

MONETARY POLICY SHOCKS AND ISLAMIC BANKS DEPOSITS IN INDONESIAN DUAL BANKING SYSTEM AFTER THE FINANCIAL CRISIS

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Abstract

Use of riba (usury) in the economic system remained a key factor that led to financial crisis since the inception of modern economy in the late of 17th century. Implementation of interest based monetary policy stipulated rampant speculation as common practices in the global financial sector. Although Islamic banking was governed by syariah (Divine Law), which was assumed to be resilient from distress, the volatility of interest movement would generally affect Islamic banks operations in a dual banking system. This paper would look at this issue and would empirically explore the dynamic inter-relationships between deposits of Islamic banks with monetary policy variables in Indonesia. In terms of market share, as of 2009, Islamic banking asset in Indonesia was a meager 2%. The industry had been affected by few monetary policy shocks on its deposits and financing. The study would employ vector auto regression model (VAR) to explore the dynamics between the variables. The study would focus on data from 2004 to 2008 or performance after the Asian financial crisis. The results from these tests determined that syariah based deposits played significant role in transmitting monetary policy effects to the economy. This study found that Islamic banking deposits in Indonesia were not sensitive to monetary policy changes. This study also concluded that Indonesian Islamic banks were resilient to financial crisis.

Key words: *monetary policy, Islamic banks, conventional banks*

Indonesia as many other countries especially who adopt dual banking system possess valuable Islamic banking opportunities instead of challenges ahead. One of the challenges that should be taken into account is the monetary policy that hitherto inherent in Islamic banking and finance operations. The merit of interest rate has been extensively considered as integrated principle of banking operations applied by many countries including Indonesia amid the rapid growth of Islamic banking and financial institutions.

Nevertheless, the above circumstances have reliable link with monetary policies which is controlled by central banks. At this stage, the policy assumed to be associated with the fluctuation of interest rate although Islamic banks recorded resilient to the financial crisis. In addition, these policies dominated by conventional thought (capitalism) that has been ruled the national economy since the inception of Islamic banking in Indonesia in the late of 1991.

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As a country who adopt dual monetary system, Islamic finance considered as a balance methodology to the conventional system. The conventional system has been brought the national economy into speculative business which is relied on the fluctuation of interest rate. In addition, this system evidenced the sluggish growth of real sector which lead to the slow down of economy. Therefore, it is no doubt that Islamic finance which is based on profit and loss sharing support the growth of real sector and become balance power to the conventional practices. However, this power strongly depend on the portion or contribution of Islamic banking and finance that might contribute to the development of national economy.

The role of a financial intermediaries such as banks emanates from the balance sheet items; both assets and liabilities. Money channel highlights the importance of banks in generating liabilities such as deposits. Banks create money through the deposits and other placement earnings from customers, banks and other financial institutions. For instance, a contraction in money supply, reduces the banks' reserves due to reserve requirements. Although theoretically, Islamic banks and conventional banks in a dual banking system are governed by different philosophical foundations, it is inevitable that these two systems may interact given that they operate in a common macroeconomic environment. For instance, although the Islamic banks operate within the interest-free framework, the macroeconomic environment in a dual banking system exposes them to problem associated with interest rate risks faced by conventional banks (Yusof et.al, 2008). This paper therefore seeks to investigate the proposition that Islamic banks are not susceptible to interest rate changes given that its asset-linked nature as compared to their conventional counterparts. Objectives of the research to examine the influence of monetary policy shock towards Islamic bank's deposit and which variable is strongly influence the Islamic banks deposits.

Manurung (2008) defined monetary policy as a control to direct the desired economy by way of

regulating the number of money supply. In a conventional system, better macroeconomic condition interpreted as an increase of balance output or maintaining the price stability. Meanwhile according to Chapra (2000), the Islamic economic system or monetary policy comprises three goals namely (a) full employment and economic growth, (b) Equal distribution of resources and (c) stable value of money. Among these three targets, equal distribution of resources remain significant characteristics. Therefore, in a monetary system, the interest rate should be abolished since this only contribute to the sluggish economy.

The disadvantage of interest rate framework not creating the interest based economy abandoned by its followers. This can be seen from the domination of capitalist system who control the world economy although some of them adopt dual banking system like Indonesia. Ascarya (2008) viewed that only small part of Islamic monetary system can be implemented, namely the prohibition of interest rate although this considered as small contribution to the whole economy while the rest remain statu quo. This evidenced that Islamic system not perfectly implemented and still influenced by the conventional practices. By this system, it is not surprise that the monetary policy reflect capitalist economic system which in turn the transmission of monetary policy definitely influence the economic system as well as Islamic finance.

Empirical assessment on the merits of the interest-free banking system has been initiated by Darrat (1988) who showed that the banking system in Tunisia becomes more stable without interest-bearing assets than if these assets were to exist. More recent studies such as Darrat (2000) and Kia (2001) provide further empirical evidences on the advantages of the interest-free monetary and banking system by focusing on the case of Iran which has a long history in implementing a full-fledged interest-free monetary and banking system since 1984. These studies find that both short and long-run interest-free money demand functions are stable and their coeffi-

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clients are invariant with respect to policy and other exogenous shocks. Kia & Darrat (2003) compare the demand equations for money and profit-sharing deposits and find that the demand for profit-sharing deposits possesses the most stable and policy invariant function, suggesting that profit-sharing banking scheme insulates the monetary system from interest rate fluctuations and minimizes the possibility of financial instability. Consequently, it is further suggested that the profit-sharing deposits could represent a credible instrument for monetary policy-making in Iran.

Yusof et.al (2008) conducted a study on dynamic inter-relationships between deposits of Islamic banks with monetary policy variables in Bahrain and in Malaysia. Both these countries are being dubbed as the worlds' largest International Islamic Financial Hubs. A comparative analysis between these two countries highlights the differences and similarities of the impact of monetary policy shocks on the Islamic banks' deposits. The analysis comprises of two major testing approaches. First, the auto-regressive distributed lag (ARDL) model is used to examine the long-run relationship among the variables. Second, the vector error-correction model (VECM) is adopted to explore the short- and long-run dynamics between the variables. The study focuses on the Malaysia and Bahrain data covering the period from January 2001 to June 2006. The results from these tests would determine if the deposits play a significant role in transmitting monetary policy effects to the economy. Compared to the Malaysia Islamic banks' deposits, the study finds that the Islamic banks' deposits in Bahrain are sensitive to monetary policy changes. This implies that the Bahrain Islamic banks are less capable to offset the de-stabilizing impact of monetary policy as compared to its Malaysian counterpart.

Haron & Ahmad (2000) delivered the facts concerning the relationship between number of deposit in Islamic banks and level of return. The study found that the muslim depositors who placed their fund in saving facility and investment grounded by

profit motive. The study confirmed that there is negative relationship between interest rate of conventional banks and number of deposit which is interest free based facility.

Meanwhile Haron & Azmi (2005) concluded their study that GDP, increase of money supply (M3), composite index and inflation will increase the number of deposit in Islamic banks.

Yusoff et.al (2007) conveyed their finding that the success of government policy in economy has positive influence towards income per capita of Malaysian and directly or indirectly influenced the growth of deposit in Islamic banks as well as conventional banks.

Ascarya et.al (2008) revealed that according to their study the behavior of money demand in dual monetary system in Indonesia that mudharabah deposit has positive respond towards GDP shock and negative respond towards mudharabah return as well as expected inflation. As for interest rate, they did not include in the model so the result could not be determined whether interest rate has influence towards deposit of Islamic banks.

Malaysia currently practised dual banking system where the conventional banks operate hand in hand with the Islamic banks. Despite the different philosophical foundations governing the two systems, they are both subject to the same macroeconomic conditions. Bacha (2004) reiterates that nevertheless, the differences may lie in the profile of the customers that subscribe to both banking systems. The non-Muslim customers constitute of a larger group of customers for both these systems. There is always a possibility of switching between the two systems. Theoretically, the non-Muslim depositors can take advantage of the arbitrage that arises from the rate differentials between the two systems. Although some studies have found that even the Muslim depositors in Malaysia switch between the two systems to take advantage in terms of the rate differentials (Sukmana & Yusof, 2005).

ISLAMIC BANKING IN INDONESIA

The rapid growth of Islamic banking in many countries certainly influenced Indonesia. During 1980s, studies supporting Islamic banks as foundation of Islamic economics has been conducted. Conventional commercial banks have been in operation in Indonesia since 1895 through the establishment of Bank Rakyat Indonesia (BRI), the first and pioneer bank in Indonesia since the colonial period. BRI was known as a small-scale financial institution named *De Poerwokertosche Hulp en Spaarbank der Inlandsche Hoofden*, founded by Raden Bei Aria Wiriaatmadja on December 16, 1895 in Purwokerto Central Java. This institution managed mosque treasury funds to be channeled to the public with a very simple repayment scheme (Lindblad, 2000).

The monetary crisis in 1997 and the national political crisis had resulted in financial turmoil and great impact to the national economy especially to the Indonesian banking sector that was dominated by the conventional system. During the crisis period, many financial institutions, including banking institutions, experienced financial hardship. High interest rate has resulted in high cost of capital to the entrepreneurs in the real sector and finally caused low productivity. As a consequence, the banking system started to lose its intermediary function as indicated by a low LDR ratio. In 2000 the NPL of conventional banks was 26.77% while their LDR fell and remained below 50%. Therefore the government has to resolve this situation to stabilize the economy as a whole. The banking sectors needed to be rejuvenated into a dual system that allows Shariah principles to operate in the banking practices.

Shariah banks in Indonesia, during and after the financial crisis had performed better than conventional banks as indicated by the low level of NPL, which was only 12.96%. In addition, the LDR of Shariah banks maintained above 100%. The lesson of Bank Muamalat Indonesia that did not experience the negative spread during the financial crisis and was not affected by a bloomy interest disaster that was becoming a disease in conventional economics based

on interest should be taken into consideration. The success story of Bank Muamalat Indonesia is shown by its performance during 1998-2009. The significant attainment of financial performance was its natural capital employment that increased 9 times from Rp 39 billion in year 1998 to Rp 311 billion by the end of 2003. However, the most important contribution to its success was the implementation of Shariah principles, non interest based policy and upholding the profit and loss sharing principle in extending credits and other form of investment activities (Affandi, 2007).

Since the beginning of Islamic banking in Indonesia, the number of Islamic banks has grown tremendously especially after the formal release of prohibition on interest rate in banking practices by MUI (Indonesian Council of Ulama) in 2004. In 2009, the number of Islamic commercial banks increased to 6 compared to previous years which was only 4, while Islamic Business Unit increased to 25 and 139 Islamic Rural Banks respectively. In addition, the act no 21 year 2008 concerning Islamic banks has been formalized which stipulates the development of Islamic banks in Indonesia.

The success story of Bank Muamalat Indonesia in facing the financial hardship in 1997 that rocked the banking industry was the starting point for banks to operate based on Shariah principles in Indonesia. The resilience of Shariah banks is the evidence of public needs towards non-interest based practices in the banking operation. In order to accommodate these needs, the government through Bank Indonesia has stipulated Banking Act 10 1998 following the issuance of edict or fatwa by Indonesian Council of Ulama (MUI) in 2004. Therefore, it is time for Shariah banks to grow better without interest.

METHOD

As dual banking system, the determination of profit and loss sharing somewhat influenced by the fluctuation interest rate. Theoretically, the model shall come up with a money demand model as proposed by Keynes as follow:

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$$IDepositst = \delta_0 + \beta_1 IIBt + \beta_2 GDPt + \beta_3 RERt + \epsilon_t$$

$$\ln IDepositst = \delta_0 + \beta_1 IIBt + \beta_2 \ln GDPt + \beta_3 \ln RERt + \epsilon_t$$

The model exhibits some variables that influence Islamic banking deposit denoted by PLS as profit and loss sharing. The GDP represent the growth of an economy and therefore may be regarded as determinant of deposits in the banking system. An increase in GDP is expected to have a positive effect on the Islamic banking deposits (Yusof, et.al, 2008). While RER is expected to be negative. An increase in real exchange rate will attract people to have deposit more in Islamic banks. Meanwhile, in order to make the data is stationer, the model should be transformed into natural logarithm (ln). The data employed can be summarized as follow Table 1.

VAR (Vector Error Correction Model)

The main problem associated with generating model is determination of VAR as appropriate model. Initially, this paper has intention to employ VECM (Vector Error Correction Model), however, due to certain characteristics of the model, this paper finally concluded with VAR, the theoretical ground on this matter will be elaborated further in the next chapter.

In general, VAR describes the relationship that lead causalities among the variables within the system by way of increasing intercept. This model generated by Sims in 1980 that assumed all variables determined in the model which is not based on theoretical grounds. If the data are stationer at first dif-

ference, then VAR model would be combined with error correction which is known as Vector Error Correction Model (VECM). Impulse respond analysis conducted to overview the respond of endogen variable towards variable shock in the model. Meanwhile, variance decomposition analysis conducted to see relative contribution of one variable in elaborating endogenous variabilities. To explore further on the step of VAR will be described as follow Figure 1.

Figure 1. The Step VAR

As general exercise, time series economic data is stochastic and not stationer, meaning it has unit of root. The first step to estimate this model is by way of testing stationarity of the data or unit of root test. If there is unit of root, then it is difficult to estimate this model since the data tend to fluctuate not around the average value. In this case, it can be concluded that the data which is stationer will tend to approach average value and fluctuate around the average value.

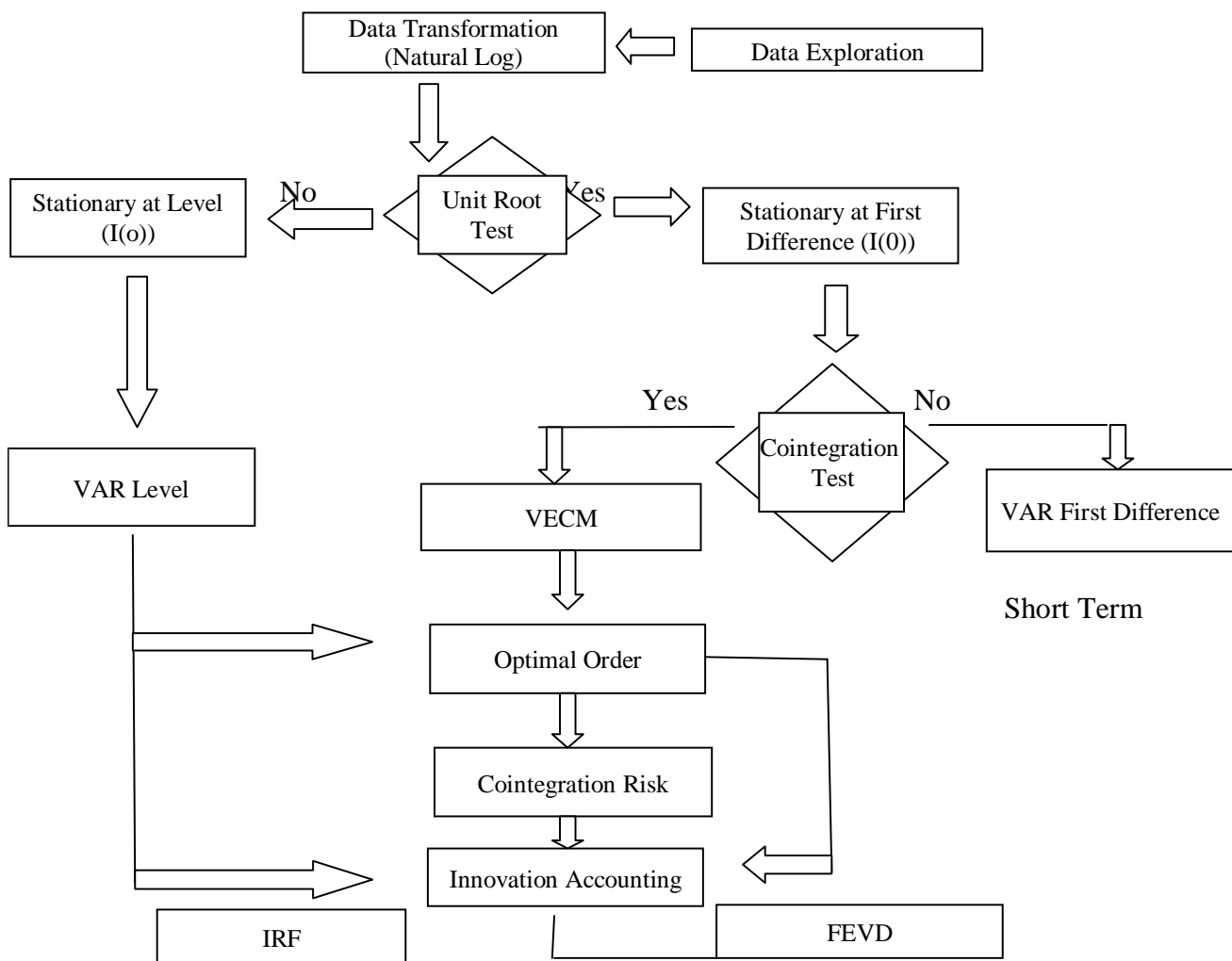
This study also applied Augmented Dickey Fuller (ADF) Test and Phillips-Peron (PP) to test stationarity of each variables. The result of ADF test will be compared with McKinnon Critical Value. Meanwhile, to determine the number of lag (ordb) in VAR model can be determined according to AIC (Akaike Information Criterion) criteria, Schwarz Information Criterion (SC) or Hannan Quinnon (HQ). The chosen lag in this study is the model with lowest value of HQ. At this stage, the stability of VAR model is being tested. Determination of lag optimum and VAR stability test conducted first before moving to cointegration test.

Table 1. Summary Data Employed

Variable	Description	Measurement	Source
ID	Islamic banks' Deposits in Indoensia	Total deposits in the Islamic banking system.	BI
M2	Real broad-Money Supply	Money Supply M2	BI
	Profit and Loss Sharing in Islamic Banks	Profit and Loss	BI
GDP	GDP	GDP or total output	BI
REER	Real Effective Exchange Rate	Exchange rate calculated using the value of Indonesian trade and areas as its weights adjusted for inflation rate differences.	BI

If stationarity at first difference or $I(1)$, then test should be conducted to view the possibility of cointegration. The concept of cointegration basically to see the balance in the long run among the observed variables. Sometimes, individual data is not stationer, but when it is compared with linear data it becomes stationer. This what is called as cointegrated. Apart from that, cointegration test conducted through Johansen procedure. In this test, the determination of conitegration can be seen from trace statistic and max eigen statistic which is higher critical value and indicates there is cointegration in the model used.

In conducting analysis, VAR has specific instrument that is specific function in explaining among the variable in the model. This instrument comprises of IRF (Impulse Response Function) and FEVD (Forecast Error Variance Decomposition) or known as Variance Decomposition (VDI). IRF is an application of vector moving average that is aimed to see the period of shock from independent variables to other variables. Meanwhile, VD in VAR has the function to analyze some shocks from one variable to influence other variables.



Source: Ascarya (2007)

RESULT

Stationarity Test

This research employing time series data that includes stationarity test since the variables used are stationer variables. The stationarity test conducted each variable using unit root of test and specifically ADF (Augmented Dickey Fuller) or Philip Peron for structural break data. The result of unit root test at level indicated that all variables are stationer and therefore does not proceed to difference. This can be seen from the absolute value of ADF where the power sign of IB and RER indicate the data fluctuate using intercept. Meanwhile, the power sign for GDP and ID indicate trend of data and intercept. As for IB it is found to be statistically significant at 5% while the rest are found statistically significant at 1%.

Table 2. Unit Root Test

Variabel	ADF/PP statistics
IB ¹⁾	-3.047599**
LNGDP ²⁾	-4.197070*
LNID ²⁾	-8.255255*p
LNRER ¹⁾	-4.727475*p

* significant at $\alpha=1\%$

**significant at $\alpha=5\%$

¹⁾ using intercept

²⁾ using intercept and trend

Lag Optimum

The option of proper lag related to VAR analysis determined through gradual form of testing. First,

the option of lag optimum can be seen from stable VAR system through invers root values and polynomial AR characteristic. VAR system is said to be stable when all roots have smaller modulus than one and all are located at unit circle. In this case VAR satisfies the stability condition at lag 1 to 3. This can be seen from the following Table 3.

Table 3. Choosing Optimum Lag

Roots of Characteristic Polynomial
 Endogenous variables: LNID IB LNRER LNGDP
 Exogenous variables: C
 Lag specification: 1 3
 Date: 03/29/05 Time: 17:17

Root	Modulus
0.944831	0.944831
0.846204	0.846204
0.506371 + 0.424542i	0.660793
0.506371 - 0.424542i	0.660793
-0.612326 - 0.224970i	0.652346
-0.612326 + 0.224970i	0.652346
0.301560 - 0.534229i	0.613465
0.301560 + 0.534229i	0.613465
-0.007510 - 0.457575i	0.457636
-0.007510 + 0.457575i	0.457636
-0.393734 + 0.210862i	0.446642
-0.393734 - 0.210862i	0.446642

Table 4. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	540.7875	NA	5.61E-19	-30.67357	-30.49582	-30.61221
1	623.8772	142.4395*	1.22E-20*	-34.50727*	-33.61850*	-34.20046*
2	637.0069	19.50703	1.50E-20	-34.34325	-32.74346	-33.79100
3	644.3364	9.214205	2.72E-20	-33.84779	-31.53699	-33.05010

* 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

The next step determining the length of optimum lag using existing information. The chosen of lag candidate is the long lag according to Likelihood Criteria (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), Hannan-Quinn Information Criterion (HQ). If information criteria only indicates at one lag candidate, so that candidate is optimum. However, if it is more than one lag candidate, so the voting of lag optimum will proceed to the further step. The result of lag at information criteria indicate that the chosen lag is lag 1. The following Table 4 elaborates more on the above process

Ordering

Before VAR analysis being conducted using IRF (Impulse Response Function), the study examined the need of ordering based on causality test. Ordering is required when the value of correlation residual among variables in the system (> 50%) is more than 0.2. Otherwise, the form of proper ordering will be based on economic theory. The following table shows

that the model does not require an ordering model since all variables more than 0.2.

Table 5. Residual Correlation Matrix

LNID	IB	LNRER	LNGDP
1.000000	0.018594	-0.075863	0.009691
0.02	1.000000	-0.101982	0.085461
-0.075863	-0.101982	1.000000	0.11
0.009691	0.085461	0.112350	1.000000

Causality Test

After optimum lag is identified and before analyzed using VAR, this study examined first the causality test of each variables. This test is conducted to see how far the causalities among variables that will be analyzed using VAR. The causality test conducted using Pairwise Granger Causality with optimum lag. Null hypothesis of this test is variable x does not influence variable y or vice versa so null hypothesis will be rejected if the value of probability smaller than alpha. According to causality test, only GDP variable that cause ID variable.

Table 6. Impulse Response Function

Period	LNID	IB	LNRER	LNGDP
1	5.479558 (0.65493)	0.000000 (0.00000)	0.000000 (0.00000)	0.000000 (0.00000)
2	-0.494855 (1.16874)	0.620925 (1.08919)	-0.555523 (1.15396)	-1.263065 (1.04856)
3	-0.192367 (0.93155)	0.558393 (1.25000)	-0.508842 (1.15235)	0.496124 (1.02928)
4	-0.429818 (0.88111)	-0.732147 (0.96310)	-0.875061 (1.18768)	0.427930 (0.58330)
5	0.284109 (0.55563)	0.120833 (0.69400)	-0.518168 (1.07984)	0.005956 (0.48955)
6	0.145603 (0.38194)	-0.514105 (0.62869)	0.579345 (0.82030)	0.187776 (0.35694)
7	0.148396 (0.34077)	-0.019390 (0.39147)	-0.025734 (0.60675)	-0.074007 (0.27805)
8	-0.024772 (0.23226)	-0.188662 (0.38451)	0.342766 (0.62663)	0.064934 (0.22138)
9	0.055524 (0.19000)	-0.075190 (0.26629)	-0.278821 (0.39547)	0.050382 (0.14685)
10	0.044836 (0.13945)	-0.034670 (0.26657)	-0.049895 (0.31028)	0.069460 (0.14509)

Cholesky Ordering: LNID IB LNRER LNGDP
Standard Errors: Analytic

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IRF

Impulse respond is used to see the contemporary influence of one serial to other variable. The result of this impulse respond depending on the ordering from serial variable used in calculation. The result of IRF showed the response of variable towards shock as described by the following Table 6.

The result of impulse response showed the changes in standard deviation from variable GDP which does not affect any thing to other variables. The IB (Profit and Loss Sharing) initially does not affect other variables. In fact, it indicates the Islamic banks' deposit positive influence towards IB (Profit and Loss Sharing). However, during 4th month (-0.732147), it is found that ID has negative respond with small fluctuation until 7th month (-0.019390). Nevertheless, the data shows that along the period (10 months) ID has stable shock. It means Islamic banks' deposit is resilient amid monetary policy shocks.

Meanwhile, the response of ID towards RER (real exchange rate) showed negative influence until the period of 5 (-0.518168). However, the fluctuation of real exchange rate showed small shock and in fact Islamic banks' deposit demonstrated stability of ID until the end of period. This evidenced that ID is really strong towards any monetary policy shocks as indicated by the above table.

As for GDP, ID has no influence at the first stage towards other variables. However, only during the

period of 2 (-1.263065), it has negative response towards GDP although it is recorded quite small shock. However, along the period, ID has strong stability showed by positive response towards other variable. It means, Islamic banks' deposit proved to be resilient.

FEVD

The Choleski Decomposition is forecasting structure on error variance from certain variable. After conducting dynamic behavior through impulse response, the next step is to see characteristic model through variance decomposition. The result of decomposition shows that Islamic banks' deposit has own influence amid the monetary policy shock. The table as well as the graph proved that other variables contributed only small portion of shock that might influence Islamic banks' deposit (Table 7).

CONCLUSION

Indonesia as many other countries who adopt dual banking system experienced dramatic changes of monetary policy shocks that associated with the development of Islamic banking industry. In this case, Islamic banks' deposit remain resilient financial instrument amid the fluctuation of interest rate as principle practices of conventional banks. Therefore, it is interesting to examine the stability of Islamic banks' deposit in Indonesia as hitherto adopting interest rate as monetary policy that influenced banking industry.

Table 7. Variance Decomposition

Period	S.E.	LNID	IB	LNRER	LNGDP
1	5.479558	100.0000	0.000000	0.000000	0.000000
2	5.706131	92.96839	1.184118	0.947809	4.899687
3	5.780466	90.70339	2.087014	1.698478	5.511118
4	5.923127	86.91335	3.515590	3.800250	5.770809
5	5.953762	86.24893	3.520693	4.518699	5.711674
6	6.008634	84.73955	4.188753	5.366203	5.705491
7	6.011009	84.73357	4.186485	5.363798	5.716144
8	6.024130	84.36656	4.266349	5.664206	5.702889
9	6.031513	84.16859	4.271450	5.864043	5.695912
10	6.032386	84.14977	4.273517	5.869188	5.707523

Cholesky Ordering: LNID IB LNRER LNGDP

Initially, the study striving to employ VECM to examine more comprehensive on the stability of Islamic banks' deposit in the long run as well as short run. However, since Islamic banking industry still regarded as an infant industry, hence the overall observations of the data revealed that it has no significant shock towards the changes of monetary policy.

In regressing the data which are all found to be stationer, the VAR model hence continued to analyze the causalities of the variables. This study found that only GDP that caused ID variable. In other words, it has two directions between the two variables. As for IRF test, each variable initially has no influence each other, however, after certain period of time some of variable found to have positive and negative influence towards Islamic Banks' deposit. This fluctuation seem to be not really significant. In fact, the data confirmed that Islamic banks' deposit found to be stable along the period. This finding proved that Indonesia particularly Islamic banking industry have no significant shock towards any monetary policy changes. In this case, Islamic banks' deposit found to be resilient to any crisis.

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