

Analysis Of External Factors Affecting Non Performing Finance (Npf) Sharia Banks In Indonesia (Period 2009 Q1-2018 Q4)

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Abstract

The high ratio of problematic financing or Non-Performing Finance (NPF) at Islamic banks is a phenomenon that needs attention because it is one indicator to assess the soundness of Islamic banks. The causative factors could be two-way, first, the internal factors in Islamic banking itself; the principle of prudence in channeling financing; and second, external factors. Economic data indicated a slowdown in global economic growth became a negative sentiment on the financial markets; one of the consequences was the weakening of the customer ability to meet their obligations would be increasing the ratio of problem financing (NPF). The purpose of this study is to analyze and identify the relationship between macro variables Gross Domestic Product (GDP), exchange rate, and inflation with NPF at Sharia Banks in Indonesia 2009: Q1 to 2018: Q4. This research is a quantitative study with the data analysis method used Auto-regressive Distributed Lag (ARDL) to analyze the relationship between independent variables on the dependent variable in the long term and short term. The result is that GDP has a negative and significant effect on NPF both in the long term and short term. In comparison, the exchange rate and inflation have a positive and significant effect on the NPF in the short run but have no significant effect in the long run.

Keywords

Non-Performing Finance (NPF); Auto-regressive Distributed Lag (ARDL); Gross Domestic Product (GDP); Kurs; Inflation

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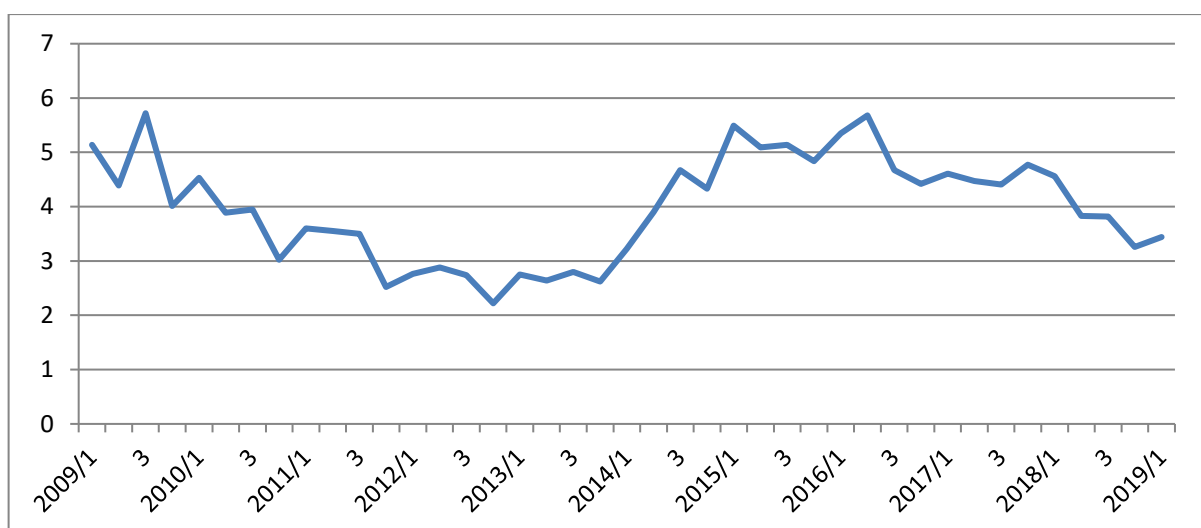
Introduction

Financing is one of the sharia bank products that get the most attention. Financing has an essential role for banks to develop financing management. The bank conducts financing analysis in various ways to minimize the existing risks and to maximize the income

received by the bank. The risk profile assessment in banking is divided into several sections; one is the financing risk caused by the customer's failure to fulfill obligations to the bank by the agreed agreement. Banks should be careful and

more selective in channeling funds to customers to avoid credit or financing problems. The level of problem financing in Islamic banks is known as Non-Performing Finance (NPF). By Financial Services Authority Regulation (POJK) Number 15, banks are unhealthy if the NPF ratio is more than 5%. The high ratio of problematic financing or NPF to Islamic banks in Indonesia is a phenomenon that needs attention. Referring to Islamic banking statistical data (SPS) released by the Financial Services Authority (OJK) position of the ratio of non-performing financing alias NPF at Islamic banks during 2009- 2018 experienced significant fluctuations, even in the second quarter of 2016, the NPF was in an alarming position at 5.68%. However, in the last few periods,

the NPF of Islamic banks experienced an improvement of 3.39% (BUS) as of January 2019. The high NPF ratio is one indicator to assess the level of health of Islamic banks in Indonesia. It is related to the extent to which banks run their business efficiently. Efficiency is measured by comparing the financing made with the NPF ratio; the higher the NPF of a bank, the worse the bank's performance. NPF will have an impact on decreasing the level of revenue sharing that is distributed to fund owners. Besides, the increase in the NPF rate is often referred to as a failure of the credit policy, and an increase in the NPF rate is the main reason for the reduction in bank profits by comparing bad loans with the amount of credit extended.



Source: Data from Bank Indonesia and the Financial Services Authority, processed 2019

Figure 1. Non-Performing Finance (NPF) Graph of Sharia Banks in Indonesia (in percent)

Figure 1 shows the fluctuations in NPF of Islamic banks in Indonesia, beginning with the swelling NPF, which reached 5.72 in the third quarter of 2009, is the impact of the deteriorating Indonesian economy after the global crisis began in the United States in 2008. Learning from experience in the following years, maintaining financial stability is a priority for central banks in

every country, including Indonesia, the results of which can be seen by improving NPF figures in subsequent years. However, in 2015, the economic slowdown in Indonesia was accompanied by an increase in bank credit risk. This increasingly non-conductive business climate has subsequently caused bank non-performing loans to rise again.

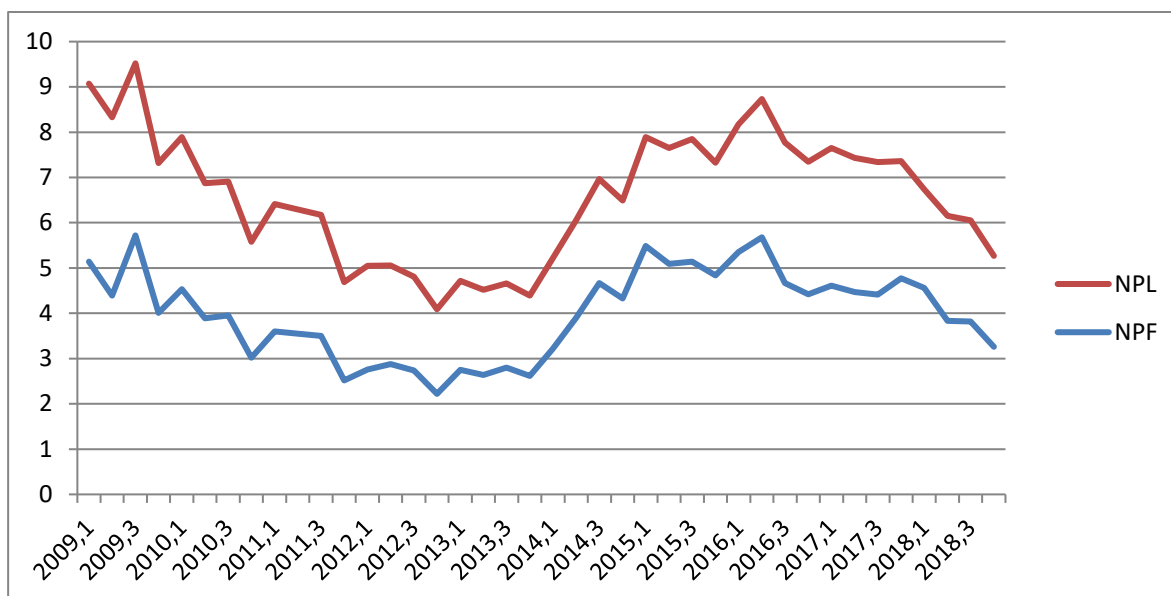


Figure 2. NPF Graph of Sharia Banks and Conventional Bank NPLs in Indonesia (in percent)

From Figure 2, we could conclude the same trend movement between NPF and NPL. However, in terms of NPF figures are always higher than NPLs, there are several principles that Islamic banks must carry out that must be more careful and selective in the financing, especially should be able to provide excellent service. Also, internal factors in Islamic bank financing risk management are further complicated by additional externalities. Especially in cases

where partners do not make payments, Islamic banks are prohibited from covering additional costs (interest). The customer could take advantage of the opportunity to delay payment, knowing that the bank will not charge a penalty (interest) during the delay in payments; bank capital is stuck on unproductive activities to decline the bank's performance.

Table 1. Development of Non-Performing Finance (NPF) and total financing of Islamic banks

Year	NPF %	NPF (Billion Rupiah)	Total (Billion Rupiah)
2015	4.84	4.915	153.968
2016	4.42	3.860	177.482
2017	4.76	4.880	189.789
2018	3.25	3.938	202.298

Source: Center of Statistical Agency of Indonesia, 2019

Referring to table 1, over the last few years, the total financing disbursed by Islamic banks has continued to increase from year to year. The slowdown in growth in the real sector mainly occurred in the sector mining, commodities, and related sectors. It has an impact on the performance of Islamic banking financing. Islamic bank business activities are constantly faced with risks related to its function as an intermediary financial institution. Developments in the external and internal environment rapidly make the risk of sharia banking business activities more complex. Islamic banks are required to be able to adapt to the environment through the application of risk management following sharia principles. The principles of risk management applied by Islamic banking in Indonesia are directed in line with the Islamic Financial Service Board (IFSB). (Rustam, 2013).

The reason for the high ratio of problematic financing itself can be caused by two

factors, internal and external banking factors. From the internal side of the bank could be in the form of investment policies, funding policies, costs, and income, or another sense that wealth (total assets), asset turnover, total debt, total capital, level of sales, operating profit, company liquidity, and others. From the external side caused by factors such as changes in government policy in the real sector, rising prices of factors of production, increased competition in the business sector, increased interest rates on loans, recession, inflation, and other monetary policies. (Suhardjono, 2002).

There is a causal relationship (feedback loop), where an event's results (output) will be another input from other situations. In the financial system, a feedback loop occurs between the financial system and the real sector. Problems originating from the financial sector can have an impact on the real sector and vice versa.

Table 2. Economic Growths in Developed and Developing Countries Period 2006 – 2010

<i>No</i>	<i>Country</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
1.	Korea	5.18	5.46	2.83	0.70	6.50
2.	Japan	1.42	1.65	-1.10	-5.42	4.20
3.	Indonesia	5.50	6.34	6.01	4.70	6.37
4.	India	9.26	9.80	3.89	8.48	10.26

Source: Organization for Economic Cooperation and Development10

In 2007 and 2008, Indonesia was less affected by the crisis than Korea, Japan, and India; however, in the recovery period that began in 2009, developing countries were more resilient to crises than developed countries. It is seen where Indonesia's economic growth in 2009 was at 4.70 and India at 8.48. In developed countries, South Korea and Japan, the impact of the crisis were felt during the recovery period in 2009. The growth of the two countries was at 2.83 and -1.10. According to the 2009 World Development Report, "Developing countries are more resistant to the global financial crisis than developed countries because their financial systems are not closely related to the US and European banking systems which are the most affected." Both the IMF and the World Bank emphasize the existence of vulnerability and uncertainty. One of the macroeconomic variables related to banking is Gross Domestic Product (GDP), which measures a country's national income. GDP provides an overview of the output of final goods and services produced by a particular region in a certain period. GDP reflects the condition of a country, whether the country's economy is progressing or vice versa. (Sheni and Darmawan, 2018).

When a country's GDP is high, it means that the average income is also high. The increase in GDP growth could be an indicator for banks to extend credit to maintain growth. When GDP increases, the NPF ratio will decrease. If the income earned by the community and companies increases, the business run by producers is also good. When the business is good, the risk of failure to pay for financing Islamic banks could be reduced because the customer could pay its obligations. Another macro variable that also affects banks' ability to overcome problematic financing is inflation. Inflation is an economic disease that often arises and is experienced by almost all countries. It is undeniable that combating the inflation rate is an economic policy that is often known as price stability.

The effect of inflation on banks is that when inflation is, the prices of goods increase. When prices increase, public spending will be greater than average conditions. The amount of expenditure increases is inversely proportional to the ability of customers to pay their obligations, which in turn has an impact on increasing non-performing financing.

The Bank of Indonesia usually responds to an increase in inflation by increasing the BI rate. An increase in the BI rate will increase the cost of financing in the form of profit-sharing ratio or financing margin, so the value of Islamic bank financing expenditure decreases. There is a tendency for the BI Rate to decline from 2011 to 2017. This situation will reduce the interest rate of conventional banks. If Islamic banks do not respond quickly by lowering the profit-sharing ratio and financing margins, it will reduce financing. It will reduce the amount of financing, thereby reducing the risk of problems with Islamic banks.¹⁴ The exchange rate becomes one of the independent variables that move influence banking performance. The recent weakening of the rupiah against the dollar has also affected the banking world, especially the NPF. (Widokartiko, 2016)

Direct effects could come from debt obligations denominated in foreign currencies owned by banks. While indirectly, the effect comes from debtors or bank customers who have import-oriented businesses. When the exchange rate weakens, the cash flow of the debtor or customer with an import orientation business will have a higher operating expense, for example, a company that has \$ 1 million in debt. If the rupiah exchange rate is 13,800 IDR per US dollar, the company's debt is equivalent to 13.8 billion IDR. Meanwhile, if the rupiah weakens to 14,800 IDR per US dollar, the company's debt will swell to 14.8 billion IDR. "That is the difference in magnitude that causes the company's debt obligations to be greater and has the potential to become bad credit

or non-performing loans (NPLs) in the banking industry." Based on some of the facts above, it is essential to study analyzing the impact of the macroeconomy on the health of Islamic banks, mainly through NPF in Indonesia.

Literature Review

Non-Performing Finance (NPF) is the ratio of problem financing to total financing. In the conventional banking world, NPF is also referred to as NPL or Non-Performing Loan, which is financing experiencing congestion in its settlement due to intentional or unintentional factors. NPF is one of the biggest problems for banks because NPF is the leading cause of bank failures. It should be noted that the risk management of the financing strongly influences more than 70 percent of the banking balance sheet. Based on these reasons, NPF is a significant cause of banking failure. (Greuning and Iqbal, 2011).

NPF is the ratio of financing categorized as problematic to the total financing that has been distributed. Furthermore, what is meant by NPF is substandard, doubtful, and lousy financing. The distribution of funds by Islamic banks in financing is earning assets that must be maintained in quality. Islamic bank income is highly dependent on the quality of productive assets, where when the quality of productive assets is good, the potential income will be high. Vice versa, when the quality of productive assets is terrible, it will reduce the income potential. The technique used by banks sharia to reduce the risk of financing (NPF) is the same as conventional banks. Whereas the most commonly used is to rely on the historical record of the customer with the bank and collect information about the feasibility of financing the customer concerned through information sources and local community networks. (Greuning and Iqbal, 2011). Based on Bank Indonesia Circular Letter No.9 / 24 / DPbS 2007, the

criteria for rating the NPF are as follows: (Regulation of Bank Indonesia, 2007)

- a) Rank 1, $NPF < 2\%$ Asset quality is very good with very minimal portfolio risk.
- b) Rank 2, $2\% \leq NPF < 5\%$ Asset quality is good, but insignificant weaknesses are.
- c) Rating 3, $5\% \leq NPF < 8\%$ The quality of the assets is quite good, but it is expected to decrease if there is no improvement.
- d) Rating 4, $8\% \leq NPF < 12\%$ Asset quality is poor and is expected to threaten the survival of banks if fundamental repairs are not made.
- e) Rating 5, $NPF \geq 12\%$ Asset quality is not good, and it is estimated that the survival of banks is difficult to save.

Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is the growing value of goods and services produced or produced by a country in a given period by adding up all outputs of the citizens concerned plus foreign nationals working in the country concerned³⁴. GDP is divided into two; real GDP and nominal GDP. Real GDP is the broadest measure that can describe the overall condition of the economy. Economists often use real GDP to describe prosperity in the economy. Measuring better economic prosperity will calculate the output of economic goods and services and will not be affected by price changes. (Mankiw, 2003).

There are three types of national income calculation approaches (Sukirno, 2012).

- 1) Production approach or product approach, in trying to calculate the amount of national income by collecting data about the final results of goods and services for a certain period of all production units that produce these goods and services. All final values of goods and services are added up.
- 2) The income approach trying to calculate national income is to collect

income data obtained by family households.

- 3) The expenditure approach is trying to calculate the amount of national income that adds up all the expenditures made by the four sectors

in the economy, namely the consumer sector, the corporate sector, the government sector, and the foreign trade sector.

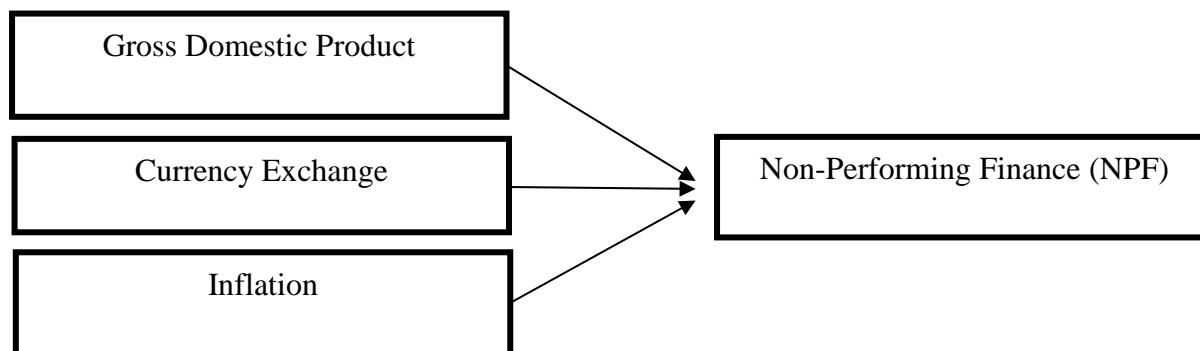


Figure 3. Framework

Methodology

Research is carried out in Indonesia through the websites of each Islamic bank. The population in this study were all Islamic banks registered with the Financial Services Authority of the Republic of Indonesia, which amounted to 13 banks. The observation period was conducted for nine years (2009-2018) based on quarter data. Variables must be operationally defined to make it easier to find the relationship between one variable and another and its measurement. Without operational variables, researchers will have difficulty determining the measurement of relationships between variables that are still conceptual. This study uses two variables; the dependent variable and the independent variable. The following is an explanation of the variables used in this study:

- a) The dependent variable, The dependent variable (variable Y), i.e., is the variable whose value is influenced by the independent variable. The dependent variable is the type of variable that is explained or influenced by the independent variable. In this study, the dependent variable is Net Performing Finance (NPF). The NPF data ratio is obtained by distributing the amount of substandard and doubtful

financing with total financing then multiplied by 100%

$$NPF = \frac{\text{Financing } (kl, d, m)}{\text{Total Financing}} \times 100\%$$

- b) The independent variable (variable X) is the variable that causes or influences the dependent variable. The independent variables tested in this study are the Gross Domestic Product (GDP), inflation, and the exchange rate. GDP data comes from Indonesian banks, which are published quarterly. Inflation data comes from the price index used by BPS to calculate the inflation movement of each commodity, the inflation data used is quarter inflation data. The exchange rate data used is the middle rate, which is used to record the value of foreign currency conversions.
- c) Data collection technique, Data collection techniques by downloading from the official website of each institution. Non-performing finance (NPF) data from sharia banking statistics published by the Financial Services Authority (OJK), www.ok.go.id. Data on Gross Domestic Products (GDP) and inflation

from the Central Statistics Agency (BPS), www.bps.go.id. Exchange rate data from Bank Indonesia (BI), www.bi.go.id.

d) Data analysis technique. The analytical method used in this study is Auto-Regressive Distributed Lag Models (ARDL). The regression that uses non-stationary time series data will most likely result in spurious regression. Faulty regression occurs if the coefficient of determination is high enough, but the relationship between the independent and dependent variables has no meaning. It happens because their relationship, which is a time-series data, only shows trends. So the high coefficient of determination is because the trend is not because of the relationship between the two. One of them is ARDL (Autoregressive-Distributed Lag). ARDL is the least-squares regression model that combines the time interval of the independent variable (distributed-lag model) and the time interval of the dependent variable (autoregressive model). One of the advantages of ARDL compared to other dynamic models is that ARDL does not require that each variable has the same stationarity at the level or 1-difference level (although estimation using ARDL can no longer be done if the stationary variable is at 2-difference).

e) Data Stationarity Test, The ARDL model, does not require a stationarity test on the data, but in the ARDL test, the data may not be stationary on the 2nd diff. Time series data is said to be stationary if the data does not contain unit roots, which is where the mean value of the variance is constant throughout the observation time, and the covariance between the two-time series data depends only on the lag between these two times periods. Statistically stated as follows:

$$\begin{aligned} \text{a.} \quad E(Y_t) &= \mu \\ \text{Means from Y constant} & \quad (3.1) \end{aligned}$$

$$\begin{aligned} \text{f)} \quad \text{var}(Y_t) &= E(Y_t - \mu)^2 = \sigma^2 \\ \text{Varian from Y constant} & \quad (3.2) \\ \text{a.} \quad Y_k &= E(Y_t - \mu)(Y_{t+k} - \mu) \\ \text{Covariant} & \quad (3.3) \end{aligned}$$

Vice versa, time-series data is not stationary if it contains unit roots that cause the data to be analyzed at any time or time (time is not independent) on the data. If regressed, data that are not stationary will increase the likelihood of a cointegration relationship between variables, where the coefficient value resulting from the regression is invalid (spurious regression). The stationarity test can be done (at most) with the Augmented Dickey-Fuller (ADF), and Philips-Perron (PP) approaches. This study uses the data stationarity test with the Philips-Perron (PP) approach. The difference with Dickey-Fuller (DF) is that the approach with DF assumes that the disturbance variable e_t is independent with a mean of zero, constant, and unrelated variance (non-autocorrelation). PP makes unit root tests using non-parametric statistical methods to explain autocorrelation between etheric disturbance variables without including explanatory variables for differential inaction as in the ADF test. The unit root test with the PP approach is as follows:

$$\begin{aligned} \text{b.} \quad \Delta Y_t &= \gamma Y_{t-1} + e_t \\ & \quad (3.4) \end{aligned}$$

$$\begin{aligned} \text{c.} \quad \Delta Y_t &= \alpha_0 + \gamma Y_{t-1} + e_t \\ & \quad (3.5) \end{aligned}$$

$$\begin{aligned} \text{d.} \quad \Delta Y_t &= \alpha_0 + \alpha_1 + \gamma Y_{t-1} + e_t \\ & \quad (3.6) \end{aligned}$$

e. where T = is a time trend

g) The t distribution does not follow the standard distribution statistics but follows the PP statistical distribution, while the critical value is used as the critical value stated by Mackinnon. The Mackinnon statistical distribution is the procedure to determine whether the data is stationary by comparing the PP statistical value with the critical value. The statistical value of PP is indicated by the value of the statistical t

coefficient $\gamma Y_{(t-1)}$ in equations (3.4) to (3.6). If the absolute value of PP statistics is greater than the critical value, then the data observed is stationary, and if the reverse is the case, the data is not stationary.

- h) Bound Test Cointegration, a regression that uses non-stationary time series data, will most likely result in spurious regression. Faulty regression occurs if the coefficient of determination is high enough, but the relationship between the independent and dependent variables has no meaning. It is happening because their relationship, which is a time-series data, only shows trends. So the high coefficient of determination is because the trend is not because of the relationship between the two. Bound Test Cointegration does cointegration test on ARDL estimation. This method has an advantage because it does not matter the variables contained in the model are I (0) or I (1). Through the Bounds Testing Cointegration method, the ARDL approach will produce long-term coefficients with consistent estimates that are asymptotically normal. Cointegration tests such as Engle-Granger or Johansen are not appropriate when estimating the ARDL model because both tests require all stationary variables I (1). In this study, using the Bound Test, the Cointegration test is done by estimating the general equation of ARDL, which uses all its independent variables alternately, where the value of the F-statistics can be compared with the value of the Bound Test I (0) and I (1).

The steps are as follows;

Hypothesis;

Ho = There is no cointegration data.

Ha = Data is cointegration.

The decision-making criteria are;

If the F-statistic value is less than I (I) Bound, then accepting Ho, so the data does

not have cointegration or there is no relationship in the long run.

If the F-statistic value is more excellent than I (I) Bound, reject Ho, so the data has cointegration or a long-term relationship.

ARDL model, many economic analyses are related to time series analysis, which is realized by the relationship between changes in an economic scale and other economic phenomena and behavior. The economic relationship is formulated with a dynamic linear model. The dynamic linear model is more emphasized the short-term dynamic structure. However, economic theory does not only tell about dynamic models but many researchers are also fooled by R2 syndrome, where the estimated R2 height is affected by direct regression. In connection with this, there are two methods to avoid direct regression, namely: Without data stationarity test, namely by forming dynamic linear models such as Autoregressive Distributed Lag (ARDL), Partial Adjustment Model (PAM), Buffer Stock Model (BSM), and others. By using a stationarity test or using a cointegration approach. Long-term relationship (cointegration) on the equation can be tested using the Engle-Granger method and the Vector Error Correction Model (VECM). However, in this study, the ARDL method developed by Pesar, Shin, and Smith (2001) was chosen because it has advantages compared to other methods. First, this method has a relatively simple procedure, which can be applied to a small number of samples to apply the bound test. Second, ARDL estimates the short-term and long-term components simultaneously and eliminates problems related to autocorrelation and omitted variables. Third, the ARDL model is an estimator of long-term coefficients that are super consistent and valid inferences of the long-term coefficients created using asymptotic normal standard theory. Fourth, the Wald test or the F statistic test used in the bound test has a non-standard distribution with a null hypothesis that there is no cointegration without regard to the variables tested having

unit-roots I (0) and or I (1) or co-integrated and must not have degrees same integration.

$$NPF = \beta_0 + \beta_1 NPF_{t-1} + \dots + \beta_p NPF_t + \alpha PDB_t + \alpha_1 PDB_{t-1} + \dots + \alpha_q PDB_{t-q} + \rho KURS_t + \rho_1 KURS_{t-1} + \dots + \rho_r KURS_{t-r} + \delta INFLAS_t + \delta_1 INFLAS_{t-1} + \dots + \delta_s INFLAS_{t-s} + \varepsilon_t$$

Model stability test (CUSUM Test), To determine the model's validity in the ARDL method, several diagnostic tests need to be performed to determine the model's validity and variables. A stability test is used to detect the stability of parameters in the long run and short run. In the ARDL method, the CUSUM test is used to measure the coefficient's stability and determine whether there is a structural break in the

model due to the analysis. This CUSUM test is based on the cumulative value of the number of recursive residuals. The cumulative value of recursive residuals is then plotted with the band in the form of a critical line of 5%. As the recursive residual method, if the cumulative value of recursive residuals is in the band, it indicates the estimated parameters' stability in the study period. Conversely, if the cumulative value of recursive residuals is outside the band, it means there are instability parameters within the study period.

Results And Discussion

Dickey and Fuller developed the Augmented Dickey-Fuller (ADF) test to test the unit-roots in this study.

Table 3. Stationary Test Results

Variable	Test of Root unit			
	Level		1st difference	
	ADF	Prob	ADF	Prob
NPF	-2.140307	0.2307	-9.600385	0.0000
PDB	1.139624	0.9972	-5.706312	0.0000
KURS	-0.152667	0.9361	-7.958875	0.0000
INFLATO	-2.977128	0.0459	-5.720913	0.0000
N				

Source: Results of data eviews, 2019

In the ARDL method, the unit root test does not have to be stationary at the same level of difference (as the Engle-Granger or Johansen method), but this is done to ensure that the variables used are stationary at the level, and physical difference levels and there are no stationary variables at the level second difference. Unit root testing with the Augmented Dickey-Fuller (ADF) method gives the stationary output data summarized in Table 4.1. ADF test results show that only inflation is stationary at the level or level. While the whole data,

stationary at the first level or first difference (1st Diff).

1. Bound Test Cointegration

Cointegration could be used as an analytical tool for non-stationary time series data solutions. Specifically for research using the ARDL approach, the Bounds Testing Cointegration cointegration test method is used to determine the cointegration of the model so that long-term relationships between variables in the equation can be known.

Table 4. Bound Test Integration

F-statistic Value	8.546046	
Significance	I0 Bound (Lower Bound)	I1 Bound (Upper Bound)
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Results of data eviews, 2019

From the table above, information is obtained that the value of F-statistic value > value I (0) and I (1) is 8.546046 > 2.72 and 3.77 significant at 10%. So, Ho is rejected. It means that it can be used to find out that each model has a long-term equilibrium relationship, and NPF, GDP, EXCHANGE and Inflation, are stationary. After the data has passed the classical assumption test, an optimal lag combination selects the best

ARDL model using the Hannan-Quinn selection. Meanwhile, the regression results show that the R-Squared value of the ARDL model is relatively high, with an average value of around 0.83. The R-Squared Adjusted value of 0.83 indicates that 83% of the variation in NPF dependent variables can be explained by each independent variable of the selected ARDL model.

Tabel 5. Result of Long Term Model ARDL

Variable	Coefficient	Std. Error	t-Stat	Prob.*
NPF(-1)	0.467642	0.112354	4.162220	0.0003
LOG(PDB(-1)	0.095702	2.424247	0.039477	0.9688
LOG(PDB(-2)	-3.647725	2.090846	1.744617	0.0920
LOG(KURS(-1))	-6.698888	3.086554	-2.170345	0.0386
LOG(KURS(-2))	9.354158	2.085092	4.486208	0.0001
INF(-1)	0.243666	0.078816	3.091580	0.0045

Source: eviews data processed, 2019

The short-term estimation results using the ARDL model in table 5 show that each independent variable (GDP, exchange rates, and inflation) has different coefficients and probabilities levels.

1. The GDP variable has no significant effect on lag 1 (0.9688) > 10%, meaning that changes in GDP in the previous quarter were not immediately responded to changes in NPF in the following period. In lag two, the GDP variable has a negative and significant effect on NPF with a coefficient of 3.647725 significant at

- the 10% level, meaning that changes in GDP affect the NPF in the short term but require a lag time (lag 2).
2. The exchange rate variable at lag 1 has a negative effect (-6.698888) and is significant at the 5% level, whereas at lag 2, it has a positive effect (9.354158) and is significant at the 1% level. If comparing the significance level of the two lags, lag 2 is more recommended for use, meaning that changes in GDP will be responded positively with an increase in NPF in the short term.

3. The inflation variable in lag 1 has a positive effect (0.243666) and is significant at the level of 1%, meaning that in the short term,

changes in inflation in the previous quarter will be responded to by increasing the NPF value.

Table 6. ARDL Model Long-Term Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
NPF(-1)	0.467642	0.112354	4.162220	0.0003
PDB	-3.853562	1.841512	-2.092607	0.0456
KURS	0.237824	2.528304	0.094065	0.9257
INF	-0.044889	0.075802	-0.592191	0.5585

Source: Data views processed, 2019

From the long-term estimation results using the ARDL model in table 6, it can be seen that only the GDP variable has a significant effect on the NPF, while the exchange rate and inflation variables have no significant effect on the NPF.

- 1) The variable GDP has a negative effect (-3.853562) and is significant at the 5% level of the NPF. It means that the increase in GDP is responded to by decreasing the NPF percentage in the long run.
- 2) In the long run, exchange rates have a more negligible effect on NPF; the coefficient number (0.237824) is not followed by a significance level of 10%, 5%, or 1%.

- 3) Inflation, in the long run, has a more negligible effect on the NPF. The coefficient number (0.237824) is not followed by a 10%, 5%, or 1% significance level.

Model Stability Test

Several diagnostic tests need to be performed to determine the validity of the model and variables. In the ARDL method, the CUSUM test is used to measure the coefficient's stability and determine whether there is a structural break in the model as a result of the analysis.

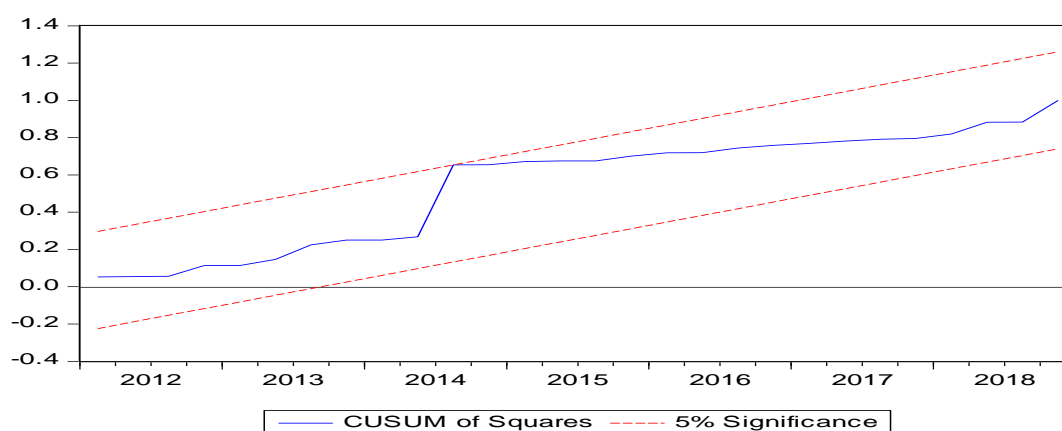


Figure 4. Custom Test

Based on figure 4, the model is declared stable because the blue line does not come out of the red line boundary. It means that the ARDL model is declared stable / pass the CUSUM test, and all variables are verified.

Effect of GDP on NPF

In the short and long term, changes in GDP were responded negatively by the NPF; this could be translated as an improvement in economic conditions that would reduce the ratio of problem financing to Islamic banks in Indonesia. It is consistent with the explanation of Nova and Ari, which states that when a country's GDP is high, the average income of the people of that country is also high. The increase in GDP growth can be used as an indicator for banks to extend credit to maintain economic growth. When GDP increases, the NPF ratio will decrease. If the income earned by the community and companies increases, the business run by producers is also good. When the business is good, the risk of default on financing Islamic banks could be reduced because customers could pay their obligations. The development of GDP is an indicator of maintaining the stability of a country's economy. This GDP reflects the output capacity that the economy can produce by utilizing all available resources. Concerning problematic financing, in a recession, a decrease in sales and incomes of individuals and companies will affect individuals' and companies' ability to repay their loans, causing increased financing problems.

- a) That according to Keynes's theory, when the economy is stable, public consumption is also stable so do the savings, but when the economy goes into crisis, consumption will increase due to rising prices of goods and scarcity of goods in the market and reduce the level of public savings due to concerns about banking institutions.
- b) The results of this study are supported by research conducted by Ahlem Selma

Message and Fathi Jouini, who stated that GDP had a negative effect of - 0.44054, which was significant at the 10% level. An increase in GDP usually leads to an improvement in household income flows and increased profitability. When the household's economic situation improves, it will undoubtedly impact fulfilling its obligations (NPF).

- c) Kristiani Naibaho Sri and Mangesti Rahayu also said that GDP had a significant and negative effect on the NPF. When the economy is stable, public consumption is also stable so do the savings (according to Keynes's theory), but when the economy goes into crisis, consumption will increase due to rising prices of goods and scarcity of goods in the market and reduce the level of public savings due to concerns about banking institutions.

Effects of exchange rates on NPF

Estimation results in the ARDL model show that the exchange rate only affects the NPF in the short term; this is due to an increase in the value of the Indonesian Rupiah against the US Dollar which means the value of the domestic currency weakening (depreciation) will cause the price of imported goods to be higher. Domestic producers and entrepreneurs who use imported products as raw materials will experience an increase in production costs that will impact price increases and falling product demand. If this happens, the company will suffer losses and reduce the customer's ability to repay the financing, so the problem financing risk is high.

The exchange rate is used to measure the rupiah's value against the US dollar, which is used as a benchmark foreign exchange. If the exchange rate increases, the rupiah's value experiences a decline (depreciation) against the dollar. Conversely, if the exchange rate falls, the rupiah's value will increase (appreciation) against the dollar. The decline in the value of the Indonesia

rupiah will reduce company revenues due to rising prices of goods and services caused by rising production costs. This situation causes entrepreneurs to tend to reduce the capital obtained from bank financing.

On the other hand, banks will face an increased risk of non-performing financing due to increased production costs. However, this problem only applies in a short period because both internal banking and customers will soon improve to deal with this condition so that conditions stabilize soon. In the long run, the exchange rate has no significant effect on the NPF; this happens because the community has adapted to changes in the exchange rate. The community, in this case, producers or entrepreneurs, will make adjustments so they are better prepared to run their business so that income is stable and able to return its obligations to the bank, and it does not affect the ratio. This result is supported by the findings of Yudhistira Ardana and Rita Irviani, 2017 who, in their research, stated that changes in the exchange rate, in the long run, had no significant effect on the NPF. Correspondingly, Muthia Roza Linda et al., 2015, stated the same thing that in the long run, exchange rate fluctuations do not affect the NPL because customers do not so feel changes in the exchange rate; the situation occurs because of changes in the exchange rate relatively occur in the short term, the situation does not become disruptive to the business of the customer. Therefore changes in the Indonesian rupiah exchange rate do not affect the ability of customers to pay credit bills. This phenomenon has pushed the ratio of problem loans as measured by Non-Performing Loans not to significant changes due to changes in exchange rates.

Influence of inflation on NPF

Estimation results in the ARDL model show that inflation only affects the NPF in the short term, this is because inflation is generally interpreted as an increase in the price of goods and services as a result of the

money amount (demand) is greater than the number of goods and services available (supply). Growth in the money amount exceeds the real sector causes inflation because the purchasing money power continuously decreases. Thus inflation will affect economic activities, both macro and micro. When inflation occurs, it affects the change in people's purchasing decline because, in real terms, the level of income also decreases when inflation occurs. Rising inflation causes installment payments to become increasingly imprecise, leading to worsening and problematic financing quality, which means that inflation positively affects the ratio of problem financing (NPF). An increased price of fuel oil (BBM) and electricity tariffs, for example, will lead to increase inflation. The most felt impact by business actors from various economic sectors is increasing operating expenses or expenses that they have to spend due to rising electricity tariffs and fuel prices.

- 1) Inflation will make prices relatively expensive, reducing the level of public consumption of goods and services. This decline in public purchasing power will affect the level of company or investor production and affect the company's profit target decline. This situation will make financing ratios and margins relatively higher, and it is difficult for entrepreneurs to pay for financing in Islamic banks. Therefore, high inflation raises the potential for the increased risk of non-payment of financing obligations on Islamic banks.
- 2) However, this effect does not occur in the long run, because the continuous increase in prices of goods and services will force people to adjust their consumption levels and also it would be rearranging the financial allocation in the household under the posts that are needed and to pay financing obligations in Islamic banks. On the other hand, the Islamic bank will also quickly respond by issuing policies to maintain bank stability.

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