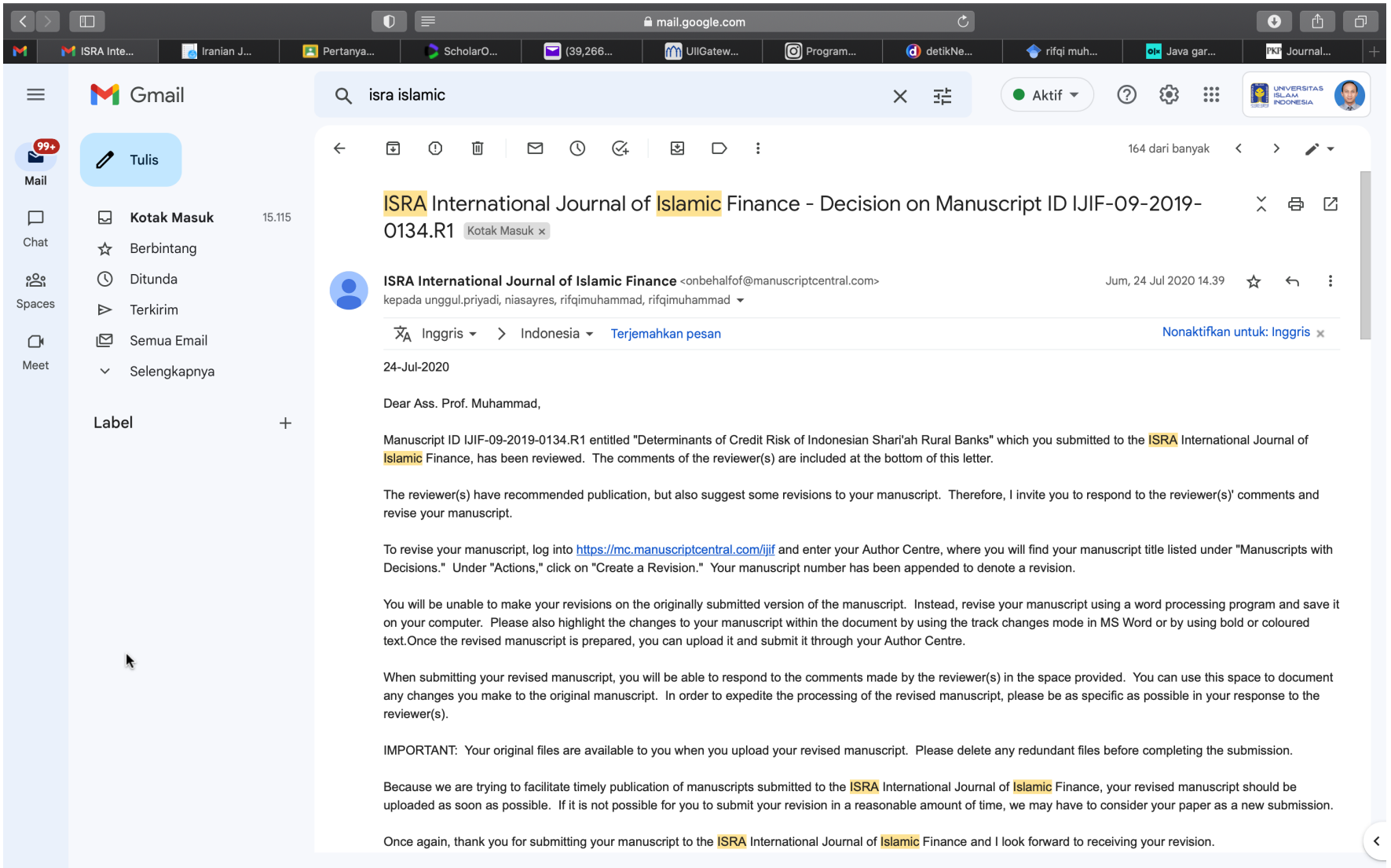
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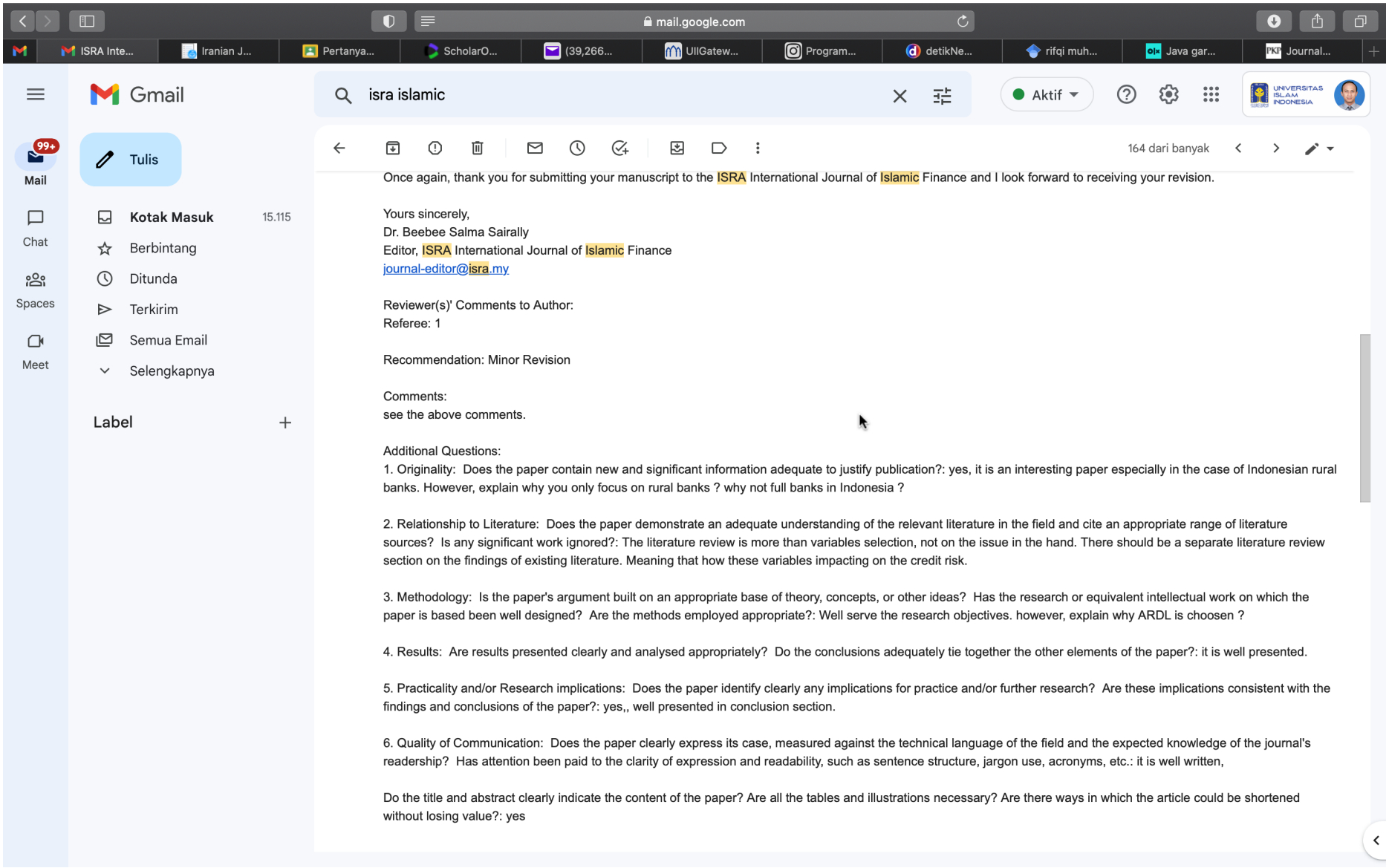
24-Jul-2020
Dear Ass. Prof. Muhammad,
Manuscript ID IJIF-09-2019-0134.R1 entitled "Determinants of Credit Risk of Indonesian Shari'ah Rural Banks" which you submitted to the ISRA International Journal of Islamic Finance, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.
The reviewer(s) have recommended publication, but also suggest some revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript.
To revise your manuscript, log into https://mc.manuscriptcentral.com/ijif and enter your Author Centre, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.
You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer. Please also highlight the changes to your manuscript within the document by using the track changes mode in MS Word or by using bold or coloured text.Once the revised manuscript is prepared, you can upload it and submit it through your Author Centre.
When submitting your revised manuscript, you will be able to respond to the comments made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).
IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.
Because we are trying to facilitate timely publication of manuscripts submitted to the ISRA International Journal of Islamic Finance, your revised manuscript should be uploaded as soon as possible. If it is not possible for you to submit your revision in a reasonable amount of time, we may have to consider your paper as a new submission.
Once again, thank you for submitting your manuscript to the ISRA International Journal of Islamic Finance and I look forward to receiving your revision.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Once again, thank you for submitting your manuscript to the ISRA International Journal of Islamic Finance and I look forward to receiving your revision.
Yours sincerely,
Dr. Beebee Salma Sairally
Editor, ISRA International Journal of Islamic Finance
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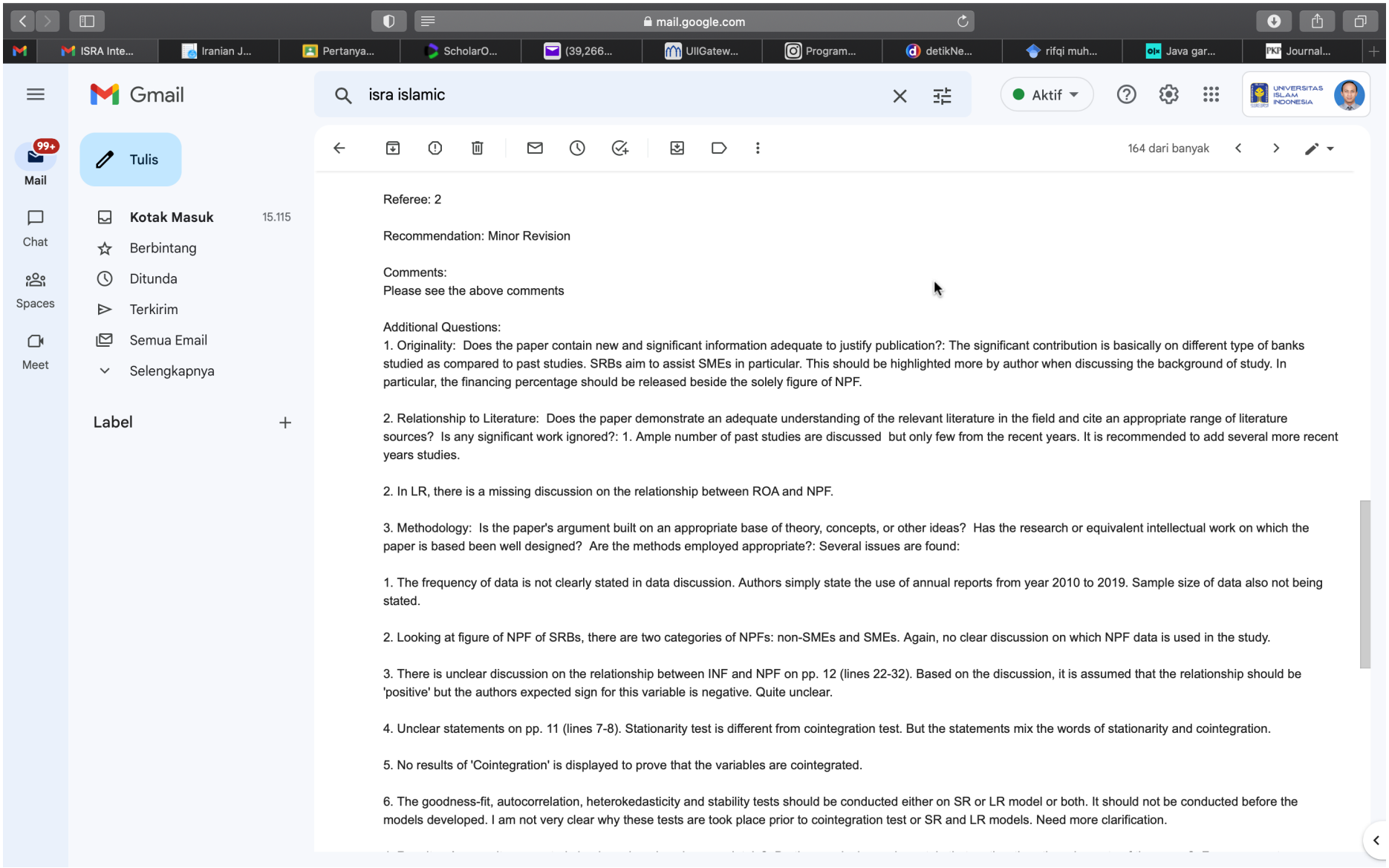
Reviewer(s)' Comments to Author:
Referee: 1
Recommendation: Minor Revision
Comments:
see the above comments.
Additional Questions:
1. Originality: Does the paper contain new and significant information adequate to justify publication?: yes, it is an interesting paper especially in the case of Indonesian rural banks. However, explain why you only focus on rural banks ? why not full banks in Indonesia ?
2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The literature review is more than variables selection, not on the issue in the hand. There should be a separate literature review section on the findings of existing literature. Meaning that how these variables impacting on the credit risk.
3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: Well serve the research objectives. however, explain why ARDL is choosen ?
4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: it is well presented.
5. Practicality and/or Research implications: Does the paper identify clearly any implications for practice and/or further research? Are these implications consistent with the findings and conclusions of the paper?: yes,, well presented in conclusion section.
6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: it is well written,
Do the title and abstract clearly indicate the content of the paper? Are all the tables and illustrations necessary? Are there ways in which the article could be shortened without losing value?: yes



Referee: 2

Recommendation: Minor Revision

Comments:
Please see the above comments

Additional Questions:
1. Originality: Does the paper contain new and significant information adequate to justify publication?: The significant contribution is basically on different type of banks studied as compared to past studies. SRBs aim to assist SMEs in particular. This should be highlighted more by author when discussing the background of study. In particular, the financing percentage should be released beside the solely figure of NPF.

2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: 1. Ample number of past studies are discussed but only few from the recent years. It is recommended to add several more recent years studies.

2. In LR, there is a missing discussion on the relationship between ROA and NPF.

3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: Several issues are found:

1. The frequency of data is not clearly stated in data discussion. Authors simply state the use of annual reports from year 2010 to 2019. Sample size of data also not being stated.

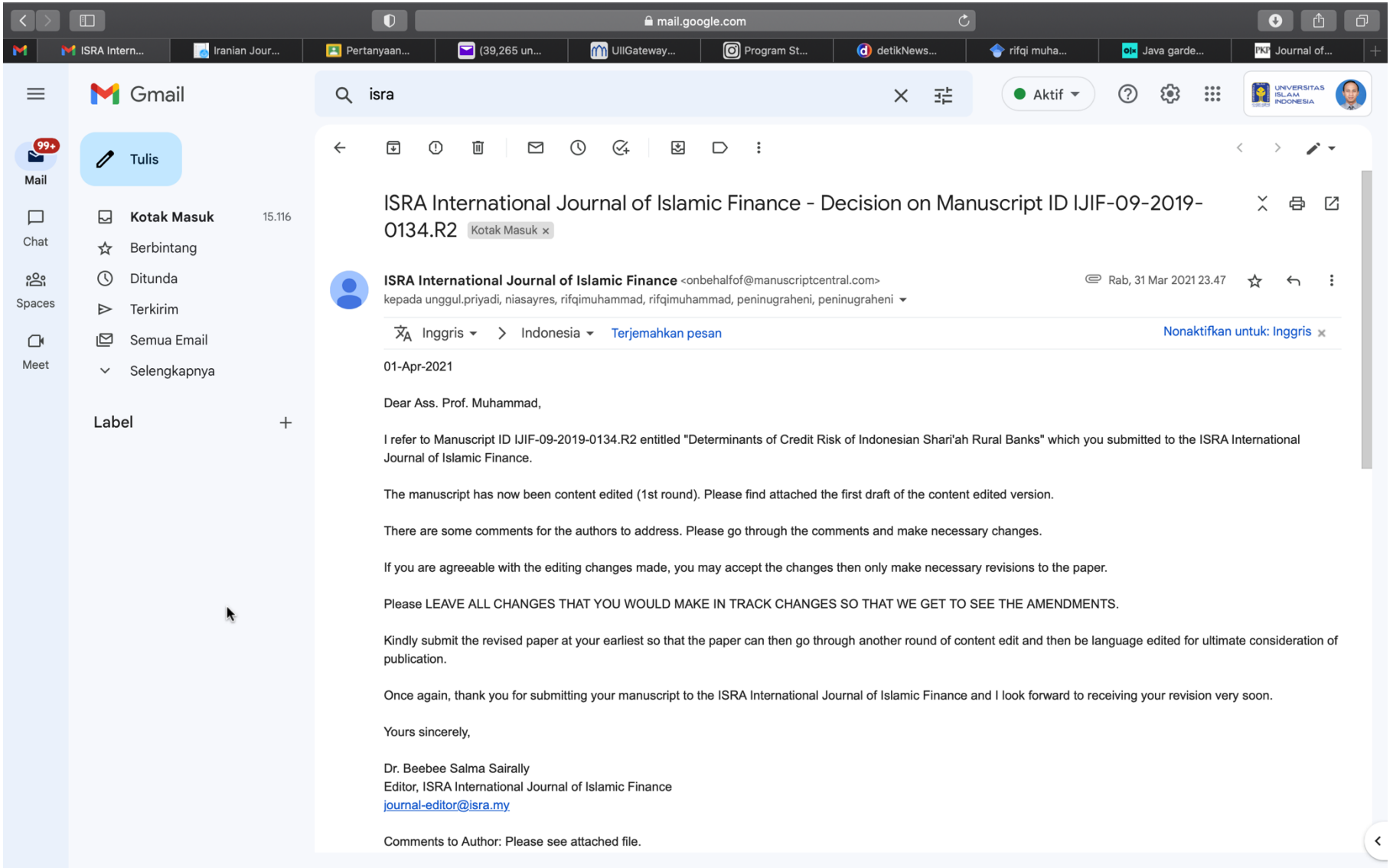
2. Looking at figure of NPF of SRBs, there are two categories of NPFs: non-SMEs and SMEs. Again, no clear discussion on which NPF data is used in the study.

3. There is unclear discussion on the relationship between INF and NPF on pp. 12 (lines 22-32). Based on the discussion, it is assumed that the relationship should be 'positive' but the authors expected sign for this variable is negative. Quite unclear.

4. Unclear statements on pp. 11 (lines 7-8). Stationarity test is different from cointegration test. But the statements mix the words of stationarity and cointegration.

5. No results of 'Cointegration' is displayed to prove that the variables are cointegrated.

6. The goodness-fit, autocorrelation, heterokedasticity and stability tests should be conducted either on SR or LR model or both. It should not be conducted before the models developed. I am not very clear why these tests are took place prior to cointegration test or SR and LR models. Need more clarification.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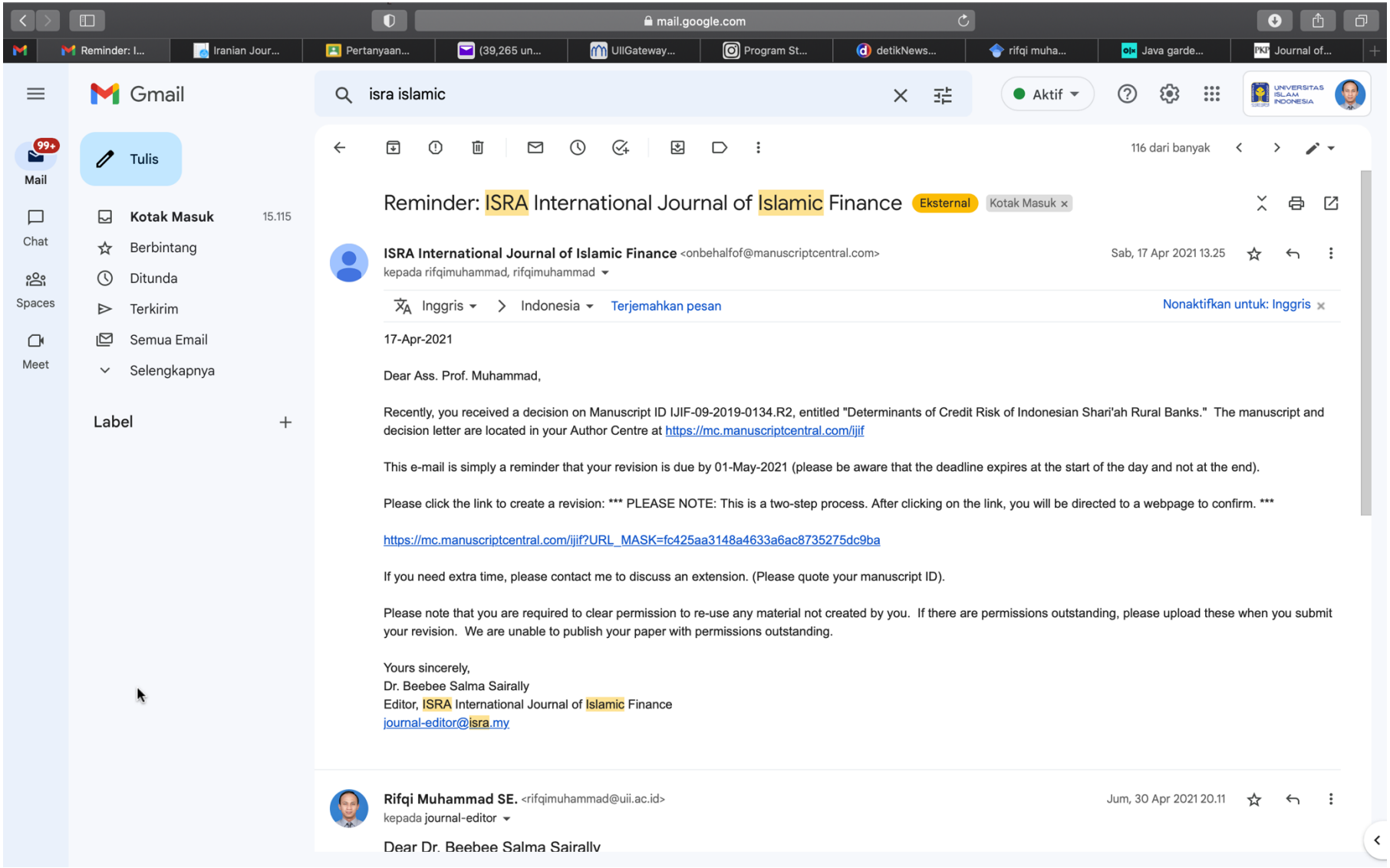
01-Apr-2021
Dear Ass. Prof. Muhammad,
I refer to Manuscript ID IJIF-09-2019-0134.R2 entitled "Determinants of Credit Risk of Indonesian Shari'ah Rural Banks" which you submitted to the ISRA International Journal of Islamic Finance.
The manuscript has now been content edited (1st round). Please find attached the first draft of the content edited version.
There are some comments for the authors to address. Please go through the comments and make necessary changes.
If you are agreeable with the editing changes made, you may accept the changes then only make necessary revisions to the paper.
Please LEAVE ALL CHANGES THAT YOU WOULD MAKE IN TRACK CHANGES SO THAT WE GET TO SEE THE AMENDMENTS.
Kindly submit the revised paper at your earliest so that the paper can then go through another round of content edit and then be language edited for ultimate consideration of publication.
Once again, thank you for submitting your manuscript to the ISRA International Journal of Islamic Finance and I look forward to receiving your revision very soon.
Yours sincerely,
Dr. Beebee Salma Sairally
Editor, ISRA International Journal of Islamic Finance
journal-editor@isra.my
Comments to Author: Please see attached file.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17-Apr-2021
Dear Ass. Prof. Muhammad,
Recently, you received a decision on Manuscript ID IJIF-09-2019-0134.R2, entitled "Determinants of Credit Risk of Indonesian Shari'ah Rural Banks." The manuscript and decision letter are located in your Author Centre at https://mc.manuscriptcentral.com/ijif
This e-mail is simply a reminder that your revision is due by 01-May-2021 (please be aware that the deadline expires at the start of the day and not at the end).
Please click the link to create a revision: *** PLEASE NOTE: This is a two-step process. After clicking on the link, you will be directed to a webpage to confirm. ***
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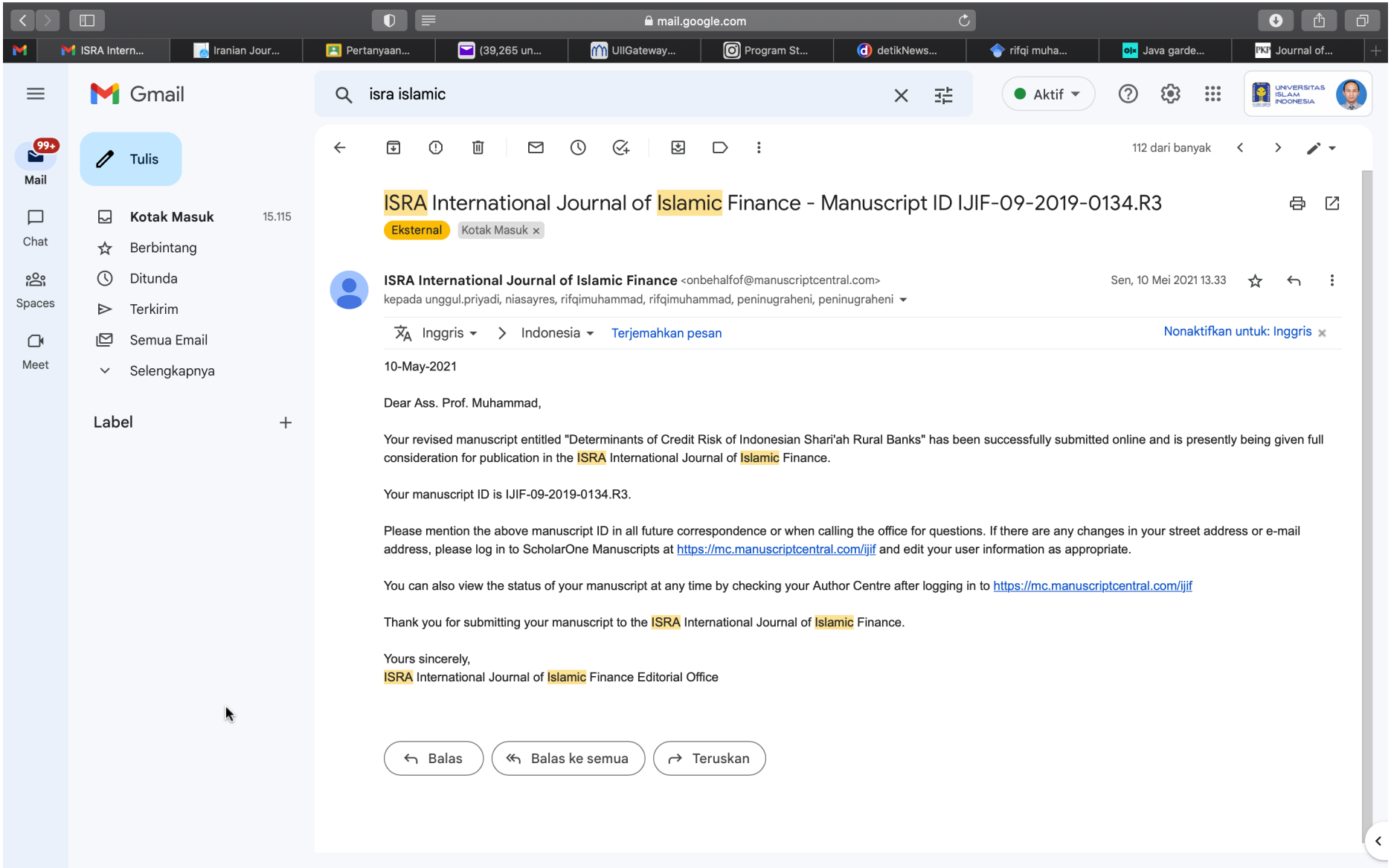
Dear Dr. Beebee Salma Sairally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10-May-2021
Dear Ass. Prof. Muhammad,
Your revised manuscript entitled "Determinants of Credit Risk of Indonesian Shari'ah Rural Banks" has been successfully submitted online and is presently being given full consideration for publication in the ISRA International Journal of Islamic Finance.
Your manuscript ID is IJIF-09-2019-0134.R3.
Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at https://mc.manuscriptcentral.com/ijif and edit your user information as appropriate.
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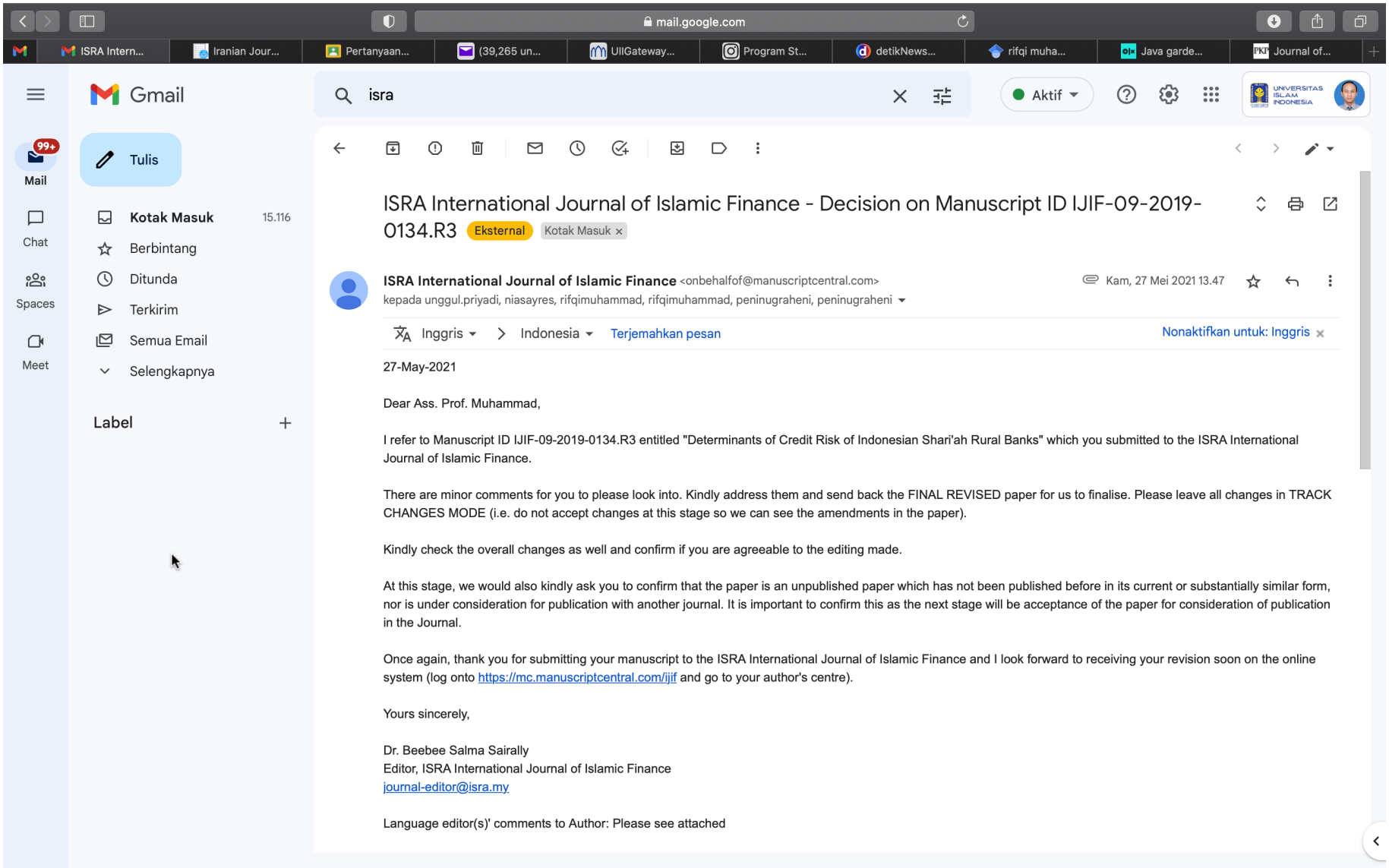
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27-May-2021
Dear Ass. Prof. Muhammad,
I refer to Manuscript ID IJIF-09-2019-0134.R3 entitled "Determinants of Credit Risk of Indonesian Shari'ah Rural Banks" which you submitted to the ISRA International Journal of Islamic Finance.
There are minor comments for you to please look into. Kindly address them and send back the FINAL REVISED paper for us to finalise. Please leave all changes in TRACK CHANGES MODE (i.e. do not accept changes at this stage so we can see the amendments in the paper).
Kindly check the overall changes as well and confirm if you are agreeable to the editing made.
At this stage, we would also kindly ask you to confirm that the paper is an unpublished paper which has not been published before in its current or substantially similar form, nor is under consideration for publication with another journal. It is important to confirm this as the next stage will be acceptance of the paper for consideration of publication in the Journal.
Once again, thank you for submitting your manuscript to the ISRA International Journal of Islamic Finance and I look forward to receiving your revision soon on the online system (log onto https://mc.manuscriptcentral.com/ijif and go to your author's centre).
Yours sincerely,
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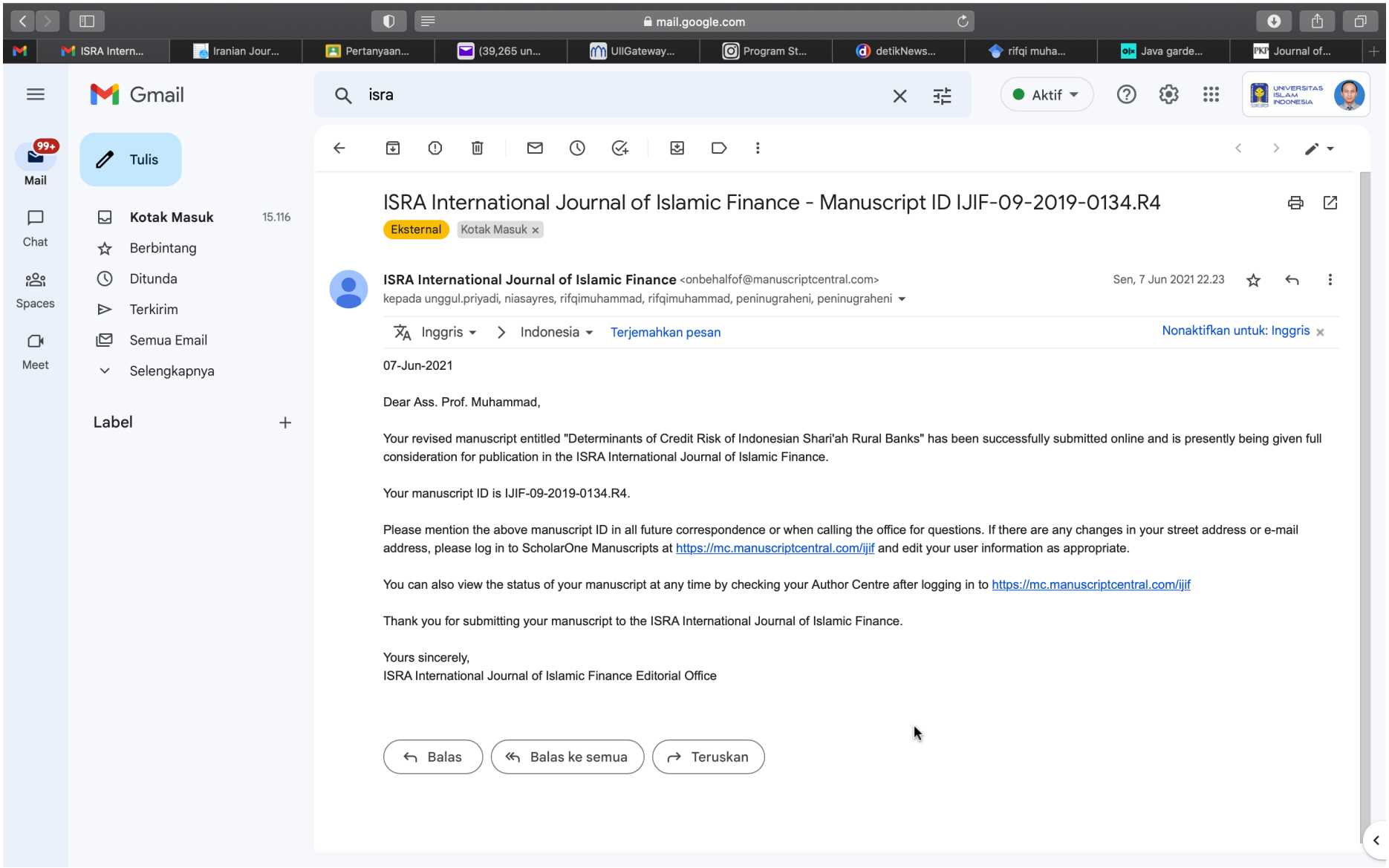
Language editor(s)' comments to Author: Please see attached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07-Jun-2021
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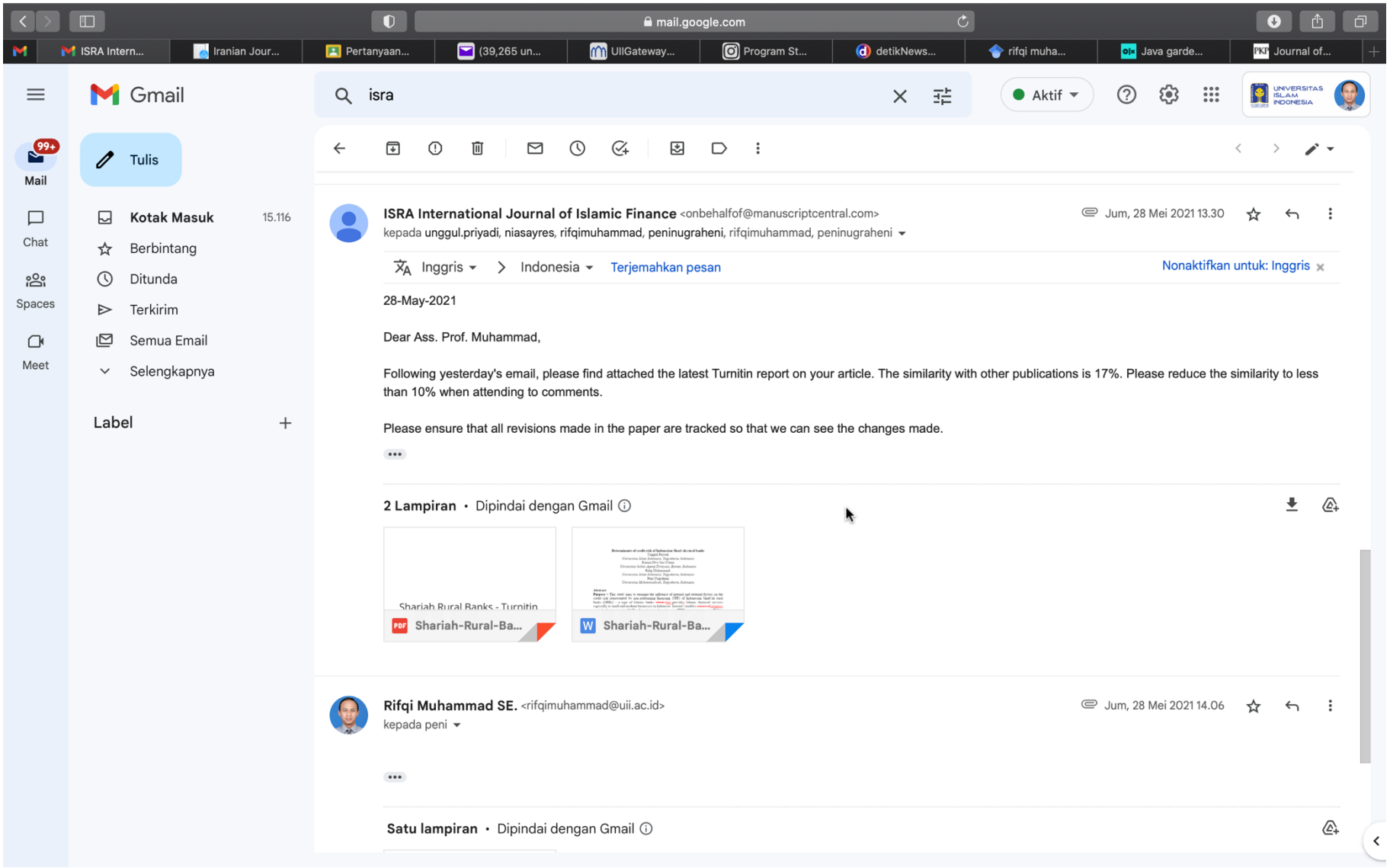
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Dear Ass. Prof. Muhammad,
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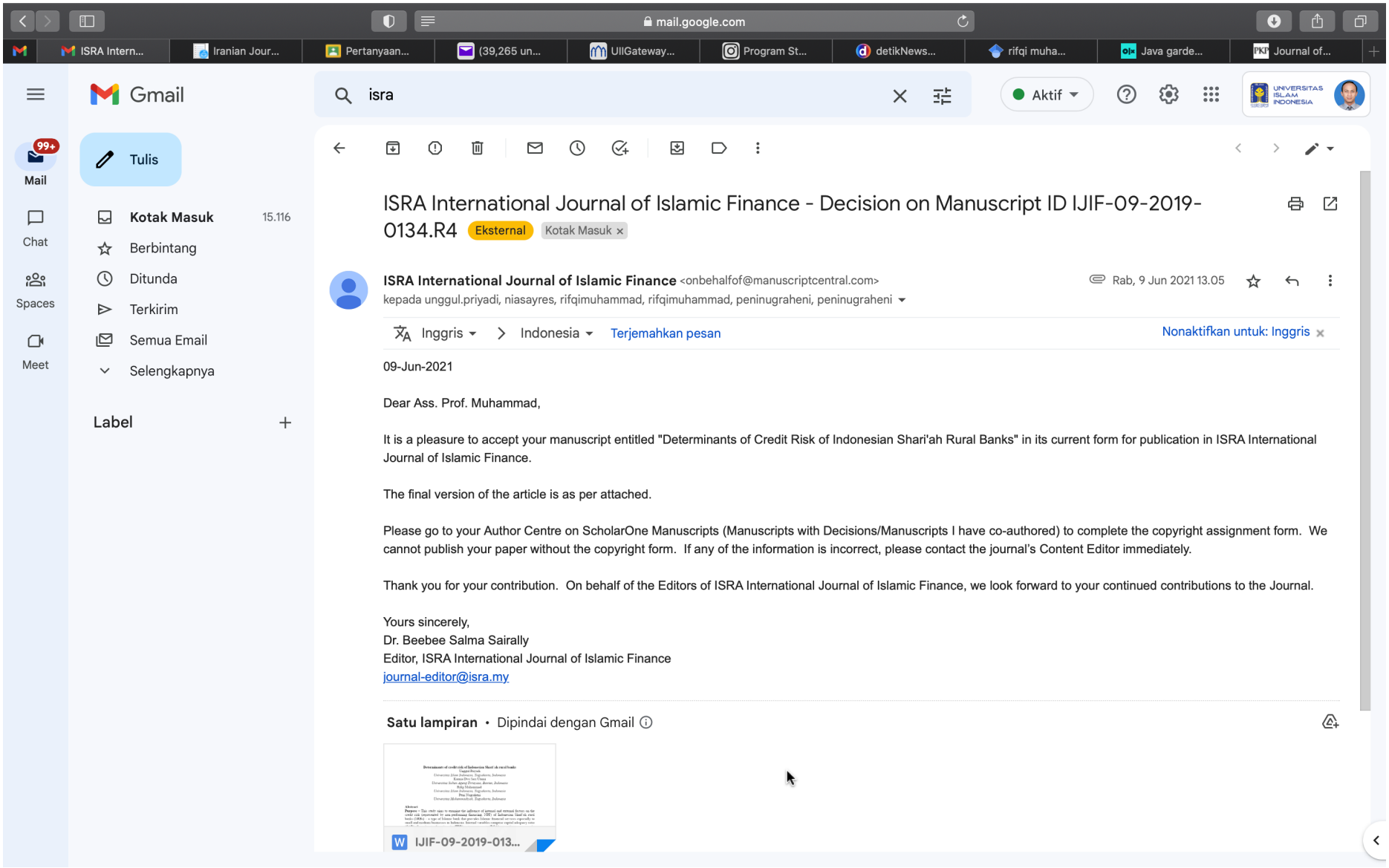
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09-Jun-2021
Dear Ass. Prof. Muhammad,
It is a pleasure to accept your manuscript entitled "Determinants of Credit Risk of Indonesian Shari'ah Rural Banks" in its current form for publication in ISRA International Journal of Islamic Finance.
The final version of the article is as per attached.
Please go to your Author Centre on ScholarOne Manuscripts (Manuscripts with Decisions/Manuscripts I have co-authored) to complete the copyright assignment form. We cannot publish your paper without the copyright form. If any of the information is incorrect, please contact the journal's Content Editor immediately.
Thank you for your contribution. On behalf of the Editors of ISRA International Journal of Islamic Finance, we look forward to your continued contributions to the Journal.
Yours sincerely,
Dr. Beebee Salma Sairally
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Original Paper:

DETERMINANTS OF CREDIT RISK OF INDONESIAN SHARI'AH RURAL BANKS

Abstract

Purpose
This study aims to examine the influence of internal and external factors on the credit risk (non-performing financing/NPF) in Indonesian shari'ah rural banks. Internal variables consist of capital adequacy ratio (CAR), financing to deposit Ratio (FDR), return on asset (ROA), Operating Expense Ratio (OER), Loan to Value (LTV) and Profit and Loss Sharing (PLS). External variables consist of inflation, economic growth, and interest rate.

Design/methodology/approach
The study uses annual report as secondary data of shari'ah rural bank in Indonesia for the year 2010-2019. The auto regressive distribution lag (ARDL) is used as analysis method to examine the short and long run relationship between the variables.

Findings
The statistical results show that in the short run relationship, inflation has negative significant influence, PLS have positive significant influence, meanwhile economic growth, interest rate, ROA, OER, CAR, FDR and LTV have no influence on the NPF. Furthermore, the long run results show that CAR, and ROA influence positively while inflation and PLS influence negatively toward NPF. The rest variables of economic growth, interest rate, FDR, LTV and OER do not have influence on NPF in shari'ah rural banks.

Research Limitations/implications
NPF in shari'ah rural banks exceeds the provision of central bank of Indonesia. The findings are expected to have implication for banks and regulator to consider and manage properly the factors related to NPF due to the important role of shari'ah rural bank in the small and medium business development.

Originality/Value
This study examines internal and external factors that influence NPF in shari'ah rural bank – a shari'ah bank that providing financial service especially for small and medium business. Furthermore, the usage of ARDL method can estimate the short and long run effects of those variables.

Key words: Credit Risk, Non-Performing Financing, Shari'ah Rural Banks, ARDL, Internal factors, External factors

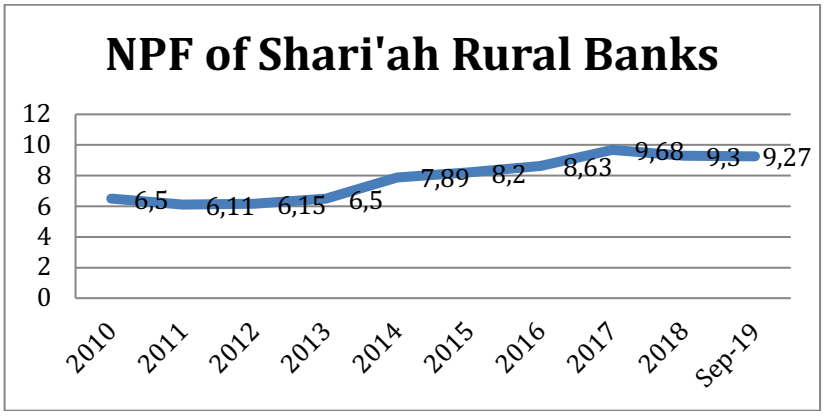
Paper type: Research paper

Introduction

Credit risk which is often represented by for non-performing loans (NPLs) for conventional banks is an important component in economic stability. According to Endut et al. (2013), NPL is said to be related to the financial crisis in Asia in 2007 and the collapse of financial markets. Therefore, NPLs become an important issue and a continuing challenge for financial institutions (Endut et al., 2013). Islamic banks also face the same problem related to NPL or called non-performing financing/NPF. According to Al-wesabi & Ahmad (2013), bad management of credit risk is the cause of failure of the three quaters of Islamic banks. One of the reason is due to limited knowledge about the dynamics of credit risk. Therefore, an adequate understanding of credit risk will encourage a more stable financial system (Adebola et al., 2011).

In Indonesia, credit risk in Islamic banks must be given special attention because they face the high level of NPF. Central bank of Indonesia (Bank Indonesia/BI) require the maximum level of NPL for banking industry is 5%. However, based on statistics issued by Financial service authority (FSA), NPF of shari'ah commercial banks is around 6.17% and shari'ah rural banks is 10% per 2016. Shari'ah rural bank (SRB) is shari'ah bank providing service especially for micro sector. However, the NPF value of Islamic banks is higher than NPL of conventional bank which is 3.05%.

Figure 1
NPF of Shari'ah rural banks During 2010-2019



Source: FSA (2019)

Figure 1 shows that the NPF of shari'ah rural bank has variation during the year of 2010-2019, but all data show that NPF is above 5% which means it exceeds the requirements of Bank Indonesia. This certainly raises the question of the extent to which SRB manages its financing risks.

NPL and NPF can be influenced by several factors, both internal and external factors. Previous studies state that internal factors such as financial ratio or bank characteristics, (Suryanto, 2015, Effendi et al., 2017;) and external factors such as GDP, inflation rate and interest rate influence credit risk in banking industry (Adebola et al., 2011; Endut et al., 2013). Many studies also examine those internal and external factors toward NPF (Firmansyah, 2014; Havidz and Setiawan, 2015; Supriani and Sudarsono, 2018) and the results vary between studies.

The objective of this study is to analyze the internal and external factors that influence credit risk of shari'ah rural banks in Indonesia. Internal factors used in this study are capital adequacy ratio (CAR), financing to deposit Ratio (FDR), return on asset (ROA), Operating Expense Ratio (OER), Loan to Value (LTV) and Profit and Loss Sharing (PLS) meanwhile the external factors consist of inflation, economic growth, and interest rate. The study about credit risk in banking industry is important because of some reasons. First, credit risk is one of criteria to measure the financial performance of banks. Thus, the high non-performing loans of banks will have an impact on the decreasing level of banks' income and the sustainability of their business (Haniifah, 2015). Second, the impact of high NPL not only affects the bank itself, but also will affect the economic stability of a country. According to Rahman et al. (2017), bad management of NPL "will lead to banking failure and coutrywide financial vulnerability" (p. 181).

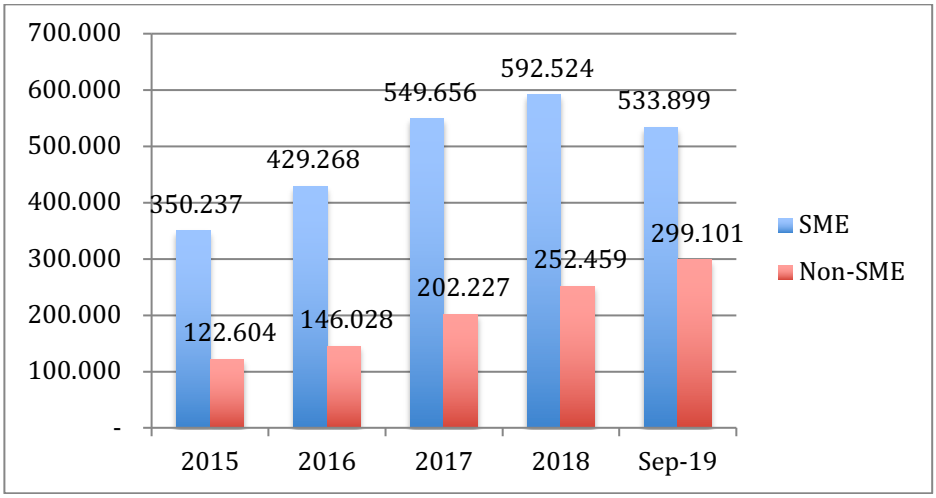
The rest of the paper is structured as follows: section 2 reviews the literature on shari'ah rural bank and credit risk and section 3 presents the research methodology. Section 4 analyses the data and discusses the results, and finally, the conclusion is presented in section 5.

Literature Review

Shari'ah Rural Banks

In Indonesia most of the poor households, micro-enterprises and Small and Medium Entreprises (SMEs) are not covered by banking services and formal lending. Some of the poorer households use shadow banks that charge much higher interest rates. Therefore, the presence of Shari'ah Rural Banks (SRB) which give financing to the micro businesses, can be a solution to the limited funds in the SMEs sector. However, SRB should aware to the high number of NPF of SMEs. The following are data comparison of NPF between SMEs and non-SMEs financing:

Figure 2
Non-Performing Financing of SMEs and Non-SMEs in Shari'ah Rural Banks for the Year 2015 – 2019 (in milion IDR)



Source: FSA (2019)

Figure 2 shows that NPF of SMEs are higher than NPF of non-SMEs. Banks need to give attention to this fenomena and try to solve the problem. Shari'ah rural banks with a market

share of the micro sector tend to be vulnerable changes in the business world (Firmansyah, 2014)

Credit Risk

Risk is defined as "the likelihood of loss (Megginson, 1997 cited in Elgari, 2003). Credit risk is the most important risk faced by bank in its operation (Elgari, 2003). Credit risk is "the loss of income arising as a result of the counterparty's delay in payment on time or in full as contractually agreed " (Ahmed & Khan, 2007, p.144). Credit risk can arise in Islamic bank that channel financing to customers in the form of *mudharaba, musharaka*, and *murabaha*. Islamic banks face credit risk of *Mudharaba* and *musharaka financing* under the profit sharing principles in the form of deferred payments to unpaid profits by the entrepreneur, while credit risk in *murabaha* contracts arises in the form of the failure of consumers to repay financing in full and on time (Ahmed and Khan, 2007).

Non performing financing (NPF) is representation of a tool to measure financing risk. Banking performance can be evaluated by measuring the level of NPF/NPL to indicate liquidity, profitability and solvability (Dwihandayani, 2016). Isaev & Masih (2017) argue that NPF plays key role in determining the quality and performance of banks because financing is the main function of banking in contributing the economic development.

There are many factors influencing NPL or NPF. Endut et al. (2013) examines NPL in 12 countries in the Asia Pacific region in 2000-2008 and the result shows that macroeconomic stability, and good economic growth will reduce NPL. Meanwhile, poor macroeconomic implications and higher capital costs will increase NPL. Haniifah (2015) examines NPL in 25 commercial banks in Uganda during 2000-2013 using four variables namely inflation, exchange rate, interest rate and growth economy by linear regression. The results show that inflation, exchange rate and economic growth have a significant negative effect.

Supriani & Sudarsono (2018) study the influence of micro and macro variables toward NPF in Islamic banking. The study finds that CAR, FDR and BOPO have positive influence and ROA, rate of Bank Indonesia (BI rate) and exchange rate do not influence NPF in long term. In the short term, the different results are found that FDR, ROA, BOPO, and BI Rate have positive influence on NPF, exchange rate and inflation have negative influence toward NPF. The study of NPF in shari'ah rural bank has been conducted by Firmansyah (2014) who finds that Inflation and GDP have negative influence, efficiency and bank size have no influence and FDR has positive influence toward NPF.

The study of non-performing financing is also conducted at Bank Islam Malaysia by Adebola et al. (2011) using ARDL during January 2007 to December 2009. The result shows a long-term positive effect between interest rate and non-performing financing on the calculation of production index. This reflects that customers of shari'ah banking do not consider profit or loss because the impact of interest rates is relatively stronger.

Inflation and NPF

Inflation is "the sustained increase in the general prices of goods and services in an economy over time" (Haniifah, 2015). Inflation impacts on the high price of good and services and if the income has not increased, the ability of debtors to pay their installments has weakened and will increase the NPL in the bank. Previous research conducted by Firmansyah (2014), Endut et al. (2013) and Supriani & Sudarsono (2018) shows that inflation

has a significant negative effect on the NPF, while Haniifah (2015) finds that inflation has a negative but not significant relationship toward NPF.

Economic growth and NPF

Economic growth is defined as the development of activities in the economy which causes the goods and services produced in society and the prosperity of the community increasing (Sukirno, 2013). Bank loans are still the main source of business financing and are expected to drive economic grotwth (Firmansyah, 2014). Economic growth can be measured using Gross Domestic Product (GDP). The high economic growth may encourage banks to expand their financing. However, banks must be careful in selecting the right recipients. The bank's lack of caution in giving financing can result in high NPF. If NPF can not be overcome it will have an impact on reducing profits. Therefore, high economic growth will increase NPF because of very large funding distribution. Sukmana (2015) and Effendi et al. (2017) state that GDP variable has a significant positive effect toward NPF.

Interest rate and NPF

Interest is remuneration provided by banks based on conventional principles to customers. Interest can also be interpreted as the price that must be paid to customers who have deposits or must be paid by customers to banks (Kasmir, 2014). In daily banking activities there are two types of interest given to customers, namely interest on deposits and interest on loans. Deposit interest is interest given as a stimulus or remuneration for customers who save their money in a bank. Deposit interest is the price the bank must pay to its customers. Furthermore, the loan interest is the interest given to the borrowers or the price that must be paid by the loan customer to the bank. Interest on loans and deposits is the main income and expense for the bank. Credit interest is the main component of income obtained by the bank.

Distribution of funds in the form of loans made by banks occupies the largest position of a bank's income. While the interest costs of third party funds include the largest costs borne by the bank. Interest on loans and deposits has a close relationship. An increase in deposit rates will affect the increase in lending rates. Consequently, the amount of repayments that borrowers have to pay is higher and this can increase NPF (Sukmana, 2015). Central Bank of Indonesia's rate (BI rate) is a proxy for interest rate that become a reference for determining interest on loans and deposits. Endut et al. (2013) and Sukmana (2015) find that interest rate has positive effect on the NPL in Asian Pacific Region.

Capital Adequacy Ratio (CAR) and NPF

Capital Adequacy Ratio (CAR) is the main ratio in assessing the capital adequacy of banks. The usefulness of CAR is as instrument to manage the the risk of loss of earning assets, especially those originating from credit risk (Sukmana, 2015). A high CAR value gives an impetus for banks to channel more financing so that if the value of financing channeled by banks is greater, the trend of non-performing loans increases. Higher CAR encourage banks to distibute more financing and therefore the trend of NPF will be higher. (Supriani and Sudarsono, 2018) find that CAR has positive effect on NPF for the long term.

Financing to Deposits Ratio (FDR) and NPF

Liquidity is the ability of the bank to fulfill its financial obligations both in fulfilling the withdrawal of funds from the community and commitment to give financing. Comparison

between funds given to customers in the form of financing with funds collected from the public is reflected in the Financing to Deposits Ratio (FDR) ratio. Funds collected include public deposits in the form of savings and various types of deposits. The type of financing provided is divided into financing in the form of equity financing or debt financing. The high FDR represents the dynamic role of banking intermediation which requires in-depth analysis. Higher FDR will have an impact on the higher level of NPF. Suryanto (2015) and Firmansyah (2014) state that LDR has significant positive on NPL in Regional development bank in Indonesia. High LDR without good management increase the credit problem in the financing (Suryanto, 2015).

Operating Expense Ratio (OER) and NPF

Operating Expense ratio (OER) is a comparison between operating costs and operating income (Dendawijaya, 2011). This ratio is one of efficiency measurement of the organization performance. The smaller OER indicates the more efficient of banks in managing operational costs and vice versa. The high ratio of OER which is caused by high operating expense will disturb the operational of Islamic banks and will impact on the high NPF (Effendi et al., 2017). Effendi et al. (2017) finds that there is positive influence of OER toward NPF in Islamic banks in Indonesia. Suryanto (2015) who study the relationship between OER and NPL in regional development bank in Indonesia also find the positive effect between those variables.

Loan To Value (LTV) and NPF

Loan to value (LTV) or financing to value is the maximum financing provided by the bank on the basis of a percentage of the collateral value. The need for LTV by banks is as an analysis of the ability and sincerity of prospective borrowers, one of which is the existence of self financing (capital) from prospective debtors. One of the component of LTV is down payment (DP). Large DP will reduce the amount of the main installment and interest of the debtor in the future. In addition, the longer tenor or credit period given to the customer will impact on the smaller amout of the installment. LTV usually ia applied in consumption and manufacturing product. According to Sutanto (2012), the high DP will reduce the demand of lending. Moreover, the high cost of borrowing will result on low number of loan applicant and that is expected to reduce NPL or NPF (Wu et al., 2003).

Indonesian central bank issued LTV policy on September 2013 concerning credit and DP for property. The policy is regulated through External circular of Bank Indonesia No. 15/40/DKMP Year 2013 concerning Application of Risk Management to Banks that Provide Property Ownership Loans or Financing, Property-Backed Credit or Financing Loans and Motor Vehicle Loans or Financing. This policy has purpose to enhance the aspect of bank's prudence in property loan distribution. The growth of property's price is feared to be a trigger for financial instability because of the default by the people who use banking services as a source of financing for property purchases. Therefore, this policy may have impact on the NPF by measuring the NPF level before and after the policy issued.

Profit and Lost Sharing (PLS) Financing and NPF

Based on the Islamic banking statistics for the year 2017, the main pattern of financing that dominates Islamic banks is the principle of buying and selling and profit sharing. For profit sharing principles, the most widely used is *musharaka* and *mudharaba* (Muhammad, 2019). Profit sharing reflects the commitment of Islamic banks in developing Islamic shari'ah-

compliant finance. However, the profit sharing-based financing has higher risk compared to financing with buying and selling principle because the income of the bank is not fixed which depends on the profit of the business's debtors. Therefore, Effendi et al. (2017) state that PLS financing has negative and significant influence on NPF.

Research Methodology

The study uses annual report as secondary data of Shari'ah Rural Bank in Indonesia for the year 2010-2019 The annual reports are accessed from the banks' website. The analysis method used in this research is Auto Regressive Distributed Lag (ARDL). The advantages of using ARDL is this model can estimate the short and long run effects of the variables simultaneously (Sukmana and Setianto, 2018). There are three steps in ARDL analysis, stationary test, lag determination and co-integration test.

The data analysis of this study including descriptive statistics and test of goodness of fit which includes test of autocorrelation, heterokedasticity, normality and stability (Cusum test) before doing ARDL regression. ARDL model of this research is as follows:

$$NPF_t = \delta_0+\sum\delta_{1i}INF_{t-1}+\sum\delta_{2i}GDP_{t-1}+\sum\delta_{3i}IRATE_{t-1}+\sum\delta_4CAR_{t-1}+\sum\delta_5FDR_{t-1}+\sum\delta_6ROAt_{-1}+\sum\delta_7OER_{t-1}+\sum\delta_8LTV_{t-1}+\sum\delta_9PLS_{t-1}+\beta_1INF_{t-1}+\beta_2GDP_{t-1}+\beta_3IRATE_{t-1}+\beta_4CAR_{t-1}+\beta_5FDR_{t-1}+\beta_6ROA_{t-1}+\beta_7OER_{t-1}+\beta_8LTV_{t-1}+\beta_9PLS_{t-1}+e_t$$

Description:

NPF = Non-Performing Financing (%)
INF = Inflation in percent using Consumer Price Index (CPI) (%)
GDP = Economic Growth using Industrial Production Index (IPI) (%)
IRate = Interest Rate (%)
CAR = Capital Adequacy Ratio (%)
FDR = Financing Deposits Ratio (%)
ROA = Return on Assets (%)
OER = Operating Expense Ratio (%)
LTV = Loan to Value (dummy), where 0 for before and 1 for after the policy
PLS = Profit & Loss Sharing in percent (%)
ε = Error term

Result and Discussion

The sample in this research consists of Shari'ah Rural Banks in period of January 2010 –September 2019. The result of descriptive statistics can be described in table 1.

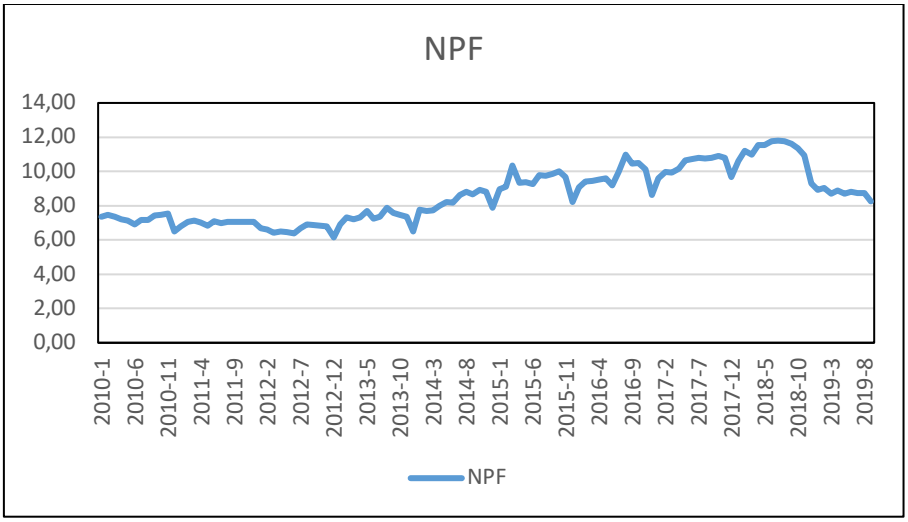
Tabel 1
The Results of Descriptive Statistics

Variables	Minimum	Maximum	Mean	Std. Dev
NPF	6.15	11.80	8.5988	1.57791
INF	88.79	138.75	1.1468E2	15.43855

GDP	92.32	154.02	1.2260E2	15.93085
IRate	4.25	7.75	6.1944	1.02717
CAR	18.81	33.25	23.1687	3.08398
FDR	109.34	139.96	1.2396E2	7.30467
ROA	1.73	3.97	2.6105	.42704
OER	75.20	91.89	83.5004	4.88657
PLS	10.83	14.81	12.6444	1.14091

Table 1 shows that NPF has an average value of 8.59, standar deviation is 1.57, maximum value is 11.80 and minimum value is 6.15. The value of NPF in shari'ah rural banks is high during the observation period. Even the minimum value of NPF has exceeded the reasonable limit of BI's policy. The following is a graph of NPF level during the year of 2010-2019.

Figure 3
NPF of Shari'ah Rural banks during the year 2010-2019



According to figure 3, the NPF has fluctuation during 2010-2019. The highest NPF is 11.80 from the year of 2018 quarter 2 and lowest NPF is 6.15 on the year 2013 quarter 1. These high NPFs should be managed properly so as not to decrease the profit obtained by the bank.

The use of analytical methods in the regression requires a hypothesis test in advance to evaluate that they meet the classical assumptions. The classical assumption test shows the results in table 2 and indicates that the variables fulfill the classical assumption.

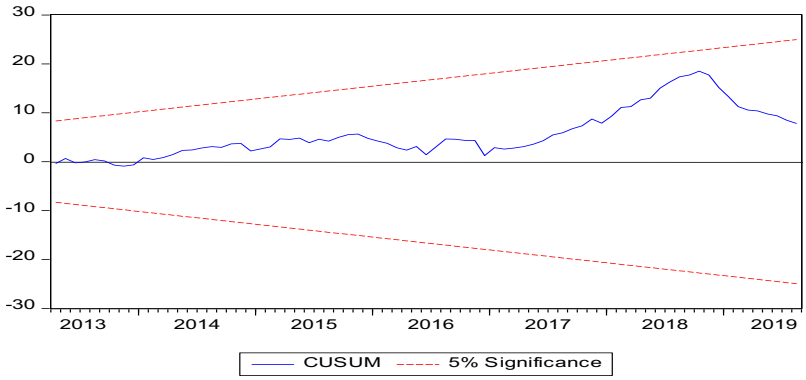
Table 2
Result of Classical Assumption Test and Goodness of Fit

Test of Goodness of Fit	Analysis Result (Probability)

Test of Autocorrelation	0,787
Test of Heterokedasticity	0,220

A stability test is conducted to see the stability of the model. The test used is Cusum test. The result of the Cusum test in the figure 4 below shows that the Cusum line is on the line of 5 percent significance which means that the model is in a stable state.

Figure 4
Result of Cusum Test



Result of ARDL Regression

There are three steps in doing ARDL regression. First, the stationary test is conducted to know the integrated data in the same or different order. The stationary test used Philips-Perron (PP) test and Augmented Dickey-Fuller (ADF) test. The results of stationarity testing show that there is no cointegration between variables so that the selection of the ARDL method is the right method of looking at the relationship between the level of non-performing financing and macro-microeconomic conditions that affect Shari'ah rural bank.

Second, lag determination is used to select of the best ARDL model and selected lag combination based on Akaike Info Criterion (AIC). Third, cointegration testing is carried out to analyze the long-term relationship between explanatory variables and the dependent variable on data that is not stationary. The result of bound test shows that that the variables on this research have cointegration in the long term.

In the ARDL regression, estimation has function to evaluate the relationship between dependent and independent variables from time to time is carried out. Based on the estimation results, an Error Corection Mechanism (ECM) estimation is carried out in the ARDL model to balance short-term economic relations with variables that have a long-term balance or economic relationship. The estimation results of the ARDL model for short run are described on table 3.

Table 3
Estimation of Short-Run Dynamics

ECM Regression Case 2: Restricted Constant and No Trend		
Variable	Coefficient	Prob.
D(NPF(-1))	-0.247377	0.0126***
D(INF)	-0.245595	0.0015***
D(INF(-1))	0.352704	0.0002***
D(INF(-2))	-0.150658	0.1081
D(INF(-3))	0.305944	0.0002**
D(CAR)	-0.003615	0.9362
D(CAR(-1))	-0.117786	0.0224**
D(CAR(-2))	-0.096642	0.0433**
D(CAR(-3))	-0.118587	0.0064***

D(PLS)	0.378112	0.0303**
D(PLS(-1))	-0.696637	0.0001***
CointEq(-1)*	-0.124078	0.0003***
p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001		

Table 3 shows that the NPF variable in lag 1 negatively affects the next month's NPF. This means that every 1 percent increase in NPF in the previous month will decrease the NPF of the current month by 0.24 percent at significance of 1 percent. This indicates that the NPF decrease is now contributed by the previous month's NPF. Furthermore, table 4 describes the results in long run.

Table 4
Result of Estimation of Long-Term Coefficient of ARDL

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	0.057000	0.076379	0.746280	0.4574
GDP	-0.023150	0.054837	-0.422166	0.6739
IRATE	-1.523375	0.570355	-2.670927	0.0090***
CAR	0.519735	0.253498	2.050255	0.0432**
FDR	0.142077	0.100986	1.406899	0.1629
ROA	0.506846	0.200404	2.529125	0.0132***
OER	1.192526	1.135359	1.050352	0.2963
LTV	-0.325318	0.318194	-1.022387	0.3093
PLS	-55.36658	22.48850	-2.461996	0.0157***
C	0.057000	0.076379	0.746280	0.4574
p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001				

The statistical analysis of each variable in both short run and long run shows the variation result. Inflation has negative effect on NPF in short run and it means that the high inflation will impact on the low NPF. This result supports the study by Effendi et al. (2017) and Supriani & Sudarsono (2018). The increase in prices of services and goods due to inflation will reduce the people's purchasing power. This phenomenon will have impact on the company's sales and decrease company's profit, and make it difficult for the owner to repay their financing in Islamic banks, and therefore increase NPF in Islamic banks (Supriani & Sudarsono, 2018).

From the long run estimation, inflation does not have an effect on financing risk. This can happens because inflation in the long run declines as happened in the last 4 years i.e. inflation reached a high level in 2013 to 2014 but then went down in 2015 and 2016. The result supports the study by Havidz & Setiawan (2015) and Dwihandayani (2016).

Economic growth does not have influence on NPF in shari'ah rural bank both in short run and long run. According to Firmansyah (2014), a high or low GDP will influence the capability of people to repay their obligation and thus impact on financing problem. However, the process of selecting the financing recipient in term of capability and capacity will also influence the smooth installment payment. Therefore, the economic condition may not influence the bank returns from financing due to the good characteristics of selected borrowers.

The interest rate has a positive influence on financing risk or NPF. According to Endut et al. (2013), when interest rate is high, conventional banks may increase the interest rate of lending to maintain their profit. It will impact on the consumer desire to apply financing in Islamic bank if there is a significant difference between the interest rate and the equivalent rate in Islamic bank. The higher financing distributed by Islamic bank because of the increase in demand from consumer transfers from conventional banks will increase the risk of financing. The result of this study is inline with Sukmana (2015) and Endut et al. (2013).

Interest rate influences negatively the NPF in the long term. When the interest rate is increased, conventional banks tend to increase deposit interest when there is an increase in lending rates to maintain their profitability. It can encourage the number of third-party funds of Islamic banks likely to move to the conventional banks. It is meant that there is transfer of funds from Islamic banks to conventional banks and cause Islamic banks decrease their financing and impact on the lower NPF. In addition, as interest rates rise, banks are more interested in placing their funds in Shari'ah State Securities (SBSN) with increasing yields. This result is different with Adebola et al., (2011) who state that interest rate has a significant positive effect over the long term while Haniifah (2015) shows no significant positive effect between interest rate and NPF.

The capital adequacy ratio or CAR does not have effect on NPF in short run. This means that the size of the capital owned by Islamic banks does not affect the NPF. Capital owned by banks is not always channeled in the form of financing or to cover losses resulting from financing risks. Banks may use the capital to invest and not for financing (Suryanto, 2015). This study supports the results obtained by Havidz & Setiawan (2015) and Suryanto (2015).

The different influence of CAR and NPF happens in the long run which CAR has a significant and positive relationship to NPF. Shari'ah Rural Bank's financing from 2010 to 2016 is mostly disbursed in the form of a commercial loan (working capital and investment financing) which reaches 60 percent of the total financing. Shari'ah rural banks tend to place assets with high-weighted risk. High NPF rates on commercial loan financing require high CAR reserves. Supriani & Sudarsono (2018) and Effendi et al. (2017) also show significant positive influence between CAR and NPF in Indonesian Islamic banks.

The FDR variable does not have influence on NPF in Islamic Rural banks both in short run and long run. One source of bank income is the profit sharing of the funds disbursed. When financing is managed properly by assessing the risks that may arise from each customer who proposes financing, a large amount of financing will actually bring a large income because the NPF can be reduced. The result is in line with Havidz & Setiawan (2015) and Dwihandayani (2016). According to Havidz & Setiawan (2015), the influence of FDR is not significant because financing risks are more influenced by portfolio management financing i.e. good or bad management.

The statistical result shows that profitabiliy or return on asset (ROA) has significant positive influence toward NPF in the long run. Profitability is very important to attract investors to invest their funds in the company. High financing distributed is expected to result on the high profit. This profit can be used to overcome the financing risk and therefore the NPF can be increased. The result is in accordance with the studies Setiawan & Putri (2013).

The OER variable has no effect toward NPF which indicates that the efficient or inefficient of shari'ah rural bank does not influence NPF in the short run and long run. However, banks need to evaluate theirself regarding many activities that can cause

ineffiency because it will influence the banks' performance. Suryanto (2015) explains that bank efficiency related to the level of quality management and the effectiveness of product and services offered by the banks. Better quality management will enhance the better efficiency in the operational activities of the bank.

Loan to Value (LTV) does not affect NPF both in the short term and long term. Financing with LTV related to selling and buying contracts such as murabaha, istishna', musharaka mutanaqisah and also ijarah muntahiya bittamlik. Sutanto (2012) cite the opinion of the scholar that the LTV policy has purpose to relocate between consumption and investment loans that so far been unbalanced. During the September of 2019, murabaha financing distributed by Shari'ah rural banks reaches 75.6% of total financing, followed by musharaka (9.62%) and multi purpose financing (9.57%). However, the composition of financing based on type of usage consists of working capital (37.75%), investment (14.93%) and consumption (47.32%). The consumption usage still dominate the financing of shari'ah rural banks but the gap with working capital is less than 10%. It may cause LTV does not influence NPF in this banks. This result is in line with the study by Al-wesabi & Ahmad (2013) who find that an increase in property demand will raise the level of real estate investments which have a significant positive effect on the NPF rise. While Wu et al.'s (2003) research indicates that low house prices will have an impact on high financing risks.

The variable of profit and loss sharing (PLS) has a significant positive effect on NPF in the short run. According to Ozili (2017), the greater financial intermediation is done by banking industry, the greater NPL will be faced. The high financing can influence the ability of banks to mitigate financing risk because monitoring and financing evaluation costs are quite large.

For long run, PLS has negative effect to the NPF. It means that the higher PLS will impact on the lower NPF. Isaev & Masih (2017) state that type of contract influences the problem of financing to customers. PLS financing contract is more beneficial to consumers especially when the economic growth is low because it does not require fixed payment but uses the agreed percentage of the profits earned (profit sharing). Banking sector will measure the risk of changes on business structure, economy growth, and the possibility of inflation before giving financing to prevent financing risk. PLS model is the solution to promote fair and justice for both two parties, Islamic banks and mudharib to manage risk effectively (Isaev & Masih, 2017).

Conclusion

Financing risk management of Islamic banking industry is important because it become one of the financial performance measurements. Non-performing financing (NPF) must be managed well to maintain the sustainability of Islamic banking. This study attempts to examine the influence of internal and external factors toward NPF in shari'ah rural banks. Internal variables are capital adequacy ratio (CAR), financing to deposit Ratio (FDR), return on asset (ROA), Operating Expense Ratio (OER), Loan to Value (LTV) and Profit and Loss Sharing (PLS). External variables used in this study are inflation, economic growth, and interest rate.

The findings indicate that in the short run relationship, inflation has negative significant influence, PLS have positive significant influence, meanwhile economic growth, interest rate, ROA, OER, CAR, FDR and LTV have no influence on the NPF. Furthermore, the long run results show that CAR, and ROA influence positively while inflation and PLS

influence negatively toward NPF. The rest variables of economic growth, interest rate, FDR, LTV and OER do not have influence on NPF in shari'ah rural banks.

These findings are expected to be able to contribute to the banking party to be able to look more closely at the factors that affect NPF while anticipating that effect. The existence of different results between short and long run for certain variables, requires the bank to arrange the right strategy in accordance with these estimates. For regulators, these factors can be considered to determine the policy and managed properly because large NPFs can disrupt the continuity of the bank and affect the economic growth of a nation. The limitation of this study is that there are several findings that are different from previous studies. This might be due to the difference in research subjects. This study uses shari'ah rural bank while previous studies mostly used Islamic banks. Future research can try to analyze more deeply those differences.

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Determinants of credit risk of Indonesian Sharīʿah rural banks

Unggul Priyadi
Universitas Islam Indonesia, Yogyakarta, Indonesia
Kurnia Dwi Sari Utami
Universitas Sultan Ageng Tirtayasa, Banten, Indonesia
Rifqi Muhammad
Universitas Islam Indonesia, Yogyakarta, Indonesia
Peni Nugraheni
Universitas Muhammadiyah, Yogyakarta, Indonesia

Abstract

Purpose – This study aims to examine the influence of internal and external factors on the credit risk (represented by non-performing financing, NPF) of Indonesian Sharīʿah rural banks (SRBs) – a type of Islamic bank that provides Islamic financial services especially to small and medium businesses in Indonesia. Internal variables comprise capital adequacy ratio (CAR), financing to deposit ratio (FDR), return on assets (ROA), operating expense ratio (OER), financing to value (FTV), and profit and loss sharing (PLS) financing ratio. External variables comprise inflation, economic growth and interest rate.

Design/methodology/approach – The study uses the annual reports of SRBs in Indonesia as secondary data for the years 2010–2019. Auto regressive distributed lag (ARDL) is used as the analysis method to examine the short-run and long-run relationship between the variables.

Findings – The findings indicate that four variables experienced a lag in the short run, namely NPF, inflation, CAR and PLS, with different results recorded for each of the variables. Furthermore, the long-run results show that CAR and ROA influence the NPF of SRBs positively while inflation and PLS have a negative influence on NPF. The rest of the variables – notably economic growth, interest rate, FDR, FTV and OER – do not have an influence on NPF in SRBs.

Research limitations/implications – The level of NPF in SRBs exceeds the provision of the Central Bank of Indonesia. The findings are expected to have implications for SRBs and the regulator to consider and to manage the factors related to NPF properly due to the important role of SRBs in small and medium businesses' development.

Originality/value – This study measures the determinants of NPF using internal and external variables, including the addition of a dummy variable, notably financing to value (FTV). This study also uses ARDL to analyze the financial policies involving data at the present time and lagged time.

Keywords ARDL, Credit risk, Internal factors, External factors, Non-performing financing, Sharīʿah rural banks

Paper type Research paper

Introduction

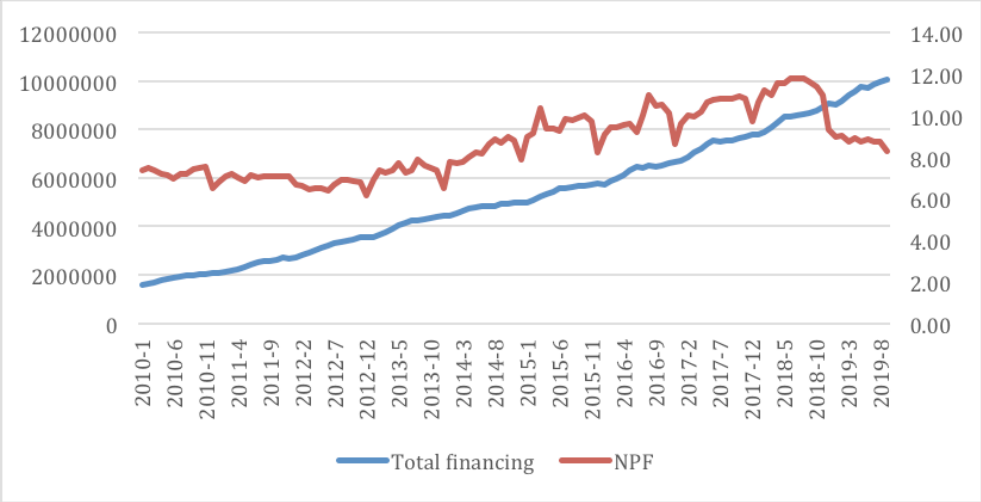
Credit risk, which is often represented by non-performing loans (NPLs) for conventional banks, is an important component in economic stability. According to Endut *et al.* (2013), NPLs were related to the Asian financial crisis of 2007 and the collapse of financial markets. As a result, NPLs became an important issue and continue to represent a challenge that financial institutions have to manage (Endut *et al.*, 2013). Islamic banks also face the issue of credit risk, in particular, that of non-performing financing (NPF). According to Al-Wesabi and Ahmad (2013), bad management of credit risk is the cause of failure of three-quarters of

Islamic banks. One of the reasons is due to limited knowledge about the dynamics of credit risk. Therefore, an adequate understanding of credit risk will lead to a more stable financial system (Adebola *et al.*, 2011).

In Indonesia, credit risk in Islamic banks must be given special attention because the banks face a high level of NPF. Bank Indonesia (the central bank of Indonesia), requires the maximum level of NPL for the banking industry to be 5% (FSA, 2013). However, based on statistics issued by the Financial Services Authority (FSA), the NPF of Sharīʿah rural banks (SRBs) stood at 8.28% as at October 2019. SRBs are Islamic banks which provide services especially to the micro sector. There are 57.89 million business units in Indonesia, and the majority of them (99.9%) are micro, small, and medium enterprises (MSMEs) (FSA, 2019). Many MSMEs do not have access to banking services (KNKS, 2019). The existence of SRBs is expected to strengthen the economic activity of the society, especially in rural areas where MSMEs face many difficulties in accessing business capital (Amelia and Fauziah, 2017).

The FSA of Indonesia (2019) released the financing distribution and NPF ratio of SRBs. A summary for 2010-2019 is provided in Figure 1.

Figure 1: NPF of Sharīʿah rural banks during 2010-2019



Source: FSA (2019)

Figure 1 shows that the trend of total financing from 2010 to 2019 has increased and that this has been accompanied by an increase in NPF. The NPF of SRBs varied over the period 2010–2019, but all data show that NPF has been above 5%, which means that it exceeded the requirements of Bank Indonesia. However, from mid-2018 to the end of 2019, NPF appears to be under control. The trend of NPF depicted in the above figure certainly raises the question of the extent to which SRBs manage their financing risks.

NPL and NPF can be affected by several factors, both internal and external. Previous studies enumerated the internal factors influencing credit risk in the banking industry, specifically NPLs, such as financial ratio and bank characteristics (Suryanto, 2015; Effendi *et al.*, 2017) and external factors such as interest rate, inflation rate and gross domestic product (GDP) (Adebola *et al.*, 2011; Endut *et al.*, 2013; Widarjono and Rudatin, 2021). Many studies also examined the internal and external factors influencing NPF, with varying results among studies (Firmansyah, 2014; Havidz and Setiawan, 2015; Supriani and Sudarsono, 2018).

The objective of this study is to analyze the internal and external factors that influence the credit risk of SRBs in Indonesia. Internal factors used in this study are capital adequacy ratio (CAR), financing to deposit ratio (FDR), return on assets (ROA), operating expense ratio (OER), financing to value (FTV), and profit and loss sharing (PLS) financing ratio. Meanwhile, the external factors consist of inflation, economic growth and interest rate.

The study of credit risk in the banking industry is important for the following reasons. First, credit risk is one of the criteria used to measure the financial performance of banks. Thus, high levels of NPLs at banks will have a negative impact on the banks' income and the sustainability of their businesses (Haniifah, 2015). Secondly, high NPL ratios not only affect individual banks but also have an impact on the economic stability of a country. According to Rahman *et al.* (2017), bad management of NPLs "will lead to banking failure and countrywide financial vulnerability" (p. 181).

The study can be divided into several sections: the second section discusses the literaturę reviews on SRBs and credit risk; the third section presents the research methodology; the fourth section discusses data analyses and the finding; the fifth section is conclusion and implication of study.

Literature review

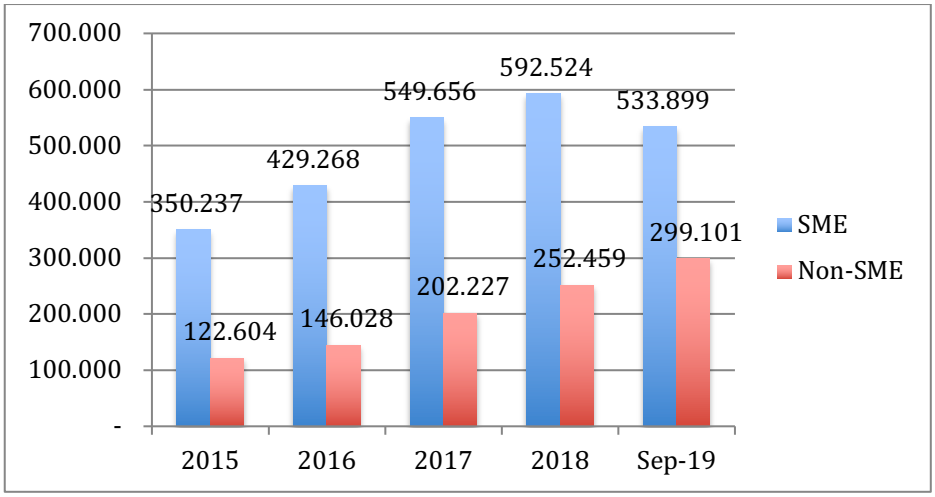
Sharīʿah rural banks

In Indonesia, most of the poor households, micro-enterprises and small and medium enterprises (SMEs) are not covered by banking services and do not avail of formal lending practices. Some of the poorer households use shadow banks that charge much higher interest rates. Therefore, the presence of SRBs which provide financing to micro businesses can be a solution to the limited funds available to the SME sector. According to Widarjono *et al.* (2020), SRBs focus on the financing of SMEs, and therefore they are important financial intermediaries in Indonesia's economic sector.

There are 165 SRBs in Indonesia, spread over 23 provinces (out of a total of 34 provinces), encompassing both rural areas and cities (KNKS, 2019). The aim is for SRBs to be closer to potential customers to better meet their needs. Furthermore, KNKS (2019) states that SRBs are expected not only to provide financing but also to empower small communities to improve their standard of living.

Nonetheless, according to Nugrohowati and Bimo (2019), SRBs face major challenges, among others; a high level of competition and the need to control risks, especially credit risk. Competition between SRBs and Islamic commercial banks occurs because the government requires the latter to also provide financing to MSMEs. Because of this competition, SRBs may be motivated to simplify the financing procedures, which if not monitored carefully, can increase the risk of bad financing (Nugrohowati and Bimo, 2019). Still, SRBs should be aware of the high percentage of NPF among SMEs. According to KNKS (2019), the financing distributed by SRBs amounted to IDR4.55 trillion (US$325 million) for SMEs and IDR5.52 trillion (US$394 million) for non-SMEs as at September 2019, and the NPF rate for financing SMEs is higher than for non-SMEs. Figure 2 compares the NPF data between SMEs and non-SMEs.

Figure 2: Non-performing financing of SMEs and non-SMEs in Sharīʿah rural banks during 2015–2019 (in million IDR)



Source: FSA (2019)

Figure 2 shows that the NPF of SMEs is higher than the NPF of non-SMEs. SRBs, in particular, need to give attention to this phenomenon and try to solve the problem because their focus is on the provision of financing to SMEs. If SRBs cannot manage their levels of NPF, it will have an impact on their financial performance. SRBs, having a market share in the micro sector, tend to be vulnerable to changes in the business world (Firmansyah, 2014).

Credit risk

The definition of risk is "the likelihood of loss" (Megginson, 1997 cited in Elgari, 2003). Credit risk is the most important risk faced by a bank in its operations (Elgari, 2003). Credit risk is "the loss of income arising as a result of the counterparty's delay in payment on time or in full as contractually agreed" (Ahmed and Khan, 2007, p. 144). Credit risk can arise in Islamic banks that channel financing to customers in the form of profit sharing (*muḍārabah),* profit and loss sharing (*mushārakah)* and *murābaḥah* (cost plus mark up). Islamic banks face credit risk in *muḍārabah* and *mushārakah* financing under the profit sharing principles in the form of deferred payments of unpaid profits by the entrepreneur, while credit risk in *murābaḥah* contracts arises in the form of the failure of customers to repay financing in full and on time (Ahmed and Khan, 2007). Trinugroho *et al.* (2021) state that Islamic banks may have higher credit risk because of the moral hazard aspect in profit and loss sharing contracts.

NPF represents a tool to measure financing risks. Banking performance can be evaluated by measuring the level of NPF/NPLs to indicate liquidity, profitability and solvability ratios (Dwihandayani, 2016). Isaev and Masih (2017) argue that NPF plays a key role in determining the quality and performance of banks because financing is the main function of banks in contributing to economic development. Islamic banks need to specifically manage their NPF level because it will have an impact on their performance in competing with conventional banks (Nugraheni and Muhammad, 2019).

There are many factors influencing NPLs or NPF. Endut *et al.* (2013) examined NPLs in 12 countries in the Asia Pacific region during 2000–2008; the results reveal that the performance of macroeconomic variables (inflation, interest rate, and GDP) has implications on NPLs. The study shows that macroeconomic stability and positive economic growth will reduce NPLs. Meanwhile, poor macroeconomic implications and higher capital costs will increase NPLs. Poor repayment performance will also trigger higher cost and thus higher financing payments, which in turn will lead to an increasing rate of NPLs.

A similar finding by Damanhur *et al.* (2017) is that increased of goods and services production as an indicator of good economic growth would reduce financing problems. Adebola *et al.* (2011) explain the long-term negative relationship between NPF and interest rate. In a period of high interest rates, the equivalent rate charged to seekers of Islamic financing will increase, as Islamic banks usually refer to the interest rate to determine their financing rates (Hasna *et al.*, 2019). A high equivalent rate will reduce the intention of customers to apply for financing. Consequently, the number of customers who propose financing will be less. This can reduce the volume of financing and the level of financing risk so that the NPF rate will also have the potential to decrease.

Studies about NPLs/NPF in different country scenarios have also been undertaken. Haniifah (2015), for instance, examined NPLs in 25 commercial banks in Uganda during 2000-2013. The author analysed four variables (exchange rate, inflation, growth of the economy and interest rate) by linear regression. In line with the above studies which considered the effect of macroeconomic variables on NPF, the results show that inflation, exchange rate and economic growth have a significant negative effect. Adebola *et al.* (2011) studied NPF at Bank Islam Malaysia by using the autoregressive distributive lag (ARDL) approach over the period January 2007–December 2009. The result shows an insignificant effect between the industrial production index and NPF while the interest rate is found to positively influence NPF in the long run.

In the context of Indonesia, Damanhur *et al.* (2017) studied the determinant of NPF in branches of Sharīʿah regional banks in Aceh and found that inflation and total assets influence NPF, while FDR has no significant effects on those banks. Supriani and Sudarsono (2018) also studied the influence of micro and macro variables on NPF in the context of Islamic banking in Indonesia. The study found that CAR, FDR and OER have a positive influence on NPF while ROA, rate of Bank Indonesia (BI rate) and exchange rate do not influence NPF in the long term. In the short term, different results were found, notably that FDR, ROA, OER and BI rate have a positive effect on NPF while exchange rate and inflation have a negative influence on NPF. Soekapdjo *et al.* (2018) further studied the influence of macro and micro variables on the bad debt of Indonesian Islamic banks. The study found that OER, exchange rate and GDP have a positive influence; inflation has a negative influence; while FDR and CAR do not influence NPF in Indonesian Islamic banks. Widarjono and Rudatin (2021), who examined NPF in Indonesian commercial Islamic banks and Islamic business units, found that operating efficiency and financing diversification had a positive effect, inflation had a negative effect, and CAR had no effect on NPF.

A few researchers have conducted studies of NPF in SRBs in Indonesia. Firmansyah (2014), for instance, found that inflation and GDP have a negative influence, efficiency and size of bank have no influence, and FDR has a positive influence on NPF over the period 2010-2012. Using a sample of SRBs in Indonesia for the years 2012-2017, Nugrohowati and Bimo (2019) found that ROA and CAR negatively influence NPF while inflation has no influence on NPF in SRBs. Meanwhile, Muhammad *et al.* (2020) found that CAR, ROA and bank size negatively influence NPF in SRBs.

The results of the above-mentioned studies indicate that NPF and NPLs are influenced by micro and macroeconomic factors and by internal and external characteristics of companies. Although these studies reflect different results, in general, these variables tend to have an influence on NPF.

This study will examine the determinants of NPF using internal and external variables. The added value of this study is the addition of the dummy variable, financing to value (FTV). Islamic banks can use FTV to determine the ratio policy of providing property financing. FTV is useful to maintain the bank prudence level when disbursing mortgage financing because it can increase the risk exposure if SRBs do not implement adequate prudential principles. Another value of this research is the use of ARDL to analyze the financial policies of SRBs, using data at the present time and lagged time. SRBs are very important for the Indonesian economy to distribute financing to SMEs; therefore, assessment of their financial performance is expected to encourage better management of the banks.

Inflation and non-performing financing

Inflation is "the sustained increase in the general prices of goods and services in an economy over time" (Haniifah, 2015, p. 142). Inflation leads to the high price of goods and services; if income does not increase, debtors' ability to pay their installments will weaken, which will lead to an increase in the NPLs of a bank. However, previous research of Endut *et al.* (2013), Firmansyah (2014), and Supriani and Sudarsono (2018) show that inflation has a negative effect on NPF, while Haniifah (2015) found that inflation has a negative but insignificant influence on NPF.

An increase in inflation may result in a decrease in bank income or profits, so that banks reduce their financing expansion when inflation occurs. The decline in financing growth will in turn lower NPF rate of Islamic banks.

Economic growth and non-performing financing

Economic growth refers to the process of development of economic activities that cause goods and services to be produced in the society and an increase in the wealth of society (Sukirno, 2013). Bank loans are the main source of business financing and are expected to drive economic growth (Firmansyah, 2014). Measurement of economic growth can use gross domestic product (GDP). High economic growth may encourage banks to expand their financing. However, banks must be careful in selecting the right recipients. Banks' lack of caution in giving financing can result in high NPF. If NPF cannot be managed it will have a negative impact on profits. Therefore, high economic growth tends to lead to an increase in NPF because of very large funding distribution. Sukmana (2015) and Effendi *et al.* (2017) find that increased GDP has a significant positive effect on NPF.

Interest rate and non-performing financing

Interest in daily banking activities can be divided into two types: interest on deposits and interest on loans. Deposit interest is interest given as a stimulus or remuneration to depositors of bank. It is the price the bank must pay to its customers within the conventional banking set-up. Interest on loans is the interest or the price that must be paid by customers for the loans they borrow from the bank. Interest on loans and deposits is the main income and expense for the bank, respectively.

Distribution of funds in the form of loans is the greatest contributor to a bank's income; while interest costs of third party funds comprise the largest cost borne by the bank. Interest on loans and interest on deposits have a close relationship. An increase in deposit rates will affect the lending rates as well. An increase in the lending rate will necessitate higher repayments by borrowers to the bank; consequently, this can increase

NPF (Sukmana, 2015). The central bank of Indonesia's rate (BI rate) is a proxy for the interest rate that becomes a reference for determining interest rates on loans and deposits. Endut *et al.* (2013) and Sukmana (2015) find that interest rate positively influence NPLs in the Asia Pacific region.

Capital adequacy ratio and non-performing financing
CAR is the main ratio in assessing the capital adequacy of banks. It is a useful instrument in managing the risk of loss of earning assets, especially those originating from credit risk (Sukmana, 2015). Higher CAR encourages banks to distribute more financing, and therefore the trend of NPF will be higher. Supriani and Sudarsono (2018) found that CAR has a positive effect on NPF in the long term.

Financing to deposits ratio and non-performing financing
Availability of liquidity enables a bank to fulfill its financial obligations, both in terms of fulfilling the demand for withdrawal of funds and commitment to give financing. Comparison between funds given to customers in the form of financing with funds collected from the public is reflected in the financing to deposits ratio (FDR). Funds collected include public deposits in the form of savings and various other types of deposits. The type of financing provided is divided into equity financing and debt financing.

A high FDR may lead to a higher level of NPF. Firmansyah (2014) and Suryanto (2015) confirm that FDR has a significantly positive relationship with NPLs in regional development banks in Indonesia. Suryanto (2015) especially states that a high FDR without good management increases the credit problem in financing.

Return on assets and non-performing financing
The ROA ratio reflects the level of effectiveness of SRBs in managing their assets; a higher ROA indicates a better performance by a bank. According to Ozili (2019), there is an association between ROA and NPLs. A high ROA shows that the financing by Islamic banks can provide benefits. A high profit indicates a low NPF level because almost all bank assets are in the form of financing, meaning that the largest part of a bank's income comes from financing. If the financing provided to customers is less problematic, then this will increase the income and profitability of the bank. Nugrohowati and Bimo (2019) found that ROA negatively influences the NPF of SRBs in Indonesia.

Operating expense ratio and non-performing financing
OER compares operating costs and operating income (Dendawijaya, 2011). This ratio measures the efficiency in an organization's performance. A smaller OER indicates that banks are more efficient to manage operational costs. A high OER which is caused by high operating expenses will, on the other hand, disturb the operations of Islamic banks and result in a high NPF (Effendi *et al.*, 2017). Effendi *et al.* (2017) found that OER positively affect NPF in Islamic banks in Indonesia. Suryanto (2015) who studied the relationship between OER and NPLs in regional development banks in Indonesia also found a positive effect between these two variables.

Financing to value and non-performing financing
Financing to value (FTV) or loan to value (LTV) is the maximum financing provided by a bank based on the percentage of the collateral value. FTV assesses the lending risk that banks

calculate before approving the financing amount. One of the factors affecting FTV is down payment (DP). A large DP will reduce the amount of the installment and interest payments of the customer. In addition, a longer tenure or credit period given to the customer means that the customer will have to make smaller regular installments. According to Sutanto (2012), the requirement for a high DP will reduce the demand for financing. Moreover, a high cost of borrowing will result in a lower number of loan applications, and this is expected to reduce NPLs/NPF (Wu *et al.*, 2003).

Bank Indonesia issued its LTV policy concerning credit and DP for property in September 2013. The policy is regulated through the external circular of Bank Indonesia No. 15/40/DKMP Year 2013 concerning 'Application of Risk Management to Banks That Provide Property Ownership Loans or Financing, Property-Backed Credit or Financing Loans and Motor Vehicle Loans or Financing'. The aim of this policy is to enhance the aspect of banks' prudence in property financing. The growth of property prices is feared to be a trigger for financial instability as a result of the default of customers who use banking services to finance their property purchases. Therefore, this policy may have an impact on the NPF level of banks.

Profit and loss sharing and non-performing financing

Based on the Islamic banking statistics of 2017, the main pattern of financing that dominates Islamic banks are the principles of profit sharing and of buying and selling. For profit sharing principles, the most widely used financing modes are *mushārakah* and *muḍārabah* (Muhammad, 2019). Profit sharing reflects the commitment of Islamic banks in developing Sharīʿah-compliant finance. However, financing based on profit sharing has higher risks compared to financing involving buying and selling because the income of the bank is not fixed as it depends on the profit generated by the customers' businesses. Therefore, Effendi *et al.* (2017) state that PLS financing has a negative influence on NPF.

Research methodology

The study uses annual reports as secondary data of SRBs in Indonesia for the years 2010–2019. The annual reports were accessed from the banks' websites. The study uses analysis method of auto regressive distributed lag (ARDL). In the ARDL method, variables with different integration orders (level and first difference) can be used. The ARDL method can also assign the direction of the causality of the variables used in the model. One of the advantages of using ARDL is that this model can estimate the short-run and long-run effects of the variables simultaneously (Sukmana and Setianto, 2018).

Data analyses of this study include descriptive statistics, unit root test (Augmented Dickey-Fuller/ADF) test and Philips-Perron (PP) test), model estimation in the short-run and long-run, lag determination, cointegration test, diagnostic test and stability test. The ARDL model of this study is as follows:

$$NPF_{t} = \delta_0+\sum\delta_{1i}INF_{t-1}+\sum\delta_{2i}GDP_{t-1}+\sum\delta_{3i}IRATE_{t-1}+\sum\delta_4CAR_{t-1}+\sum\delta_5FDR_{t-1}+\sum\delta_6ROA_{t-1}+\sum\delta_7OER_{t-1}+\sum\delta_8FTV_{t-1}+\sum\delta_9PLS_{t-1}+\beta_1INF_{t-1}+\beta_2GDP_{t-1}+\beta_3IRATE_{t-1}+\beta_4CAR_{t-1}+\beta_5FDR_{t-1}+\beta_6ROA_{t-1}+\beta_7OER_{t-1}+\beta_8FTV_{t-1}+\beta_9PLS_{t-1}+e_t$$

where:

NPF = Non-performing financing (%)

INF = Inflation using Consumer Price Index (CPI) (%)

GDP = Economic growth using Industrial Production Index (IPI) (%)
IRate = Interest rate (%)
CAR = Capital adequacy ratio (%)
FDR = Financing deposits ratio (%)
ROA = Return on assets (%)
OER = Operating expense ratio (%)
FTV = Financing to value (dummy), where 0 = before the policy and 1 = after the policy
PLS = Profit and loss sharing financing ratio (%)
e = Error term

Results and discussion

The sample in this research consists of SRBs which are studied over the period January 2010–September 2019. There were 165 SRBs in Indonesia in 2019. Based on the availability of data, this study analyses 164 SRBs (99.4%) using monthly data. The results of the descriptive statistics are described in Table 1.

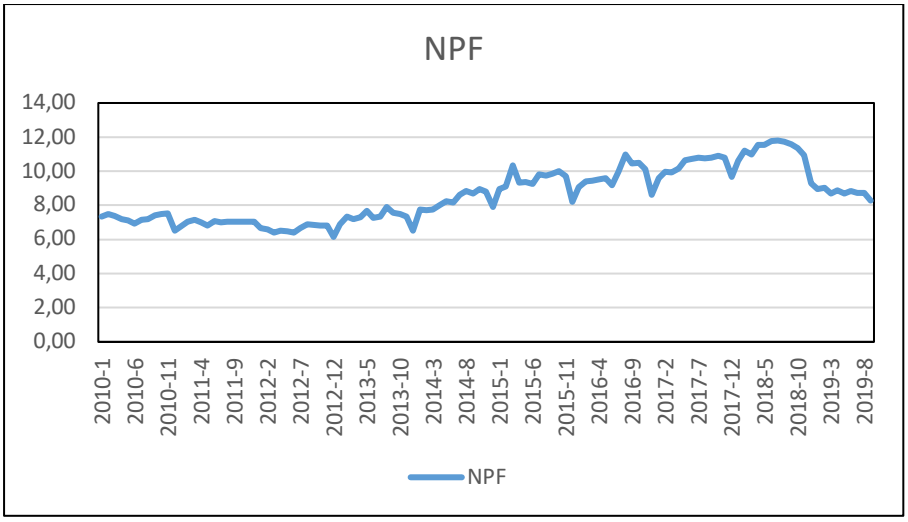
Table 1: Results of descriptive statistics

Variables	Minimum	Maximum	Mean	Std. Dev.
NPF	6.15	11.8	8.5988	1.57791
INF	88.79	138.75	1.15E+02	15.43855
GDP	92.32	154.02	1.23E+02	15.93085
IRate	4.25	7.75	6.1944	1.02717
CAR	18.81	33.25	23.1687	3.08398
FDR	109.34	139.96	1.24E+02	7.30467
ROA	1.73	3.97	2.6105	0.42704
OER	75.2	91.89	83.5004	4.88657
PLS	10.83	14.81	12.6444	1.14091

Source: Authors' own

Table 1 shows that NPF has an average value of 8.59, standard deviation is 1.57, maximum value is 11.80 and minimum value is 6.15. The value of NPF in SRBs is found to be high during the observation period. Even the minimum value of NPF exceeded the expected limit of 5% instituted under Bank Indonesia's NPF policy. Figure 3 illustrates the NPF level of SRBs over the studied period.

Figure 3: NPF of SRBs over the period 2010–2019



Source: Authors' own

According to Figure 3, the NPF level fluctuated during 2010–2019. The highest NPF is 11.80 as at Q2–2018 and the lowest NPF is 6.15 as at Q1–2013. These high NPFs should be managed properly so as not to decrease the profits obtained by the bank.

Stationary testing is carried out to determine which data is integrated in the same or different orders. The results of stationary testing show that there are several variables at the stationary level while other variables are stationary at the first difference level or not integrated in the same order. The stationary test uses an Augmented Dickey-Fuller (ADF) test and Philips-Perron (PP) test.

Table 2: Results of stationary test

Variables	ADF		PP	
	Level	First Difference	Level	First Difference
NPF	-1.749311	-12.42104***	-2.369885	-12.95242***
INF	-1.054095	-9.850579***	-1.829982	-7.133381***
GDP	0.554129	-7.680117***	-11.12324***	-54.57975***
IRate	-1.309887	-7.187220***	-1.743521	-7.304156***
CAR	-3.053515**	-16.43171***	-4.300390***	-23.52130***
FDR	-2.456795	-6.493852***	-3.903073**	-7.935367***
ROA	-2.665797*	-9.643522***	-2.841609	-13.04410***
OER	-1.475434	-11.63488***	-2.246113	-17.40983***
FTV	-1.429996	-10.67708***	-1.645499	-10.66632***
PLS	-3.90641***	-6.566503***	-1.766455	-6.015062***

The significant values at the level of 1%, 5% and 10% are indicated by ***,**,* respectively.
Source: Authors' own

Table 2 shows that NPF, INF, GDP, IRate, FDR, OER and FTV have ADF probability value greater than the alpha value of 10%. It means that the data is not stationary at the level. Furthermore, the stationary test for the first difference was carried out, and the results showed that the ADF probability values for all variables were smaller than the alpha value of 1%, which indicates that the data are stationary in the first difference. Meanwhile the PP test at the level shows that NPF, INF, IRate, ROA, OER, FTV and PLS values are greater than

the alpha value of 10%, meaning that the data are not stationary at the level. The PP test on the first difference shows that all variables are stationary at the alpha value of 1%.

The results of stationarity testing show that there is no integration between the variables so that the selection of the ARDL method is the right method for examining the relationship between NPF and macro-microeconomic conditions that affect SRBs.

In the ARDL regression an estimation of dependent and independent variables relationship is carried out. Based on the estimation results, an error correction mechanism (ECM) regression is carried out to balance the short-term economic relations with variables that have a long-term balance or economic relationship. The estimation results for the short-run are described in Table 3, while Table 4 presents the long-run results.

Table 3: Estimation of short-run dynamics

ECM Regression Case 2: Restricted Constant and No Trend		
Variables	Coefficient	Prob.
D(NPF(-1))	-0.247377	0.0126***
D(INF)	-0.245595	0.0015***
D(INF(-1))	0.352704	0.0002***
D(INF(-2))	-0.150658	0.1081
D(INF(-3))	0.305944	0.0002**
D(CAR)	-0.003615	0.9362
D(CAR(-1))	-0.117786	0.0224**
D(CAR(-2))	-0.096642	0.0433**
D(CAR(-3))	-0.118587	0.0064***
D(PLS)	0.378112	0.0303**
D(PLS(-1))	-0.696637	0.0001***
CointEq(-1)*	-0.124078	0.0003***
p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001		

Source: Authors' own

Table 3 shows that the NPF variable in lag 1 negatively affects the following month's NPF. This means that every 1% increase in NPF in the previous month will decrease the NPF of the current month by 0.24% at 1% significance level. This indicates that the NPF decrease is contributed by the previous month's NPF.

Inflation negatively influences NPF in the short run at a 1% significance level. The increasing of inflation of 1% will reduce NPF by 0.24%. This implies that higher inflation rates will result in lower NPF. The result is consistent with the study by Effendi *et al.* (2017) and Supriani and Sudarsono (2018). High prices of goods and services due to inflation may reduce the intention of the society to save. Therefore, Islamic banks may have lower third party funds and will thus be more careful in giving out financing (Widiastuty, 2017); consequently, Islamic banks will have lower NPF too.

Otherwise, INF(-1) and INF(-3) had a significant positive effect at the 1% and 5% significance levels. If there is a 1% increase in inflation, NPF will increase by 0.35% in the first month and 0.30% in the third month. The positive effect is inline with the theory that when there is inflation, the high prices of goods will reduce people's purchasing power if their income is constant, and affect the ability of customers to pay off their financing. Widarjono and Rudatin (2021) explain that inflation can worsen economic conditions by decreasing the purchasing power of consumers, therefore increasing 'poor' financing.

CAR does not have an effect on NPF in the short run. This means that the size of the capital owned by Islamic banks does not affect NPF. Capital owned by banks is not always channelled in the form of financing or to cover losses resulting from financing risks. Banks may instead use the capital to invest (Suryanto, 2015). This study supports the results obtained by Havidz and Setiawan (2015) and Suryanto (2015).

However, different results can be observed for CAR(-1), CAR(-2) and CAR(-3) that show a significant negative effect on NPF. This means that if there is an increase in CAR by 1%, it will reduce NPF by 0.117% in the first month, 0.096% in the second month and 0.118% in the third month. A higher CAR means that SRBs have to maintain a larger amount of reserve funds, thus limiting their ability to provide financing in the long term and minimizing their credit risk as well. This result supports the finding of Muhammad *et al.* (2020) that high CAR can be used to absorb losses and thus minimize financing risk.

PLS has a significant positive effect on NPF in the short run. According to Ozili (2017), the more involved the banking industry is in its role as a financial intermediary, the higher will the risk of NPLs be. The positive relationship between NPF and PLS indicates that SRBs are not successfully mitigating the risk of PLS financing as doing so may involve large monitoring costs. This raises the issue of instability of the Islamic banking system (Fatoni and Sidiq, 2019).

In addition, with a coefficient of 0.696%, PLS(-1) has a significant negative effect. With monthly data, PLS(-1) is interpreted as the lag of the PLS variable in the first month. This means that an increase in PLS financing at lag 1 (in the previous month) will reduce NPF in the current month by 0.696% at the 1% significance level.

Table 4: Results of estimation of long-term coefficient

Levels Equation Case 2: Restricted Constant and No Trend				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
INF	0.057	0.076379	0.74628	0.4574
GDP	-0.02315	0.054837	-0.422166	0.6739
IRATE	-1.523375	0.570355	-2.670927	0.0090***
CAR	0.519735	0.253498	2.050255	0.0432**
FDR	0.142077	0.100986	1.406899	0.1629
ROA	0.506846	0.200404	2.529125	0.0132***
OER	1.192526	1.135359	1.050352	0.2963
FTV	-0.325318	0.318194	-1.022387	0.3093
PLS	-55.36658	22.4885	-2.461996	0.0157***
C	0.057	0.076379	0.74628	0.4574
p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001				

Source: Authors' own

The use of the cointegration analysis method aims to analyze the long-term relationship between the explanatory variables and the dependent variable, especially in models containing non-stationary variables. This study uses the cointegration test method from Pesaran *et al.* (1996), namely the bound test. If the statistical F-value is greater than the first difference value at the 5% significance level, then the variables have a long-term cointegration and pass the test.

Table 5: Results of bound test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	2.786921	10%	1.8	2.8
k	9	5%	2.04	2.08
		2.5%	2.24	3.35
		1%	2.5	3.68

Source: Authors' own

From the results of the bound test, it is found that the F-statistical value (2.786) is greater than the F-critical value (2.08) at the 5% significance level, meaning that the variables in this study have long-term cointegration.

Model testing is carried out to ensure the suitability of the model by conducting diagnostic and stability tests. Diagnostic tests are performed by testing the correlation test and heteroscedasticity test. Table 6 indicates that the probability values of autocorrelation and heteroscedasticity test are greater than 0.05%, meaning that the model is free from autocorrelation and heteroscedasticity problems.

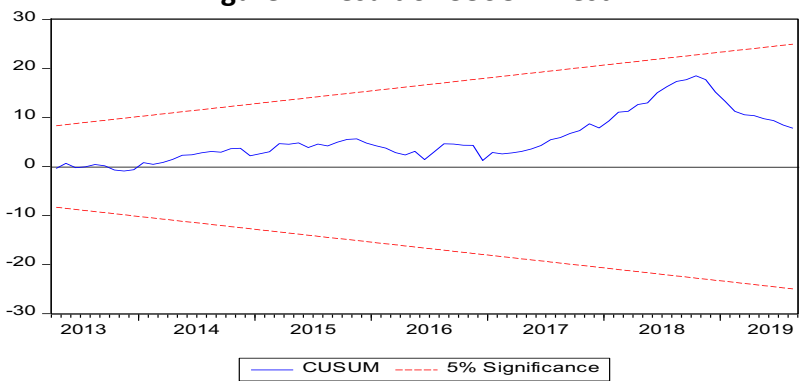
Table 6: Results of diagnostic test

Test of Goodness of Fit	Analysis Result (Probability)
Test of Autocorrelation	0.787
Test of Heteroscedasticity	0.220

Source: Authors' own

A stability test is conducted to see the stability of the model by using the CUSUM test. The result of the CUSUM test in Figure 4 shows that the CUSUM line is on the line of the 5% significance which means that the model is stable.

Figure 4: Result of CUSUM Test



Source: Authors' own

Discussion of long run results

The statistical analysis of each variable in the long run shows the variation result. Inflation does not influence financing risk. The data shows that in the long run, inflation declined in the period 2013–2016, i.e. inflation was high in 2013 and 2014 but then went down in 2015 and 2016. This means that inflation may not have a significant impact on the activities of Indonesians, including the financing activities of SRBs.

This study finds that economic growth does not have an influence on NPF in SRBs in the long run. According to Firmansyah (2014), a high or low GDP will influence the ability of people to repay their obligations and thus will have an impact on NPF. Nonetheless, the bank's financing approval process, which examines the capability and capacity of customers to make repayments, will also influence smooth installment repayments. Therefore, economic conditions may not influence the bank's returns from financing if borrowers with the capacity to repay are selected. Hasna *et al.* (2019) state that when inflation is rising, it will impact on the rising yield of State Sharia Securities (SBSN) and thus, the financing of Islamic banks may be directed to the financing of SBSN.

In addition, the financing of SRBs was dominated by SMEs, which have an important role in supporting the economy. The economic crisis of 1998 shows that SMEs can survive crises better than larger companies (KNKS, 2019). However, high levels of NPF can occur due to mismanagement of financing distribution to economic sectors that are not booming, so that it does not affect economic growth.

This study finds that interest rate negatively influences NPF in the long term. When the bank rate increases, conventional banks tend to increase their deposit interest rates as well as lending rates to maintain their profitability. This can encourage third-party funds to move to conventional banks rather than to Islamic banks/SRBs, if profit rates shared by Islamic banks/SRBs are not raised accordingly. This may lead SRBs to decrease their financing, thus resulting in a lower NPF.

This result is different from that of Adebola *et al.* (2011), who state that interest rate has a significant positive effect over the long term, whereas Haniifah (2015) shows no significant positive effect between interest rate and NPF. SRBs do not apply interest rates in their operational activities. However, there is competition between conventional and Islamic banks (Trinugroho *et al.*, 2021). When interest rates rise, SRBs tend to reduce expansion in the distribution of financing because the cost of third party funds becomes expensive to compensate for conventional banks. SRBs are more interested in placing their funds in State Sharia Securities (SBSN) which provide good returns compared to channeling funds in the form of financing. SBSN use a yield or equivalent rate. When SBSN yields increase, financing in SBSN by Islamic banks also increases (Hasna *et al.*, 2019). SRBs can reduce the risk of financing when interest rates increase by investing in SBSN, and therefore, the small financing distribution will impact on a smaller NPF.

CAR has a significant and positive relationship with NPF in the long run. SRBs' financing from 2010 to 2019 was mostly disbursed in the form of productive loans (working capital and investment financing) which reached 60% of total financing (FSA, 2020). The placement of risk-weighted assets in SRBs is high. High NPF rates on commercial loan financing require high CAR reserves. Effendi *et al.* (2017) and Supriani and Sudarsono (2018) also show a significant positive influence between CAR and NPF in Indonesian Islamic banks. CAR is a form of SRBs' capital capacity. SRBs management may feel confident when there is an improvement of their CAR and attempt to increase the volume of financing without necessarily considering the repayment ability of customers. Consequently, it increases the

potential for NPF to increase due to less optimal screening and monitoring processes for prospective customers.

Table 4 also shows that FDR does not have an influence on the NPF of SRBs in the long run. When financing is managed properly by assessing each customer's risk level, a large or small amount of financing will not influence NPF. This result is in line with Havidz and Setiawan (2015), Dwihandayani (2016) and Muhammad *et al.* (2020). Furthermore, Figure 2 above shows that the NPF for SMEs' financing is higher than for non-SMEs although total financing provided to non-SMEs is higher than that to SMEs. Hence, it is important for SRBs to manage the level of financing disbursed for both SMEs and non-SMEs to minimize the NPF level. According to Havidz and Setiawan (2015), the influence of FDR is not significant because financing risks are rather influenced by portfolio management financing, i.e., good or bad management. Muhammad *et al.* (2020) state that there are two possibilities when FDR has no effect on NPF. First, SRBs get profit not only from financing, but also investment in SBSN or the financial market. Second, SRBs distribute more on financing that has low-risk (such as *murābaḥah*) than PLS financing.

The statistical result shows that profitability or return on assets (ROA) has a significant positive influence on NPF in the long run. Profitability is very important to attract investors to invest their funds in the company. A high level of financing that is distributed is expected to result in a high profit, although the possibility of having a high percentage of NPLs as a consequence can occur. SRBs face competition not only with conventional banks but also with Islamic commercial banks, and it may encourage them to increase their level of financing to generate higher profits; and this may result in high NPF also. The result is in accordance with the findings of Setiawan and Putri (2013).

OER has been found to have no effect on NPF which indicates that the efficiency or inefficiency of SRBs does not influence NPF in the long run. This can be explained in two ways. First, according to data from FSA (2019), *murābaḥah* financing of SRBs dominated their financing distribution by 75.6%. The profit from *murābaḥah* financing can be calculated with certainty based on the value of the margin on the price of the goods. Therefore, SRBs can rely on the performance of *murābaḥah* financing in determining a high or low NPF, and may not look at the efficiency of SRBs' activities. Second, the management of SRBs may not prioritise the reduction of NPF levels. The efficiency of Islamic banks is lower than conventional banks (Chamberlain and Khokhar, 2020; Trinugroho *et al.*, 2021). Therefore, NPF settlement in Islamic banks can be done through litigation and non-litigation processes. Litigation resolution will be more expensive than non-litigation because it requires more resources and time. If OER is unable to significantly reduce the NPF level, management tends to seek non-litigation solutions that are less costly but have a risk of a protracted settlement.

However, banks need to evaluate their activities that can cause inefficiency because it will influence the banks' performance. Suryanto (2015) explains that bank efficiency is related to the quality level of management and the effectiveness of the products and services offered. Better quality management will enhance efficiency in the operational activities of the bank.

This paper finds that FTV does not affect NPF in the long term. FTV is related to contracts of sale and purchase such as *murābaḥah*, *istiṣnāʿ*, *mushārakah mutanāqiṣah* and *ijārah muntahiyah bittamlik*. Sutanto (2012) noted that the purpose of the LTV policy is to relocate between consumption and investment loans to ensure a balance between the two types of financing. In September 2019, *murābaḥah* financing distributed by SRBs amounted

to 75.6% of total financing, followed by *mushārakah* (9.62%) and multi-purpose financing (9.57%) (KNKS, 2019). However, the composition of financing based on types of usage consisted of working capital (37.75%), investment (14.93%) and consumption (47.32%). Financing for consumption purposes still dominated the financing of SRBs It may cause FTV not to influence NPF in these banks.

In the long run, PLS has a negative effect on NPF. It means that an increase in PLS will result in a lower NPF. There are several possible reasons why that happened: first, SRB financing is dominated by non-PLS financing, so there is a possibility that NPF will occur due to a problem in non-PLS financing. Data as at September 2019 shows that SRB financing is dominated by *murābaḥah* financing (75.6%) while Figure 1 also shows that the NPF level continues to increase. So when PLS is low but NPF is high, NPF may arise from the higher portion of non-PLS financing. This is in accordance with the argument by Widarjono and Rudatin (2021) that the increase in NPF can be influenced by the distribution of concentrated financing in Islamic banks. Second, generally, risk of PLS financing is higher than other financing types. When SRBs have higher PLS financing, the management may apply high risk mitigation to prevent NPF and therefore, it will impact on lower NPF.

Conclusion

Managing financing risks at the level of the Islamic banking industry is important because it is one of the key financial performance measurements. NPF must be managed well to maintain the sustainability of Islamic banks. This study attempts to examine the factors (internal and external) that influence NPF in SRBs. Internal variables examined are: financing to deposit ratio (FDR), capital adequacy ratio (CAR), return on assets (ROA), operating expense ratio (OER), loan to value (FTV) and profit and loss sharing (PLS) financing ratio. External variables consist of inflation, economic growth and interest rate.

The findings indicate that there are four variables that have a lag in the short run, namely NPF, inflation, CAR and PLS. Furthermore, the long run results show that CAR and ROA influence NPF positively while inflation and PLS have a negative influence on NPF. The rest of the variables, including economic growth, interest rate, FDR, FTV and OER do not have an influence on NPF in SRBs.

The results show that internal factors tend to dominate the NPF level of SRBs in Indonesia. This is understandable because SRBs are local banking institutions and face a different environment compared to Islamic commercial banks, which operate on the national banking scale. Therefore, the ability of SRBs' management to understand business complexity and risk management may influence their capability in monitoring and controlling potential financing problems. The different results found for the short run and long run for certain variables require the banks to adopt the right strategy in accordance with these estimates.

SRBs must also meet the central bank's NPLs/NPF requirements that have been issued for the banking industry. They need to more carefully screen prospective customers and the guarantees they can provide in the early stage of financing approval in order to reduce the risk of default. SRBs also need to develop the necessary competency in managerial and risk management to improve their understanding of business risks and risk mitigation with regard to SMEs' customers. SRBs tend to attract more SMEs' customers as the latter are considered less bankable when they seek financing with commercial banks; thus, they turn to SRBs to fulfil their financing needs because it is easier to meet these

banks' conditions. Thus, to manage the credit risk arising from the financing of SMEs, SRBs should adopt the right risk management mechanism.

The findings of this study would be helpful to the regulator for it to determine policies that accommodate the characteristics of SRBs because excessive NPF can disrupt the continuity of the banks and affect the economic growth of a nation. Regulations can focus on the improvement of the corporate governance structure in SRBs to increase the competency and experience of management in controlling, monitoring and mitigating financing risk especially for SMEs' customers.

It is noted that several of the findings of this study are different from those reported in previous studies. This might be due to the difference in research subjects with different characteristics. This study examines the case of SRBs while previous studies mostly discussed Islamic banks. Future research can try to analyze those differences in greater depth.

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About the authors

Unggul Priyadi is an Associate Professor of Economics at Universitas Islam Indonesia. His areas of interest are Islamic economics and finance, human resources economics, and the Indonesian economy.

Kurnia Dwi Sari Utami is a lecturer at the Economics Department of Universitas Sultan Ageng Tirtayasa, Banten, Indonesia. She is interested in Islamic economics and finance.

Rifqi Muhammad is an Associate Professor of Accounting at Universitas Islam Indonesia. His areas of interest includes Islamic accounting, Shariah audit and governance and Islamic banking and finance. Rifqi Muhammad is the corresponding author and can be contacted at rifqimuhammad@uii.ac.id

Peni Nugraheni is a lecturer of Accounting Department at Universitas Muhammadiyah Yogyakarta. Her areas of interest are Islamic banking and finance, Islamic accounting, ethics, corporate governance, and disclosure.