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The Effect of Financing Diversification on Financing Risk of Islamic Rural Banks

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Abstract

The main problem faced by Islamic rural banks (IRBs) in Indonesia is the high level of non-performing financing (NPF). This paper analyzes the factors that influence NPF by focusing on the effect of financing diversification based on financing contracts. The IRBs being studied are banks located in West Java and East Java which constitute 34% of the total IRBs in Indonesia. The research period is from 2016-2022 using quarterly data and unbalanced panel data. The estimation method used is panel regression. The results document that the concentration of financing based on financing contracts reduces the NPF. Apart from that, the size of the bank and high capital will also reduce NPF but low efficiency increases NPF. However, stability and financing do not affect NPF. COVID-19, which has caused a decline in Indonesia's economic growth, has increased the NPF. More interestingly, COVID-19 as a moderating variable further strengthens the effect of financing concentration in reducing NPF during COVID-19. The policy implication of these findings is that IRBs must focus on certain financing contracts to reduce the risk of bad financing instead of disbursing all financing contracts.

Kata kunci:
BPRS;
NPF;
Diversifikasi pembiayaan;
COVID

Abstrak

Persoalan utama yang dihadapi BPRS di Indonesia adalah tingginya non-perfoming financing (NPF). Tulisan ini menganalisis faktor yang mempengaruhi NPF BPRS dengan memfokuskan pada pengaruh variabel diversifikasi pembiayaan. BPRS yang diteliti adalah BPRS yang berlokasi di Jawa Barat dan Jawa Timur yang merupakan 34% dari total BPRS di Indonesia. Periode penelitian dari 2016-2022 dengan menggunakan data kuartalan dan data panel yang tidak seimbang. Metode estimasi yang digunakan adalah regresi data panel. Hasilnya menunjukkan bahwa konsentrasi pembiayaan berdasarkan akad menurukan NPF. Selain itu, besarnya asset dan tingginya modal menurunkan NPF namun ketidaksefisien bank meningkatkan NPF. Variabel stabiltias dan besarnya pembiayaan tidak berpengaruh terhadap NPF. COVID-19 yang menyebabkan adanya penurunan pertumbuhan ekonomi Indonesia, telah meningkatkan NPF. Lebih menariknya, variabel moderasi COVID-19 semakin memperkuat pengaruh konsentrasi pembiayaan dalam menurunkan NPF selama COVID-19. Implikasi kebijakan dari temuan ini adalah BPRS harus memfokuskan pada akad-akad tertentu untuk mengurangi resiko adanya pembiayaan macet, bukan melakukan pembiayaan kepada semua jenis akad.

1. Introduction

The role of Islamic rural banks (IRBs) in the Indonesian economy is very important because the focus of IRB financing is on the micro, small, and medium enterprises (MSME) which is the largest business sector in Indonesia (Widarjono, Anto, et al., 2020; Widarjono, Mifrahi, et al., 2020). The number of BPRS throughout Indonesia is 175 with total assets of IDR 23.177 trillion in 2023. In addition, the MSME greatly benefits from the profit-sharing financing system (Mudharabah). Mudharabah financing has flexibility in repayment of financing that is in accordance with the character of MSMEs

However, financing carried out by IRBs must be managed properly to meet liquidity targets and improve bank financial stability and health. In the financing system, Islamic bank, including Islamic rural banks (IRBs) face risks caused by the failure of customers to meet their obligations. This risk is from the failure of customers to return their financing. This risk is the ratio of non-performing financing to total financing called Non-Performing Financing (NPF).

In distributing financing, IRB implements Profit Loss Sharing (PLS) contracts such as the Musharakah and Mudharabah contracts and Non-PLS comprising a Murabahah contract with a margin system, a Salam and Istishna as a contract system, and an Ijarah with a rental system. Based on data from the Financial Services Authority (OJK), financing with the Murabahah contract at IBRs is the largest of the other contracts. The growth of Murabahah contract financing continues to increase, even during the COVID-19 pandemic. Meanwhile, financing with Musharakah contracts, although not as large as Murabahah, shows a positive trend. Other types of contract financing, consisting of Mudharabah, Salam, Istishna, Ijarah, and Qardh are relatively stable.

The thing to pay attention to for financing is high financing risk which is measured by Non-Performing Financing (NPF). In the 2016-2022 period, the average NPF of IRBs was 9.06% while the average NPL of conventional rural banks (CRBs) was 4.18%. With a value above the threshold of 5%, it shows that IBRs face higher financing risks compared to conventional CRBs. Therefore, research on NPF of IRBs is very important to be conducted to find out what factors influence the financing risk of IRBs. This study, then, gives some practical implications for IRBs in how to manage their financing properly.

Theoretically, there are two strategies for IRBs to reduce high NPF, namely financing diversification or financing concentration (Šeho et al., 2021). IRBs diversify their financing in various forms of contracts to avoid high risk in their financing portfolio because their financing is in various types of contracts. Financing diversification thus reduces NPF (Šeho et al., 2024). Conversely, IRBs must focus on certain types of contracts so that they can gain a comparative advantage and reduce agency problems. As a result, concentrated financing will reduce NPF (Sutrisno et al., 2023).

A bunch of empirical studies have analyzed the factors that affect the NPF of IRBs. Some studies use internal bank factors that influence NPF (Nugrohowati & Bimo, 2019; Priyadi et al., 2021). Some studies also include macroeconomic variables that affect financing risk (Saputri et al., 2020; Widarjono & Rudatin, 2021b). Sutrisno et al. (2023) analyzed the influence of financing diversification based on PLS and Non-PLS financing on IRBs in Indonesia for the 2017-2020 period. However, there has been no empirical research that focuses on the impact of financing diversification based on the types of financing contracts on non-performing financing from Islamic banks.

Many factors affect the NPF of IRB, both internal and external. Internal factors are specific variables of IRB, namely financing diversification, bank size, capital adequacy, bank stability, financing, and bank operation efficiency (Widarjono, Anto, et al., 2020). External variables come from macroeconomic conditions, one of which is COVID-19. The COVID-19 pandemic that hit Indonesia in early 2020 became a threat to economic

activities at that time. Several sectors were affected by the COVID-19 pandemic, one of which was IRBs. Several policies have been implemented by the Indonesian government, to overcome the impact of this pandemic. One of them is to take advantage of the role of banks in distributing credit assistance to affected business actors and providing credit relief for customers. In addition, does IRBS also carry out a diversification strategy or concentration of financing to reduce non-performing financing during COVID-19? For this reason, it is interesting to examine whether the effect of financing diversification on NPF also is influenced by COVID.

Based on the above background, this study analyzes the influence of financing diversification based on contracts along with internal bank variables as a control variable in influencing the financing risk of IRBs. The internal variables of the bank are assets, bank capital, stability, financing, and efficiency. Some contributions are expected from this study. First, our study includes financing diversification based on contracts in influencing IBR's NPF. In this study, the diversification of 8 types of contracts is studied. Second, this study also included external variables, namely COVID-19. COVID-19 has reduced Indonesia's economic growth. Low economic growth will increase financing risks. For further analysis, this study wants to know whether the effect of financing diversification on NPF is affected during COVID-19 by implementing COVID-19 as a moderating variable. Accordingly, this study conducts an interaction between financing diversification and COVID-19.

2. Literature Review

2.1. Literature Review

Sudarsono (2018) analyzed the influence of micro and macro variables on the NPF of Sharia Banking in Indonesia. In the long run, the FDR, ROA, CIR, and BI rates have a positive effect on NPF while the CAR does not affect NPF. In the short run, the variables CAR, FDR, and CIR have a positive effect on NPF while inflation has a negative effect on NPF. Meanwhile, the ROA, BI rate, and exchange rate have no effect on NPF,

Nugrohowati and Bimo (2019) analyzed the influence of internal and external bank factors on NPF in Islamic Rural Banks in Indonesia. The CIR had a positive effect on NPF while the CAR and ROA have a negative effect on NPF. Assets do not affect NPF. For macroeconomic variables, the BI rate and GDP have a positive effect on NPF while Inflation and unemployment have no effect on IBRs' NPF.

Widarjono et al. (2020) investigated the influence of PLS financing on IRB's NPF. The high proportion of PLS contracts leads to high financing risks. Large IRBs face higher non-performing financing derived from *profit and loss* (PLS) contracts compared to small IRBs. The PLS contract also results in higher financing risks for IRBs outside the island of Java. Revenue diversification reduces financing risk and has a positive impact on IRB located on the island of Java. IRB, therefore, can consider optimizing the PLS contract rate to reduce financing risks.

Priyadi et al. (2021) examined internal and external factors that affect the NPF of IRBs using aggregate data. The research period is by using monthly data. In the long run,

the CAR and ROA have a positive effect on NPF while the PLS financing variable has a negative effect on NPF. Inflation have a negative effect on NPF. Meanwhile, the FDR, CIR, economic growth, and interest rate have no effect on NPF.

Widarjono and Rudatin (2021b) explored the influence of bank-specific variables and macroeconomic variables on non-performing financing of IBRs. The data used is aggregate data from 2009 to 2018 using monthly data. CAR has a positive effect on NPF while income diversification reduces NPF. GDP has a negative impact on NPF and inflation has a positive effect on NPF. Interestingly, GDP and inflation have an asymmetrical effect on NPF. The economic downturn increases NPF, but the economic boom does not affect NPF. Meanwhile, inflation increases NPF but deflation has no effect on NPF.

Sutrisno et al. (2023) investigated the factors affecting the NPF of IBRs comprising 100 banks in Indonesia. The research period is from 2017 to 2020 using quarterly data. Concentration of financing and bank stability have a negative effect on NPF. CAR and CIR have a positive effect on NPF. Based on the size of the bank, large banks are effective in using financing concentration policies to reduce NPFs while small banks are effective in using financing diversification policies to reduce NPFs.

Dewi (2022) examined whether the financing products in sharia commercial banks will affect financial performance if moderated by NPF. The results showed that mudarabah, musyarakah, and ijarah had a positive effect on financial performance, while murabahah had no effect. NPF as a moderating variable is proven to be able to weaken the effect of mudaraba and ijarah, strengthen murabahah, but doesn't moderate the effect of musyarakah.

Based on the above literature review, the study of Sutrisno et al. (2023) is the only study that analyzed the influence of financing diversification based on PLS and non-PLS contracts on IRBs. However, empirical research that addresses the impact of financing diversification based on each type of financing contract consisting of Mudharabah, Musyarakah, Murabahah, Salam, Istishna, and Ijarah has not been conducted yet. Financing diversification or financing confrontation are basically strategies to reduce financing risk which is measured by non-performing financing. For that reason, this study analyzes the influence of financing diversification (concentration) based on each contract on NPF IRBs to fill the research gap and at the same time show the contribution of this study.

2.2. Hypothesis

Financing in Islamic banks is categorized into two types, namely the principle of profit-sharing financing and the principle of buying and selling. In financing based on the principle of profit sharing, the financing contracts are al musyarakah, al mudharabah, al muzara'ah, and al musaqah. Meanwhile, in financing with the principle of buying and selling, the financing contracts are murabahah, salam, and istishna. Regarding financing, there are two strategies that can be carried out by Islamic banks, namely financing diversification or financing concentration. Banks diversify financing in order to reduce the

risk of failure. By diversifying financing, banks can reduce bad financing. Alternatively, banks can focus on several types of financing. By focusing on several types of financing, banks can gain a competitive advantage because banks can monitor well and reduce agency problems. Thus, the concentration of financing reduces the risk of bad financing (Sutrisno et al., 2023).

H1: Financing Diversification based on contracts affects NPF

The size of a bank can be proxied by the bank's assets. Along with the increase in assets, the capacity of banks to offer financing increases. Large banks can lower financing risks because they can improve the efficiency of bank management (Ibrahim & Rizvi, 2017). However, large banks also face the problem of management inefficiency and limited control over financing. The amount of funding without considering the prudential principle, leads to an increase in funding risk. Havidz and Setiawan (2015) found that large banks can reduce financing risks. On the contrary, Muhammad et al. (2021) reveal that large banks increase the risk of financing.

H2: Assets affecting *Non-Performing Financing* (NPF)

The Z-score is a measurement used to measure the stability of Islamic banking (Widarjono et al., 2022). If the Z-score is high, it can be concluded that Islamic banking is increasingly stable and vice versa. If Islamic banking is in a stable condition, then the condition of Islamic banking is good. This condition then reflects that the condition of bad loans in financing activities is getting smaller so that the threat of bankruptcy in Islamic banking is also getting smaller (Sutrisno et al., 2023).

H3: Z-score has a negative effect on *Non-Performing Financing* (NPF)

CAR is an indicator used by the central bank (BI) to set the provisions of minimum capital for banks. If the bank has a high CAR, it can be said that the higher or larger the capital owned. High CAR causes banks to have large financial resources to overcome bad financing. Thus, the bank's ability to control bad financing is getting bigger so that financing risk will also decrease (Aiyubbi et al., 2022). CAR is closely related to risk-weighted assets (RWA). Increased financing will increase the total RWA and will decrease the value of CAR.

H4: *Capital Adequacy Ratio* (CAR) has a negative effect on *Non-Performing Finance*

FDR is used to measure the ability of Islamic banks to disburse funds in terms of financing from a third fund. This financing is financing that does not include financing to other banks. Third-party funds include current accounts, savings, term deposits, and deposits. The high value of FDR is related to the high ability of banks to channel their funds into financing and vice versa. As the bank can channel all the funds, the bank will make a profit. However, if the banks do not distribute the funds, they will lose the opportunity to make a profit. The high value of FDR shows that banks have disbursed almost all of their funds. It can be concluded that the larger the funds used in financing, the higher the value of FDR and the higher the risk of non-performing financing (Widarjono, Anto, et al., 2020).

H5: Financing to Deposit Ratio has a positive effect on NPF

Operating Costs to Operating Income (OCOI) is an indicator used to measure the the level of efficiency and it also indicates ability of banks to carry out their operational activities. OCOI is used by banks to make decisions in distributing their financing. If banks can keep the OCOI value stable, then the NPF will also be stable (Haryanto et al., 2024).
H6: Operating Costs Operating Income has a positive effect on NPF

The COVID-19 pandemic caused a severe impact on several sectors, especially the economic and financial sectors. COVID-19 led to a slowdown in economic growth in the 2nd quarter. In the financial sector, banks face a fairly high risk of non-performing financing so this has an impact on the increase in NPF (Risfandy & Pratiwi, 2022).
H7: COVID-19 has a positive effect on NPF

3. Research Methods

3.1. Data

This study analyzes the NPF of Islamic rural banks in West Java Province and East Java Province. The West Java Province and East Java Province were selected because both provinces have a large number of IRBs. Accordingly, it is expected that the two provinces can represent the condition of IRBs in Indonesia. The number of IRBs in the two provinces is 59 IBRs or 34% of the total IRBs in Indonesia. We select 53 IRBs that provide complete data for our estimation. The period in this study is from 2016-2022 using quarterly data.

The type of data used in this study is secondary data in the form of panels obtained from quarterly publication reports in the period 2016 to 2022. The total panel data in this study is 1454 and is in the form of unbalanced panel data. The data in this study is sourced from the financial report of each IRB obtained from the official website of the Financial Services Authority (OJK).

3.2. Research Method

The method used is static panel data regression which is a combining data between time series and data cross section. The following is a model of the panel data regression equation used in this study:

$$NPF_{it} = \beta_0 + \beta_1 HHIF_{it} + \beta_2 LASSET_{it} + \beta_3 CAR_{it} + \beta_4 Zscore_{it} + \beta_5 FDR_{it} + \beta_6 OCI_{it} + \epsilon_t \quad (1)$$

NPF is non-performing financing which measures bad financing. HHIF is the Herfindahl-Hirschman Index which measures financing diversification. Assets are total assets that measure bank size. CAR is the Capital Adequacy Ratio which measures capital adequacy. Zscore is the stability of the bank. FDR is the Financing Deposit ratio which measures the amount of financing. OCI is a cost-income ratio that measures operational efficiency.

COVID-19 has reduced Indonesia's economic growth and subsequently had an impact on increasing financing risks. To analyze the effect of COVID-19 on NPF, this study included the COVID variable as a dummy variable. The government officially declared the COVID-19 pandemic in the second quarter of 2020 and announced the end of COVID in 2022. For that reason, COVID-19 as a dummy variable was equal to 1 starting

in the second quarter of 2020 till 2021 and it is 0 otherwise For further analysis, this study analyzes whether the effect of financing diversification is affected during COVID-19 by conducting an interaction between financing diversification and COVID-19. The model of the panel regression equation by including COVID-19 is as follows:

$$NPF_{it} = \beta_0 + \beta_1 HHIF_{it} + \beta_2 HHIFxCovid_{it} + \beta_3 LASSET_{it} + \beta_4 CAR_{it} + \beta_5 Zscore_{it} + \beta_6 FDR_{it} + \beta_7 CIR_{it} + \beta_8 Covid_{it} + \epsilon_t \quad (2)$$

In estimating the panel data regression model in this study, several methods were used, consisting of common effect, fixed effect, and random effect. The F, LM, and Hausman tests were used to select the best method for analyzing equations (1) and (2).

3.3. Variable Measurement

The dependent variables in this study are Non-Performing Financing (NPF). NPF is a ratio used to measure the risk of failure to repay loans by debtors (Alandejani & Asutay, 2017; Warninda et al., 2019).

Some independent variables obviously affect NPF. The first independent variable is the financing diversification based on contracts. Financing diversification (HHIF) based on contracts is calculated using the Herfindahl-Hirschman Index (HHI) as follows (Trinugroho et al., 2018; Widarjono & Rudatin, 2021a).

$$HHIF = \left(\frac{Musyarakah}{TFin}\right)^2 + \left(\frac{Mudharabah}{TFin}\right)^2 + \left(\frac{Murabahan}{TFin}\right)^2 + \left(\frac{salam}{TFin}\right)^2 + \left(\frac{istishna}{TFin}\right)^2 + \left(\frac{ijarah}{TFin}\right)^2 + \left(\frac{qardh}{TFin}\right)^2 \quad (3)$$

TFin is total financing.

The Z-score is a measuring tool used to show the stability of Islamic banking. It is also a measure of the variability of Islamic banking profitability. If an Islamic bank with a Z-score, it can be concluded that an Islamic bank is increasingly stable and vice versa. The Z-score is calculated using the following formula (Risfandy et al., 2022):

$$Zscore = \frac{ROA + CAR}{SDROA} \quad (4)$$

Where ROA is Return on the asset, CAR is capital adequacy ratio and SDROA is the standard deviation of ROA.

Assets are the total assets owned by banks. In the balance sheet, assets are presented together with obligations in the form of stocks or positions at a certain time. Total assets show bank size (Widarjono & Misanam, 2024). Capital Adequacy Ratio (CAR) is equity divided by assets weighted risk (Šeho et al., 2024). CAR is a ratio used as an indicator in assessing the bank's ability to cover the decline in its assets as a result of the bank's losses due to risky assets. Financing to Deposit Ratio (FDR) is the ratio of total financing to third-party funds (Sutrisno & Widarjono, 2022). FDR is a ratio used to measure the level of liquidity in Islamic banking (Almunawwaroh & Marliana, 2018). The ratio of income to cost (CIR) represents operating efficiency (Rizvi et al., 2020). Operational costs are the costs incurred by the bank to carry out its basic business activities

while operating income is the bank's main income. CIR is a ratio used to measure the level of efficiency and ability of banks to carry out their operational activities (Kasanah et al., 2022).

4. Results and Discussion

4.1. Description of the Object

Descriptive statistics are shown in **Table 1**. The mean of NPF was 10.60% with a standard deviation of 11.34. The high NPF which is above the threshold of 5% is due to IBRs financing focused on micro-enterprises that have higher risks than large companies. The mean of financing diversification was 76.54% with a standard deviation of 17.25%. This condition shows that it is still far closer to 50% because IRBs still do not have many financing products. The mean of the assets was IDR 11. 49 billion with a standard deviation of 20.66 billion. This indicates that there is a variation in the size of IRBs The mean of the Z-score was 87.15% and is relatively stable with a standard deviation of 163.25%. The mean of CAR was 31.60% with a standard deviation of 24.22%. The CAR of IRBs is still relatively high due to the lack of role of IRBs compared to CRBs in financing. The FDR, on average, was 99.64% and is below 100% with a standard deviation of 232.25%. This condition shows the high commitment of IBRs in West Java Province and East Java Province to be careful when carrying out their financing activities. The mean of CIR was 86.12% below the threshold of 90% with a standard deviation of 84.17%. This condition suggests that IBRs in West Java and East Java Province are categorized as healthy.

Table 1. Summary statistics

Variable	Mean	Std. dev.	Min	Max
NPF	10.6036	11.3433	0.1200	90.2100
HHIF	0.7654	0.1725	0.2598	1.0000
asset	11.4973	20.6594	0.2179	170.9038
Zscore	87.1540	163.2522	-10.0008	2300.1630
CAR	31.6009	24.2229	2.2400	222.3500
FDR	99.6456	232.2581	0.7600	8762.0000
CIR	86.1245	84.1756	2.4700	2227.3470
COVID	0.2531	0.4349	0.0000	1.0000

4.2. Correlation

Table 2 displays the correlation between independent variables to ensure the absence of multicollinearity problems. The correlation value between independent variables is generally less than 0.5. A correlation value of less than 0.5 indicates that there is no multicollinearity problem so it produces robust estimators.

Table 2. Correlation matrix

	NPF	HHIF	lasset	zscore	CAR	FDR	CIR
NPF	1						
HHIF	-0.0704	1					
Lasset	-0.2402	-0.1736	1				
Zscore	-0.1227	-0.0169	0.1007	1			
CAR	-0.0614	0.0332	-0.2666	0.2161	1		

FDR	-0.0106	0.0175	-0.0232	-0.0167	-0.0296	1	
CIR	0.2049	-0.0120	-0.1473	-0.0552	0.1138	-0.0240	1
COVID	-0.0492	-0.0937	0.0889	0.0433	0.0503	-0.0227	0.0847

4.3. Panel Regression Results

Table 3 presents the results of the panel data. The first step is to choose which model is most appropriately used. The F test, the Lagrange Multiplier (LM) test, and the Hausman test are employed to select the most appropriate model. The results of the three tests are presented at the bottom of Table 3. The results suggest that the best method is the Fixed effect method based on those methods.

Table 3. Panel regression results

	CE	FE	RE
HHIF	-8.3198***	-9.0431***	-8.1721***
	(0.0000)	(0.0000)	(0.0000)
Lasset	-2.1861***	-6.2389***	-3.7486***
	(0.0000)	(0.0000)	(0.0000)
Zscore	-0.0037**	-0.0019	-0.0021
	(0.0205)	(0.1220)	(0.1055)
CAR	-0.0598***	-0.0348***	-0.0417***
	(0.0000)	(0.0090)	(0.0015)
FDR	-0.0007***	-0.0003	-0.0002
	(0.2780)	(0.4020)	(0.4170)
CIR	0.0258***	0.0138***	0.0164***
	(0.0000)	(0.0000)	(0.0000)
Constant	55.5886***	126.0879***	82.3455***
	(0.0000)	(0.0000)	(0.0000)
R-squared	0.1331	0.1566	0.1114
No. banks	53		
Observations	1454		
F -test	12.92***		
LM-test	1530.83***		
Hausman-test	23.777***		

Notes: parentheses indicate probability. ***, **, and * are significant at 1%, 5% and 10%

Based on the results of the fixed effect method, the probability for HHIF is 0.000 which is less than α= 1% so the financing diversification has a negative effect on NPF. The probability of the asset is 0.0000 which is smaller than α = 1% so the asset has a negative influence on NPF. The probability of Zscore is 0.1220, above α = 10%, which indicates that the Z-score has no effect on NPF. The probability of CAR is 0.0090, less than α = 1%, which implies that the CAR has a negative impact on NPF. The probability of FDR is 0.4020 which is greater than α = 10% so FDR has no effect on NPF. The probability of CIR is 0.000 which less than α = 1% and it indicates that the CIR has positif impact on NPF.

The results of the fixed effect showed that the HHIF had a negative effect on NPF. A high HHIF indicates that Islamic bank financing is concentrated and conversely, the smaller the HHIF, the less concentrated the financing. These results show that the more concentrated financing in IRBs will reduce the non-performing financing. This can happen because IRBs are small banks compared to Islamic commercial banking. The financing is also relatively small compared to conventional CRBs. Based on OJK data in December

2021, the loan of CRBs was IDR 116,580 billion, and the financing of IRBs was IDR 11,983 billion. IRBs are required to set strategies to avoid the risk of non-performing financing. One of the strategies implemented is to concentrate on financing. The financing concentration makes it easier to monitor their financing and at the same time can develop its comparative advantages in distributing financing. As a result, it can reduce the risk of bad financing (Widarjono & Rudatin, 2021a).

Assets have a negative effect on NPF. This result is in accordance with the research conducted by Widarjono et al. (2020) that assets have a negative effect on the NPF of IRBs. According to the Financial Soundness Indicator (FSI). Assets are the total assets reported on the balance sheet along with their obligations in the form of stocks or positions at a given time. The IRBs' assets have increased significantly from 2019-2021. In 2019, the total assets of IRBs amounted to IDR 13.76 trillion, rising to IDR 17.06 trillion in 2021. This indicates that IRBs have the potential to develop and the role of IRBs is taken into account in the financial world. Asset quality is a very important component of a bank's credit profile. Assets are related to the achievement of profits in Islamic banking. With the improvement of asset quality, it is expected to be able to increase the achievement of profits. If profits increase, it indicates that the IRB has successfully controlled financing risks (Silvia, 2017).

The results of the study showed that the Z-score had no influence on NPF. The Z-score is widely used to measure the stability of Islamic banks. The Z-score is also a measure of the variability of Islamic bank profitability. If the Z-score is high, it can be concluded that Islamic banks are increasingly stable and vice versa. Theoretically, stable banks can minimize non-performing financing. However, bad financing depends on the customer's ability to return their financing. Customers of IRbs are MSMEs whose business management is unstable so bank stability does not guarantee that the bank can reduce its bad financing (Sutrisno et al., 2023). IRBs This result is not consistent with previous research Fatoni and Sidiq (2019) which shows that stability.

The results of this study indicate that the CAR has a negative effect on NPF. CAR is an internal banking variable used to measure capital adequacy. To reduce the risk of non-performing financing, the bank provides funds used for business development as much as possible and accommodates the risk of fund losses due to banking operational activities. The availability of funds is an important factor in banking operations so that it can overcome financing defaults (Widarjono, Anto, et al., 2020). The higher CAR is the greater the bank's ability to minimize the non-performing financing. The results of this study are in accordance with the study conducted by Nugrohowati and Bimo (2019) which documents that the CAR had a negative effect on the NPF of IRBs

The results of the fixed effect method document that the FDR has no effect on NPF. However, the results of this study are different from existing studies conducted by Muhammad et al. (2020) which indicates that FDR had a negative effect on NPF. This can happen because the capacity of IRBs is still small compared to Islamic commercial banks. Another factor is that the object of this study is located in Java, which is the center of the Indonesian economy. Accordingly, financing risk is low.

The results indicate that CIR positively affects NPF. The results of this study are in accordance with the research conducted by Hosen and Muhari (2019). Operating costs to operating income are ratios used to measure the level of efficiency of banking activities. CIR necessarily increases the bad financing. This is because bad financing is directly related to the level of operational efficiency. A bank with a high CIR indicates that the bank does not run efficiently so it could increase impaired financing (Sutrisno et al., 2023).

4.4. Impact of Covid on NPF

Covid 19 is an outbreak of disease caused by the coronavirus that first originated in Wuhan, China. This disease has become a pandemic that has infected several countries. As a result of this pandemic, several sectors have been severely affected, including Islamic banking. **Table 4** presents the results of the impact of COVID-19 and the variable interaction between HHIF and COVID-19 on the NPF of IRBs.

The results of the F test, LM test, and Hausman test imply that fixed effect is the best method. The HHIF variable negatively affects NPF at α = 1%, assets have a negative impact on NPF at α = 1%, CAR negatively influences NPF at α = 1%, and Z-score has a negative effect on NPF at α = 5%. These results are in line with the results without COVID which are presented in **Table 3**. The probability of COVID is 0.0007 which is less than α = 1%. These results show that the Covid 19 has a positive and significant effect on the NPF. Finally, the interaction between HHIF and COVID negatively affects NPF at α = 1%.

Table 4. Impact of Covid on NPF

Variable	CE	FE	RE
HHIF	-8.0433***	-7.6904***	-6.8278***
	(0.0000)	(0.0020)	(0.0030)
HHIF*covid	-1.1747	-5.8193**	-5.7461**
	(0.3805)	(0.0420)	(0.0440)
Lasset	-2.1860***	-6.1737***	-3.7000***
	(0.0000)	(0.0000)	(0.0000)
Zscore	-0.0036**	-0.0019	-0.0020
	(0.0210)	(0.1300)	(0.1115)
CAR	-0.0601***	-0.0345***	-0.0417***
	(0.0000)	(0.0095)	(0.0015)
FDR	-0.0007	-0.0003	-0.0002
	(0.2770)	(0.3955)	(0.4105)
CIR	0.0258***	0.0137***	0.0163***
	(0.0000)	(0.0000)	(0.0000)
COVID	0.1754	3.8346*	3.7149
	(0.4790)	(0.0930)	(0.1005)
Constant	55.3727***	123.8821***	80.4413***
	(0.0000)	(0.0000)	(0.0000)
R-squared	0.1333	0.1541	0.1889
No. banks	53		
Observations	1454		
F-test	12.99***		
LM-test	1536.74***		
Hausman-test	25.97**		

Notes: parentheses indicate probability. ***, **, and * are significant at 1%, 5% and 10%.

The results of this study show that COVID-19 has a positive effect on the NPF of IRBs. The COVID-19 pandemic has caused income from financing to decrease. The spread of COVID-19 has caused a decline in the performance and capacity of Islamic banking, especially debtors. Therefore, a decline in debtor performance will increase credit risks that interfere with the operation and financial stability of Islamic banking (Risfandy & Pratiwi, 2022). According to Ajizah and Widarjono (2023), COVID-19 caused panic in the financial sector and had an impact on banking conditions. Economic growth in the second quarter experienced turmoil, where the current account balance and capital account experienced a deficit, causing the rupiah exchange rate to weaken against the U.S. dollar. COVID-19 has caused a decline in business activities. The decline lowers the ability of debtors to pay installments which has an impact on a decrease in liquidity. To overcome the crisis that occurred due to the COVID pandemic, the government provides assistance stimulus to the community, and affected sectors. One of the stimuli provided is the relaxation of banking credit and intensifying the distribution of small business credit (Sutrisno et al., 2023).

More interestingly, this study indicates that the effect of financing diversification is affected during COVID-19. The interaction between HHIF and COVID-19 is negative and significant, meaning that COVID-19 as a moderating variable further strengthens the effect of financing concentration in reducing NPF during COVID-19. In other words, during COVID-19, the financing concentration strategy is very appropriate to reduce NPF, instead of financing diversification.

5. Conclusions and Policy Implications

From the results of panel regression, it can be concluded that the financing concentration based on contracts lowers NPF. Also, strong bank fundamentals reduce financing risk. The larger bank, high capital, and strong stability obviously reduce financing risk. Economic downturns due to COVID-19 increased financing risk.

The results of the study showed that the variable of financing concentration based on the contract lowers the financing risk of IRBs. Several policy implications can be taken from the results of this study. First, IRBs must focus financing on certain types of contracts, not financing all types of contracts. With a focus on certain types of financing, IRBs are able to monitor their financing well and overcome agency problems. Second, each IRB must build up strong bank fundamentals by increasing its bank size, accumulating high capital, and increasing profitability to reduce financing risk. Third, the soundness of IRBs before and after the COVID-19 pandemic is clearly differences. This means that IRBs must also improve their financial health management, to be able to survive in critical circumstances such as the COVID-19 pandemic.

The sample in this study only uses the number of IRBs in West Java Province and East Java Province. Therefore, further research to take more samples and spread them across all provinces in Indonesia.

Authors' Declaration

Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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