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Islamic banks credit risk performance for home financing: Before and during Covid-19 pandemic

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Abstract

Purpose — This study aims to assess the home financing credit risk performed by Islamic banks in Indonesia.

Methods — A panel dynamic analysis is adopted to measure the bad loan performance before and during the Covid-19 pandemic. The observation period started from January 2016 to September 2020 with 1,881 observation periods of monthly panel data from the province level.

Findings — The study finds a difference in bad loan performance before and during the Covid-19 pandemic. Before this pandemic, inflation has a positive and significant influence on non-performing financing in real estate, rental business, and company service. However, during the Covid-19 pandemic, a substantial and positive effect of inflation is found on the bad loan for personal flat and apartment ownership. On the other hand, a significant and negative impact of inflation is found on the bad home loan for personal business shop ownership.

Implication — This analysis could trigger the government to provide financial assistance for those affected by the Covid-19 crisis. In addition to that, an Islamic bank is also expected to give financing allowances for them by providing an option of debt restructuration and rescheduling.

Originality — This paper analyses the Islamic bank's credit risk performance for home financing before and during the Covid-19 pandemic. This issue has not been presented in the literature to the best of our knowledge.

Keywords — credit risk, islamic banks, home financing, panel dynamic, inflation

Introduction

The COVID-19 pandemic comes as a surprise to all countries in the world, without the exception of Indonesia. Many countries could not predict how severe the effects of this virus are on the health, social, or economic condition. Particularly in Indonesia, a massive spread of COVID-19 from early March 2020 has caused a decline in economic activity and disrupted many macroeconomic indicators at the national level, including household consumption, investment, financing, inflation, and so forth (Statistics Indonesia, 2020). It has been hard for analysts and economists to forecast the national economic growth considering the unprecedented nature of the Covid-19 crisis. While few optimists hope to have moderately positive economic growth, a majority group merely forecasts a contraction.

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One of the indicators is the inflation rate in Indonesia. Claeys, Bénassy-quéré, Demertzis, and Zenios (2020) emphasise that inflation can be part of the main objective for the central bank to conduct monetary policy. In addition, inflation is one of the robust indicators utilised to explain the current economic circumstance. Bohl and Siklos (2018) state that inflation reflects what is happening in the real market in terms of goods and service conditions. An increase in inflation explains that there is a rise in prices for goods and services in the market, and it can be caused by two things which are cost-pull inflation and demand-pull inflation. A dramatic increase in inflation occurred during financial crises such as the Asian financial crisis in 1998 due to the cost-pull inflation Field (Mishkin, 1999). It also happened in the global financial crisis in 2008. It impacted the real market because a rocketed inflation rate made a sound, and services were less affordable.

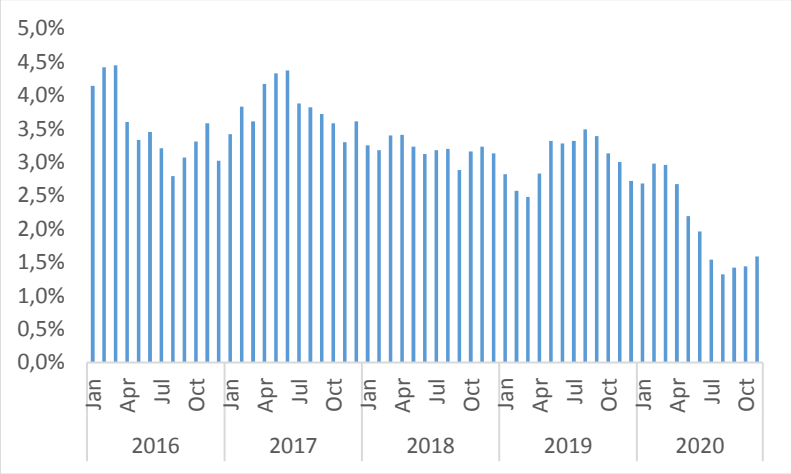


Figure 1. Inflation Rate in Indonesia
Source: Central Bank of Indonesia (2020)

On the other hand, financial turmoil can cause low inflation that sheds light on a lower purchasing power of society in Indonesia; this condition is shown in Figure 1, which expresses, in general, an upward movement of inflation after March 2020. Sukharev (2020) demonstrates that a hit in the real and financial sectors during the Covid-19 pandemic is possibly impacted the inflation rate to be lower than in the normal situation. A lower inflation rate which means a fall in purchasing power, confirms that the people tend to postpone their spending on non-primary needs goods and service. On a large scale, it significantly impacts production activities that provide non-primary needs products, and in the end, it creates a supply shock in economic activities (Claeys et al., 2020).

Even though less purchasing power appears in the society, according to Statistics Indonesia in August 2020, several sectors recorded positive growth, including information and communication, water supply, health services, and real estate. Notably, for real estate, a capital-extensive sector with a huge multiplier effect to more than 170 sub-sectors still appears as a positive driver of the national economy even in times of crisis like today. Despite many challenges brought by this pandemic, such as a fall in demand due to a weakened purchasing power as well as the ability to repay, the housing sector is shown to have a strong resilience by contributing a positive growth of 2.3% to the national Gross Domestic Product in the second quarter of 2020 (Statistics Indonesia, 2020). It could not be denied that the growth of the housing sector in 2020 heavily depends on the coordinated steps taken by the government, including a new housing loan subsidies of IDR 1.5 trillion (US$89.7 million) for 175,000 low-income families nationwide and other financing allowances provided by banks as the significant financial institutions (The Jakarta Post, 2020).

As home to the largest Muslim population and the most significant number of Islamic financial institutions globally, Islamic banks indeed play a crucial role in assisting society in financing their housing needs. Based on Law No. 21 of 2008, Islamic Bank can be defined as a bank that carries out business operations complying with Islamic principles, which are reflected in the fatwa of the Indonesian *Ulama* Council. Islamic banks in Indonesia provide Sharia-compliant

financing through various types of Sharia contracts according to the purpose of the funding including property financing. In a report released by Financial Services Authority (2020), Islamic Banks have provided financing to 18 industrial sectors in Indonesia. The financing of the 18 sectors is carried out by both Islamic Commercial Banks (BUS) and Islamic Business Units (UUS).

The covid-19 pandemic severely impacted almost all industries, not to exclude Islamic banking, which holds a crucial function as an intermediary that connects surplus funds and deficit funds. As a response, various urgent changes have been immediately implemented to allow this industry to survive the battle against the Covid-19 pandemic. When major industries need faster and easier access to capital, the role of Islamic banking is increasingly significant. However, on the one hand, Islamic banking must also remain cautious in carrying out its operations because the inevitable exposure to the risk is getting bigger amidst the uncertainty at the macroeconomic level arising from the Covid-19 pandemic.

Especially for home financing activities, being prudent is a key to maintaining the quality of financing activities. Ahmed (2010) explains that imprudent financing in the home financing or mortgage sector can be a preliminary cause to make the banks have a higher opportunity to default. This condition once occurred during the global financial crisis in 2008 that was started due to excessive and imprudent financing to the banking customers. Cheng, Cen, Wang, and Li (2020) add that the subprime mortgage crisis impacted the business cycle activities in the international market, creating a slowdown movement in trading activities.

Some previous research, including Field Ghosh (2016), shows that macroeconomic variables greatly determine banking performance in a dual banking system. It is also in line with the result of Fakhrunnas, Dari, and Mifrahi (2018), which confirms that in a dual banking system like Indonesia, a bank's risk-taking behaviour would be affected by macroeconomic indicators over a long period. Nonetheless, there is a distinct response between conventional and Islamic banks as the former are more exposed to the interest rate. Mohamad, Hasbulah, and Razali (2015) and Aviliani, Siregar, Maulana, ad Hasanah (2015) find that inflation impacts the banks' performance, which may increase the cost of business operation. In addition, the banks also need to adjust their expected return when the inflation rate goes up.

In addition to that, Zarrouk, Ben Jedidia, and Moualhi (2016) reveal a direct effect of economic growth on the performance of Islamic banking. The result also shows that Islamic banks will tend to provide a large number of financing and ultimately contribute more to the economic growth on the condition of good economic signals. Furthermore, Iriani and Yuliadi (2015) find that bank performance in form of non-performing financing (NPF) ratio is significantly affected by bank behaviors and macroeconomic indicators. The level of inflation held by a nation will affect the performance and the risk of banking activities in the future (Lin, Farhani, & Koo, 2016).

Research on Islamic banking is one of the most popular topics published in reputable journals both nationally and internationally. However, when it comes to a study on Islamic banking during the Covid-19 pandemic we find that there is still limited number research discussing this topic. Several existing studies such as Ningsih and Mahfudz (2020) and Ubaidillah and Syah Aji (2020) show that at the beginning of 2020 all banks, including Islamic banks, experienced turmoil in their intermediary function both from collecting and distributing funds which aggressively showed a downward trend. Other research such as Fitriani (2020) explains that the effect of the Covid-19 pandemic differs between the banks as her study reveals significant differences in financial performance between Islamic banks in Indonesia, in terms of NPF, ROA, and BOPO ratios.

On the other hand, several studies such as Hachicha and Amar (2012), Farahani and Dastan (2013), and Rosylin and Bahlous (2013) discuss the impact of Islamic bank's financing on economic growth. These studies find that the financing carried out by Islamic banks has a positive impact on the long-term economic growth, especially for the financing under Profit-Loss-Sharing (PLS) scheme. Further research related to the impact of macroeconomic variables on the performance of Islamic banking has also been carried out by Karim, Al-Habshi, and Abduh (2016), Louhichi and Boujelbene (2016), Trad, Trabelsi, and Goux (2017) and Srairi (2013).

As far as the authors are concerned, there are only few studies have used banking financial statement data to analyze the impact of the Covid-19 pandemic on Islamic bank's financing, in

particular the housing financing. Secondly, the use of regional macroeconomic variables will analyze more objectively the characteristics of Islamic banking in the selected provinces. Thirdly, the use of a dynamic panel approach will provide more information about the dynamic impact of Islamic banking financing on regional macroeconomic variables.

Based on the abovementioned explanations, this study aims to assess the Islamic Banks' credit risk performance for home financing before and during the Covid-19 pandemic. This paper will firstly present an introduction which covers the factual background and the literature review supporting this research. It is then followed by the method used in this study. Afterward, it will provide the results and discussion prior to presenting the conclusion and the recommendations for related stakeholders.

Methods

Data

The study uses panel data analysis that comprises cross-section data of 33 Indonesian provinces which provide Islamic banks financing service for home financing. The data is retrieved from Indonesian Financial Service Authority (FSA) which provides Islamic banks financial performance on monthly basis. The period is started in January 2016 and ended in September 2020. The study-time-period is applied because it is the maximum data that is able to be analyzed. Totally, there are 1881-year-observation periods. Table 1 describes the variable and its explanation.

Table 1. The Variables Definition

Variable(s)	Definition(s)	Source (s)
NPREU	The percentage of Islamic banks' bad loan for real estate, rental business and company service in each province	Financial Service Authority
NPRT	The percentage of Islamic banks' bad loan for personal residential ownership in each province	Financial Service Authority
NPFA	The percentage of Islamic banks' bad loan for personal flat and apartment ownership in each province	Financial Service Authority
NPR	The percentage of Islamic banks' bad loan for personal business shop ownership in each province	Financial Service Authority
INF	The percentage of inflation rate in each province	Statistics Indonesia
FDR	The ratio of total financing to third-party funding of Islamic banks in each province	Financial Service Authority
Ln_FIN	The log of total financing of Islamic banks in each province	Financial Service Authority
Ln_ASSET	The log of total asset of Islamic banks in each province	Financial Service Authority

Empirical Model

The study aims to assess the impact of the Covid-19 pandemic on the performance of Islamic banks' home financing by looking at regional inflation as its determinant. To understand the impact of the Covid-19 pandemic, the study segregates time-frame analysis by separating the analysis to be all observation period bases, before Covid-19 pandemic period basis and during Covid-19 pandemic basis. The general model used in the analysis is as below;

$$CHF = f(INF, FDR, Ln\_FIN, Ln\_ASSET) \quad (1)$$

Moreover, the formula can be explained as,

$$CHF_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 FDR_{it} + \beta_3 Ln\_FIN_{it} + \beta_4 Ln\_ASSET_{it} + \varepsilon_{it} \quad (2)$$

β_0 expresses the constant in the model while β_1 to β_4 reflect estimated parameters. Moreover, the symbol of *i* and *t* describe the cross-sectional and time-series data respectively then ε_{it} is a symbol for the error term. To specify the analysis, CHF is split into NPREU, NPFA, NPRT, and NPR for the following estimation model.

Estimation Model

To attain the objective, a dynamic panel data analysis is utilized with following Holtz-Eakin, Newey, and Rosen (1988) approach to adopt Panel Vector Autoregression (PVAR) that also allows time-series effect within panel data. In addition, PVAR analysis deal with the endogeneity issue among the variables and unobserved individual heterogeneity in panel data is permissible to exist. Moreover, the use of PVAR also provides the opportunity for the researcher to examine the Variance Decompositions (VDs) and Impulse Response Factors (IFRs) that explain multivariate causalities among the observed variables (Anarfo, Abor, Osei, & Syeke-Dako, 2019; Fakhrunnas, 2020).

Love and Zicchino (2006) stated that the use of PVAR model in economic and finance research can utilize the formula as follows:

$$Y_{it} = \tau_1 Y_{it-1} + f_i + d_t + e_{it} \quad (3)$$

In which Y_{it} describe the observed variable using PVAR approach that is while f_i explains a fixed effect of an unobservable time-invariant effect specific to each province. Furthermore, d_t is a time dummy for each provinces-specific then e_{it} is defined as a random error term iid.

Derived from the formula, this study uses four models which are;

Model 1,

$$NPREU_{it} = \sum_{j=1}^{p} \emptyset_{1j} NPREU_{it-j} + \sum_{j=1}^{p} \emptyset_{2j} INF_{it-j} + \sum_{j=1}^{p} \emptyset_{3j} FDR_{it-j} + \sum_{j=1}^{p} \emptyset_{4j} Ln\_FIN_{it-j} + \sum_{j=1}^{p} \emptyset_{5j} Ln\_ASSET_{it-j} + f_i + d_t + e_{it} \quad (4)$$

Model 2,

$$NPRT_{it} = \sum_{j=1}^{p} \emptyset_{1j} NPRT_{it-j} + \sum_{j=1}^{p} \emptyset_{2j} INF_{it-j} + \sum_{j=1}^{p} \emptyset_{3j} FDR_{it-j} + \sum_{j=1}^{p} \emptyset_{4j} Ln_{FIN\,it-j} + \sum_{j=1}^{p} \emptyset_{5j} Ln_{ASSET\,it-j} + f_i + d_t + e_{it} \quad (5)$$

Model 3,

$$NPFA_{it} = \sum_{j=1}^{p} \emptyset_{1j} NPFA_{it-j} + \sum_{j=1}^{p} \emptyset_{2j} INF_{it-j} + \sum_{j=1}^{p} \emptyset_{3j} FDR_{it-j} + \sum_{j=1}^{p} \emptyset_{4j} Ln\_FIN_{it-j} + \sum_{j=1}^{p} \emptyset_{5j} Ln\_ASSET_{it-j} + f_i + d_t + e_{it} \quad (6)$$

Model 4,

$$NPR_{it} = \sum_{j=1}^{p} \emptyset_{1j} NPR_{it-j} + \sum_{j=1}^{p} \emptyset_{2j} INF_{it-j} + \sum_{j=1}^{p} \emptyset_{3j} FDR_{it-j} + \sum_{j=1}^{p} \emptyset_{4j} Ln_{FIN\,it-j} + \sum_{j=1}^{p} \emptyset_{5j} Ln_{ASSET\,it-j} + f_i + d_t + e_{it} \quad (7)$$

To conduct PVAR analysis, a Panel Unit Roots Test suggested by Pesaran (2012) and Pedroni (2000, 2004) must be firstly exercised then it is followed by PVAR analysis. Qu and Perron (2007) suggest using lag selection criteria to optimize the analysis by generating robust results. Lastly, VDs and IRFs can be conducted to examine the impact of independent variables on dependent variables by capturing the time-variant effect.

Results and Discussion

Table 2. Data Description

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
NPREU	7.9 %	3.6%	198.7%	0%	12.9%
NPRT	3.9%	2.9%	47.6%	0%	03.4%
NPFA	4.8%	1.8%	308.7%	0%	11.2%
NPR	5.1%	3.2%	71.3%	0%	6.8%
INF	0.317%	0.25%	4.2 %	-3.03 %	0.705%
FDR	111.91%	103.36%	256.60%	26.7 %	0.424%
FIN	IDR 8416 bn	IDR 2985 bn	IDR 158743 bn	IDR 93.12 bn	IDR 21938 bn
ASSET	IDR 16292 bn	IDR 3745 bn	IDR 403995 bn	IDR 171.3 bn	IDR 54192 bn

Table 2 highlights the descriptive data from all 33 provinces in Indonesia during observation period which is starting from January 2016 to September 2020. According to the table, the minimum score of NPREU, NPRT, NPFA, and NPR is zero which reflects that in certain provinces and time there was inexistence of bad loan for home financing in several provinces in Indonesia during the observation period. In contrast, Islamic banks once had a maximum bad loan for home financing in NPFA variable which reached 308.7% in a month which was in West Sumatra Province on September 2017. This high percentage reflected that at that moment the number of bad loan is higher than total financing for personal flat and apartment ownership.

For inflation, the average inflation rate during the observation period in all provinces was 1.124% while the highest percentage of inflation rate was 4.2% occurred in Yogyakarta Province in December 2017. Jakarta province had the highest amount of total financing that was IDR 158,743 bn in May 2020 while the lowest number was IDR 2985 bn performed in Jambi Province in February 2019. Lastly, in average the total amount of Islamic banks' assets was IDR 16,292 bn in all provinces over the observation period.

Panel Unit Roots Test Results

To begin the analysis, Panel Unit Roots test is firstly conducted to check the level of stationary. Referring to Table 3, the panel unit roots test is divided by using three categories which are intercept, trend and intercept, and none. This paper adopts the approach Pesaran (2012) and Pedroni (2000, 2004) to use ADF-statistics and PP-statistics to be a benchmark to determine the level of stationary for each variable. The result of the test shows that all variables are stationary in the first level at 1% level of significance. Then, according to the result, Panel Vector Autoregression (PVAR) can be applied.

Panel VAR results

Table 4 shows the result of Panel VAR that consists of four models with the condition of all periods by using all samples, before the Covid-19 pandemic and during the Covid-19 pandemic. In all periods, it can be seen that inflation has significant influence to NPFA that reflects the bad loan for real estate, rental business, and company service. In the lag 2, the inflation has negative impact to NPFA which also means a home financing for business purposes. It also highlights that a decrease in inflation will increase bad loan rate.

Table 3. The Results of Panel Unit Roots Test

Variable	Intercept				Trend and Intercept				None			
	At Level		First Difference		At Level		First Difference		At Level		First Difference	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
NPREU	297.9***	435.0***	952.3***	1132.6***	226.3***	358.8***	814.0***	1039.4***	265.7***	413.6***	2036.7***	6277.8***
NPRT	301.7***	522.0***	1130.4***	1206.6***	245.7***	485.6***	986.1***	1071.6***	136.0***	195.2***	2770.1***	7885.8***
NPFA	287.2***	425.0***	1047.6***	1110.2***	269.4***	438.0***	903.7***	1058.9***	248.8***	365.0***	2263.3***	7045.6***
NPR	225.4***	353.7***	967.8***	1170.7***	202.5***	355.0***	825.8***	1072.9***	199.1***	300.1***	1933.9***	5867.8***
INF	781.0***	1350.7***	984.4***	712.4***	674.2***	1102.1***	1205.***	949.5***	712.5***	1087.1***	4567.8***	8170.9***
FDR	154.0***	192.7***	839.7***	1280.1***	129.1***	165.9***	697.2***	1154.5***	51.8841	56.7315	1406.2***	4140.9***
Ln_Fin	92.4***	101.5**	679.2***	1147.6***	67.85***	81.5***	545.7***	1031.8***	15.1099	14.7441	994.3***	2547.8***
Ln_Asset	106.8***	149.4***	780.7***	1220.2***	81.4**	126.2***	644.3***	1093.7***	12.0781	10.7297	1215.4***	3130.2***

Note: The symbol of ***,** and * describe the level significance in 1%, 5% and 10% respectively.

The finding in line with Iriani and Yuliadi (2015) and Lin, Farhani, and Koo (2016) who also conclude that macroeconomic variables including inflation has a significant relationship to the banks' performance. Moreover, a lower rate of inflation reflects less purchasing power for the market and hits the supply side which makes the business activities are disrupted due to less product that can be produced (Mishkin, 1999). In contrast, Islamic banks' home financing for personal home ownership as shown in model 2 to model 4 which are NPRT, NPFA and NPR do not have any significant relationship with inflation rate.

When the period is separated into before the Covid-19 pandemic and during the Covid-19 pandemic, the findings of this study are different. Before the Covid-19 pandemic, inflation has positive and significant influence to NPREU. An increase 1% in the inflation rate will increase

0.006% of monthly non-performing financing in real estate, rental business, and company service. Before Covid-19, in a stable economic condition, an increase in inflation will tend to make the bad loan rate increase. It possibly occurs because inflation will increase the price of the product which will raise the cost of production of business activities. It means that an additional cost for Islamic banks' customers is needed to operate the business activities which possible loss their potential return. This result is supported by Aviliani et al. (2015) lso explains that an increase of inflation which means a reduction for the real profit of the banks tend to encourage the banks to increase their return by offering more profitable contract while they are giving financing to customers. In other words, the price of the property sold by Islamic banks to the customers will be higher.

During the Covid-19 pandemic, which started in Indonesia from March 2020, the impact of inflation to Islamic banks' home financing is different. Inflation does not influence anymore to NPREU which reflects financing activities in business sectors performed by the company. It has a shift of influence that is previously from Islamic banks' home financing for business purposes to home financing for personal ownership. The findings are exhibited by the significant influence of inflation to the bad loans of Islamic banks' home financing in model 2 and 4.

In model 2, inflation significantly impacts positively to NPFA which is the bad loan of home financing for personal flat and apartment ownership in 5% level of significance. A rise in the inflation rate will increase the bad loan rate for personal flat and apartment ownership. It indicates that a high inflation will encourage Islamic banks to have more profit in financing during the Covid-19 pandemic in Indonesia. Mohamad, Hasbulah, and Razali (2015) and Aviliani et al. (2015) state that a high inflation rate will deduct real return for the bank. Then, to respond to this condition, Islamic banks possibly attempt to generate more return in their financing activities which still has a positive growth during the Covid-19 pandemic especially for home financing in personal flat and apartment ownership.

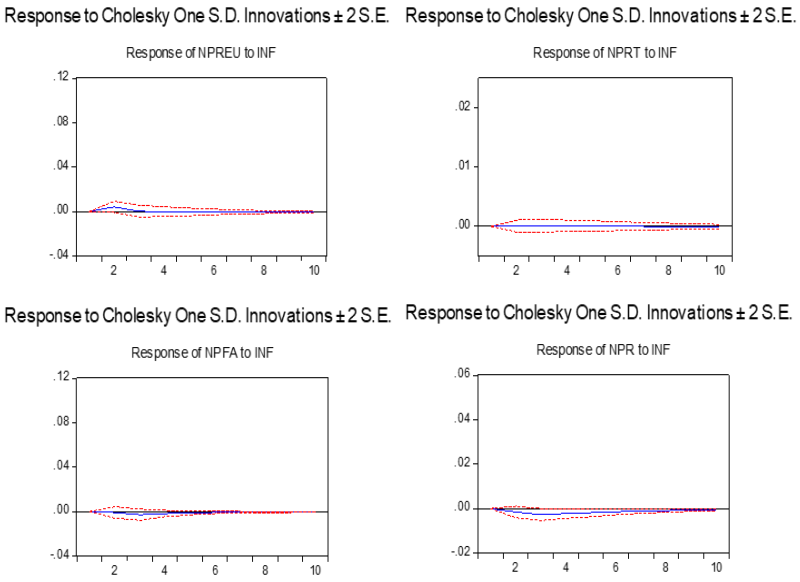
As consequence, an increase in profit demand from Islamic banks' side is equivalent to the rise of price in the home financing from customers' side. Finally, it gives more possibility for customers to fail to return the financing funds from Islamic banks and it also means that the default risk exposure is increasing. The influence of inflation to Islamic banks' performance is also supported by the previous findings performed by Karim et al. (2016), Louhichi and Boujelbene (2016), Trad et al. (2017) and Srairi (2013)

Table 4. The Results of PVAR

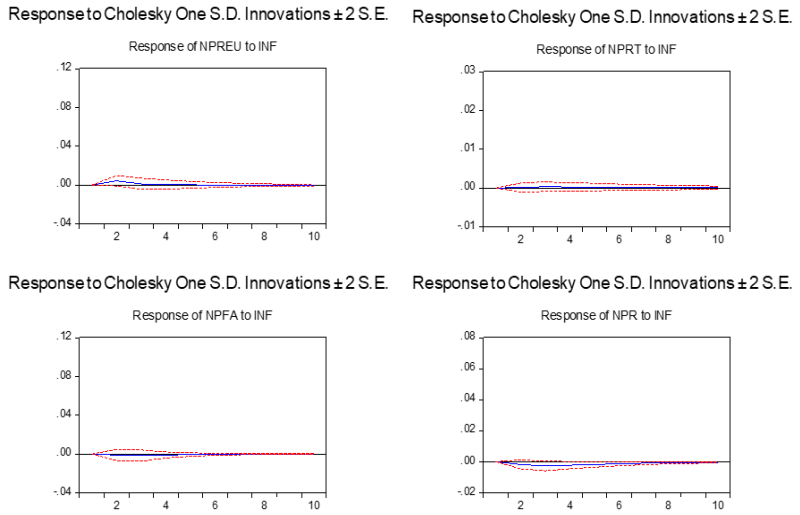
Indicators/Variables	All Periods				Before Covid-19				During Covid-19			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
HF(-1)	0.483***	0.485***	0.208***	0.415***	0.492***	0.47***	0.195***	0.390***	0.341***	0.646***	0.578***	0.964***
	[20.72]	[21.49]	[8.868]	[18.29]	[19.62]	[19.72]	[7.779]	[16.01]	[4.102]	[8.219]	[7.253]	[12.91]
HF(-2)	0.153***	0.285***	0.113***	0.233***	0.123***	0.29***	0.103***	0.213***	0.469***	0.266***	0.258***	-0.022
	[6.578]	[12.69]	[4.813]	[10.24]	[4.841]	[11.99]	[4.099]	[8.734]	[5.617]	[3.429]	[3.064]	[-0.300]
INF(-1)	0.006**	0.001	-0.001	-0.002	0.006**	0.000	-0.001	-0.002	0.008	0.002**	0.007	0.005**
	[1.716]	[0.042]	[-0.310]	[-1.170]	[1.625]	[0.175]	[-0.334]	[-1.165]	[0.478]	[1.59330]	[0.940]	[2.052]
INF(-2)	-0.005*	0.001	-0.003	-0.002	-0.004	0.000	-0.001	-0.002	-0.004	-0.001	-0.006	-0.005***
	[-1.322]	[0.167]	[-0.864]	[-1.168]	[-0.887]	[0.437]	[-0.317]	[-1.016]	[-0.278]	[-0.854]	[-0.858]	[-2.654]
FDR(-1)	-0.0506**	-0.002	0.026	0.003	-0.051**	-0.000	0.029	0.003	0.010	0.0011	0.013	-0.016
	[-1.839]	[-0.360]	[0.992]	[0.234]	[-1.699]	[-0.386]	[0.992]	[0.214]	[0.079]	[0.106]	[0.248]	[-1.013]
FDR(-2)	0.057**	0.003	0.018	0.001	0.061**	0.00	0.017	0.002	-0.026	0.002	-0.010	0.013
	[2.078]	[0.548]	[0.688]	[0.113]	[2.044]	[0.567]	[0.575]	[0.137]	[-0.207]	[0.163]	[-0.201]	[0.8010]
LN_FIN(-1)	-0.015	-0.006	-0.017	-0.001	-0.010	-0.00	-0.018	-0.001	-0.501*	-0.003	-0.079	-0.014
	[-0.391]	[-0.773]	[-0.439]	[-0.015]	[-0.231]	[-0.699]	[-0.436]	[-0.056]	[-1.297]	[-0.095]	[-0.500]	[-0.294]
LN_FIN(-2)	0.0360	0.005	-0.011	0.008	0.027	0.01	-0.010	0.009	0.558	-0.006	0.0810	0.02
	[0.981]	[0.677]	[-0.281]	[0.441]	[0.695]	[0.681]	[-0.254]	[0.427]	[1.453]	[-0.195]	[0.513]	[0.410]
LN_ASSET(-1)	-0.001	0.005	0.017	0.004	-0.007	0.00	0.018	0.005	0.2675	-0.011	0.087	-0.046
	[-0.036]	[0.659]	[0.450]	[0.192]	[-0.172]	[0.609]	[0.435]	[0.221]	[0.576]	[-0.279]	[0.457]	[-0.774]
LN_ASSET(-2)	-0.021	-0.006	0.007	-0.010	-0.012	-0.00	0.007	-0.011	-0.328	0.019	-0.090	0.041
	[-0.573]	[-0.746]	[0.196]	[-0.551]	[-0.314]	[-0.772]	[0.169]	[-0.544]	[-0.707]	[0.496]	[-0.470]	[0.692]
C	0.035**	0.018***	-0.003	0.006	0.032*	0.02***	0.001	0.010	0.090	0.005	0.012	0.004
	[1.652]	[3.983]	[-0.122]	[0.558]	[1.406]	[3.788]	[0.060]	[0.783]	[1.183]	[0.688]	[0.384]	[0.445]
R-squared	0.3636	0.587	0.10205	0.356	0.345	0.57	0.091	0.303	0.516	0.873	0.604	0.962
Adj. R-squared	0.360	0.584	0.09701	0.352	0.3408	0.57	0.085	0.298	0.484	0.864	0.577	0.959
F-statistic	101.8***	253.1***	20.27***	98.66***	82.02***	211***	15.63***	67.68***	15.91***	102.4***	22.71***	376.5***

Note: The symbol of ***,**, and * describe the level significance in 1%, 5%, and 10% respectively.

All Periods



Before Covid-19 Pandemic



During Covid-19 Pandemic

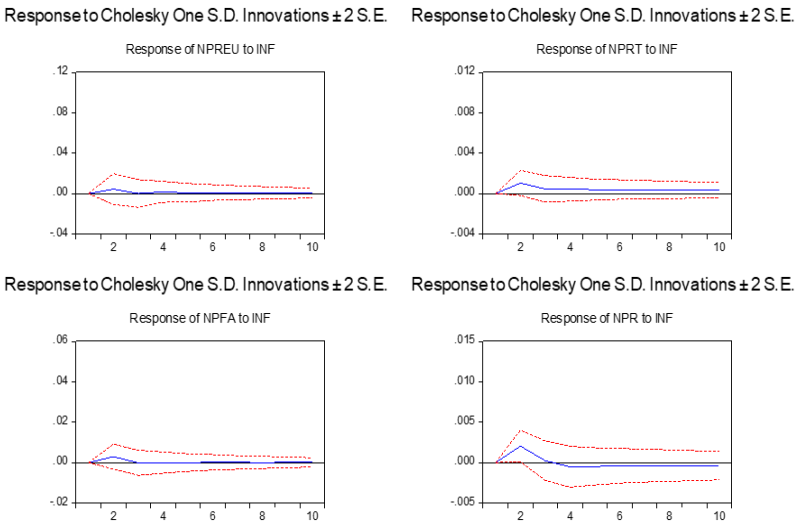


Figure 2. The Results of IRFs

In model 4, inflation has a significant and negative impact to NPR which stands for the percentage of Islamic banks' bad loans for personal business shop ownership in lag two. A decrease in inflation of 1% will increase the percentage of bad loans in personal business shop ownership by 0.005%. As mentioned above, a lower inflation rate possibly reflects a lower purchasing power of the society. Further, this condition may influence the supply side including personal business activities that are not able to sell and to produce the products and services at the maximum level. A lower income from business activities lessens the amount of the profit and the default risk of the customers will increase.

IRFs and VDs results

As adopted by Rosylin and Bahlous (2013) and Love and Zicchino (2006), Impulse Response Factors (IRFs) can be utilized to assess the movement of independent variables to dependent variables. By using IRFs, the movement and direction of independent variables can be examined over the observation periods. According to Figure 2, the movement of inflation through Islamic banks' home financing in all periods and before the Covid-19 period have a similar direction. At first, inflation increases the percentage of bad loans of NPREU in the first-two period and after that, it declines and remains stable to move around zero line after the first-three period. Inflation affects NPRT around the zero line and very less fluctuation occurs during the observation period. It goes the same with the influence of inflation to NPFA. In addition, inflation decreases the percentage of bad loans of NPRT in the first-three period and after that, it has an upward trend and remains stable to move around zero line after the first-five period.

The impact of inflation to Islamic banks' financing during the Covid-19 pandemic is more fluctuating than before the Covid-19 pandemic. It can be seen from the same figure in which NPREU and NPFA have an identical direction which has upward movement in the first-two period then it goes down and tends to move similar roughly near to zero line. For NPRT, a rise of bad loan percentage exists in the first-two period and mostly it is stable to move slightly above zero line. The most dynamic response is NPR that experiences a rise in the one to two early periods and then it decreases significantly until slightly below zero line then it constantly moves in the same direction. The difference of fluctuation as well as the movement of the direction depicts the different reactions before and during the Covid-19 pandemic in terms of the rate of the bad loans in Islamic banks' home financing.

Furthermore, the result for Variance Decompositions (VDs) is highlighted in Table 5. VDs shed light on how the independent variables affect the value of dependent variables along the observation period in the short-run (Mohd. Yusof & Bahlous, 2013). Based on Table 5, it is separate among observation periods which consists of all periods, before the Covid-19 period and during the Covid-19 period. In all periods and before the Covid-19 period, the influence of inflation to home financing value in all models is roughly similar. In model 1, either all periods or before the Covid-19 period, the influence of inflation to NPREU score is less than 0.2%. The influence of inflation to NPRT in the model 2 is almost the same for the two observation periods which are the value near to zero. In model 3, the highest inflation rate influence to NPFA is 0.113% in the period of 10 in all period groups, while in the group of before the Covid-19 period, the highest value is 0.037% and it can be seen in the period of 10. Lastly in model 4, the average influence of inflation to NPR is around 0.5% in all periods and 0.4% before the Covid-19 period.

The influence of inflation during the Covid-19 pandemic is higher than that in the other periods. Generally, in all models, inflation almost has zero influence in the 1st period. In model 1, inflation has the highest effect on period 4 reaching 0.16% of NPREU then it tends to fall for the rest of the period and finally the score of influence becomes 0.145% in the period of 10. NPRT has the highest influence from inflation that is able to deduct the value of NPRT by more than 1% in almost all period of time. The highest value is in the 2nd period that attains 1.3%. Furthermore, in model 3, the influence of inflation to NPFA reaches its peak in the 2nd period which is 0.44% and it ends in the 10th period that is only 0.233%. Finally, for model 4, inflation is able to deduct the NPR value which is almost 1.5% in the 2nd period but the downward trend of the influence appears in the next period.

Table 5. The Results of VDs

All Period												
Period	Model 1			Model 2			Model 3			Model 4		
	S.E	NPREU	INF	S.E	NPRT	INF	S.E	NPFA	INF	S.E	NPR	INF
1	0.104059	100	0	0.0215	100	0	0.1082	100	0	0.054685	100	0
2	0.115901	99.4894	0.1332	0.0239	99.9317	0	0.1106	99.9416	0.005	0.059235	99.9109	0.065
3	0.122652	99.4844	0.1195	0.0264	99.90724	0	0.112	99.7267	0.07	0.063297	99.708	0.241
4	0.125633	99.4859	0.1139	0.0278	99.86989	0	0.1123	99.5309	0.094	0.064979	99.5589	0.346
5	0.127132	99.4412	0.112	0.0287	99.80767	0	0.1124	99.3376	0.104	0.065979	99.432	0.415
6	0.127889	99.3851	0.1116	0.0293	99.73066	0	0.1125	99.1565	0.109	0.066504	99.3239	0.455
7	0.128296	99.3091	0.112	0.0298	99.63414	0	0.1126	98.9873	0.111	0.066805	99.2243	0.479
8	0.12853	99.2237	0.1127	0.0301	99.52306	0	0.1127	98.8304	0.112	0.06698	99.1299	0.493
9	0.128681	99.1317	0.1135	0.0303	99.39825	0	0.1128	98.6851	0.112	0.067088	99.0388	0.501
10	0.128789	99.037	0.1143	0.0305	99.26251	0	0.1129	98.5507	0.113	0.067159	98.9505	0.506

Before Covid-19												
Period	Model 1			Model 2			Model 3			Model 4		
	S.E	NPREU	INF	S.E	NPRT	INF	S.E	NPFA	INF	S.E	NPR	INF
1	0.106296	100	0	0.0227	100	0	0.1146	100	0	0.057816	100	0
2	0.118741	99.4984	0.1374	0.0252	99.92534	0	0.1168	99.9303	0.008	0.062096	99.9004	0.075
3	0.124851	99.4762	0.1339	0.0278	99.8844	0	0.118	99.7543	0.027	0.065656	99.7025	0.245
4	0.127392	99.4678	0.1303	0.0291	99.84051	0	0.1183	99.5688	0.034	0.066993	99.5641	0.341
5	0.128567	99.411	0.1282	0.0301	99.76574	0	0.1184	99.3814	0.036	0.067725	99.451	0.398
6	0.129125	99.3399	0.1271	0.0307	99.67673	0	0.1185	99.203	0.037	0.068078	99.3566	0.427
7	0.129415	99.2493	0.1265	0.0312	99.56541	0	0.1186	99.0364	0.037	0.068268	99.2702	0.443
8	0.129585	99.1503	0.1262	0.0315	99.43829	0	0.1187	98.882	0.037	0.068374	99.1887	0.451
9	0.129701	99.0463	0.1261	0.0317	99.29594	0	0.1188	98.7396	0.037	0.068439	99.1103	0.455
10	0.129792	98.9415	0.126	0.0318	99.14176	0	0.1189	98.6082	0.037	0.068483	99.0349	0.457

During Covid-19												
Period	Model 1			Model 2			Model 3			Model 4		
	S.E	NPREU	INF	S.E	NPRT	INF	S.E	NPFA	INF	S.E	NPR	INF
1	0.094195	100	0	0.0077	100	0	0.0386	100	0	0.01198	100	0
2	0.100064	98.9362	0.203	0.0093	98.39659	1.3	0.0446	99.4121	0.442	0.017021	98.0956	1.463
3	0.114096	98.9579	0.1563	0.0106	98.44215	1.2	0.0499	99.5128	0.353	0.020268	97.912	1.046
4	0.119351	98.8227	0.1655	0.0116	98.3174	1.1	0.0534	99.557	0.309	0.022799	97.6838	0.879
5	0.12502	98.7944	0.1543	0.0125	98.20833	1.1	0.0559	99.5854	0.281	0.024861	97.5432	0.776
6	0.128433	98.7608	0.1536	0.0131	98.02998	1.1	0.0578	99.602	0.263	0.026568	97.434	0.701
7	0.131338	98.7372	0.1498	0.0137	97.83379	1.1	0.0592	99.6111	0.251	0.028003	97.3293	0.65
8	0.133404	98.7164	0.1481	0.0142	97.60529	1	0.0602	99.6149	0.243	0.029226	97.2239	0.615
9	0.135051	98.694	0.1462	0.0146	97.35449	1	0.061	99.6145	0.237	0.030278	97.1166	0.59
10	0.1363	98.6708	0.1448	0.0149	97.07933	1.1	0.0616	99.6109	0.233	0.031191	97.0059	0.571

Conclusion

The Covid-19 pandemic has disrupted the global economy at an unprecedented scale. As the macroeconomic indicators have been hit on account of low business activity, it becomes more challenging for the society to fulfill their basic necessity including the housing needs. As depicted in this study, in general there is a bigger impact of inflation toward bad loans during the Covid-19 pandemic, compared to that in the other periods. Further, it is interesting to note the distinct impact of inflation to the Islamic bank's home financing based on its specific purposes. Prior to this pandemic, inflation has positive and significant influence to non-performing financing in real estate, rental business, and company service (NPREU). However, during the Covid-19 pandemic, inflation no longer has an influence to NPREU and even reflects a shift of influence from business purposes to personal ownership. Inflation is found to have a significant and positive impact toward bad loan of home financing for personal flat and apartment ownership.

Considering the fact that this pandemic has forced millions of people lost their job and hence significantly reduced the income of many households, it would be very hard for them to pay for the home loan. Therefore, this result could trigger the government to provide financial assistance for those people affected by the Covid-19 crisis. In addition to that, Islamic bank is also expected to give financing allowances for them by giving an option of debt restructuration and rescheduling. In addition to that, inflation is also found to have a significant and negative impact to bad loans for personal business shop ownership (NPR). It can be justified with the fact that

during pandemic there is a monthly financial injection given by the government to the personal business categorized as Micro, Small, and Medium Enterprises (MSMEs). It is a good signal for the government that their program is effective enough to cater the bad home financing for personal business, thus the program is recommended to be continued. For future research, this paper recommends to extend the current study by examining other financing sectors affected by the Covid-19 pandemic. Hence, the effect of macroeconomic variables on Islamic bank's financing during the Covid-19 pandemic can be comprehensively informed in order to formulate an effective strategy to tackle the Covid-19 effect on our economy.

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