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Examining the Effect of Economic Collison: Case On Credit Performance in Islamic Banking

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Abstract

This study will examine the impact of economic collision on the non-performing financing in sharia bank in Indonesia. The current study adopts VAR/VECM method to examine inter variables correlation by testing an economic factors, including 1) Real GDP Growth, 2) Exchange Rate, 3) Inflation, 4) Interest Rate, and 5) IDX Composite. A total NPF of 14 Islamic Banks and 20 Sharia Business Units were selected as data samples from 2006 to 2020. The findings indicate that inflation positively impacts NPF in the short run and delivers the biggest shock to NPF. The result states that Inflation, Exchange rate, and Interest rate are the dominant factors to shock NPF in Islamic Banks. From the analysis results, the economic variables, i.e., GDP, exchange rates, inflation, interest rates, and the IDX Composite, provide a stable long-term relationship and, in the short term, adjust to each other to achieve a new balance in the long term.

Keywords: Banking; Credit Performance; Economic Factor

JEL Classifications: E4; E5; G2

Introduction

The banking sector is part of the financial sector which has a role in economic growth. Banking has a strategic position in bridging the need for capital and investment. The banking sector is important in many countries; therefore, it needs continuous implementation and adequate policy measures to ensure that the banking sector can execute its functions properly.

Banks play an important role in the economy; thus, creating competition between the banking sector becomes crucial (Liyangamage, 2021). Based on (Levine, 2005), the banking sector gives five features that may support economic growth; by (i) providing ex-ante records on funding possibilities and capital allocation, (ii) supervising investment and encouraging government companies after supplying credit, (iii) facilitating trade, threat diversification, and risk management, (iv) mobilizing and gathering deposits, and (v) helping along the exchange of goods and services.

There are two forms of operational banking systems in the Indonesian banking system, i.e., conventional banks and Islamic banks. Islamic banking is also an intermediary institution between investors who want to invest in banking, and they can also funnel their funds to parties in need of funds. Islamic banks operate based on profit-sharing principles that provide mutually beneficial alternatives for the community and banking and emphasize aspects of fairness in transactions, ethical investments, prioritize the values of togetherness and fraternity, and avoid speculation in finance (Purnamasari & Ramayanti, 2019).

Furthermore, the main function of banking, including Islamic banks, is to channel funding to the public through savings and loan services (Fakhfakh, 2020). Investors who place their funds will receive profits in profit-sharing from Islamic banks (Aysan et al., 2018). Then, banks will funnel it to parties in need, in general, to sale and purchase agreement activities and business cooperation (Alam et al., 2017)

From the data on the banking industry profile report, the first quarter of 2021, published by the Financial Services Authority (OJK, 2021), Islamic bank assets grew 12.98% (yoy) compared to the previous year of 8.91% (yoy). The main component of assets was financing (65.33%), securities (21.24%), and placement with Bank Indonesia (9.54%) (OJK, 2021).

Most of the funds raised by Islamic banks were funneled into financing, which grew by 6.64% (yoy). However, compared to the previous year, it decreased 10.6% (yoy) (OJK, 2021). Financing is one of the fund distribution activities carried out by Islamic banking to people who need funding. The source of these funds comes from people with a surplus of funds (Popita, 2013).

Islamic banks are also prompted to gain returns like different financial institutions (Salman & Nawaz, 2018). But, in execution, banks also have to consider the risk, known as financing threat (Wasiaturrahma et al., 2020). Islamic banks distribute funding in financing designed as loans following sharia standards.

Islamic banks also face credit risk (financing), similar to conventional banks. Financing risk is known as the risk of possible losses that Islamic banks will encounter due to debtors and other parties' inability to repay loans (Lassoued, 2018). The ratio used to measure the quality of credit (financing) in Islamic banks is Non-Performing Financing (NPF). Risk sources for Islamic banks consist of systematic risk and non-systematic risk (Trabelsi & Naifar, 2017). According to (REHMAN, 2017), NPL is affected by macroeconomic variables and bank-specific factor variables, where the NPL reprise to macroeconomic variables is more significant in the post-crisis period.

In the context of economic policy, banking plays an important role in the economy because the banking sector regulates the entire financial sector, collects funds, and distributes funding (Hamza & Saadaoui, 2018). Macroeconomic conditions such as inflation, exchange rates, GDP, and stock price indexes affect the decrease or increase in savings and financing (Akhtar et al., 2017; Boateng et al., 2014; Hossain, 2016).

Many studies have documented that the increase in non-performing loans in banks can lead to a decline in a country's economic position. Studies on credit/financing risk have been carried out by several researchers including, (Azmat et al., 2020; Budiandru, 2021; Kabir et al., 2015; Kabir & Worthington, 2017; Mensi et al., 2020; Safiullah & Shamsuddin, 2019; Usman et al., 2019).

This study discusses the variables of economic policy and credit performance of Islamic banks more comprehensively. The purpose of this study is to analyze the effect of economic problems on Islamic bank financing in the short and long term, to analyze the response of non-performing financing against economic shocks, and to analyze the contribution of each economic variable in explaining the differences in non-performing financing faced by Islamic banks. The update of this study includes GDP growth, inflation, interest rates, exchange rates, and the IDX Composite in influencing financing risk, the impact of these variables in the short and long term, and NPF responses related to changes in these various macroeconomic variables.

Literature Review

This research is underlining theories are the concept of monetary policy and macroeconomic gauge in Indonesia. The core of the monetary theory is the factors analysis that influences the demand and deliver of cash (Budiandru, 2021). Discussion on monetary policy is can not separated from other macroeconomic variables together with inflation, countrywide profits, and exchange rates.

One of the transmission mechanisms of monetary policy is banking financing. First, loans to the banking sector use the existing monetary policy to funnel financing, especially in the aspect of asset use. Second, a company's financial condition requires financing in terms of cash flow and leverage due to the current monetary policy.

Non-Performing Financing

In measuring the quality of financing provided by Islamic Banks, the ratio of non-performing financing (NPF) is used with the composition of the percentage of non-performing financing calculations with the status of substandard, doubtful, and bad of the total bank financing. The smaller the NPL ratio, indicates the smaller the risk borne by the bank. On the contrary, the higher the NPL ratio indicates less professional credit management (Purnamasari & Ramayanti, 2019).

The effect of the correlation between macroeconomic variables and internal variables (NPF) refers to the theory explained by (Miskin, FS, 2011) regarding the correlation between macroeconomic variables, finance, and banking stability. This influence begins with the emergence of shock changes in macroeconomic variables (inflation, GDP, exchange rates) (Santosa et al., 2020).

The Effect of GDP on Non-Performing Financing

GDP is an indicator of economic growth, an important measure in explaining economic performance in providing goods and services. GDP is calculated based on the total value of goods and services based on market prices produced by an economy using factors of production. GDP growth is directly proportional to credit growth, indicating that when the GDP growth trend increases, the demand for credit is high and vice versa.

(de Leon, 2020) and (Al-Homaidi et al., 2019) stated that macroeconomic indicators, i.e., GDP, inflation, and interest rates affect banking income or profit. Research by (Kusuma & Atahau, 2019) stated that Islamic banks are more efficient due to economic conditions and political stability. Research by (Filip, 2017; Santosa et al., 2020) shows that GDP negatively affects NPF. However, it differs from research by (Kusmayadi et al., 2017), which stated that GDP positively affects NPF.

H₁: Real GDP Growth affects non-performing financing

The Effect of Exchange Rate on Non-Performing Financing

A country's exchange rate is a significant factor in determining production costs for exports and affects imports' value. The growth of the exchange rate significantly affects economic activity. Currency depreciation can signal a decrease in public investment in other countries' currencies due to the low value of the local currency.

Currency fluctuation is negatively related to international trade as currency values change, leading to increased uncertainty. On the part of debtors who do business in foreign currencies, it will have an impact on currency depreciation which will affect credit payments (Lin et al., 2018; Sugiharti et al., 2020).

H₂: Exchange rate affects non-performing financing

The Effect of Inflation on Non-Performing Financing

Inflation is a general and continuous increase in the price of goods. High inflation will reduce people's welfare and reduce purchasing power. The high value of inflation can positively or negatively affect the NPF. (Leka et al., 2019) argued that the bad impact of inflation can decrease GDP, which can affect people's savings, and ultimately banks will lose funding sources. Banking will experience a decline, marked by a decrease in funding (third party funds), which will affect the financing of Islamic banks.

Inflation becomes a threat to every country because it is inevitable for every country in the world. An increase in inflation has an impact on the banking sector. An increase in the price of goods and services will impact public spending, which is inversely proportional to the debtor's ability to repay loans (Alzoubi, 2017; Apriadi et al., 2016; ben Zeev, 2019; Filip, 2017).

H₃: Inflation affects non-performing financing

The Effect of Interest Rate on Non-Performing Financing

One of the monetary policies that policymakers, entrepreneurs, and investors often focus on is the interest rate (Alaoui & Jusoh, 2019; Caporale et al., 2020). Fluctuations in interest rates will get a different response for each investor. Higher interest rates give benefit to savings and time deposits. However, for individuals who acquire bank loans, an increase in interest rates will effect growing prices or cost to the bank (Hamza & Saadaoui, 2018). In contrast, High-interest rates can impact the potential to pay debts. The decline in paying Money owed due to bad economic conditions will negatively impact Bank's NPF (Amzal, 2016; Budiandru, 2021; Caroline Barus, 2016; Santosa et al., 2020).

H₄: Interest Rate affects non-performing financing

The Effect of IDX Composite on Non-Performing Financing

(Shahzad et al., 2017) studied returns and volatility on the worldwide Islamic capital market (the US, UK, and Japan) and some of the consequences of macro variables on financial variables. The empirical research led to a robust relationship between the Islamic stock market, the conventional stock market, and the collection of risk factors. Another finding from the study stated that the Islamic stock market is not a realizable alternative for hedging. (Louhichi & Boujelbene, 2016) stated that credit risk factors in the banking system by analyzing the correlation between credit risk and macroeconomic factors in 10 Organization of Islamic Cooperation (OIC) countries, which resulted that Islamic banks and conventional banks had extraordinary reaction to financial shocks. The correlation between the JCI and the NPF is indirectly related. The stock price index displays market conditions, whether or not crowded, sluggish, or strong (Coşkun et al., 2017).

The growth of shares in the banking sector is a signal for increased bank performance. An increase in stock prices can signal a corporate action to increase capital. The correlation between the IDX Composite and financing due to the increase in stock prices is in line with the enlarge in the distribution of bank financing (Naifar, 2016).

H₅: IDX Composite affects non-performing financing

Research and Methodology

This study uses time-series monthly data from 2006 to 2020 which consist of non-performing financing (NPF), real GDP growth, exchange rates, inflation, interest rates, and the IDX Composite. The research data was extracted from websites that provide access to the data on the variables studied, i.e., the Financial Services Authority websites, Bank Indonesia, IDX, yahoo finance, and CEIC. The research object consists of 14 Islamic Commercial Banks and 20 Sharia Business Units in Indonesia from 2006 to 2020. The monthly data in this study was based on economic theory to provide information and test existing theories.

This study uses time-series data with the Vector Auto Regression (VAR) approach if the data under study is stationary and no cointegration is found. Meanwhile, it uses the Vector Error Correction Model (VECM) approach if the research data is non-stationary, even though there is cointegration.

The Vector Autoregression (VAR) method was proposed by (Sims, 1980) and (Bernanke & Blinder, 1992). VAR is a system of equations that shows each variable of a linear function as a constant, the lag value of the variable itself, and the lag value of other variables in the system of equations. Therefore, the explanatory variable in VAR includes the lag value of all dependent variables in the system.

Furthermore, the Vector Error Correction Model (VECM) method is a restricted form of VAR. This additional restriction must be given due to non-stationary but cointegrated data forms. When two or more variables seen in an equation at the data level are non-stationary, there may be cointegration in the equation (Veerbek, M, 2017).

The steps for conducting a VAR/VECM analysis can be carried out as follows; (1) Data Stationarity Test, (2) Optimal Lag Determination, (3) VAR Model Stability Test, (4) Cointegration Test, (5) Impulse Response Function (IRF) Analysis, (6) Forecast Error Variance Decomposition (FEVD).

The research model formed in this paper the Vector Error Correction Model (VECM) equation for the long-term period and the Error Correction Model (ECM) for the short-term period.

$$\begin{aligned} NPF_t &= \beta_0 + \beta_1 GDP_t + \beta_2 EXC_t + \beta_3 INF_t + \beta_4 INT_t + \beta_5 IHSG_t + \varepsilon_t \\ \Delta NPF_t &= \beta_0 + \beta_1 \Delta GDP_t + \beta_2 \Delta EXC_t + \beta_3 \Delta INF_t + \beta_4 \Delta INT_t + \beta_5 \Delta IHSG_t + \beta_6 ECT_t + \varepsilon_t \end{aligned}$$

Where, NPF_t is non-performing financing (NFP) in duration t , GDP_t defines GDP growth in length t , EXC_t defines the exchange fee in length t , INF_t defines inflation in duration t , INT_t described the interest rate in length t , JII_t described JII (Jakarta Islamic Index) in length t . β_0 defined the intercept, $\beta_1 - \beta_5$ defined the coefficient of every variable, ECT_t defines the error correction term, ε_t is the error in period t and Δ defines the change in the current value minus the previous duration.

Findings

In the VAR/VECM model, the first step is to test the stationarity of each research variable used in the model. The results of the stationarity test of research variables for the effect of Real GDP Growth (GDP), Exchange Rate (EXC), Inflation (INF), Interest Rates (INT), and IDX Composite on Non-Performing Financing are presented in the table below. The statistical test results show that all variables except INF and INT are non-stationary at the level.

From the table of Augmented Dickey-Fuller test results, all variables are insignificant at a significance level of 5%. Furthermore, the stationarity test of each variable with the first difference conditions was carried out using the ADF test. It was discovered that all the variables from the results of the first differentiation were stationary, as seen from the p-value below the 5% significance level.

Table 1: Stationarity Test Results of Research Variables

Variable	Level		First Difference	
	<i>p-value</i>	Description	<i>p-value</i>	Description
NPF	0.2297	Non Stationary	0.0000	Stationary
GDP	0.7876	Non Stationary	0.0000	Stationary
EXC	0.7721	Non Stationary	0.0000	Stationary
INF	0.0019	Stationary	0.0019	Stationary
INT	0.0485	Stationary	0.0485	Stationary
IHSG	0.5442	Non Stationary	0.0000	Stationary

Description: Unit Root Test with Augmented Dickey-Fuller

Selection of Optimal Lag

After the stationary test, the most crucial step is to select the optimal lag, which is to first select the maximum number of lags from the VAR/VECM model, which still gives stable model results. The stability of the model is seen from the overall modulus value, which is less than one (Table 2). The stability test was met at lag 10; thus, the maximum lag of the VAR model was 10.

Table 2: Test Results of Model Stability

Roots of Characteristic Polynomial
Endogenous variables: D(NPF) D(GDP) D(EXC) INF ...
Exogenous variables: C
Lag specification: 1 10
Date: 01/14/22 Time: 21:44

Root	Modulus
0.970733	0.970733
-0.947393 - 0.151307i	0.959400
-0.947393 + 0.151307i	0.959400
0.437421 + 0.841195i	0.948128
0.437421 - 0.841195i	0.948128
0.838383 + 0.425817i	0.940322
0.838383 - 0.425817i	0.940322
-0.718220 - 0.606603i	0.940110
-0.718220 + 0.606603i	0.940110
0.800428 + 0.488201i	0.937563
0.800428 - 0.488201i	0.937563
0.896523 - 0.225559i	0.924462
0.896523 + 0.225559i	0.924462
-0.092067 + 0.919824i	0.924420
-0.092067 - 0.919824i	0.924420
0.905614 - 0.179016i	0.923138
0.905614 + 0.179016i	0.923138
-0.334820 + 0.858572i	0.921547
-0.334820 - 0.858572i	0.921547
-0.837480 - 0.375481i	0.917801
-0.837480 + 0.375481i	0.917801
0.603939 + 0.688843i	0.916104
0.603939 - 0.688843i	0.916104
-0.431419 + 0.807010i	0.915089
-0.431419 - 0.807010i	0.915089
0.905757 + 0.121067i	0.913812
0.905757 - 0.121067i	0.913812
0.024072 - 0.906678i	0.906998
0.024072 + 0.906678i	0.906998
-0.903367 - 0.017422i	0.903535
-0.903367 + 0.017422i	0.903535
0.442383 + 0.785241i	0.901280
0.442383 - 0.785241i	0.901280
-0.586167 - 0.677384i	0.895791
-0.586167 + 0.677384i	0.895791
-0.196531 - 0.857479i	0.879713
-0.196531 + 0.857479i	0.879713
0.266456 - 0.836063i	0.877496
0.266456 + 0.836063i	0.877496
0.534740 - 0.690866i	0.873637
0.534740 + 0.690866i	0.873637
-0.724244 - 0.468927i	0.862799
-0.724244 + 0.468927i	0.862799
0.787854 - 0.341602i	0.858723
0.787854 + 0.341602i	0.858723
-0.477026 + 0.712338i	0.857309
-0.477026 - 0.712338i	0.857309
0.621927 - 0.539712i	0.823458
0.621927 + 0.539712i	0.823458
-0.767986 + 0.263138i	0.811815
-0.767986 - 0.263138i	0.811815
-0.319398 + 0.703133i	0.772277
-0.319398 - 0.703133i	0.772277
0.041530 + 0.741678i	0.742840
0.041530 - 0.741678i	0.742840
0.128272 - 0.693336i	0.705102
0.128272 + 0.693336i	0.705102
-0.551622 - 0.204755i	0.588397
-0.551622 + 0.204755i	0.588397
0.071846	0.071846

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

The model stability can be seen from the modulus value in the table above. If all the AR roots values are below one, the model is stable. At the output above, the modulus value obtained is no more than 1, then the stability of the model is considered to have been met.

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After obtaining the maximum number of lags, the optimal number of lags will be determined. Several criteria that can be used in determining the optimal lag of the factors that affect the NPF include; sequential modified test statistics (LR), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn (HQ).

The highest LR value (except lag 1) was selected for model selection criteria, while the smallest FPE, AIC, SC, and HQ values were selected. From the test results, it can be seen that there are several recommended lags, i.e., lag 7 (based on LR criteria), lag 2 (based on FPE and AIC criteria), and lag 1 (based on SC and HQ criteria). Furthermore, from the results of the optimal lag selection, the VAR/VECM model will be selected at lag 2 by examining the lowest AIC value.

Table 3: Test Results of Optimal Lag

VAR Lag Order Selection Criteria
Endogenous variables: D(NPF) D(GDP) D(EXC) INF INT D(IHSG)
Exogenous variables: C
Date: 01/14/22 Time: 21:47
Sample: 2006M01 2020M12
Included observations: 169

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3020.056	NA	1.44e+08	35.81131	35.92243	35.85640
1	-2498.904	999.1308	461802.1	30.06987	30.84771*	30.38553*
2	-2452.012	86.56900	406581.8*	29.94098*	31.38554	30.52721
3	-2429.945	39.17216	481339.7	30.10586	32.21716	30.96267
4	-2416.482	22.94400	633125.7	30.37257	33.15058	31.49994
5	-2382.594	55.34358	657037.8	30.39756	33.84230	31.79550
6	-2350.464	50.19066	700344.7	30.44336	34.55483	32.11187
7	-2315.699	51.83928*	728895.6	30.45798	35.23617	32.39706
8	-2291.846	33.87348	870828.7	30.60173	36.04665	32.81138
9	-2257.964	45.71109	933682.6	30.62679	36.73843	33.10701
10	-2218.098	50.95365	944207.8	30.58104	37.35940	33.33182

* 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

Cointegration Test

Non-stationary variables at the level raise the possibility of a cointegration correlation between variables. It is necessary to conduct a cointegration test to find out the cointegration correlation. From this test, it can be seen whether there is a long-term correlation between the variables studied in the model.

Based on the stationary test of all stationary variables at the same degree, the cointegration test can be carried out with the Johansen Cointegration test using the optimal lag length of 2. From the test results, there is a cointegration correlation seen by the presence of 5 cointegration equations based on the Trace-Statistic value at a 5% significance level.

Table 4: Test Results of Cointegration

Date: 01/14/22 Time: 22:19
Sample (adjusted): 2006M05 2020M12
Included observations: 176 after adjustments
Trend assumption: No deterministic trend (restricted constant)
Series: D(NPF) D(GDP) D(EXC) INF INT D(IHSG)
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.445859	310.0915	103.8473	0.0000
At most 1 *	0.333941	206.1922	76.97277	0.0000
At most 2 *	0.309887	134.6699	54.07904	0.0000
At most 3 *	0.189087	69.39150	35.19275	0.0000
At most 4 *	0.107675	32.50286	20.26184	0.0006
At most 5 *	0.068306	12.45217	9.164546	0.0115

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

The statistical trace value is higher than the critical value at the 5% confidence level and is greater than the Eigenvalue. The "*" symbol on At most 1 to At most 5 indicates that there is cointegration in each variable with each other; therefore, this equation can be developed into a VECM (Vector Correction Model) model. Thus, it can be concluded from the results obtained that the NPF variable and the GDP, EXC, INF, INT, and IDX Composite variables have a stable long-term equilibrium correlation. Meanwhile, in the short term, all variables adjust to each other for a long-term relationship, meaning that in the long term, the relationship is stronger than in the short term.

Analysis of IRF and Variance Decomposition

Analysis of Impulse Response Function

Figure 1 shows the response impulses for each research variable. Based on the figure, at the beginning of the period, i.e., the first period until the next period, changes in NPF are not too fluctuating and tend to be stable.

NPF shocks in the short term show a small fluctuation in response to the exchange rate variable and a slight increase in response to shocks from the inflation variable. In short term, inflation has positive effect on NPF. High inflation will give impact on low purchasing power, so this gives bad impact on debt's ability to pay the installment or loan (Prastyo & Anwar, 2021) However, the NPF shock explained that the independent variables did not result in fluctuating changes from the initial to the final period. The NPF variable was the fastest to be stable in response to GDP and IDX Composite. From the analysis of dynamic behavior through impulse responses, the economic variables that tend to cause fluctuations in the NPF were inflation, exchange rates, and interest rates.

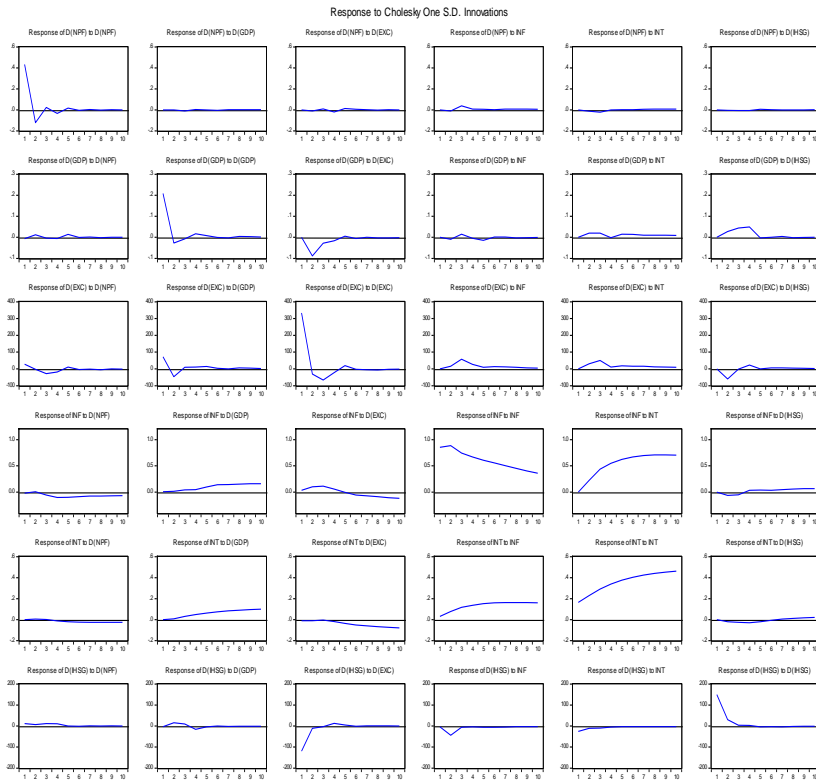


Figure 1: NPF Response Due to Monetary Shocks

Analysis of Variance Decomposition

At this stage, we will analyze how the contribution of monetary variables explains the variability or fluctuations in NPF through variance decomposition (FEVD). The FEVD simulation of each variable is projected over 10-time horizons. Forecasting with variance decomposition provides an overview of the percentage or the contribution of each variable in the model to the variability of certain variables. The results of the decomposition variance are summarized in the table below.

Table 5: Analysis of Variance Decomposition

Variance Decomposition of D(NPF):							
Period	S.E.	D(NPF)	D(GDP)	D(EXC)	INF	INT	D(IHSG)
1	0.432328	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.449811	99.79847	0.000484	0.060035	0.054218	0.074649	0.012146
3	0.452761	98.74528	0.062170	0.102264	0.751042	0.308283	0.030957
4	0.454663	98.48955	0.067082	0.313898	0.767893	0.305740	0.055839
5	0.455221	98.38506	0.066976	0.399636	0.775766	0.305045	0.067515
6	0.455307	98.35978	0.074620	0.414298	0.777048	0.306526	0.067725
7	0.455413	98.31735	0.075230	0.415705	0.805679	0.317982	0.068054
8	0.455533	98.27062	0.075345	0.418963	0.828796	0.337237	0.069039
9	0.455649	98.22072	0.075907	0.419078	0.851844	0.363249	0.069197
10	0.455753	98.17659	0.076701	0.418887	0.867570	0.391030	0.069226

From the table above, in the period, the NPF variable was strongly influenced by the NPF shock itself by 100%. Meanwhile, in the first period, the variables GDP (GDP), EXC (Exchange Rate), INF (Inflation), INT (Interest rate), and IDX Composite have not affected the NPF. Furthermore, in the second period, the GDP variable contributed to the shock of 0.000484 and tended to increase until the 10th period. This study shows that economic growth (GDP) does not affect NPF in the long term, in line with the research results by (Priyadi

et al., 2021). Thus, economic conditions may not affect the bank's rate of return in terms of financing if the debtor has a good repayment capacity.

In the second period, the EXC variable (Exchange rate) contributed to the shock of 0.0060035 and continued to increase until the 10th period. Then, the second period of the variable INF (Inflation) contributed to the shock of 0.054218 and continued to increase until period-10. NPF experienced a decrease when exchange rate variables depreciate. Publics find it easier to repay the loan when there was a depreciation in rupiah against dollar (Budiandru, 2021).

Compared to other variables, the inflation variable (INF) delivered the biggest shock, with the biggest shock occurring in the 10th period of 0.867570. An increase in inflation rate can cause in a decrease bank profit, so banking sector tends to reduce their financing when the inflation rate gets high. The declining in financing will lower the NPF level (Priyadi et al., 2021).

The interest rate variable (INT) shocked by 0.074649 in the 2nd period and increased to the 10th period. In the long term, interest rates positively affect NPF, in line with the results of research by (Sakiru Adebola et al., 2011). Fluctuation in interest rate can effect public decision whether saving or getting the loans and financing from banking (Aysan et al., 2018).

Lastly, the IDX Composite variable provided a shock of 0.012146 in the 2nd period and continued to increase until the 10th period. IDX Composite contributed the lowest shock in the first position, followed by GDP in the second position.

Variables of Inflation (INF), Exchange Rate (EXC), and interest rates (INT) contributed the most dominant shock to NPF fluctuations. However, over time, in the long term, the contribution of NPF tends to be stable with low fluctuations. Thus, it can be concluded that the NPF variable will generally be affected by economic fluctuations originating from inflation, exchange rates, and interest rates in the long term.

Conclusions

From the analysis results, the economic variables, i.e., GDP, exchange rates, inflation, interest rates, and the IDX Composite, provide a stable long-term correlation. In the short term, these economic variables adjust to each other to achieve a new balance in the long term. In the short term, an increase in inflation can impact increasing the NPF. Variables of Inflation, Exchange Rates, and Interest Rates dominantly contribute to the shock to the NPF, especially fluctuations in inflation.

Islamic banks must be vigilant of occurring inflationary fluctuations and remain cautious in analyzing financing applications by examining the prospect of future economic conditions, whether there is a decline or increase. Islamic banks also need to monitor businesses that make loans, whether they can cover costs and installments to the bank or not. In addition, Islamic banks must pay attention to the business prospects of creditors before funneling financing and ensure that the debtor can repay the loan punctually.

Islamic banks must also be conscious of changes in exchange rates and interest rates in determining financing policies. This will be useful to avoid the possibility of increasing NPF and immediately resolve financing problems.

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