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Macroeconomics fluctuations and its impact on musharaka financing

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Abstract

This study aims to analyze the effect of the movement of macroeconomic variables on financing using the musharaka contract on Islamic banks. This study consists of sharia commercial banks and sharia business units using monthly data from January 2004 to December 2019. This study uses Vector Error Correction Model (VECM) to answer the research objectives. All variables tested have an influence on financing using the musharaka contract. Financing using the musharaka contract responds negatively to movements in the exchange rate and interest rates while inflation responds positively and negatively. Islamic banking needs to prepare more reserve funds in the face of such movements before achieving stability. The musharaka contract financing itself dominates the forecasting then followed by interest rates, inflation, and exchange rates. Therefore, Islamic banking needs to prepare a reserve fund in the face of these shocks before achieving stability.

Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh pergerakan variabel makroekonomi terhadap pembiayaan menggunakan akad musharaka pada bank syariah. Penelitian ini terdiri dari Bank Umum Syariah dan Unit Usaha Syariah dengan menggunakan data bulanan dari Januari 2004 sampai dengan Desember 2019. Penelitian ini menggunakan Vector Error Correction Model (VECM) untuk menjawab tujuan penelitian. Semua variabel yang diujikan memiliki pengaruh terhadap pembiayaan menggunakan akad musharaka. Pembiayaan menggunakan akad musharaka merespon negatif pergerakan dari nilai tukar dan suku bunga sedangkan inflasi direpson positif dan negatif. Adapun peramalan didominasi oleh pembiayaan akad musharaka itu sendiri kemudian diikuti oleh suku bunga, inflasi dan nilai tukar. Oleh karena itu, perbankan syariah perlu menyiapkan dana cadangan dalam menghadapi guncangan sebelum mencapai kestabilan.

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1. Introduction

Islamic banking as a financial institution that has an intermediary function where the function is to collect funds from the public and channel them back to the people who need these funds (Mushtaq & Siddiqui, 2017; Shibani & De Fuentes, 2017). One of the main activities in Islamic banking operations, in addition to raising funds, is the distribution of funds or better known as financing (Paltrinieri et al., 2019).

Fund distribution activities in the form of financing as an effort in moving the real sector have received significant attention from Islamic banking (Naqvi et al., 2018). Total financing and total financing using musharaka contracts from year to year have increased. The total funding that was successfully channeled by Islamic banking until December 2019 was recorded at 344 trillion, while the total financing that was successfully directed using the musharaka contract until December 2019 was recorded at 129.64 trillion (Otoritas Jasa Keuangan, 2019).

Distribution of funds using the musharaka contract gives the most excellent results among the activities of channeling funds using other arrangements conducted by Islamic banks. Along with the high results obtained, of course, the risks that may arise from the process of financing distribution are also higher (Mahdi & Abbes, 2018). Therefore, before channeling funds, Islamic banks should need to carry out a series of procedures to analyze the feasibility of financing proposed by prospective customers (Azmat, Skully, & Brown, 2015; Miah & Uddin, 2017).

Indonesia, which adopts an open economic system, causes the implementation of monetary policy in creating conducive macroeconomic conditions that are also influenced by external changes so that Islamic banking as an intermediary in channeling financing is affected by these conditions (Bahloul, Mroua, & Naifar, 2017). A stable macroeconomic environment will be useful for the develop-

ment of the Islamic financial sector, ultimately driving economic growth (Hossain, 2016). Fluctuations in exchange rates, inflation, and interest rates are macroeconomic indicators that have an essential role in the distribution of Islamic banking financing (Sakti & Harun, 2013).

The exchange rate of the rupiah against the United States dollar (US) can affect the total Islamic banking financing (Rifai, Susanti, & Setyaningrum, 2017). The exchange rate is the level of exchange rates from one currency to another and is used in various transactions (Chien, Lustig, & Naknoi, 2019). The inflation rate also plays a role in the distribution of Islamic banking financing using the Consumer Price Index proxy (Kassim et al., 2009). Muslim economists say that the impact of inflation can cause disruption of the function of money, weaken the spirit of saving, increase shopping trends and lead to unproductive investments (Khan & Mirakhor, 1989; Trad, Trabelsi, & Goux, 2017).

The interest rate determined by Bank Indonesia as an instrument of monetary policy will indirectly have an impact on the distribution of financing undertaken by Islamic banks. An increase in interest rates will affect the performance of third party fund collection of Islamic banks because the growth can increase the risk of transfer of funds from Islamic banks to conventional banks (Kasri & Kassim, 2009).

Research that discusses the relationship between macroeconomic variables on Islamic banking financing has indeed been conducted by Lassoued (2018), Léon & Weill (2018), Aysan, Disli, & Ozturk (2018), Hamza & Saadaoui (2018), Hassan, Khan, & Paltrinieri (2019), but no research discusses the relationship between macroeconomic variables on Islamic banking financing using the musharaka contract. Therefore, this study fills the void from previous research.

This research contributes to the literature by discussing macroeconomics comprehensively with financing using a musharaka agreement with an ex-

tended range of years. Islamic banking financing performance that is influenced by macroeconomic conditions causes an increase or decrease in the distribution of financing to the public. Therefore, considering that Islamic banking financing is so necessary for the Indonesian economy, the purpose of this study is to empirically record the impact of changes in macroeconomic conditions on investment, in particular using the musharaka contract on Islamic banking.

2. Data, Method, and Analysis

The data used in this study uses secondary data obtained from the Financial Services Authority (OJK), the pacific exchange rate service, Bank Indonesia (BI), and the Central Statistics Agency (BPS). The data used are data on Islamic banking consisting of Islamic Commercial Banks (BUS) and Islamic Business Units (UUS), Funding uses a musharaka contract (MUS), exchange rate data that reflects the exchange rate of Rupiah per US Dollar (EXR), inflation data that reflect changes in the price level (CPI) and the BI Rate that is reflecting the benchmark interest rate (BIR). The data used in this study are time series with the period January 2004 to December 2019.

If it is found that the data used is not stationary at the level, then it must be differentiated in the first differentiation so that the results have a long-term relationship (cointegration) and the Vector Autoregression (VAR) model will be combined with the error correction model into a Vector Error Correction Model (VECM). In the VAR and VECM analysis, several stages need to be done, namely data stationarity test, stability test, optimal lag determination, cointegration test, general VECM model determination, and Innovation Accounting, which consists of Impulse Response Function (IRF) and Variance Decomposition (VD) analysis. The VAR general equation is as follows:

$$y_t = A_0 + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + e_t \quad (1)$$

Where: y_t = A vector (n.1) containing n variables in a VAR model; A_0 = Intercept vector sized (n.1); A_i : Matrix coefficient / parameter size (n.n) for each $i = 1, 2, \dots, p$; e_t = Vector error sized (n.1)

While the VECM model is as follows:

$$\Delta y_t = \mu_{0x} + \mu_{1x}t + \prod_x y_{t-1} + \sum_{i=1}^{k-1} \Gamma_{ix} \Delta y_{t-i} + \varepsilon_t \quad (2)$$

Where: y_t = vector containing the variables analyzed in the study; μ_{0x} = intercept vector; μ_{1x} = regression coefficient vector; t = time period; $\prod_x = \alpha \times \beta$ where β contains a long-term cointegration equation; y_{t-1} = in-level variable; Γ_{ix} = regression coefficient matrix; $k-1$ = VECM order of VAR; ε_t = error term

3. Results

Data stationary testing

Time series data generally contain unit roots, which can cause the data to become unstationary at the level. Data that have unit roots are often found to have good results but, in reality, cannot describe the actual conditions, so stationary testing of each variable needs to be done.

In this study, stationary testing uses the Augmented Dickey-Fuller (ADF) test. The rule that applies in ADF testing is that if the ADF probability value is smaller than the critical value (5 percent), then the data is stationary. The ADF test decision is to reject H_0 , which indicates that the data is stationary. Checking the time series data stationarity on each variable in the level using the ADF test can be seen in Table 1. As for stationarity testing, the hypotheses tested are as follows:

H_0 : $\delta = 0$ (data not stationary)

H_1 : $\delta < 0$ (data is stationary)

Based on the results of tests that have been done, it can be concluded that the MUS, EXR, CPI,

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and *BIR* data are not stationary at the level, but are already stationary at the difference. As a result of data that has not been stationary at the level of the level of integration, tests are carried out, which requires that the data is differentiated to a certain degree so that the data becomes stationary.

Table 1. Testing the stationarity of data

Variable	ADF	
	Level	Difference
<i>MUS</i>	0.1629	0.0000*
<i>EXR</i>	0.5757	0.0000*
<i>CPI</i>	0.0927	0.0000*
<i>BIR</i>	0.1182	0.0000*

*stationery at 5 percent real level

Cointegration testing

This test aims to determine whether the variables are not stationary cointegrated or not. The concept of cointegration as a linear combination of

two or more variables that are not stationary will produce a fixed variable. This test is significant because it can see each of the variables used in this study in the relationship in the long run even though when viewed individually it is not stationary but will be fixed if considered in a linear combination. To achieve a long-term relationship, the value of the error must fluctuate around zero. From the test results using the Johansen Cointegration Test for the primary proxy variable *MUS*, it can be seen that there is cointegration. So that in this study using the VECM method in answering research problems

Optimal lag testing

Before entering into the VAR structural analysis stage, optimal lag testing will be performed to determine the optimum amount of lag that will be used in the variables to be analyzed. Testing the optimal lag length by utilizing the available criteria,

Table 2. Cointegration testing results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05	
			Critical Value	Prob.**
None *	0.221311	100.0819	63.87610	0.0000
At most 1 *	0.142983	52.55464	42.91525	0.0042
At most 2	0.079055	23.23805	25.87211	0.1028
At most 3	0.039163	7.590617	12.51798	0.2869

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Table 3. Optimal lag test results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	758.1754	NA	3.24e-09	-8.197559	-8.127669	-8.169232
1	1595.935	1629.988*	4.27e-13*	-17.12972*	-16.78027*	-16.98809*
2	1606.058	19.25715	4.56e-13	-17.06585	-16.43684	-16.81091
3	1612.627	12.20911	5.05e-13	-16.96334	-16.05477	-16.59508
4	1624.584	21.70442	5.28e-13	-16.91939	-15.73126	-16.43783
5	1631.867	12.90355	5.82e-13	-16.82464	-15.35695	-16.22977
6	1636.732	8.408354	6.59e-13	-16.70361	-14.95636	-15.99543
7	1642.058	8.973152	7.43e-13	-16.58759	-14.56078	-15.76610
8	1651.221	15.03880	8.04e-13	-16.51327	-14.20690	-15.57847

*indicates lag order selected by the criterion

LR= sequential modified LR test statistic (each test at 5 percent level); FPE= Final prediction error; AIC= Akaike information criterion; SC= Schwarz information criterion; HQ= Hannan-Quinn information criterion

namely Likelihood Ratio (*LR*), Final Prediction Error (*FPE*), Akaike Information Criterion (*AIC*), Schwarz Information Criterion (*SC*) and Hannan-Quinn Criterion (*HQ*). If the information criteria only refer to an interval candidate, then that candidate is chosen as the optimal interval length to continue estimating the next stage. The optimal number of lags in this study is based on the smallest or minimum Schwarz Information Criterion (*SC*) value. The optimal lag test results of the model Table 3. Based on the specified criteria (smallest *SC*), it appears that the selected lag is lag 1.

VAR stability testing

The estimation results of the VAR equation system that have been formed are then tested for stability through the VAR stability condition check in the form of roots of the characteristic polynomial of all variables used multiplied by the number of lags of each VAR. If the modulus of all sources of a characteristic polynomial is less than one, the VAR equation system is considered stable. After the VAR equation system is stable, an estimation of VECM can be performed. Based on the results of the VAR stability test, it can be concluded that the VAR system with the optimal lag that is used is stable.

Table 4. VAR stability testing results

Root	Modulus
0.993986	0.993986
0.921546	0.921546
0.844538 - 0.020727i	0.844792
0.844538 + 0.020727i	0.844792

VECM testing

From the results of processing the VAR test will compare the calculated t-statistic value in the square brackets with the t-statistic value ($\alpha/2$, $n-1$) = 1.652 with the reject rule H_0 if the calculated t-statistic value <-1.652 or t-statistic count> 1.652. The hypotheses used are:

H_0 : the independent variable does not influence the dependent variable

H_1 : The independent variable significantly influences the dependent variable

The adjustment mechanism from the short run to the long run shown by the cointegration of errors shows significant results. This condition indicates that there is an adjustment from the short term to a long time, or in other words, Islamic banking is longer in achieving stability. This might imply that the cyclicity concern on lending is not severe in musharaka lending. While in a conventional loan, the literature has shown that lending cyclicity is a concern.

The *EXR* variable that reflects the exchange rate has a positive and significant effect on financing using the musharaka contract at a 5 percent real level, with the resulting coefficient of 0.051187. The results (Table 5) showed that when there was an increase in the exchange rate, which meant a weakening of the rupiah currency, it would increase financing by Islamic banks using the musharaka contract by 0.051187 percent. Musharaka is a contract of cooperation between two or more parties for a specific business, where each party contributes funds provided that the profits and losses are shared based on the agreement. The weakening of the rupiah has resulted in domestic trade relying on imported goods, which will automatically weaken people's purchasing power because the price of goods has increased. So the possibility of decreased business turnover and will reduce the velocity of money.

Table 5. VECM testing results

Variable	Coefficient Short-term	t-statistics
<i>CointEq1</i>	-0.059496	-1.53663*
<i>D(MUSY(-1))</i>	-0.090057	-1.09635*
<i>D(EXR(-1))</i>	0.051187	0.12844*
<i>D(CPI(-1))</i>	-1.764391	-1.4751*
<i>D(BIR(-1))</i>	1.732452	0.79229*
<i>C</i>	0.027875	1.87826
Long-term		
<i>EXR(-1)</i>	1.503504	2.61500
<i>CPI(-1)</i>	-12.18993	-5.41101
<i>BIR(-1)</i>	23.84893	5.04631

*Significant at 5 percent

4. Discussion

This study is in line with research conducted by Lin, Shi, & Ye (2018), which states that the role of financing in determining the trading effects of exchange rate volatility. Overall, the exchange rate volatility influences a company. Zeev (2019) states that exchange rate depreciation can effectively be a profitable expansion of loan spending. Magud & Vesperoni (2015) found that more exchange rate flexibility moderate changes in financing. However, flexibility cannot completely protect the economy from credit reversals. A flexible exchange rate policy can help smooth the financing cycle through additional capital costs. Conversely, a more rigid exchange rate policy would benefit the most from measures to curb excessive financing growth.

The *CPI* variable that reflects the inflation rate has a negative and significant effect on financing using the musharaka contract at the 5 percent real level, with the resulting coefficient of -1.764391. The results showed that when there was an increase in the inflation rate, it would reduce financing by Islamic banks using the musharaka contract by 1.764391 percent. The growth affected by this aspect has a higher proportion than the increase in other variables. The inflation movement shows the economy is getting better and growing (Hossain, 2016). This can be seen from the significant growth of the middle class in the study period. This study is in line with research conducted by Ostadi & Sarlak (2014) that inflation has a significant negative effect on Islamic banking financing in Iran.

A conducive economic situation needs to be maintained and improved so that the stretch of the real sector continues to move. The increased benchmark interest rate will undoubtedly be followed by an increase in lending rates (Meslier, Risfandy, & Tarazi, 2017). The rise in interest rates was responded positively by the distribution of financing using a musharaka contract in the short term. Interest costs to be paid by debtors may be lower than the gains obtained with loans received so that even

though interest rates increase, it is not a crucial problem for customers (Sukmana & Ibrahim, 2017). The results of this study are in line with research conducted by Rashid & Jabeen (2016) Islamic banking in Pakistan.

Impulse Response Function

Monetary policy, in addition to influencing banking performance in its role as an intermediary institution, also impacts capital market activities. The right system will undoubtedly have a positive impact and affect the increase in bank financing. Several macroeconomic variables undoubtedly influence the amount of funding provided by banks. Islamic banking does not only compete with similar banks but also competes with conventional banking. The increase in the exchange rate responded positively by Islamic banking financing for the next thirty months. Exchange rate conditions always fluctuate, often many commodities traded are affected by volatility, for example, when depreciation of imported products will be more expensive, when debtors want to make purchases, for instance, electronic devices with specific prices will feel the loss when the exchange rate improves again because the actual cost will be cheaper. Therefore, rational customers will think more about finding more affordable sources of financing when the exchange rate falls.

Islamic banking financing has responded negatively to inflation movements for the next thirty months. Inflation reflects economic stability. If inflation rises, people tend to reduce investment. This condition will have an impact on the decline in banking assets in real terms because the funds raised have decreased so that it will affect the ability of banking operations in lending. When viewed from the debtor's side, inflation is considered beneficial because, at the time of debt payment to creditors, the value of money is lower than when borrowing. Conversely, for creditors or those who lend money will suffer losses because the amount of the cashback

is smaller when compared to the time of borrowing. Inflationary pressures that occur require the central bank to raise interest rates to reduce it.

Debtors negatively responded to the increase in bank interest rates in the short term because they were concerned about the liquidity of the company's finances. The benchmark interest rate set by the central bank will encourage banks to increase lending and deposit rates, which aim to stimulate customers to raise deposit funds. When viewed from the demand side, the increase in loan interest rates has a negative correlation with the number of loans because the interest costs that must be incurred by the debtor are higher. Interest rate movements have not been responded to by Islamic banking financing and only reacted negatively in the second to the thirti-

eth month. This condition explains that Islamic banking is a substitute for conventional banking, where when there is an increase in interest rates will have an impact on the movement of customers who will apply for credit from traditional banking to Islamic banking because the costs incurred by the debtor will be higher than before the interest rate increase. This condition is called displaced commercial risk where when interest rates are in a period of growth, the debtor will turn to look for sources of substitution financing from Islamic banking and vice versa.

Forecast Error Variance Decomposition (FEVD)

Fluctuations of each variable due to shocks can be done by analyzing the role of each trauma in

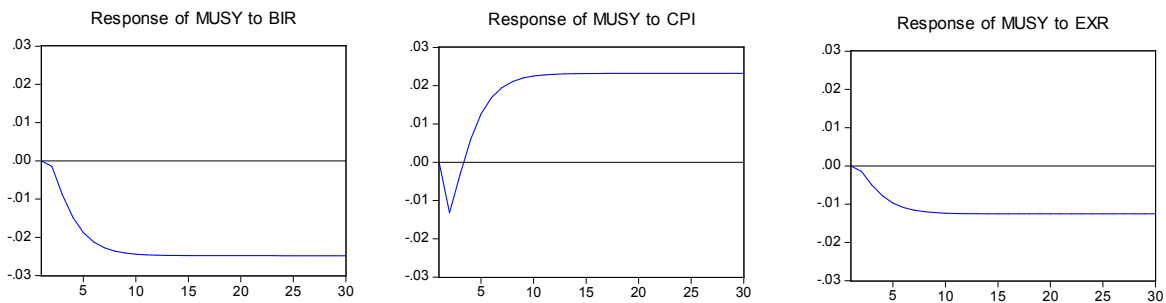


Figure 1. Financing response to exchange rate movements, inflation, and interest rates

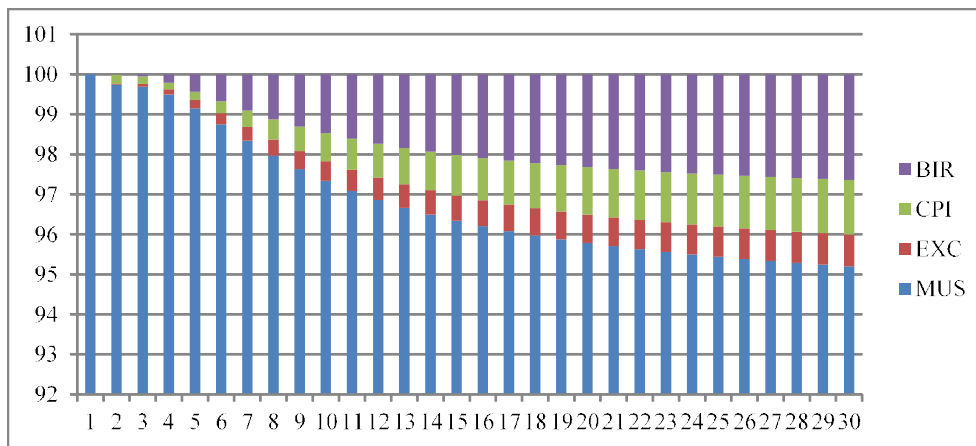


Figure 2. Variance decomposition of musharaka contract financing model

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explaining changes in macroeconomic variables through FEVD analysis or variance decomposition analysis. The results of the variance decomposition of the sharia banking model in Indonesia show that the forecasting variance in financing intervals using the Islamic banking musharaka contract (*MUS*) is very much due to *MUS*'s innovation itself.

The simulation presented in Figure 2 shows that in the first period, the macroeconomic variable shock was influenced by the *MUS* shock itself by 100 percent. In contrast, the other variables did not affect. The contribution of macroeconomic variable shocks began to be felt in the second period of observation even though the percentage affecting was tiny. This is because the effect of changing macro conditions requires time to influence other aspects. Interest rate shocks (*BIR*) provide the most significant contribution, followed by inflation (*CPI*) and exchange rate (*EXC*).

The effect of *MUS* shocks on itself decreases with time, while other macroeconomic variables make relatively smaller contributions. The results of the variance decomposition indicate that innovations in Islamic financing such as exchange rates, inflation rates, and interest rates have a more modest effect compared to innovations in the funding itself. Changes in the exchange rate in the first period responded by Islamic financing to be a factor that affects the performance of the financing because it is inseparable from the condition of exchange rate fluctuations that affect. However, the proportion caused by shocks from these variables is tiny or can even be concluded with no effect in the long run. Exchange rate stability is needed for every economic entity, especially entrepreneurs who carry out export-import transactions. Thus, the regulator must pay serious attention to policies issued to maintain or even improve the competitiveness of Islamic banking.

CPI contribution continues to grow and becomes one of the dominant factors in macro variables as the forecast period increases. *CPI* is consid-

ered by the debtor to increase the loan. High *CPI* will undoubtedly adversely affect the performance of financing distribution. The regulator will respond to the *CPI* to raise interest rates so that debtors will think twice about increasing their loans. Rational debtors will use a much cheaper source of financing, meaning that when there is an increase in interest rates will be responded to by falling demand for investment. An increase in interest rates is sometimes not a sensitive matter for debtors, so the high and low-interest rates do not always result in an increase or decrease in financing demand because this variable is one of the variables considered both in the supply and demand functions of financing.

Demand for financing, especially those originating from the micro and small business sector as well as financing for consumptive purposes, are usually not too based on high or low-interest rates, but rather consider the speed of service and facilities felt in the loan application process. Another case with large-scale business sectors, interest rates are sensitive to the demand for financing because the loan quantity proposed is relatively large and has a long maturity period so that with high-interest rates will undoubtedly add to the burden of the company, especially in the future.

5. Conclusion

The exchange rate variable has a positive and significant effect on financing using the musharaka contract. Whereas variable interest rates and inflation rates have a positive and negative influence on investment using the musharaka contract. The exchange rate increase was responded negatively by Islamic banking financing for the next thirty months. Islamic banking financing responded negatively and then positively to inflation movements for the next thirty months. Inflation reflects economic stability. If inflation rises, people tend to reduce investment. This condition will have an impact on the decline in banking assets in real terms because the funds raised

have decreased so that it will affect the ability of banking operations in lending.

Debtors negatively responded to the increase in bank interest rates in the short term because they were concerned about the liquidity of the company's finances. Macroeconomic variable shocks are influenced by sharia financing shocks themselves, while other variables do not affect. The contribution of macroeconomic variable shocks began to be felt in the second period of observation even though the percentage affecting was tiny. The most influencing variables are the variable interest rates, inflation rates, and exchange rates.

Some implications that can be formulated are increasing the intensity of socialization and improving communication-related to product and service development, formulating an imaging program through providing entrepreneurship training and capital support, improving the quality of human resources by increasing sharia financial experts, promoting superior loan products to attract debtors. Empirical results indicate that macroeconomic variables have a significant effect on the short term. Therefore, the government needs to maintain the stability of the movement of these macroeconomic variables.

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