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Nexus between financial inclusion and Islamic financing distribution: Evidence from Indonesian MSMEs

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Abstract

Purpose – The purpose of this study is to investigate the relationship between financial inclusion and the distribution of Islamic banking financing to Indonesia's MSME industry.

Methodology – This study utilizes the Vector Error Correction Model (VECM) approach covering the period between 2015 to 2020.

Findings – The study's findings suggest that the use of all-inclusive financial variables, as represented by the number of ATMs, branch offices, and Third-Party Fund (TPF), has a significant effect on the distribution of financing in the short-term but not in the long term. Furthermore, macroeconomic as well as internal control variables, such as inflation and Non-Performing Financing, have been shown to have a significant influence. The impulse-response function analysis shows that the financing distribution responds positively to financial inclusion variables such as ATMs and branch offices. TPF, inflation, ROA, and exchange rate variables were found to have negative responses in the case of a shock.

Implications – The findings of this study are expected to be used as a basis to develop government policies, particularly in supporting the post-COVID-19 national economic recovery through a comprehensive financial program that can broaden access to financing from Islamic banks for the general public, particularly MSME actors who have been severely impacted by the COVID-19 pandemic.

Originality – This investigation utilizes three distinct indicators to assess the relationship between Islamic financing distribution in Islamic banking and financial inclusion for MSMEs. These include measures of financial inclusion, financial performance metrics of Islamic banking institutions, and macroeconomic variables.

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Introduction

Financial institutions, especially banks, play an important role in the economic growth of developing countries like Indonesia. Banks in Indonesia serve as a primary source of financing for business operations, acting as intermediaries between parties with surplus and deficit funds,

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facilitating trade, and transmitting monetary policies. Additionally, banks continue to be a significant source of funding for various private sectors, including corporations and Micro, Small, and Medium Enterprises (MSMEs), with a particular emphasis on Islamic banks (Dasih, 2019). As a majority-Muslim nation, Indonesia has a tremendous opportunity to optimize the Islamic banking sector as a growth driver. Thus, Islamic banking has an essential function in attracting new customers, notably those who; for personal or religious purposes, have chosen to utilize a different financial system (Hakeem, 2019).

Furthermore, The Financial Services Authority/Otoritas Jasa Keuangan (2022) has released Islamic Banking Statistics (SPS) data; the number of financing disbursements by Islamic banks in Indonesia grew annually from 2015 to 2020. In 2015, the allocation of financing totaled IDR 3,182,083 billion, which increased year until its final tally in 2020, which was IDR 4,798,787 billion. As the number of Third-Party Funds (TPF) increases, so does its annual growth rate. It rose from 15,476,183 billion IDR in 2015 to 30,244,128 billion IDR by the end of 2020. In addition, this improvement was accompanied by a decrease in the level of non-performing finance (NPF) from above 4% to 4.8% in 2017 and a 3.1% decline in 2020.

Furthermore, as of the end of 2019, the world is afflicted by the COVID-19 pandemic, which has crippled numerous critical economic sectors, including the MSME sector. Small and medium-sized businesses (MSMEs) are the sector severely afflicted by the COVID-19 pandemic issue (Sulaeman, 2021). To recover, micro, small, and medium-sized businesses require fresh funding sources from financial institutions, particularly Islamic banks. Therefore, Islamic banking can provide a viable option for MSMEs looking to expand their operations by obtaining additional financial resources. According to Disli et al. (2022), if the appropriate set of strategies, support, and enabling framework is in place, MSMEs can become the foundation of the economy and significantly contribute to GDP growth. The restricted availability of financial resources, the absence of infrastructure assistance, and the absence of connections to domestic and international markets are some of the obstacles limiting MSMEs from expanding and flourishing.

Financial inclusion, commonly referred to as "support for simple access to financial services," is required to finance the SME sector. In accordance with (Kim et al., 2018; Raza et al., 2019), Inclusive finance seeks to provide individuals and organizations with previously unavailable formal financial services, particularly micro, small, and medium-sized enterprises (MSMEs) in the private sector. This includes providing small business financing options from formal financial institutions. (Sethi & Acharya, 2018). In measuring financial inclusion based on studies carried out by (Kim et al., 2018; Raza et al., 2019; Sethi & Acharya, 2018; Sharma, 2016), it can be represented from three dimensions: access, availability, and coverage, including the number of account holders, borrowers/creditors, branch offices, ATM availability, and mobile banking users.

Considering the significance of Islamic bank financing in boosting financial inclusion by distributing funds for the MSME sector, several investigations have been undertaken to identify the variables influencing the distribution of Islamic financing. Empirical evidence from India Iqbal and Sami (2017) demonstrated that a larger credit deposit ratio and a greater number of bank branches, which serves as an indicator for financial inclusion, have a substantial beneficial impact on economic growth. Another research by Harley et al. (2017) reveals that the prevalence of a large number of operational automatic teller machines (ATMs) and government spending significantly impact the reduction of poverty and fostering economic activity in Nigeria. Moreover, in several previous studies, such as Shaban et al. (2014) and Aysan et al. (2016), Islamic financing also became one of the main funding sources for MSME, surpassing conventional banks, as evidenced by Indonesia and Turkey. The most recent comprehensive article by Disli et al. (2022) provided the most recent and comprehensive findings, revealing that Islamic banks lend to MSMEs more than conventional banks and that Islamic banking has a greater effect on enhancing the long-term viability of MSMEs in Turkey. Additionally, this study discovered that Islamic banking generates more revenues by serving MSMEs. Overall, Previous research indicates that Islamic banking plays a critical role in expanding financial inclusion for MSMEs in developed nations.

This research seeks to address an absence in prior research by investigating the relationship between financial inclusion indicators, macroeconomic factors, and internal Islamic banking variables, the distribution of Islamic bank lending to micro, small, and medium-sized businesses (MSME) on a short and long-term basis. It also investigates the impact of unanticipated changes in these variables, referred to as shocks, on the distribution of lending. This study's findings will provide policymakers with valuable insights for promoting the financial inclusion of MSMEs, particularly in the context of Islamic banking.

Literature Review

Financing in Shariah perspective

The concept of financing is based on Law Number 21 of 2018; includes various types of profit-sharing arrangements such as Mudharabah and Musyarakah, leasing agreements such as Ijarah or Ijarah Mutahiya Bittamlik, purchase agreements like Murabahah, Salam, and Istishna' as well as lending and borrowing through Qardh contracts and service leasing or multi-service transactions that are agreed upon by all parties involved, including Sharia Banks and other parties, for a specific period of time, with terms following the contract used in the transaction (Otoritas Jasa Keuangan, 2008). Financing refers to the provision of funds for investment activities, either through personal efforts or through collaboration with others. Meanwhile, based to Rifai et al. (2017), Financing refers to the provision of funds through an agreement between financial institutions, such as Islamic banks, and other parties who require the money for a specific period of time, with an expectation of profit and security.

Financial inclusion

Financial inclusion is an indispensable component of global development initiatives. Accordance with Haini (2021), It aims to remove barriers and provide formal access to financial services such as loans, savings, payments, and insurance for marginalized or disadvantaged groups, such as the poor or those without access to safe, fair, and affordable financial services. Financial inclusion is defined by The Global Partnership for Financial Inclusion (GPFI) as having access to or making sufficient use of formal financial services from financial institutions. This includes providing convenient and responsible services at affordable costs for customers and sustainable for providers; in order to reach underbanked customers are encouraged to use formal financial services rather than informal alternatives, as stated by Anwar et al. (2016). The purpose of inclusive finance is to provide formal banking services to economically marginalized individuals and communities (Evans, 2018; Le et al., 2019; Raza et al., 2019; Sethi & Acharya, 2018; Tahiri Jouti, 2018); this can help to reduce poverty and income inequality (Williams et al., 2017). Additionally, inclusive finance aims to improve credit access and increase availability of financial services like savings, insurance, and mobile banking (Gutiérrez-Romero & Ahamed, 2021).

Previous studies

There are previous studies that focus on empirical testing related to financial inclusion, one of which is Kim et al. (2018) conducted empirical research in 55 member countries of Islamic cooperation organizations and found that there is a positive relationship between financial inclusion and economic growth. Harley et al. (2017) have mentioned the role of financial inclusion in increasing economic growth and reducing poverty. However, research related to the relationship between financial inclusion and the distribution of funds in Islamic banking still needs to be carried out, especially for the MSME sector. Research on the distribution of banking financing in countries like Indonesia, both conventional and Sharia banking, is still very minimal, particularly on the relationship between financial inclusion and the distribution of Sharia financing to micro, small, and medium enterprises. Small Enterprises (MSMEs).

Several other studies that focus on channeling banking funding, including Islamic banks, have been carried out by Nastiti & Kasri (2019) examined the factors influencing the allocation of funds for 12 Islamic commercial banks in Indonesia between 2015 and 2017. Using panel data analysis and the random effect model (REM), the study discovered that profit and loss before zakat and tax (PFNPF) and investment have a positive and statistically significant influence on the distribution of funding among Islamic banks. Moreover, return on assets (ROA) was discovered to have a negative impact on the allocation of funding by Islamic institutions. In contrast, it was determined that inflation has a negative effect on the allocation of funding by Islamic banks, whereas the quantity of money in circulation has a positive effect.

After the worldwide economic downturn, Dasih (2019) conducted a study that evaluated the factors affecting lending in Indonesia, such as assets, equity, GDP, PUAB, and inflation. Utilizing the Pooled Mean Group (PMG) estimator, the analysis was conducted using the ARDL-ECM Panel method. The study discovered that assets had a positive and substantial effect on financing and credit across the short and long run. Capital had a negative short-term impact on credit but a positive long-term impact. In addition, macroeconomic factors, especially GDP and inflation, had a substantial positive impact on long-term lending. According to the results of the error correction model, the discrepancy between short-term credit and long-term balance will be corrected at a rate of 19 percent.

Using the Error Correction Model (ECM) analysis method, Prsetyo (2018) investigated the factors that influence Islamic banking financing in two specific regions, Bali and West Nusa Tenggara (NTB). Long-term and short-term effects of total assets and Third Party Funds (TPF) on Islamic bank financing were found to be positive and significant. NFP had little effect on the financing of Islamic banks in the province of Bali. In contrast, both the short-term and long-term TPF results for Islamic banking financing in NTB showed a positive trend, according to the study.

Rifai et al. (2017) used Third Party Funds (TPF) as a moderating variable to examine the effect of exchange rate, inflation, money supply (M2), and export growth on the distribution of financing at Islamic banks in Indonesia between 2007 and 2015. As an analytical technique, they used multiple regression analysis models. The study discovered that the exchange rate, inflation, money supply, and export growth all had a substantial effect on total Islamic banking financing. Inflation and M2 had a positive and significant influence on total Islamic banking financing in Indonesia, whereas third-party funds mitigated the impact of exchange rate, inflation, and export growth on total Islamic banking financing in Indonesia.

Whidaningayu (2018) examined the impact of Non-Performing Financing (NFP) and Financing to Deposit Ratio (FDR) on the volume of funding for Islamic banks in Indonesia from 2008 to 2012. The study used Third Party Funds (TPF) as a moderating variable to investigate the results. The findings revealed that NFP has a significant and positive impact on the volume of funding for Islamic banks in Indonesia, while FDR had no impact. Additionally, TPF was found to have a positive effect on the volume of funding for Islamic commercial banks in Indonesia and effectively mediated the effects of NFP and FDR on funding.

Gitaharie et al. (2017) have undertaken a study on inclusive finance in Indonesia based on 2008 and 2012 SUSENAS data by examining the impact of inclusive finance on access to household credit/financing in Indonesia. Using the multinominal logit method, his research determined that household profile/characteristic factors (such as gender, age, education, location, status, and house size) and socioeconomic factors (such as employment status, ownership of cell phones, computers, and access to technology) affect access to business financing offered by banks, non-bank institutions, and individuals in Indonesia.

Conceptual Framework and Hypotheses Development

The following study framework shows the connection between the independent and dependent factors of financial inclusion, internal variables of Islamic banks, and macroeconomic variables based on prior research and theoretical studies.

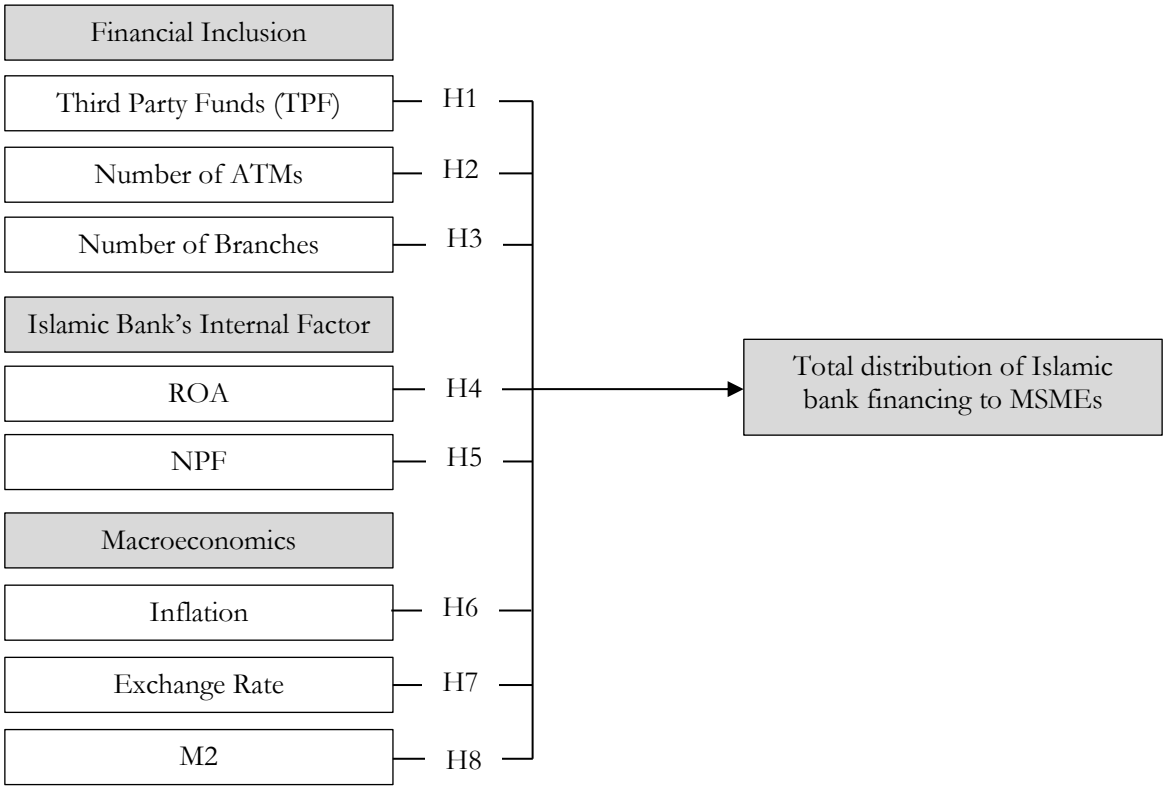

Figure 1. Research Conceptual Framework

The hypothesis in this study is as follows:

1) Inclusive Financial Factors
   - H1: The total of TPF has a positive and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term.
   - H2: The number of ATMs has a positive and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia, both in the short and long term.
   - H3: The number of branch offices has a positive and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia, both in the short and long term.
2) Internal Factors of Islamic Banks
   - H4: The ROA variable has a positive and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term.
   - H5: The NPF variable has a negative and significant effect on the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term.
3) Macroeconomic Factors
   - H6: The inflation variable has a negative and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term.
   - H7: The exchange rate variable has a negative and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term.
   - H8: The M2 variable has a positive and significant relationship to the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term.

Research Methods

Data

This study empirically investigates the role of financial inclusion, internal Islamic banking, and macroeconomics in the distribution of Islamic banking funding to the Indonesian MSME sector. We used monthly data from 2015 to 2020 from various organizations such as Bank Indonesia (BI), Statistics Indonesia (BPS), and the Financial Services Authority's Sharia Banking Statistics (OJK) in this research. The study focuses on the allocation of funding for MSMEs by Islamic banks, with

independent variables including third-party funds (TPF), ATM count, branch office count, return on assets (ROA), non-performing financing (NPF), inflation, exchange rates, and money supply (M2). ROA, NPF, and inflation are variables that were transformed into natural logarithms (Ln) for simplicity of analysis.

Table 1. Summary of Operational Variables

Type of Variable	Name	Sign	Unit	Source of Data
Dependent	Total distribution of Islamic bank financing to MSMEs	LnPMBY	Billion rupiahs	Financial Services Authority
Independent	**Bank's specific variables**			
	Third party funds	LnTPF	Billion rupiahs	Financial Services Authority
	Number of ATMs	LnATM	Unit	Financial Services Authority
	Number of branches	LnKC	Unit	Financial Services Authority
	Return on Asset	ROA	Percentage	Financial Services Authority
	Non-Performing Financing	NPF	Percentage	Financial Services Authority
	Macroeconomics variables			
	Inflation rate	Inflation	Percentage	Bank Indonesia (BI)
	Exchange rate	LnKurs	Rupiahs	Bank Indonesia (BI)
	Money supply	LnM2	Billion rupiahs	Statistics Indonesia (BPS)

Method

This study uses the VECM (Vector Error Correction Model) model, which must fulfill the assumption that the variables to be tested must be stationary at the same differentiation.

$$LnPMBY_t = \beta_0 + \beta_1 LnDPK_t + \beta_2 LnATM_t + \beta_3 LnKC_t + \beta_4 ROA_t + \beta_5 NPF_t + \beta_6 Inflasi_t + \beta_7 LnKurs_t + \beta_8 LnM2_t + \varepsilon_t$$

Where t is the period, β0 is a constant, β1, β2, β3, β4, β5, β6, β7, and β8 are coefficients in the regression model when changes in the dependent variable will change the unit of change in the independent variable, and ε is an error.

There are several steps involved in the VECM testing procedure. Originally, a unit root test (stationary test) was performed using Dickey and Fuller's Augmented Dickey-Fuller (ADF) Test (1979). The ADF and PP tests are used to identify data stationarity at a 5% significance level. If the ADF statistic at the time is less than the critical value or the p-value is less than the significance value, the Null Hypothesis (H0) is rejected, showing that the data is stationary (Basuki, 2018). The number of lags (orders) is then calculated using different information criteria such as the Likelihood Ratio (LR) criterion, the Final Prediction Error (FPE) criterion, the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SC), and the Hannan-Quin Criterion (HQ).

In the following phase, the inverse roots of the AR polynomial characteristic are used to determine the consistency of the autoregressive model. The cointegration is then analyzed to see if there is any relationship between the variables, particularly over time. The presence of cointegration among the variables used in the model suggests that these variables have a long-term connection. The Johansen Cointegration Test can be used to prove cointegration (Basuki, 2018). The Impulse-Response Function (IRF) test is conducted after the VECM estimation test, which provides a graphical representation of forecasting and evaluates the effect of shocks on each variable over time. The IRF test is important for finding how changes in one variable affect the behavior of another. Finally, the Forecasting Error of Variance Decomposition (FEVD) analysis is used to determine how other variables, as well as the variable itself, impact a variable's variance.

Results and Analysis

Data Stationarity Test Result

Before estimating the vector error correction model (VECM), a unit root test is first performed to see the stationarity of the data (Basuki, 2018). The sequence of integration for each variable is determined by the stationarity test. A time series has a unit root if it is not stationary at its initial level but becomes stationary after first-order, first-differencing integration. If the time series is not stationary, the presence of the unit root test indicates a spurious regression that gives unreliable results. To avoid this problem, it is essential to assess the stationarity of time series data. To determine the sequence of integration at the level and difference of each variable in the model, the ADF unit root test was used. The results are summarized in Table 2.

Table 2. Stationarity Test Results

Variable	Level		Remarks	First Difference		Remarks
	ADF Statistic	P-Value		ADF Statistic	P-Value	
Ln_PMBY	-1.125790	0.7013	Non-stationary	-12.71255	0.0001	Stationary
Ln_TPF	-1.300273	0.6253	Non-stationary	-9.521092	0.0001	Stationary
Ln_ATM	-1.609253	0.4726	Non-stationary	-8.688886	0.0001	Stationary
Ln_KC	-5.617345	0.0001	Stationary	-5.617345	0.0001	Stationary
ROA	-3.475587	0.0499	Stationary	-3.475587	0.0499	Stationary
NPF	-3.535155	0.0436	Stationary	-3.535155	0.0436	Stationary
Inflation	-1.880348	0.3396	Non-stationary	-6.568312	0.0001	Stationary
Ln_Kurs	-3.963740	0.0143	Stationary	-3.963740	0.0143	Stationary
Ln_M2	-0.06088	0.9484	Non-stationary	-9.956778	0.0000	Stationary

According to Table 2, the results of the unit root test at the level indicate that certain variables are not stationary at the 5% significance level and that their probability value (P-Value) is greater than 0.05; consequently, additional testing is conducted at the first and second difference levels. As shown in Table 3, the results of the unit root test at the first difference level indicate that, with the exception of Ln M2 at the second difference level, all variables are stationary at the 5% significance level and their probability value (P-Value) is less than 0.05. As a consequence of this study's findings, the Johansen cointegration test can be estimated in order to determine whether or not variables have a long-term relationship.

Optimum Lag Length Test Results

Table 3. Optimum Lag Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	560.8655	NA	8.29e-20	-18.39552	-18.08136	-18.27263
1	921.1470	600.4692	7.73e-24	-27.70490	**-24.56338***	-26.47608
2	990.7550	95.13095	1.34e-23	-27.32517	-21.35628	-24.99041
3	1108.646	125.7504	6.49e-24	-28.55486	-19.75862	-25.11417
4	1261.250	116.9967	1.88e-24	-30.94168	-19.31807	-26.39504
5	1509.283	**115.7487***	**9.36e-26***	**-36.50944***	-22.05847	-30.85687*

* Indicates lag order selected by the criterion

In this study, the selection of the optimum lag was carried out using the criteria of Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quin Criterion (HQ) (Basuki, 2018). The optimum lag test results for the five models are shown in Table 3. The value marked with an asterisk (*) in Table 3 is the smallest value in the criterion, indicating that the latency closest to this value is the optimal lag. The majority of this test's asterisks are found in lag 5. Consequently, lag five is the optimal lag in this study.

Model Stability Test Results

After determining the optimum lag length from the preceding test, the chosen lag must be tested in order to determine a stable autoregressive maximum interval length. The inverse roots of the polynomial AR characteristics can be used to determine the stability of the autoregressive model. All of the roots of an autoregressive system are considered stable (stationary) if their modulus is less than one (Lutkepohl, 1991). Table 4 shows the findings of stability testing in this study.

Table 4. Model Stability Test Results

Root	Modulus
0.994484	0.994484
0.891485 - 0.129494i	0.900841
0.891485 + 0.129494i	0.900841
0.768982 - 0.224351i	0.801041
0.768982 + 0.224351i	0.801041
0.690783 - 0.377201i	0.787058
0.690783 + 0.377201i	0.787058
0.262044 + 0.586308i	0.642202
0.262044 - 0.586308i	0.642202
-0.510868 + 0.216253i	0.554754
-0.510868 - 0.216253i	0.554754
-0.554397	0.554397
-0.285825 - 0.375403i	0.471829
-0.285825 + 0.375403i	0.471829
-0.455865	0.455865
0.429799	0.429799
0.195647 + 0.301268i	0.359221
0.195647 - 0.301268i	0.359221
No root lies outside the unit circle	
VAR satisfies the stability condition	

Based on Table 4, the modulus value for the autoregressive model ranges from 0.359221 to 1.994484, indicating that the modulus value obtained does not exceed one. Therefore, the autoregressive model is stable at each interval length, and the FEVD (Forecasting Error) test can be conducted. Variance Decomposition) on this model to generate valid output.

Johansen Cointegration Test Results

The Johansen cointegration test was used to determine whether the research variables had a long-term relationship.

Table 5. Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.724259	274.9318	197.3709	0.0000
At most, 1 *	0.595608	195.0576	159.5297	0.0001
At most 2 *	0.509642	138.9245	125.6154	0.0060
At most 3	0.417812	94.74213	95.75366	0.0586
At most 4	0.327542	61.20245	69.81889	0.2003
At most 5	0.286699	36.59992	47.85613	0.3667
At most 6	0.165301	15.65308	29.79707	0.7364
At most 7	0.069064	4.450673	15.49471	0.8640
At most 8	0.000220	0.013668	3.841466	0.9068

The value of the trace statistic in this analysis demonstrates the cointegration relationship. When the value of the trace statistic exceeds the critical value by more than 5%, cointegration exists. As shown in Table 5, the Johansen Cointegration test was utilized on Eviews for this study's cointegration test.

Table 5 shows the cointegration test results, which show the existence of a cointegration equation; specifically, the trace statistic value (274,9318) is higher than the critical value at the 5% significance level (197.3709). This implies that the variables in the equations studied are cointegrated and in long-term equilibrium. The Vector Error Correction Model was used in this study with cointegration in this equation (VECM).

VECM Estimation Test Results

The results of the cointegration test imply a significant level of 5% cointegration, allowing the VECM estimation test to be conducted. VECM estimation is utilized to determine short-term relationships that adapt to produce long-term balances. However, short-term dynamics are still permitted by the VECM specification. Additionally employed for structural inference and policy analysis (Zivot & Wang, 2005). In this study, the t-statistic value for a 5% critical value is 1.99773, indicating that H0 is rejected if the absolute value of the t-statistic is greater than the t-ADF value and the variable is normally distributed. considered to have a significant effect. Table 6 and Appendix 1 summarizes the VECM estimation test results for this research.

Table 6. VECM Estimation Test Results (Long Term)

Variable	Coefficient	T- Statistic	Remarks
Long-term			
Ln_PMBY (-1)	1.000000		
Ln_TPF (-1)	2.319911	0.22729	Insignificant
Ln_ATM (-1)	0.960454	0.06805	Insignificant
Ln_KC (-1)	-5.800233	0.46805	Insignificant
ROA (-1)	-0.426455	0.03713	Significant
NPF (-1)	-0.150418	0.01400	Significant
Inflasi (-1)	0.113869	0.01408	Significant
Ln_Kurs (-1)	0.076305	0.10935	Insignificant
Ln_M2 (-1)	-2.925684	0.26130	Insignificant
C	19.03965		

Table 6 shows that the long-term value of C (constant) is 19.03965, implying that if no variables change in the previous month, PMBY will increase by 19.03965 points. C has a value of -0.011203 over the next month, indicating that PMBY will fall by 0.011203 points if no other variables shift. Furthermore, the R-squared coefficient is 0.789803, indicating that the variables from the prior month can account for 78.98% of the variables PMBY in this study. In comparison, variables not included in the model explained 21.02% of the variance.

Impulse-Response Function (IRF) Result

The Impulse-Response Function (IRF) is used in this study to describe how quickly a variable responds to changes in shock from other variables. In this analysis, the response time is not limited to a short period of time but can also be examined for multiple future horizons. as long-term knowledge (Basuki, 2018). In general, this analysis will reveal whether a variable's response to other variables is positive or negative. Short-term responses are usually significant and variable, whereas long-term responses are consistent and continue to diminish. IRF explains the response to changes in PMBY caused by shocks from other variables over the next 50 periods in this research. Figure 3 depicts the findings of this Eviews-based IRF test.

The first reaction to be examined is the PMBY variable's (previous period) response to the PMBY itself. Figure 3 indicates that the previous period's one standard deviation PMBY shock achieved a response of around 0.0175 PMBY. From period one to period 15, it can be seen that the preceding period's PMBY shocks were negatively responded to by the PMBY itself, which then

continued to fluctuate towards stagnation. As a result, PMBY took roughly 24 periods (2 years) to recover from the impact of PMBY itself.

The following reaction was examined; the TPF variable's response to PMBY. Figure 3 shows that TPF shocks of one standard deviation in period 1 resulted in a response to PMBY of around -0.0001, which continued to decrease until period 10. Then, between periods 10 and 20, TPF shocks got a positive response from PMBY, which appears to be nearing its peak. Beginning in period 18, TPF shocks started to balance and continued to fluctuate steadily until the end of the period, with a slow increase but remaining in the negative zone. So PMBY recovered from the TPF impact trauma in about 18 months (1.5 years).

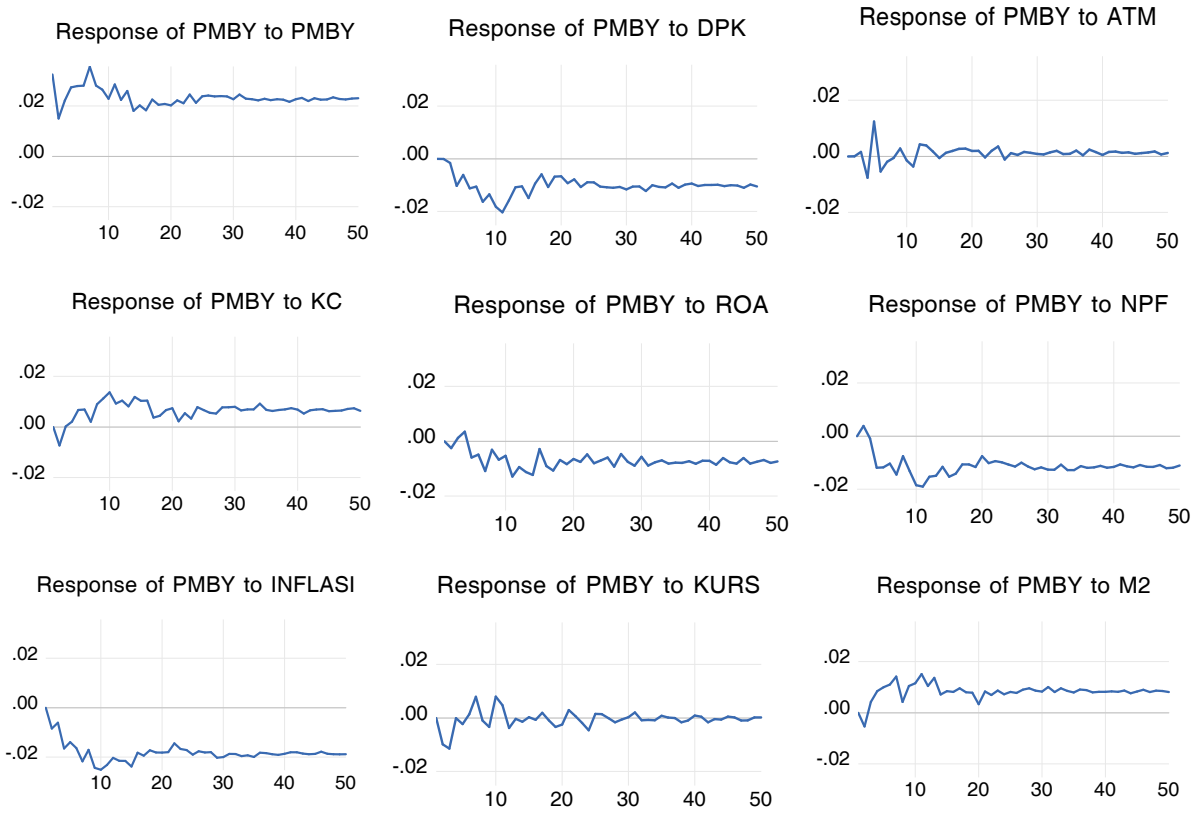

Figure 3. Impulse-Response Function (IRF) Result

The ATM variable's reaction to PMBY is the next response to be examined. Figure 3 demonstrates that a one standard deviation ATM shock in period 1 produces a positive response of around 0.0001 to PMBY. From period 1 to period 15, ATM shocks reacted by fluctuating by PMBY, which then appeared to achieve balance and continued to experience stable fluctuations until the end of the period with a slow but positive increase. As a result, PMBY took roughly 15 months (1.25 years) to recover from the impact of ATM shocks.

The next reaction to be examined is the KC variable's response to PMBY. Figure 3 demonstrates that KC shocks of one standard deviation have a negative response to PMBY of up to about 0.005. PMBY responded favorably to KC shocks from period 1 to period 10, then declined until around period 18. Then, from period 18 to the conclusion of the period, PMBY continued to experience stable fluctuations while remaining in the positive zone. As a result, PMBY needed roughly 18 months (1.5 years) to recover from the shock of the KC influence.

The ensuing response is analyzed: the ROA variable's response to PMBY. Figure 3 shows that a one standard deviation ROA shock in period 1 produces a negative reaction of around 0.0001 to PMBY. From period 1 to period 18, the ROA shock was negatively responded to by PMBY, which then proceeded to decline. From the 18th period to the end of the period, it can be seen that PMBY continues to fluctuate steadily but stays in the negative zone. As a result, PMBY recovered from the ROA impact trauma in about 18 months (1.5 years).

The NPF variable's reaction to PMBY is the next response to be examined. Figure 3 demonstrates that a one standard deviation NPF shock in period 1 produces a positive response to PMBY of up to around 0.001. From period 1 to period ten, NPF shocks were consistently negatively responded to by PMBY until they hit the negative zone. PMBY responded positively to NPF from period 10 to period 20 but stayed in the negative zone. PMBY experienced stable fluctuations but remained in the negative zone until the conclusion of the period. So it took PMBY roughly 20 months (1.67 years) to recover from the shock of the NPF's impact.

The inflation variable's reaction to PMBY is the next response to be examined. Figure 3 shows that a one standard deviation inflation shock in period 1 resulted in a negative reaction until period ten reached -0.025 against PMBY. From period 10 to period 25, the PMBY responded positively to inflation shocks and started to balance but stayed in the negative zone. PMBY experienced stable fluctuations until the conclusion of the period. As a result, it took roughly 25 months (2 years) for PMBY to recover from the inflationary shocks.

The next reaction to be examined is the exchange rate variable's response to PMBY. Figure 3 demonstrates that exchange rate shocks of one standard deviation in period 1 gave a negative response until period 3 reached its lowest point at -0.01 against PMBY. Between periods 3 and 18, the PMBY responded positively to exchange rate shocks and started to balance, but it remained in the negative zone. PMBY experienced stable fluctuations and an increasing trend in a positive way until the conclusion of the period. As a result, PMBY recovered from the exchange rate disruption in about 18 months (1.5 years).

The variable M2's reaction to PMBY is the next response to be examined. Figure 3 demonstrates that a one standard deviation M2 shock in period 1 results in a negative response of approximately 0.005, which then continues to respond positively until period 14. M2 shocks have begun to reach balance but stay in the positive zone from period 14 to the end. PMBY continued to experience stable fluctuations until the conclusion of the period. So PMBY recovered from the M2 impact trauma in about 14 months (1.1 years).

Forecasting Error Variance Decomposition (FEVD) Result

The next stage is to perform a Forecasting Error of Variance Decomposition (FEVD) analysis, which examines how the role of other variables or the variable itself influences the variance of a variable. FEVD is used to determine a variable's variance, or how much the difference is between the variance before and after the shock, regardless of whether the shock is caused by the variable itself or by other variables. The FEVD method involves calculating the percentage of shocks for each variable. According to the amount of research variables, this study had 9 FEVD columns. The period used in this research to explain FEVD is 50 periods tested using Eviews, and the results are shown in appendix 2.

According to the FEVD findings in appendix 2, the variability and fluctuation in the value of the PMBY variable in the first period can be explained entirely by the variable's own value. The impact of other variables becomes visible in the second period when the influence of the PMBY variable drops to 82.57%.

Meanwhile, the exchange rate variable had the most significant influence, with a total effect of 6.22%, and the ATM variable had a 0.00016% impact. The PMBY variable has the most influence on changes in PMBY until the end of the period, despite the fact that its influence has decreased by more than half, with the amount of input at the end of the period reaching 41.07%. Then followed the inflation variable, which increases gradually in each period, starting from period 4 to the end of the period, has the second largest effect ending with 25.25%—then followed by the NPF and TPF variables, each influencing at the end of the period 10.14% and 8.47%—followed by the variables M2 and ROA of 5.71% and 4.16%, respectively. Furthermore, KC and Exchange rates have a final effect of 3.89% and 0.73%, respectively. Furthermore, the variable with the smallest effect is ATM, with a final effect of only 0.59%.

Discussion

The results of this investigation provide support for the proposed hypothesis. The total of TPF does not have a significant effect on the distribution of Islamic bank financing to MSMEs in Indonesia in the short and long term. Therefore, H1 is rejected. This study confirms the findings of Nugraha & Darmansyah (2019) that the sluggish growth of third-party funds has not been able to keep up with the increased demand for financing, which has led to a decline in asset quality and increased financing difficulties. In contrast, the third-party funds of Islamic institutions in Indonesia continue to fall short of expectations. One of the issues with Islamic banking, according to Priyadi et al. (2021), is the high cost of financing offered, which causes consumers to favor conventional banking, which is significantly less expensive. Himmawan & Firdausi (2021) demonstrate that corporations with rising assets in the short term may utilize a third-party fund, one of which is comprised of unrestricted investment funds. The shared profit can become a bank's asset if the bank is adept at managing investments. Increasing third-party funds through mutual assistance campaigns with other organizations (such as non-bank financial services and mass organizations) may be used through crowdfunding and additional partnership contracts to fund vulnerable bank customers; banks may act as an intermediary from those organizations and distribute funding, and banks may also entice funders with long-term installment refunds.

The number of ATMs has a significant effect in the short term on the distribution of Islamic bank financing to MSMEs in Indonesia but has no significant effect in the long term. Therefore, H2 is rejected. the findings in this study are in line with the research of Kuswara et al. (2019). Banks increase revenue by optimizing the function of ATM transactions to increase fee-based transactions. This demonstrates that the number of ATMs has a significant impact on the risk-free growth of banks' non-interest income. This also suggests that, despite the bank's primary source of income being derived from bank ratios derived from the finance portfolio, the quality of financing provided must be carefully considered, or the risk associated with such financing must be minimized. The higher the quality, the greater the bank's interest income, and vice versa. Thus, funding is contingent on the quality of financing.

The number of branch offices has a significant effect in the short term to the distribution of Islamic bank financing to MSMEs in Indonesia but has no significant effect in the long term. In this case, the rejection of H3 strengthens the findings of Nastiti & Kasri (2019). Islamic banks must also expand branch networks, such as branchless banking (Bella & Himmawan, 2021; Nastiti & Kasri, 2019), which is regulated in Financial Services Authority Regulation (POJK) No. 1/POJK.03/2022 concerning Branchless Banking Services under the Inclusive Financial Framework. As a result, increasing the number of branch offices contributes a crucial role for Islamic banks.

The ROA variable has a significant impact on the short- and long-term distribution of Islamic bank financing to MSMEs in Indonesia. Therefore, H4 is accepted. The results of this study corroborate the findings of Sohibien et al. (2022), who examined the condition of decreasing ROA in Islamic banks, which tended to fluctuate due to the fact that some debtors received financing during the COVID-19 pandemic but were approved prior to the pandemic. During the COVID-19 pandemic, there is also a financing restructuring policy, such as delaying installment payments and providing relief on margin payments for affected debtors and businesses (Muhammad et al., 2020). Thus, Islamic commercial bank profits are reduced, resulting in a significant decrease in ROA.

The NPF variable has a significant long-term effect on the distribution of Islamic bank financing to MSMEs in Indonesia but has no significant effect in the short term. Therefore, H5 is rejected. According to the findings of Muhammad et al. (2020), they discovered a high level of non-performing financing, which could have a negative impact on future operations. The internal factors that can affect the level of NPF and contribute to inadequate financing management should be strengthened by banks. As a contributor to a weak financial ratio, the level of NPF can impact the performance of Islamic institutions. The financial ratio is an indicator of financial performance and provides a means for stakeholders to evaluate an Islamic bank's performance. In addition, Islamic bank management should be cautious when selecting potential consumers in order to avoid

poor-quality financing. Existing consumers' performance must be continuously evaluated and monitored on a regular basis.

The inflation variable has a significant effect in the long term on the distribution of Islamic bank financing to MSMEs in Indonesia, but in the short term, it has no significant effect. Therefore, H6 is rejected. According to Sudarsono (2019), inflation has a positive influence on the financing ratio of Islamic institutions. Inflation becomes a factor in bank management's determination of the quantity of financing for MSMEs. Inflation will diminish the value of bank-issued financing because production costs are typically high.

The exchange rate variable has no significant effect on the distribution of Islamic bank financing to MSMEs in Indonesia, both in the short and long term. Consequently, H7 is rejected. This finding corroborates the research of Maulayati et al. (2020), which demonstrates that when the exchange rate changes, the level of third-party funds in Islamic banks will change, as will the customer's intention to deposit money in Islamic banks, and the distribution of existing financing at Islamic banks, as financing will generally adjust to the prevailing exchange rate.

The M2 variable has a significant effect in the short term to the distribution of Islamic bank financing to MSMEs in Indonesia but has no significant effect in the long term. Therefore, H8 was rejected. Based on the findings of Tohirin & Husaini (2019), if M2 is used as a proxy for the distribution of financing, there is a short-term relationship between poverty reduction and the rate of financial sector development.

Conclusion

According to the findings of this empirical investigation, financial inclusion, as measured by the variables TPF, the number of ATMs, and the number of Islamic Bank Branch Offices, in the short and long term, has a significant impact on the short-term distribution of financing to MSMEs, and vice versa. This suggests that expanding the number of ATMs and branch offices can increase the availability of Islamic bank financing to the general public, especially businesspeople. The control variable of macroeconomic variables, namely inflation, has a significant long-term and short-term relationship with increasing the distribution of Sharia financing to MSMEs. In other words, rising inflation raises the capital required to increase production of goods and services to meet societal desire for goods and services. Only the NPF variable of Islamic banks has a negative and statistically significant impact on the distribution of Islamic financing in this study. Furthermore, the results of the Impulse-Response Function (IRF) indicate that the variable of financial inclusion, specifically ATMs and Branch Offices, has a positive reaction to the transmission of Islamic bank financing. TPF is reduced when shocks occur due to the variable distribution of Islamic bank financing. Inflation, ROA, and exchange prices are all falling. Meanwhile, the financing distribution variable adds the most to the variable itself, according to the FEVD results and analysis, followed by financial inclusion variables, especially branch offices, and macroeconomic factors including inflation and exchange rates.

The following policy implications are founded on the study's findings: (1) Findings regarding the short-term and long-term relationship in this financial inclusion variable must be examined when developing policies in Indonesia. In other words, inclusive finance is critical in distributing Islamic bank financing to the informal/poor population, particularly those in the MSME sector. Increasing availability and outreach can benefit not only society but also the banking industry. Furthermore, as a result of the Covid-19 pandemic, Islamic banking may consider expanding its community outreach by hastening the massive digitalization of financial services initiatives for MSMEs across Indonesia. (2) Moreover, According to an analysis of Islamic banks' internal variables, NPF has a strong connection with the decrease in the distribution of Islamic bank financing. This means there need to be appropriate steps, such as providing financing services to the MSME sector whose businesses are running a low risk. This is because when credit/financing risk increases, it can reduce the public, especially Islamic bank customers, from saving their funds in Islamic banks. This then impacts reducing the allocation of bank funding sources for financing for micro business actors, including MSMEs. In addition, macroeconomic factors negatively affect the distribution of Islamic bank financing. Therefore, it is necessary to formulate policies that do

not have a negative impact on the banking sector directly. Policy-making authorities must be more careful by looking at the current conditions during and after the Covid-19 pandemic, especially for monetary policymakers. There is a need for policies that support the process of national economic recovery, especially in the MSME sector.

However, this research still has limitations that can be filled in by subsequent researchers, namely using a proxy variable for financial inclusion that is more representative or using a variable index of financial inclusion and also using digital financial inclusion. In addition, other variables, both external to Islamic banks and internal to Islamic banks, have a strong influence on the distribution of financing for MSMEs in Indonesia.

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Appendix

Appendix 1. VECM Estimation Test Results (Short Term)

Variable	Coefficient	T- Statistic	Remarks
	Short-term		
CointEq1	-0.540370	-2.55057	Significant
Ln_PMBY (-1)	-0.154892	-0.84947	Insignificant
Ln_TPF (-1)	1.181276	1.81056	Insignificant
Ln_ATM (-1)	0.843098	2.55351	Significant
Ln_KC (-1)	-5.974063	-3.32299	Significant
ROA (-1)	-0.173963	-2.80816	Significant
NPF (-1)	-0.020379	-0.71486	Insignificant
Inflasi (-1)	0.021942	0.81618	Insignificant
Ln_Kurs (-1)	-0.086136	-0.3055	Insignificant
Ln_M2 (-1)	-2.459017	-2.99214	Significant
Ln_PMBY (-2)	0.477482	1.9985	Significant
Ln_TPF (-2)	1.265580	2.39312	Significant
Ln_ATM (-2)	0.193202	0.64539	Insignificant
Ln_KC (-2)	-1.330935	-0.79439	Insignificant
ROA (-2)	-0.088008	-1.78661	Insignificant
NPF (-2)	0.018914	0.66024	Insignificant
Inflasi (-2)	0.051564	2.0057	Significant
Ln_Kurs (-2)	-0.095583	-0.31198	Insignificant
Ln_M2 (-2)	-0.657849	-0.77608	Insignificant
Ln_PMBY (-3)	0.110607	0.51158	Insignificant
Ln_TPF (-3)	0.847671	2.23697	Significant
Ln_ATM (-3)	0.083149	0.25426	Insignificant
Ln_KC (-3)	-1.927036	-1.26005	Insignificant
ROA (-3)	-0.066442	-1.28768	Insignificant
NPF (-3)	0.037091	1.27885	Insignificant
Inflasi (-3)	-0.003279	-0.12193	Insignificant
Ln_Kurs (-3)	-0.450019	-1.17908	Insignificant
Ln_M2 (-3)	1.409090	1.70147	Insignificant
Ln_PMBY (-4)	0.570869	2.69115	Significant
Ln_TPF (-4)	0.090410	0.30408	Insignificant
Ln_ATM (-4)	0.855919	4.02968	Significant
Ln_KC (-4)	-0.247885	-0.26367	Insignificant
ROA (-4)	0.038557	0.93897	Insignificant
NPF (-4)	-0.053071	-1.69735	Insignificant
Inflasi (-4)	0.022317	1.28704	Insignificant
Ln_Kurs (-4)	-0.589873	-1.54622	Insignificant
Ln_M2 (-4)	1.023316	1.33543	Insignificant
C	-0.011203	-0.76358	Insignificant
R-squared	0.789803	-	Significant

Appendix 2. The result of Forecasting Error of Variance Decomposition (FEVD)

Variance Decomposition of PMBY:										
Period	**S.E.**	**PMBY**	**TPF**	**ATM**	**KC**	**ROA**	**NPF**	**INFLATION**	**KURS**	**M2**
1	0.032498	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.039404	82.56716	0.000204	0.000146	3.434098	0.396723	0.951816	4.569607	6.221154	1.859088
3	0.047276	79.22805	0.105500	0.108438	2.387316	0.343812	0.700154	4.820321	10.20130	2.105107
4	0.060421	69.07486	2.951869	1.654981	1.585006	0.538061	4.285632	10.42323	6.245587	3.240764
5	0.071689	64.22678	2.820983	4.184083	2.005725	1.063732	5.721429	11.18945	4.539783	4.248031
6	0.081536	61.47214	4.078374	3.670913	2.262827	1.178043	6.028695	12.65105	3.538802	5.119153
7	0.095373	58.86732	4.211084	2.723838	1.700175	2.159964	6.714398	14.41184	3.277932	5.933455
8	0.103000	57.91432	6.125267	2.338635	2.220455	1.941973	6.290344	15.09075	2.819908	5.258340
9	0.112061	54.51295	6.622356	2.038854	2.896062	1.998731	6.678635	17.46545	2.472056	5.314908
10	0.121651	49.79154	7.854265	1.744198	3.731436	1.886890	7.972371	19.08095	2.528074	5.410271
11	0.132054	46.91390	9.036072	1.555967	3.660427	2.550531	8.825974	19.27166	2.276416	5.909050
12	0.138462	45.29059	9.513654	1.510883	3.891971	2.776444	9.244701	19.68025	2.144183	5.947327
13	0.145043	44.47708	9.225172	1.449188	3.861655	3.126137	9.479540	20.12048	1.954433	6.306317
14	0.149724	43.18814	9.145966	1.373404	4.253659	3.609751	9.489653	20.95164	1.843053	6.144740
15	0.155016	41.99156	9.451518	1.282925	4.411168	3.400552	9.816779	21.89508	1.719644	6.030775
16	0.158879	41.29448	9.352280	1.227606	4.629212	3.558682	10.13729	22.15563	1.638823	6.005995
17	0.162797	41.25371	9.039217	1.183725	4.461505	3.819122	10.07949	22.52342	1.574617	6.065190
18	0.166082	41.15503	9.102096	1.163583	4.357974	3.838196	10.09518	22.71175	1.515793	6.060398
19	0.169475	41.03779	8.902523	1.144342	4.341181	3.925483	10.16676	22.95414	1.494092	6.033696
20	0.172273	41.09464	8.764591	1.120332	4.384425	3.939561	10.03038	23.32227	1.466378	5.877414
21	0.175590	41.16670	8.716267	1.090964	4.236720	3.977920	9.989753	23.50038	1.439643	5.881655
22	0.178142	41.39654	8.657807	1.060383	4.208683	3.936430	9.983616	23.48879	1.400240	5.867514
23	0.181619	41.65502	8.681333	1.032381	4.082476	3.980998	9.899037	23.43865	1.357913	5.872194
24	0.184711	41.59267	8.624966	1.034681	4.128091	3.991957	9.905340	23.51892	1.375183	5.828192
25	0.188172	41.68440	8.537265	1.000581	4.102411	3.945928	9.914376	23.67873	1.331765	5.804548
26	0.191559	41.81446	8.542549	0.969130	4.044881	4.041177	9.839642	23.69284	1.290870	5.764458
27	0.194850	41.90170	8.563228	0.937409	3.984123	3.961929	9.856336	23.76140	1.247643	5.786233
28	0.198371	41.88318	8.567857	0.910831	3.996769	3.965830	9.905708	23.74414	1.210538	5.815142
29	0.201975	41.78611	8.543269	0.882479	4.004547	4.021103	9.894047	23.90874	1.168720	5.790978
30	0.205342	41.64522	8.585186	0.855653	4.025231	3.965866	9.945982	24.08060	1.130875	5.765383
31	0.208842	41.64277	8.555763	0.828330	3.989322	4.013870	9.981350	24.08055	1.103053	5.804987
32	0.211876	41.62395	8.558037	0.809366	3.984430	4.030375	9.954300	24.18058	1.073200	5.785763
33	0.215160	41.47413	8.621212	0.793643	3.968408	4.012127	10.00487	24.27466	1.041814	5.809136
34	0.218289	41.32988	8.587406	0.772499	4.034079	4.037535	10.06214	24.36541	1.013630	5.797423
35	0.221311	41.27222	8.587469	0.753393	4.018070	4.050896	10.04947	24.51361	0.987547	5.767326
36	0.224186	41.21234	8.603275	0.742356	3.995016	4.070971	10.07726	24.55056	0.962446	5.785774
37	0.226967	41.20583	8.565238	0.724577	3.985464	4.073441	10.09970	24.60934	0.939006	5.797402
38	0.229788	41.15585	8.584387	0.718022	3.979534	4.101192	10.08802	24.67625	0.921262	5.775490
39	0.232485	41.07188	8.563908	0.705786	3.990312	4.099598	10.11653	24.78334	0.901788	5.766859
40	0.235153	41.07223	8.530779	0.690332	3.985050	4.099047	10.13149	24.85017	0.882960	5.757944
41	0.237815	41.10990	8.529293	0.679251	3.946632	4.137755	10.10658	24.87194	0.863658	5.754999
42	0.240299	41.09757	8.524005	0.670223	3.941139	4.117572	10.12116	24.92395	0.850380	5.754005
43	0.242981	41.09705	8.503944	0.658237	3.935996	4.126343	10.13307	24.95865	0.832078	5.754640
44	0.245544	41.08252	8.488720	0.648171	3.936271	4.150900	10.11867	25.02782	0.815378	5.731549
45	0.248075	41.08019	8.492571	0.636341	3.919474	4.127048	10.12970	25.08703	0.799234	5.728409
46	0.250659	41.11283	8.478013	0.625513	3.903345	4.147881	10.13536	25.07501	0.782921	5.739124
47	0.253144	41.12127	8.472401	0.616402	3.893071	4.152417	10.12071	25.12617	0.769060	5.728501
48	0.255712	41.08172	8.487902	0.608703	3.892828	4.140891	10.13934	25.16564	0.754915	5.728062
49	0.258258	41.06622	8.463140	0.597440	3.898738	4.153909	10.15168	25.20403	0.740171	5.724674
50	0.260726	41.07438	8.466797	0.588371	3.885586	4.155617	10.13994	25.25021	0.726312	5.712790