such policy rate (BI rate), inflation, Industriian Production Index (IPI), and exchange rate. The research will try to compare the response or sensitivity of Financing to Deposits ratio to the changes of those indicators. Using monthly data from 2001 to 2015 and conducted using VAR/VECM model, we found that in the long run, the external factor exchange rate and BI rate are the most significantly cointegrated with FDR ratio. In the short run, the movement of FDR itself, NPF BI rate, IPI and Inflation are positively responded by FDR. On the other hand, the response of FDR to STM, Profit, and exchange rate are negative. Furthermore, using FEVD we found the most contributing in FDR ratio variability is FDR ratio itself and the external indicators side are IPI and exchange rate.

Keywords: FDR Ratio, liquid asset to short term funding (STM), Shariah Banking, VAR/VECM.

PRELIMINARY

Islamic banking industry in Indonesia experienced a fairly rapid growth since the establishment of first Islamic bank in 1991 up to 2013. Its growth was slowing down in 2013-2014 along with slowing

economic growth, during 2013-2014 it was recorded at 5.01%. The slowdown was caused by government consumption reduction, budget savings and limited investment activities in the country.

The link between macroeconomic conditions and sharia banking industry was perceived by sharia banking during the economic pressures in the second quarter of 2005 and in early 2015 when there was an increase in domestic fuel oil prices which pushed up consumer price index. Increasing of BI rate from 5.75% in May 2013 to 7.75% in December 2014, determination of LTV for consumption financing both housing and vehicle ownership in April 2013 played a role in reducing both productive and consumptive financing growth.

The purpose of this study is to analyze the structural relationship between internal performance of Islamic banks, Islamic monetary instruments, macroeconomic conditions and the resilience of Islamic bank liquidity (FDR ratio). This research also conducted an assessment of liquidity resilience of Islamic banking and provides a recommendation regarding strategies related to liquidity to bank management.

According to Basel Committee on Banking Supervision (2000), liquidity defined as the ability of banks to meet their immediate funding needs with normal fees. Liquidity affects the efficiency and profitability of banks.

Haron and Azmi (2005) explain that inflation is negatively related to deposits collected by banks because when inflation, customers will withdraw their funds to maintain their consumption level. [1] Zeman (2008) in his research found that macroeconomic variables such as GDP, interest rates and exchange rates have most significant effect to NPL. [2] Wibowo's research (2006) also show same result that interest rates and GDP affect the performance of Islamic banking through third-party funds and ultimately affect the capital ratio. [3] Exchange rate variables affect the performance of Islamic banking through NPF and further also affect the capital ratio.

Kasri and Kasim (2009) found that the amount of mudharabah deposit has a positive relationship with realization rate of return Islamic banks and has a negative relationship with the realization of conventional bank interest rates. [4]

Ismal (2010) explains that failure and inefficiency of liquidity management caused by strong liquidity pressures, the readiness of bank liquid instruments, bank conditions, and inability of banks to obtain sources of liquidity both internally and externally. [5] Some banks internal and external factors which have potential to cause liquidity risk problems which are the results of research by several researchers, are explained in Table 1.

Table 1. Internal and external factors that causing liquidity risk

Bank Internal Factors	Bank External Factors
High exposure off balance sheet	Very sensitive financial markets and depositors.
Banks depend on short-term corporate deposits	Internal and external economic shocks
Expansion on the asset side exceeds the availability of funds on the liabilities side	Slow economic performance
Deposits are concentrated in the short term.	Reduced depositor's confidence in the banking sector
Small amounts of allocation in government liquidity instruments	Non-economic factors (political, social, security, etc.)
Small amounts of funds placement from third parties in long-term deposits	A sudden and large amount of funds withdrawal by depositors.
Maturity gap between assets and liabilities.	Unplanned disbursement of government deposits.

Source: adjusted and modified from Mirakhor and Iqbal(2007), [6] Antonio (1999), Alsayed [7] (2007).

The conceptual framework of this study begins from the problem of sharia banking liquidity which is relatively unstable and sensitive to macroeconomic conditions and customer's behavior who move from sharia banks to conventional banks due to differences between conventional bank interest rates and sharia banking profit sharing. Based on previous studies, the researchers divided the two groups of determinants that affect the ratio of short-term liquidity resilience and the intermediation ratio.

The first group is macroeconomic factors that consist of BI interest rate variables (BIRATE), inflation (INF), Industrial Production Index (IPI), Rupiah exchange rate against USD (USD) while the second group is internal Islamic sharia performance factor that consist of profit variables, non-performing financing ratio (NPF), liquidity and intermediation ratio

(FDR), Liquid Assets (Cash, placements in the BI Giro, SBIS, Securities, placements with other banks), short-term liabilities (Current accounts, savings, one-time deposits month). Liquidity resilience is defined as the ability of Islamic banks to meet obligations to third party funds as well as the intermediation ability, the intermediation ability ratio (FDR ratio).

The data that used in this study is time series data from January 2001 to May 2015. The data will be analyzed with the VAR / VECM model. Description and dynamics of each variable from the two groups of variables will be considered and analyzed as the structural relationship of each variable, dynamic response, and contribution structure of each variable to the resilience of sharia banking liquidity in Indonesia. The conceptual framework of this study is illustrated in the flow chart in Figure 1.

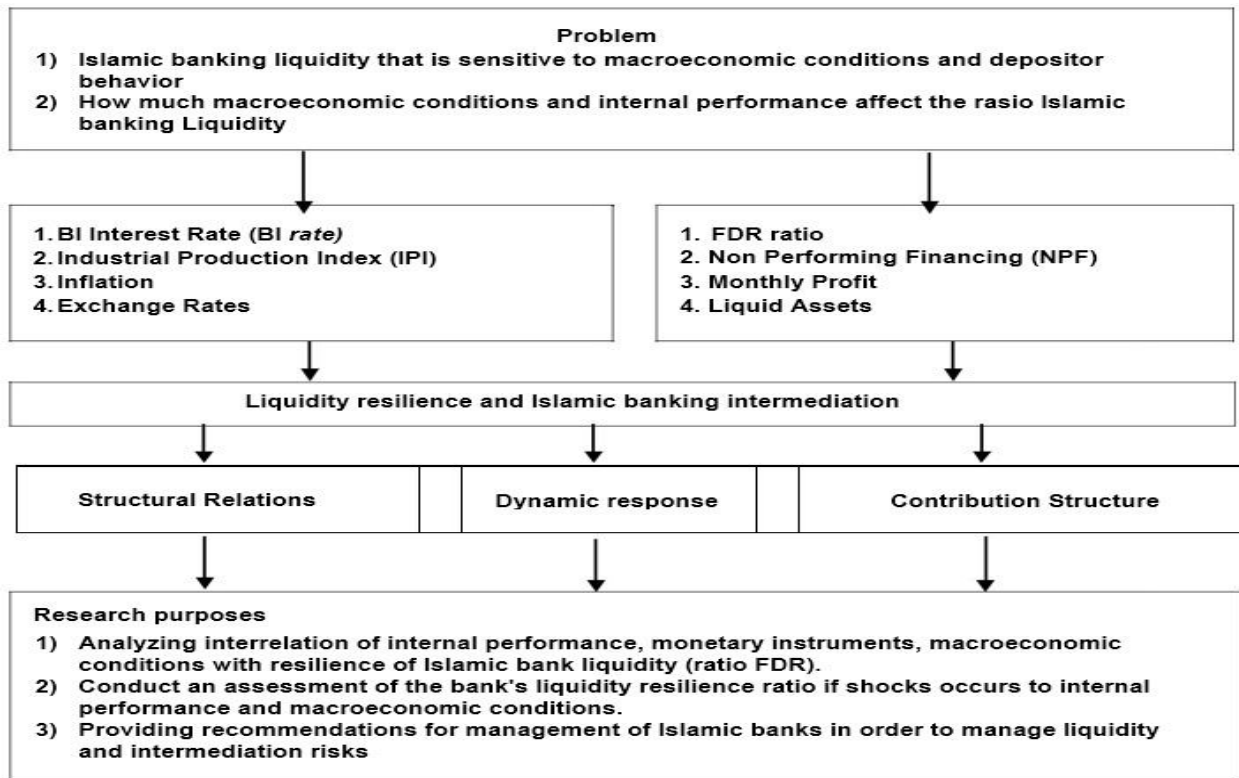


Figure 1. Research Conceptual Framework

The ultimate goal of this study is to find the determinants of liquidity resilience of Indonesian Islamic banking. The model that is built from this study results can be used as a tool for conducting liquidity resilience assessments that are beneficial to sharia bank management in making policies and strategies related to liquidity risk management, especially when deal with a decreasing economic condition.

METHOD

The data used in this study are monthly secondary data time series from January 2001 to May 2015 that sourced from Indonesian Banking Statistics of Bank Indonesia, Financial Services Authority, Central Bureau of Statistics (BPS). [8] The data used are the FDR ratio, the ratio of liquid assets to short-term third party funds, monthly profits, NPF ratio, BI rate, Inflation, Industrial Production Index, and exchange rate against the USD. Another basic consideration for variable selection is equation of bank behavior in banking sector competition which is developed by Freixas and Rochet (2008) as follows: [9]

$$\delta = r_L L + rM - r_D D - C(D, L) \dots\dots\dots(1)$$

Where:

- π = bank profit,
- r_L = loan interest rates,
- L = total outstanding loans,
- rM = moneymarket interest,
- rD = deposit interest rate,
- D = total deposit,
- C = total costs for managing loans and deposits.

The equation is derived and adjusted to the condition of Islamic banking by Ismal (2013) to be as follows: [10]

$$\pi = [(r_f F + rM)(1 - r_b)] - C(D, F) + [r_i L - C(L)] \dots\dots(2)$$

- F = Financing consist of murabahah and mudharabah / musyarakah,
- M = Islamic money market
- L = Financing Ijarah / IMBT,
- r_i = financing income,
- $C(D, F)$ = profit sharing fees for third party funds,
- $r_i L$ = income from ijarah / IMBT financing.

The model can be developed and combined with some previous studies results that are related to relation between macroeconomic indicators and bank performance both in Indonesia and other countries. Variable F as a representation of the FDR ratio, NPF ratio, and IPI. Variable M as a representation of the STM ratio. Variable D as a representation of the SMT ratio and the FDR ratio. Variable C as a representation of BIRate, inflation and exchange rates.

The analysis is carried out using descriptive analysis toward profile of each variable from year to year by explaining

important events during that time period. Econometric analysis using the VAR / VECM model. Liquidity resilience will be explained through the built model and analysis results *Impulse Response Function and Forecast Error Variance Decomposition*.

RESULTS

The variables that will be examined in this study during the period of January 2001 to May 2015 by statistical description is shown in Table 2. Each variable is calculated on average, mean and standard deviation.

Table 2. Summary description of variable statistics for period January 2001 - May 2015

Variable	The mean	Median	Std. Dev
Financing to Deposit Ratio DPK (FDR) (%)	102.79%	101.00%	9.10%
Liquid Asset Ratio to Short Term Funding (STM) (%)	36.90%	36.00%	6.67%
Bank Monthly Profit (PROFIT) (Rp. Billion)	99.52	39.72	129.34
Non Performing Financing Ratio (NPF) (%)	4.36%	4.00%	1.94%
BI Rate (BIRATE) (%)	7.96%	8.00%	2.43%
Industrial Production Index (IPI)	95.76%	93.66%	13.95%
Inflation (INF) (%)	7.73%	7.00%	3.57%
Exchange Rate (USD) (Rp.)	9,736.46	9,300.00	1,120.07

The main funding source for Islamic banking in Indonesia is third party funds. The growth of third party funds in 2014 slowed down to 18.7% compared to 2013 which was 24.4%, in line with moderation of domestic economy. Slowing down of TPF growth occurred in all components of TPF, especially the growth of Savings iB which slowed from 26.9% in 2013 to 11.2% while deposit growth increased. This indicates a shift in public funds to long-term savings in line with rising interest rates BI Rate. This shift causes the cost of bank funds to become more expensive because Islamic banks usually help adjust the profit sharing ratio to compete with conventional banks. This profit sharing ratio adjustment affects bank profitability. Average ratio of liquid assets to Islamic banking third party funds is 26% and to short term third party funds is 36%. The liquid assets ratio is high enough so it is still adequate to anticipate potential risk of fund withdrawals.

The principle of revenue sharing requires Islamic banks to optimize FDR (an average of 102.79%) in order to produce

maximum returns for both depositors and banks. This high FDR does not generate high profits because the composition of third party funds is still dominated by deposit funds that have high profit sharing costs.

Non Performing Financing (NPF) of sharia banking tends to increase although it remains below the safe limit, it is from 2.6% in 2013 to 4.3% in 2014. This financing quality decline causes a decrease in yield of third party funds and has the potential to reduce the growth of third party funds due to the funds transfer to conventional banks that provide higher interest compared to Islamic bank profit sharing (displaced commercial risk), in line with the results of Sundarajan's research (2007). ^[11]

The profitability of Islamic banking from 2001 has always increased from year to year in line with the growth of Islamic banking assets but declined from 2013 to 2014. This is reflected in a decreased ROA ratio and an increased ratio of Operating Costs to Operating Income (BOPO). This

decline in performance was influenced by slowing financing growth and rising NPF.

The dynamics of the financial sector during 2014 showed that inflation control was carried out through fixing increases BI Rate from 7.50% to 7.75% in November 2014. Bank Indonesia reduced BI rate up to 7.50% in May 2015. The impact of interest rates and profit sharing on output as reviewed by Ascarya (2007) is that interest rates have a negative effect on economic growth, while profit sharing has a positive effect on economic growth.

The sharp decline in IPI occurred several times in December 2002 and November 2004. The sharp decline in November 2002 was caused by an increase in consumer price index. The decline in November 2004 was the impact of the weakening of exchange rate of rupiah to US dollar which rise by approximately 600 points. The decline in November 2003 was due to a decrease in the performance of several industries. The decline in November 2005 was caused by an increase in production costs as triggered by the increase in fuel prices in October 2005 and weakening of the exchange rate in August 2005. The decline in October 2006, September 2010 and August 2012 was more due to an increase in inflation which resulted in a decrease in people's purchasing power.

Inflationary pressure in 2014 was caused by a reduction in LPG energy subsidies, Electricity Tariffs (TTL), and fuel oil (BBM). Fluctuation in food prices in the fourth quarter of 2014 occurred due to limited supply due to seasonal factors and the continued impact of rising subsidized fuel prices. The Rupiah tended to weaken almost throughout 2014. The strengthening of the rupiah in the first quarter of 2014 was influenced by positive domestic sentiment in the form of improvement in domestic economic fundamental indicators and optimism about the implementation of the elections. Rupiah weakened again in Q2 / 2014 as a result of moderation in domestic economic growth and domestic political conditions. Pressure on the rupiah increased in the fourth quarter of 2014 due to the strengthening of the dollar index. Rupiah could reach Rp 12,725.00 per US dollar on December 16, 2014. In first quarter to second quarter of 2015, rupiah continued to weaken reaching Rp. 13,145.00, this condition is the highest level since 1998.

ECONOMETRIC ANALYSIS

Granger Causality Test

The test results in Table 3 show that there is a relation between causal effects in both directions and one-way variables. The two-way relation that occurs could be a basis to use the VAR / VECM model.

Table 3. Granger Causality test

Null Hypothesis:	F-Statistics	P-value	Conclusion
FDR does not Granger Cause BIRATE	3.37502	0.0063	Rejected
INFLATION does not Granger Cause BIRATE	2.6401	0.0254	Rejected
BIRATE does not Granger Cause INFLATION	2.54709	0.0302	Rejected
BIRATE does not Granger Cause IPI	3.38966	0.0062	Rejected
NPF does not Granger Cause BIRATE	2.8022	0.0188	Rejected
BIRATE does not Granger Cause NPF	2.60815	0.0269	Rejected
LNUSD does not Granger Cause BIRATE	3.50409	0.0050	Rejected
IPI does not Granger Cause FDR	4.3588	0.0010	Rejected
FDR does not Granger Cause IPI	3.68314	0.0035	Rejected
FDR does not Granger Cause LJP	3.99672	0.0019	Rejected
FDR does not Granger Cause LNPRO	12.9189	0.0000	Denied
FDR does not Granger Cause LNUSD	2.30423	0.0471	Rejected
INFLATION does not Granger Cause IPI	2.86461	0.0167	Rejected
LJP does not Granger Cause IPI	2.60541	0.0271	Rejected
IPI does not Granger Cause LJP	4.3789	0.0009	Rejected
IPI does not Granger Cause LNPRO	6.4699	0.0000	Denied
IPI does not Granger Cause LNUSD	2.72136	0.0218	Rejected
LJP does not Granger Cause LNPRO	5.41482	0.0001	Rejected
NPF does not Granger Cause LNPRO	5.24157	0.0002	Rejected
LNPRO does not Granger Cause NPF	3.07436	0.0112	Rejected
LNUSD does not Granger Cause NPF	3.04613	0.0076	Rejected

Data Stationarity Test

The choice of VAR or VECM model depends on results of data stationarity test. Data stationary test results indicates that not all data is stationary on level so it must be lowered. All stationary data in the first derivative so the model used is a combination of VAR / VECM.

Table 4. Stationarity test

Variable	Level		Conclusion	1 st Difference		Conclusion
	t stat	Prob		t stat	Prob	
FDR	-3.0677	0.0309	Stationary			
STM	-5.4199	0.0000	Stationary			
LNPRO	-1.8490	0.3558	Not Stationary	-4.9776	0.0000	Stationary
NPF	-4.8590	0.0001	Stationary			
BIRATE	-2.5002	0.1172	Not Stationary	-7.1996	0.0000	Stationary
IPI	-0.5384	0.9808	Not Stationary	-6.1725	0.0000	Stationary
INFLASI	-2.7423	0.0691	Not Stationary	-11.0684	0.0000	Stationary
LNUSD	-1.3367	0.6119	Not Stationary	-10.2373	0.0000	Stationary

Optimal lag

Maximum lag amount is formed in the system stably (modulus < 1)is 16 lag. The optimal lag that will be used is based on the most consistent and stable SC indicator, which is lag one.

Cointegration Test

Johansen Cointegration Test used to find out the number of cointegrated equations in the system. Cointegration test results in Table 5 shows that the equation has at least three cointegrations and it is recommended to use cointegrated in lag one so the VECM model can be continued for analysis process next stage.

Table 5. Summary of Johansen's cointegration test results

Trace Statistics						
Ho	R=0	R<=1	R<=2	R<=3	R<=4	R<=5
H1	R>=1	R>=2	R>=3	R>=4	R>=5	R>=6
Trace Statistics	225.6576	155.5550	107.7868	67.55265	33.08790	17.64954
Critical Value of 0.05	169.5991	134.6780	103.8473	76.97277	54.07904	35.19275
Probability.	0.0000	0.0016	0.0267	0.2103	0.8070	0.8574

Model Stability Test

Stability testing results that using VAR *stability condition check* shows the modulus of whole roots of characteristic polynomial less than one, the VAR equation system is considered as stable.

Model Estimation

Johansen cointegration test results with pad lag one with one cointegration in VECM system shows that there is a structural relation both long term and short term between FDR variable with independent variable. Estimated model with these conditions are described in Table 6.

Table 6. Estimates of the FDR VECM model

Dependent Variable D(FDR)		
Independent Variable	Coefficient	t-statistics
Long-term		
STM(-1)	-0.1588	[-4.08183]
LNPRO(-1)	0.5700	[2.04860]
NPF(-1)	-0.7292	[-4.46726]
BIRATE(-1)	0.8114	[4.84055]
IPI(-1)	-0.1209	[-3.40631]
INFLASI(-1)	-0.6134	[-5.35400]
LNUSD(-1)	1.5814	[4.00363]
Short-term		
CoIntEq1	-0.003347	[-2.20975]
D(FDR(-1))	-0.134056	[-1.67348]
D(STM(-1))	-0.115502	[-1.53096]
D(LNPRO(-1))	-0.323178	[-0.83192]
D(NPF(-1))	0.124738	[0.25409]
D(BIRATE(-1))	0.569912	[2.34370]
D(IPI(-1))	0.113518	[2.00493]
D(INFLASI(-1))	-0.112035	[-0.47556]
D(LNUSD(-1))	-15.92827	[-2.09832]

The structural relation of each variable has a significant error correction variable to FDR ratio is 0.0033%. This explains that there is an adjustment from short-term equation to

long-term equation as big as 0.0033%. In other words, in every month errors are corrected by 0.0033% towards the long-term balance.

Long-term Internal Dynamics

The STM ratio variable in the long run has a significant negative effect that is if STM ratio increases by 1%, FDR ratio will decrease by 0.16%. This shows that Islamic banking will be liquid if STM ratio rises.

Profit variable has a significant positive effect on the FDR ratio, if there is an increase in profit of one percent then the FDR ratio will rise 0.57%. This shows that banks which are expansive in financing in order to increase their profits will have the consequence of a high FDR ratio, in other words bank liquidity will decrease.

The NPF variable has a significant negative effect on the FDR ratio variable. A one percent increase in the NPF ratio will reduce the FDR ratio by 0.73%. This shows that the sharia banking strategy in dealing with the increasingly high NPF ratio is by consolidating and improving the quality of financing rather than expanding financing, so that the FDR ratio will indirectly fall.

Long-term External Dynamics

BI interest rate variable (BI rate) has significant positive effect on the FDR ratio variable. One percent increase in BI rate will raises the FDR ratio by 0.81%. An increase in the FDR ratio can occur due to a decrease in third party funds due to a move to conventional banks that provide higher interest rate compared to Islamic bank (displaced commercial risk) according to Hasanah's research (2013). Islamic banks will also conduct financing expansion activities at the time BI rate go up to get a greater margin / profit share, in line with the findings of Kader (2009) This condition is what distinguishes Islamic banking from conventional banking. ^[12] When BI rate rise, conventional banks will increase the loan interest rate so that it can withdraw funds from public automatically so conventional banks will increase the loan interest rate.

IPI variable which is an indicator of the development of the real sector has a significant negative effect on FDR ratio. A one percent increase in IPI will reduce the FDR ratio by 0.12%. The composition of Islamic bank financing based on its use benefits based on Sharia Banking Statistics-OJK in June 2015 is 61% of productive sector and 39% of consumption sector. This condition illustrates that when the growth of the real sector increases, the ability to pay financing customers will increase and excess customer liquidity will be deposited to the bank.

Inflation variable has a significant negative effect on FDR ratio. A one percent increase in inflation will reduce the FDR ratio by 0.61%. The decreased FDR ratio was caused by an increase in third party funds that was greater than the increase in funding distribution. This condition is different from Haron and Azmi (2005) research results in Malaysia which found that inflation had a negative effect on Islamic bank deposits in Malaysia. High inflation will cause funds withdrawal by customers to maintaining their level of consumption because price increases.

USD exchange rate variable has a significant positive effect on the FDR variable. The average composition of third party funds in Islamic banking is 60% in the form of time deposits. Deposit third-party fund customers in Indonesia are customers who are sensitive to changes in the rate of return. USD exchange rate will be followed by an increase in inflation. This condition make depositors withdrawing their funds to be placed in USD so the value of the money would not depreciate.

Impulse Response Function Analysis

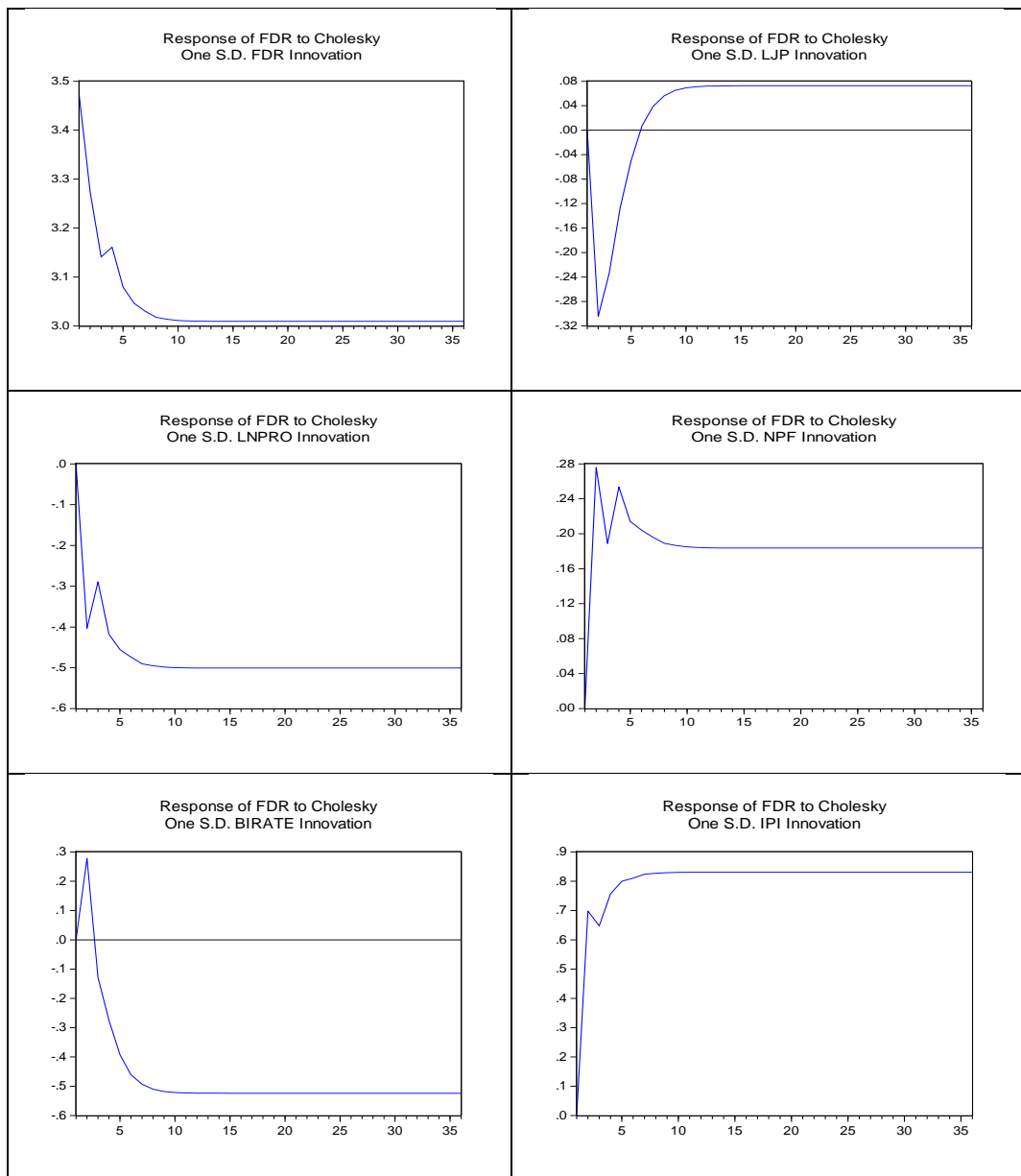
Impulse response function analysis used to determine the magnitude of the FDR ratio response in the short term if there is innovation or shock to the independent variables. This study uses standards Cholesky Decomposition in produce impulse response and determine the order of variables in the system. Table 7 shows the

response, direction and trend of changes to the FDR ratio variable for each variable

involved in the system, if an innovation or shock is made to one standard deviation.

Table 7. Summary Impulse response function

INNOVATION	RESPONSE			STABLE	
	SCORE (%)	DIRECTION	TREND	VALUE (%)	PERIOD
FDR	347	+	down	300	15
STM	30	-	ride	7	15
LNPRO	40	-	down	50	11
NPF	28	+	down	18	14
BIRATE	28	+	down	52	13
IPI	70	+	ride	80	11
INFLATION	5	+	ride	75	15
LNUSD	57	-	ride	38	17



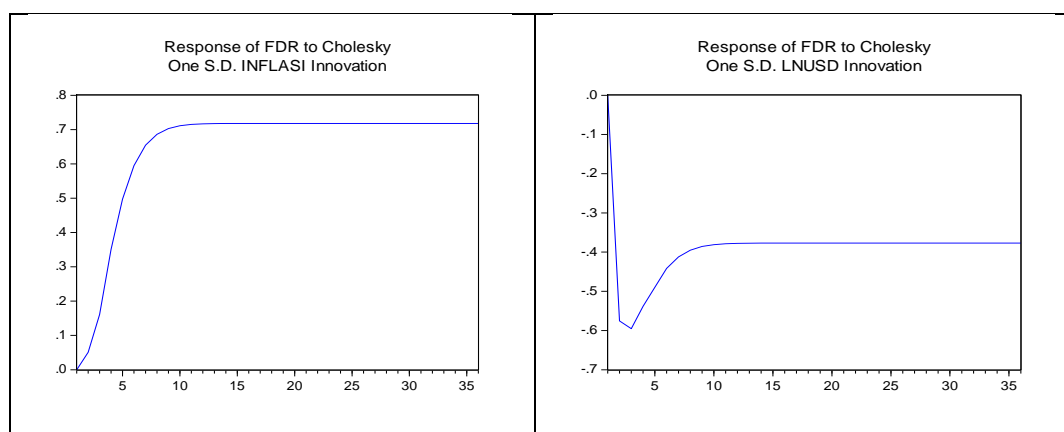


Figure 2. IRF curve

Response of the FDR ratio to the FDR ratio itself is the highest response compared to other variables. The average FDR ratio of Islamic banking during 2001-2014 was 102%, higher than the conventional bank LDR which averaged 70%-90%. This shows that sharia banking liquidity risk is higher compared to conventional banks but also has a better intermediation function compared to conventional banks. When the condition of Islamic banks is $FDR < 100\%$, the excess liquidity will be placed on other liquid asset instruments.

FDR's response to bank profit ratio can show the quality of Islamic banking asset and liability management. An optimal FDR ratio can produce a balance between return which will be obtained with the liquidity risk that will be faced.

The shock condition on NPF causes banks to conduct activities to reduce the NPF ratio. In the short term if bank still has a loose capital adequacy ratio (CAR), bank will increase financing expansion to reduce the NPF ratio.

Response of Islamic bank deposits customers is sensitive to the rate of return when BI rate going up is transferring funds from Islamic banks to conventional banks. This condition causes the FDR ratio to increase, while Islamic banks cannot raise profit sharing of third party fund products in the short term like conventional banks that raise interest rates. The interest of Islamic banks' third party funds depend on the margin income / profit sharing received

from financing customers. Sharia bank financing portfolio of 60% in the form of murabahah financing which has a fixed margin characteristic until due date. Islamic banks maintain the position of third party funds so they doesn't move to conventional banks in the short term by adding bonuses outside of profit sharing so the return rate approach the conventional bank interest.

Long-term effect of IPI is inversely proportional to short-term response of the FDR ratio. High economic and real sector growth in long run will result as decrease in goods prices, increased public purchasing power and the ability to pay for financing customers will also increase.

Inflation causes the price of raw materials to rise so that financing customers will need additional working capital financing to maintain business volume and production capacity.

The long-term relationship between USD exchange rate variable and FDR ratio has the highest value among other variables, even though the volume of forex transactions in Islamic banking is insignificant. The USD exchange rate has a significant positive effect on the FDR ratio through inflation and NPF in line with the findings of Achsani, Fauzi, and Abdullah (2010) study. ^[13]

Dynamic contributions using FEVD

Dynamic contributions using Forecast Error Variance Decomposition where each variable will be presented in the form of a curve as in Figure 3.

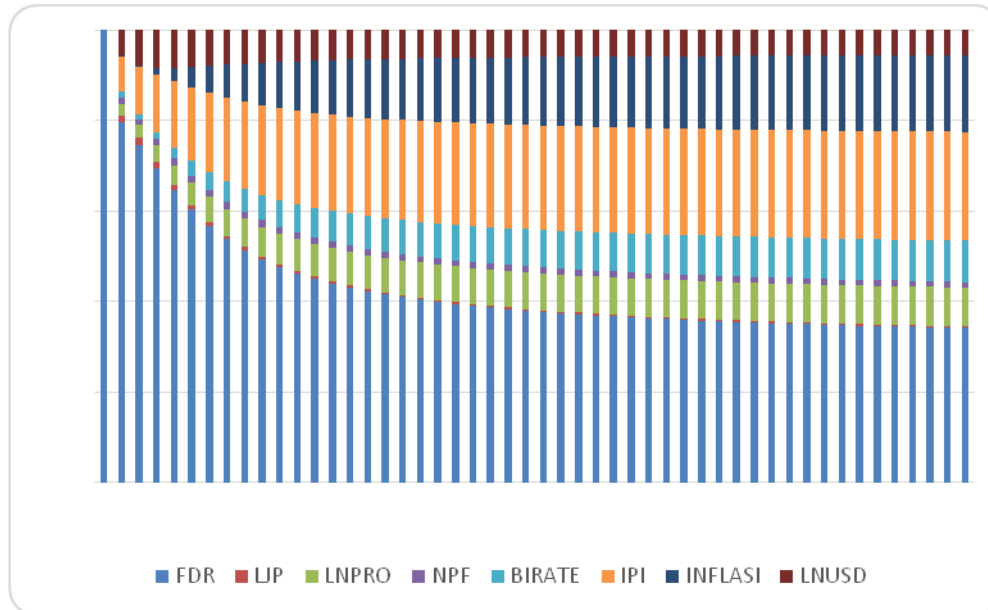


Figure 3. Dynamic contribution curves using FEVD

In the first one year period, the FDR ratio was most influenced by the FDR ratio is 86.82%, IPI is 5.88%, USD exchange Rate is 3.55%, STM ratio is 1.46% and the rest was influenced by Profit, Inflation, BI rate and NPF in small proportions respectively 0.94%, 0.78%, 0.29%, and 0.26%. The general contribution pattern of all variables to the FDR ratio is almost the same, that is achieving stability starting in the 25th period. In other words, the response to shocks in changing macroeconomic conditions and internal performance conditions to liquidity resilience is indicated by the FDR ratio variable will perceived by Islamic banking only for two years. Furthermore, the FDR ratio variability will be stable again. This shows that the economic crisis did not affect Islamic banking financial performance in short term as Noraini (2012) found.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The durability of Islamic banking liquidity (FDR ratio) has a structural relation with ratio of liquid assets and short-term funding (SMT), the ratio of non performing financing (NPF), monthly profits, interest rates Bank Indonesia (BI

rate), Industrial Production Index (IPI) and inflation, and USD exchange rate. Internal variable ratio of non performing financing significantly influences the FDR ratio in long run. External variables USD rate and BI exchange rate significantly affect the FDR ratio of Islamic banking in the long run.

Innovations from the FDR ratio, NPF ratio, BI rate, IPI, and inflation, in the short term get permanent positive response by the FDR ratio, while monthly earnings innovation, STM ratio, and USD exchange rate in the short term are responded negatively by the FDR ratio.

Variables that have potential to cause liquidity risk are variables that have a positive effect on the FDR ratio. Variables that in the short term have the potential to cause liquidity risk are NPF ratio, BI rate, Production Index (IPI), and inflation, while in the long run are profit, BI rate, and the USD exchange rate.

Based on the dynamic contribution of each variable, the most defined variability of the FDR ratio is the FDR ratio itself, then the Industrial Production Index, USD exchange rate. Based on the origin of the contribution, internal conditions give more contribution than external conditions.

Implication

The implications for Islamic banking to mitigate liquidity risk due to macroeconomic conditions are to maintain and increase the rate of return of third party funds in order to compete with conventional bank interest rates as follows:

- Islamic banking in reducing growth of large financing to corporations and increasing the growth of financing to the sector high margin (micro, small and medium). A financing agreement that is more accommodating of BI conditions rate which fluctuates is a rent-based agreement (*ijarah muntahiyah bi tamlik / IMBT*) because rental income can be adjusted according to market interest rate conditions (*floating*).Cooperation / profit-sharing agreements (*musyarakah* and *mudharabah*) are only given to business sectors that are resistant or growing during an economic crisis such as business related to basic needs and their derivatives. Profit sharing financing is also only given to businesses with definite sources of income that is based on contracts such as project financing and procurement from government or private sector. Banks must maintain quality of their productive assets by closely monitoring customer liabilities and businesses and trying to reduce NPF.
- Islamic banking does retail funding to increase composition of third party funds current accounts and savings so that dependence on expensive funds begins to decrease and carry out existing customers retain programs so they don't transfer funds to conventional bank.
- Islamic banking must reduce dependence on third party funds as a source of financing funds. This can be done by creating a bound investment fund product (*mudharabah muqayyadah*), issuing medium-term and long-term sukuk, funding sources from the syndicated market, and adding capital from shareholders.

- Islamic banking must start creating foreign exchange based products to accommodate customers who have income in USD and accommodate those related to the Hajj.
- Islamic banking must improve competence of human resources in order to be able to provide information and outreach to public, so they not only to conduct product sales activities.

Suggestion

This liquidity resilience research can be further developed by using other variables such as CAR, IHSG capital, gold price, and conventional bank internal performance variables. Liquidity resilience research can also be done by differentiating based on bank assets and bank capital, or comparing it with sharia banking liquidity resilience at the ASEAN regional level. Use of other models in liquidity resilience research, such as ARDL or structural VAR.

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How to cite this article: Susandi, Achسانی NA, Ismal R. The liquidity resilience of Islamic banking in Indonesia. *International Journal of Research and Review*. 2020; 7(8): 137-148.
