

Sharia Rural Banks in East Java: How Its Hazard Rate? (The Analysis Using Multiple Period Logit)

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Abstract

This study aimed to determine the susceptibility opportunities of each BPRS. The second objective is to find out the financial ratios that cause it. The financial sustainability measure is a measuring tool to calculate the chance of survival. Financial sustainability approximates the value of Financial Self-Sufficiency (FSS). The population used is BPRS in East Java. The analysis technique used survival analysis and multiple period logit models. The study results show that only 8 BPRS have a chance to sustain more than 30%. Research variables that invariably affect the sustainability of BPRS include NPF, ROA, Bank Size, PM, FR, GLP, WoR, and LDR. Financial sustainability is an excellent Early Warning System to determine financial institutions' financial health, so this research is a good contribution to them.

Keywords: Financial Sustainability, Financial Self-Sufficiency, Survival, Hazard Rate, Multiple Period Logit

INTRODUCTION

Sharia rural Bank is an intermediary institution focusing on financing distribution to customers such as medium, small, and micro business groups (MSMEs). These activities are carried out in villages and cities far from commercial bank services. BPRS emerged as a tool for alleviating poverty through increasing financial access to MSMEs. BPRS has proven to have a role in developing MSMEs in Indonesia (Indrarini, 2017). BPRS is a business partner of MSMEs, where the growth of financing distribution to MSMEs has a real effect on BPRS profits (M. I. Roy, 2017). Figure 1 shows statistical data on the development of BPRS in Indonesia from year to year.

The development of BPRS in 2018 was quite good, where the number of BPRS nationally was 167. Even Asbisindo dared to target that by the end of 2020, the number of sharia BPRS to increase by 50 units (Suryana, 2018). However, in 2019 3 BPRS were liquidated (Otoritas Jasa Keuangan, 2019). The decline in the number of BPRS shows that the survival of BPRS in

Indonesia is still low. It results in a decrease in business volume, market share, and financing channeled to MSMEs (Ariani, Yuyetta, & Hardiningsih, 2020) and reduced financing distribution will result in weak regional economic growth (Prasetyo, 2021). The decline in the allocation of funding resulted in weak regional economic development (Nasfi, Iska, Nofrivul, & Antoni, 2019). Therefore, financial sustainability is essential for BPRS to increase its role as a support for the regional economy.

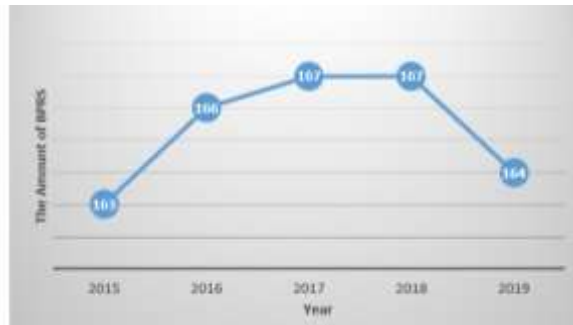


Figure 1. Development of the Number BPRS in Indonesia.
Source: Islamic Banking Statistics 2019.

The positive impact of banks on economic development will be more visible when the bank's performance and financial health are in good condition (Kinde, 2012). Financial sustainability is the ability of a bank to continue its operations to stay alive by covering its financial and administrative operational costs (Khandker, 1996). Support for financial sustainability as an efficiency motivation has become necessary for microfinance institutions (Braun & Woller, 2004). The financial sustainability of financial institutions is important for the sustainability of these institutions (Hollis & Sweetman, 1998). The possibility of a bank being a going concern in the future can be seen from its financial sustainability (Wahyuni & Fakhruddin, 2014). The sustainability of the BPRS can be maintained by maintaining the sustainability of operational finances continuously (Marwa & Aziakpono, 2015; Nasfi et al., 2019; Thapa, 2006).

Financial sustainability can be influenced by macroeconomic, microeconomic, and financial performance, and some researchers find that macro, micro, and financial performance variables have a significant effect (Almilia, Shonhadji, & Angraini, 2009). Other researchers see financial performance as having more influence on financial sustainability (Dutta & Das, 2014; Hossain & Khan, 2016; Nasfi et al., 2019; Said, Annuar, & Hamdan, 2019; Santoso, Khairunisa, & Triyanto, 2019; Sarwono & Sunarko, 2015; Septi & Pangestuti, 2016). Meanwhile, other researchers found that this variable had no dominant role in financial sustainability (Christen, Rhyne, Vogel, & McKean, 1995).

One of the detections of financial sustainability of a financial institution is to look at the opportunities to survive (Al Muhairi & Nobanee, 2019; Ariani et al., 2020; Bussiere & Fratzscher, 2006; Tanaka, Kinkyo, & Hamori, 2018). This study tries to detect hazards and survival opportunities for each BPRS in East Java. The researchers also pointed out the factors that influence these opportunities. This study uses Multiple Period Logit regression to determine the

effect of BPRS financial sustainability in Indonesia (Prastyo, Miranti, & Iriawan, 2017). The Multiple Period Logit model predicts the financial sustainability of a BPRS in Indonesia.

LITERATURE REVIEW

Sustainability is a broad concept that focuses on the capacity or ability of a company or institution to continue to operate continuously (Spodick, 2016). (Dutta & Das, 2014) stated that sustainability includes many things such as impact sustainability, environmental sustainability law policies, market sustainability, mission sustainability, sustainability programs, institutional sustainability, financial sustainability, and sustainable human resources. (Marwa & Aziakpono, 2015) stated that short-term financial sustainability could indirectly affect long-term financial sustainability.

Roy & Sarker (2015) argued that the banking industry has an essential role in sustainable development. The study conducted in Bangladesh aims to determine the concept and function of the banking industry toward the sustainability of Corporate Social Responsibility (CSR), Green Banking (GB), and Financial Inclusion (FI). This study's results indicate a positive response to the implementation of bank sustainability issues under the guidance of the Central Bank.

Marwa & Aziakpono (2015a) researched financial sustainability at the Tanzanian Savings and Loans Cooperatives (SACCOs). The research data used is the SACCOs' financial statements audited in 2011. The analysis used is linear regression. Based on this research, it is seen that only the efficiency value variable does not significantly affect the value of financial sustainability. Besides, it finds that about 61% of the samples used would be sustainably operational, while 51% of the samples were said to be sustainably operationally and financially. The average value of financial sustainability for the savings and loan cooperative sample is 127%. The financial sustainability value of 127% shows SACCOs can be a safe alternative financing business for the community. (Zubair, 2016) conducted an analysis whose aim was to determine the factors influencing the financial sustainability of the Baitul Mal Wat Tamwil (BMT) Institute. BMT is part of the Islamic Microfinance Institution (LKMS). The results of this study indicate that external factors such as infrastructure, supervision, and regulation have a significant positive effect on BMT's sustainability. On the other hand, based on the internal factors, only human resources and capital variables significantly positively affect BMT's sustainability.

In this study, financial sustainability is estimated in the ratio of financial self-sufficiency (FSS) (Dutta & Das, 2014; Marwa & Aziakpono, 2015). A rate above 100 percent indicates that the BPRS has operating income covering the bank's operating costs. It is known as operationally independent (Bogan, 2012). There are 11 predictor variables used. The variables are BPRS Size, Capital to Assets (CAR), Debt to Equity, Profit Margin, Financial revenue, Return on Assets (ROA), Gross Loan Portfolio, Write-off ratio (WoR), Loan Deposit Ratio, Deposits on Mobilization and Non-Performing Financing (NPF). This study uses a different analysis tool; in the previous study using multiple linear regression and multiple period logit regression. The multiple logit period regression has previously been used by (Prastyo et al., 2017) to analyze the survival of manufacturing companies listed on the Indonesia Stock Exchange.

The existence of Islamic law in the world is essential for humans with universal human goals, namely justice, benefit, and wisdom, or wisdom for human life. The existence of Islamic law is stated in Islamic law, fiqh, legislation, fatwas, and jurisprudence. Islamic product stages must go through the *ijtihad* process on the main principle of creating benefits and preventing

damage. The existence of lawful transactions prevents the illegal transaction system that can damage the mind, soul, religion, and descent. If there is a deviation, it will cause inconsistency with the Islamic religious law's ideals or goals. The Qur'an does not mention the concept of financial institutions explicitly. However, emphasizing the idea of organization, namely financial organization, is already in the Qur'an. The basic concept of muamalah cooperation with its various activity branches received a complementary view from the Qur'an (Yunus, 2003). Especially regarding economic matters, the Qur'an provides basic rules so that monetary transactions do not violate norms/ethics. Economic and financial transactions are more oriented towards justice and the prosperity of the people. The financial organization is called Amil's term. This agency functions as a matter of zakat alone and has a role in overall economic development, such as an equitable and fair distribution mechanism.

RESEARCH METHOD

The research design's objectivity can work optimally by using numbers, statistical processing, structure, and controlled experiments (Hamdi & Bahrudin, 2014). The population in this study includes all types of Sharia Rural Banks (BPRS) in East Java. The sample used in this study is several the population. Taking and enumerating data from the entire population as sample data is called a census (Silalahi, 2009). According to the OJK website, there are 31 BPRS in East Java. Population data is used as a sample because the researcher hopes this study's results will be more representative of the actual conditions.

This study uses response variables and predictor variables. The response variable consists of the BPRS's financial status, whether it is sustainable or not. The independent and dependent variables are described in Table 1 and Table 2. The financial status of the BPRS indicates whether the observed BPRS is sustainable or not. This status is obtained from the FSS value. The FSS value is further categorized into two categories, namely sustain and non-sustainability. If the BPRS finance experiences sustainability, it is worth 0; if the BPRS finance is not sustainable, it is worth 1. This category is taken from the FSS value if the FSS value is more than or equal to 100% sustain and if the FSS value is less than 100% not sustainable (Bayai & Ikhida, 2016; Mwangi et al., 2010). Survival Time is used to calculate the time from which the financial sustainability condition of the BPRS is observed to the time the observation is complete. The variable Survival time is denoted by T in years.

Table 1. Response Variable

Variable	Definition	Type
T	Time observation	Diskret -
y	Status of sustainability	Categories
$FSS = \frac{\text{Total Revenue}}{\text{Total expenses} + \text{Loans loss Prpvision}}$ <p>If the value of FSS: FSS \geq 100% sustain ; (categorized by 0) FSS $<$100% unsustain (categorized by 1) (Bayai & Ikhde, 2016)</p>		

Table 2. Predictor Variable

Variable	Definition	Formula
BS	BPRS Size	Total assets
CAR	Capital to Asset Ratio	$CAR = \frac{\text{Total Equity}}{\text{Total asset}}$
DER	Debt to Equity Ratio	$DER = \frac{\text{Total Liability}}{\text{Total Equity}}$
PM	Profit Margin	$PM = \frac{\text{Net Operating Income}}{\text{Total Asset}}$
FR	Financial Revenue	-
ROA	Return on Asset	$ROA = \frac{\text{Net O Income}}{\text{Total Asset}}$
GLP	Gross Loan Portfolio	Total Loans Portofolio
WoR	Write of Ratio	$WoR = \frac{\text{Total Loan Write off}}{\text{Total Loans Portofolio}}$
FDR	Financing Deposit Ratio	$FDR = \frac{\text{Total Financing}}{\text{Total Deposit}}$
DM	Deposited Mobilization	$DM = \frac{\text{Total Deposit}}{\text{Total Loans Portofolio}}$
NPF	Non-Performing Financing	$NPF = \frac{\text{Financing}}{\text{Total of Financing}}$

RESULTS

The results will be statistically indicated at the end of each data processing. At the same time, the discussion about the relationship between response variables and predictors is the debate.

Based on OJK data, 31 BPRS are registered and submit their financial reports to the OJK. Based on data obtained by researchers, 22 BPRS have experienced unsustainable conditions. The result shows that only about 30% of BPRS in East Java have a stable condition or are experiencing sustainability.

Sustainability Modeling for BPRS in East Java

In this chapter, the modeling is carried out in univariate and multivariate. This univariate modeling is carried out to test the relationship or influence of each independent variable on the dependent variable. The univariate modeling eliminates the effect of multicollinearity caused by the relationship between independent variables. The results of the univariate modeling are shown in Table 3. Based on Table 3, the several independent variables that significantly affect include NPL, ROA, BS, PM, FR, GLP, WoR, and LDR. In contrast, the variables that do not have a significant univariate effect include CAR, DER, and DM.

Table 3. Univariate Modeling

Variable	Intercept	Estimate	P-value
NPL	-1.7425	0.11420	1.3 10 ⁻⁷ ***
ROA	-0.1558	-0.11738	0.00141 **
BS	-0.1276	-0.5560 10 ⁻⁸	0.00232 **
CAR	-0.8912	0.8268	0.46773
DER	-0.7301	0.001616	0.9709
PM	-0.3271	-0.4642	0.0267 *
FR	-0.2997	-1.8487 10 ⁻⁸	0.0173 *
GLP	-0.1652	-1.9448 10 ⁻⁸	0.00286 **
WoR	-1.6395	43.2883	6.48 10 ⁻⁵ ***
LDR	-1.2479	0.14506	0.00735 **
DM	-0.2208	-1.3146	0.100

***) sig at 1%; **) sig at 5%; *) sig at 10%;) sig at 15%

Source: Authors Analysis (2021)

Getting the best model requires variable selection. The best model is then used to calculate or predict the hazard value (unsustainable condition) of each BPRS. This variable selection stage uses variables that can consistently decrease the Akaike Information Criterion (AIC). At the variable selection stage, it expects to reduce multicollinearity. The multicollinearity effect of each independent variable is indicated by the Variance Inflation Factor (VIF) value. If the VIF value is more than 10, it suggests a multicollinearity condition (Miles, 2005).

This study uses three variable selection methods: forward, backward, and stepwise. The criterion used to measure the goodness of the model is the AIC value. The smallest AIC value indicates the best model. The best variables to create a hazard equation model based on the three variable selection methods will be obtained. The model is then used to predict the hazard value and survival (sustain) for each BPRS. Table 4 shows the results of the three variable selection methods along with the AIC values. Table 4 shows that there is no difference in the results of variable selection using the three methods. The three variable selection methods showed the same research variables and AIC values. The model selection results obtained five variables from the eleven variables included in the modeling. The five variables include NPF, BS, PM, DM, and DER, with an AIC value of 222.75 and the greatest significance level is 15%.

In conducting a company's sustainability analysis, it is necessary to improve modeling using a static model. Because the financial conditions of the company or the BPRS are changing from time to time, the static model is deemed insufficient to cover all the information related to the culture and will still be sustainable or not. It hopes the multiperiod logit model will provide better output than the static model. Because the likelihood equation is the same, the multiperiod logit estimator can calculate using the logit program. The independent variables used in this modeling have undergone a variable selection process. The parameter value estimation information generated from the modeling is shown in Table 5.

Furthermore, based on the results of Table 5, equations (1) and (2) are made to calculate the hazard opportunities for each BPRS (Kleinbaum & Klein, 2012). The hazard probability increases the hazard rate every year until the final year is determined. After receiving the hazard value for each BPRS, the financial sustainability value of the BPRS determine. Table 6 shows the descriptive hazard and Probability of sustain for BPRS.

$$h(t_i, x_i) = \frac{a}{1+a} \quad (1)$$

then,

$$a = \exp \left(\frac{-0.5783 - 0.1153 (NPL) - 1.233 \cdot 10^{-8} (BS) + 0.08141 (DER) - 0.53110 (PM) - 1.7780 (DM)}{1} \right) \quad (2)$$

Table 4. The Output Variable Selection

Method	Variable in the Model	AIC
Forward & Stepwise Backward	NPF***, BS***, PM**, DM*, DER·	222.75

***) sig at 1%; **) sig at 5%; *) sig at 10%; ·) sig at 15%

Source: Authors Analysis (2021)

Table 5. Estimate Value of *Multiperiod Logit* Model

Variable	Estimate	VIF	z-value	Probability Pr(> z)
(Intercept)	-0.5783	-	-1.143	0.2529
NPF	-0.1153	1.023107	4.929	8.25 10 ⁻⁷
BS	-1.233 10 ⁻⁸	1.076740	-2.807	0.0050
DER	0.08141	1.099969	1.450	0.1471
PM	-0.53110	1.104956	-2.111	0.0347
DM	-1.7780	1.210754	-1.866	0.0621

Source: Authors Analysis (2021)

Table 6. Descriptive of *Hazard, Survival dan Delisted Probability*

Probability	Statistics					
	Mean	Min	Q1	Median	Q3	Max
<i>Hazard</i>	2.2407	0.0133	1.2303	1.9482	2.8740	5.8620
<i>Sustain</i>	0.2020	0.0028	0.0608	0.1425	0.2922	0.9867

Source: Authors Analysis (2021)

DISCUSSION

In general, BPRS in East Java is not in good shape to maintain its financial sustainability as measured by the value of the FSS ratio. The study's results stated that only about 8 BPRS had sustainability above 30%. The top 3 positions for BPRS that have a chance to sustain are PT BPRS Bhakti Sumekar, PT BPRS Makmur Indah, PT BPRS Artha Pameng with a sustain opportunity value of 98%, 52%, and 47%. Meanwhile, the three lowest positions were PT BPRS BUMI Rinjani Batu (Batu City), PT BPRS Jabal Nur Tebuireng, PT BPRS Daya Artha Mentari with a value of sustain opportunities of 0.6%, 0.5%, and 0.3%.

If it is related to the NPF value, BPRS sustainability opportunities in East Java are not good enough. The NPF value in descriptive statistics shows a value of more than 5%. Banks with high NPF values will experience cost overruns on assets and other costs (Harun, 2016). This condition will positively affect the financial stability of banks. A good NPF value is less than 5%, as stated by PBI No. 17/11 / PBI / 2015. Meanwhile, BPRS, with the lowest sustain value, has an average NPF value of more than 20%. NPF is certainly not the primary determinant that affects the sustainability of a BPRS. Several studies stated that NPFs significantly affected banking sustainability (Hadi, Suryanto, & Hiung, 2018; Septi & Pangestuti, 2016).

BS (Bank Size) shows the size of a bank based on the total assets owned, the sales obtained, or the company's capital size. BS is estimated to be the total value of banking assets in this study. Banks with relatively larger total assets tend to be more stable than banks with lower total assets (Setiyono & Amanah, 2016). The public will look more at banks that have relatively greater performance. So that in this case, banks will be very careful in reporting their financial condition, providing informative, credible, and transparent information. Several studies that support the fact that assets affect the stability of banking financial conditions, among others, were delivered by Freddy & Gultom (2020), Setiyono & Amanah (2016), and Sugiarto (2011).

Univariate DER value has no significant effect on banking sustainability. DER is part of the leverage ratio, which describes the bank's ability to pay its obligations in the event of liquidation (Fuente & Velasco, 2022). There is no significant relationship between sustainability and DER ratio because the ability to use debt to equity is not considered properly. Debt policy is not influenced by economic, social, and environmental issues (Muallifin & Priyadi, 2016). Previous empirical evidence that even though the DER value of a BPRS is low, it does not indicate that the BPRS has the highest sustain opportunity. On the other hand, the smaller the DER value, the banking conditions will improve. Companies with high profits have better capabilities related to business stability, ability to fulfill funds, and operational activities (Anggiyani & Yanto, 2016).

Deposit Mobilization (DM) measures how many total loans are funded by public or customer funds (Marwa & Aziakpono, 2015). Univariate, the value of DM does not significantly affect opportunities to sustain. However, DM is included in the best model-making variables after the variable

selection process. The relationship between the independent variable and the dependent variable causes this condition. In this study, the DM variable significantly affects the opportunities for the sustainability of the BPRS. Source of funds from third parties is the cheapest source of funds compared to other sources. The source of funds for BPRS is dominated by DPK of 75.88% or reaching IDR 8.14 trillion (Otoritas Jasa Keuangan, 2019). The largest composition of BPR Syariah funds is still contributed by *mudharabah* deposits, with a portion reaching 62.73%, followed by *wadiah* deposits of 19.60% and *mudharabah* deposits of 17.61% (infobanknews.com). If an increase in income accompanies this increase in financial resources, it will be good for banking stability. Several previous studies have shown that the size of deposits increases profitability (Nugraheni & Septiarini, 2017; Yusuf & Mahriana, 2016). It confirms the research results showing that DM, including the best model compiler variable, is significant for the financial sustainability of BPRS.

The Capital Adequacy Ratio (CAR) is the only variable that does not significantly affect the financial sustainability of BPRS in East Java, and both are viewed univariately and simultaneously. Suwandi (2019) proves that the financial statements of BPR / BPRS are inaccurate for predicting bank failures due to irregularities made by shareholders, management, and bank employees. So that any analysis, including CAR calculations based on these financial statements, will be biased and tend to be misleading. One reason is that there is no obligation for all BPR / BPRS to audit their financial statements by a public accountant.

In the univariate model, ROA, FR, GLP, WoR, and LDR significantly affect banking sustainability (Table 3). However, ROA, FR, GLP, WoR, and LDR are not included in the best models (simultaneously) that predict financial sustainability. This study's results align with Wilopo (2006) study that bank failure in Indonesia cannot be expected correctly if only using the CAMEL model, which includes ROA and LDR. Aryati & Balafif (2007) study of the financial reports of 60 healthy and 14 unhealthy banks in Indonesia during the period 2005-2006, using CAMEL ratios, concluded that the CAR, ROA, ROE, LDR, and NIM ratios showed unhealthy results. Significant or no influence on Probability. It happens because the ROA, FR, GLP, WoR, and LDR numbers are financial ratios that connect two accounting numbers and are obtained by dividing one number by another (James Carter Van Horne quoted from (Kasmir, 2004). The accounting figure itself in the presentation also contains management policies and assumptions that may affect financial ratios. Therefore, the financial ratio results cannot be used to assess the institution's performance.

CONCLUSION

Several BPRS financial ratios still do not meet the optimum value, such as the ratio of NPF, ROA, and CAR. These ratios are still below the optimum limit. Based on the hazard model, the results show about 23 BPRS in East Java. Research variables that univariately affect the sustainability of BPRS include NPF, ROA, Bank Size, PM, FR, GLP, WoR, and LDR. The best model is produced through the variable selection stage. The selected variables stated simultaneously to influence the sustainability of the BPRS are NPF, bank size, PM, DM, and DER. The variable univariate and simultaneously does not affect the sustainability of the BPRS is CAR, which can sustain below 30%. This study's results can be used as a warning system for several stakeholders in BPRS East Java. The sustainability of banking as an intermediary institution between channelers and recipients of public funds is essential to maintain economic

stability. This research is still within the scope of the BPRS in East Java. Furthermore, it can develop in a more extensive range for BPRS in Indonesia.

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