



Sale-Based vs Leased Based Contracts in House Financing Default

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Abstract: This study examines the relationship between FTV and house financing default, as well as the short and long-term effects on housing and apartment defaults. It also examines the extent to which Islamic banks implement suitable contracts for housing and apartment defaults, whether sale-based or lease-based. The data used in this paper is monthly time series data from 2015 to 2021. The finding of this study shows that the FTV policy in small houses and apartments (22-70 m²) positively significantly influences the house financing default in sale-based and lease-based contracts in both short and long-term periods. Moreover, the FTV policy in leased-based contracts has a significant influence on the house financing default in a big house (>70 m²) in a short-term period.

Keywords: *Financing to Value, House Financing Default, Sale-Based, Leased-Based, and FTV.*

JEL Classification: *E58 and G51.*


Introduction

The 2008–2009 global financial crisis has made Indonesia's problems more complicated. The global financial crisis of 2008–2009 proved that stable prices and exchange rates were insufficient to support the financial and macroeconomic system as well as long-term economic growth. The global financial crisis of 2008–2009 shows that monetary policy guided by the Inflation Targeting Framework, which aims to maintain price stability, has not been entirely successful in preserving macroeconomic stability. The Inflation Targeting Framework has been successfully implemented in numerous nations, resulting in low inflation and strong economic growth. Long-term economic growth and stability resulted in rapid credit expansion, asset price bubbles, particularly in equities and housing, and high debt acceleration (Warjiyo & Juhro, 2017).

In Indonesia, a macroprudential policy has been implemented by Bank Indonesia. Bank Indonesia is a state institution having the authority to issue legal means of payment from a country, formulate and implement monetary policy, regulate and maintain the smoothness of the payment system, regulate and supervise banks, and perform functions as lenders of last resort (Qudraty & Suriani, 2017). The macroprudential policy seeks to reduce economic systemic risks, particularly in the banking sector. The Loan-to-Value or Financing-to-Value (LTV/FTV), the Macroprudential Intermediation Ratio (MIR) and Sharia Macroprudential Intermediation Ratio (Sharia MIR), the Macroprudential Liquidity Buffer (MPLB) and Sharia Macroprudential Liquidity Buffer (Sharia MPLB), and Short-term liquidity assistance are all examples of macroprudential policy instruments (bi.go.id)

As the country with the largest Muslim population in Indonesia, the development of Islamic banks is undeniable. Islamic banks are present to meet the aspirations of Muslims in driving economic and banking transactions based on Islamic law (Hassan & Aliyu, 2018). The Islamic financial system (IFS) is a different kind of financial system compared to the 'conventional' financial system which has been previously discussed, that comprises various Islamic financial institutions (IFIs) doing Islamic finance and providing Islamic financial services following Islamic teachings, especially they should be free from *ribā* (usury or interest), free from *maysir* (game of chance or speculation) and free from *gharar* (excessive uncertainty) (Rahmawati & Karim, 2018). The Islamic financial system also received a great deal of attention regarding its impact on financial stability. The proponents of Islamic finance believe that the Islamic financial system is theoretically and empirically proven to be more resilient in financial crisis than conventional counterparts. Small Islamic banks are more stable than small conventional

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banks, whereas large Islamic banks are less resilient than their conventional counterparts (Čihák & Hesse, 2010). However, this system is still not immune to financial crises and, to some extent, deviations from Shari'ah compliance can make the industry susceptible to instability and trigger bank failure (Zulkhibri & Manap, 2019).

Since the global financial crisis, macroprudential housing finance tools have been increasingly used to reduce the financial system vulnerability associated with housing market imbalances (Cahyono & Rani, 2019). Sustainable homeownership is widely (though not universally) regarded as a basis for tenure security and social stability, as well as an important goal of housing policy.¹ The 2008-2009 Global Financial Crisis (GFC) had a significant impact on the housing markets in many advanced economies and emerging economies (Albers, 2010; Case & Quigley, 2008; Kim & Renaud, 2009; and Sanders, 2008). A focus on credit risk is understandable since it was a key factor in the GFC (Kim & You, 2021).

Basically conventional and Islamic banks share similar mapping of risks with some variations that result from the differences underlying both banking models. Although the integration among risks has been emphasized for Islamic banks, the significance of this has also been recognized for conventional banks throughout the literature. The traditional banking activities in Islamic banks represented in the main financing modes such as *murabaha* clearly incorporate the integration of risks.

Islamic banking operations might be less risky than their conventional counterparts. Added to that is the ability of Islamic banks, based on PLS contracts, to transfer risks to investment deposit holders who share in a bank's profits or losses, providing another layer of protection in addition to capital (Čihák & Hesse, 2010).

As a macroprudential policy tool, financing to value encourages a well-balanced and high-quality bank intermediation role to support national economic growth while preserving the stability of the financial system. FTV policy is a countercyclical macroprudential policy tool that can be modified to reflect changes in the financial and economic environment. This study examines the relationship between FTV and house financing default, as well as the short- and long-term effects on housing and apartment defaults. It also examines the extent to which Islamic banks implement suitable contracts for housing and apartment defaults, whether sale-based or lease-based.

As a macroprudential policy tool, financing to value encourages a well-balanced and high-quality bank intermediation role to support national economic growth while preserving the stability of the financial system. FTV policy is a countercyclical macroprudential policy tool that can be modified to reflect changes in the financial and economic environment. This study examines the relationship between FTV and house financing default, as well as the short- and long-term effects on housing and apartment defaults. It also examines the extent to which Islamic banks implement suitable contracts for housing and apartment defaults, whether sale-based or lease-based. This study differs from the previous research. This study evaluates the short-term and long-term impact of the FTV policy based on the sale and lease contracts in Islamic banks depending on the square meters of houses and apartments.

Literature Review

Islamic Macropudential Policy

The Issue of macroprudential policy has been more popular in Indonesia after the global financial crisis in 2008. As Mentioned by Bank Indonesia (2015), generally, macroprudential policy leads to more overall analysis on the financial system rather than individual financial institution. (Dahlan Ji Ringroad Selatan et al., 2018). In the meantime, Bank Indonesia (2014) released PBI No. 16/11/PBI/2014 concerning "Pengaturan dan Pengawasan Makropudential" which aims to (i) prevent and reduce the systemic risk, (ii) promote the balanced and qualified intermediation function, (iii) enhance financial system efficiency and financial accesibility. (Rahmawati & Karim, n.d.)

Bank Indonesia conducts macroprudential supervision through financial system surveillance as well as inspections of banks and other institutions with interconnectedness to banks as required. Surveillance begins with monitoring financial system developments to the identification, analysis and evaluation of risk. In practice, banks are required to provide and submit data and information as required and are held accountable for the accuracy of the data and information submitted. Macropudential policy instruments in Indonesia has four instruments as follows:

Countercyclical Capital Buffer (CCyB)

The Countercyclical Capital Buffer (CCyB) functions as an additional buffer to anticipate losses caused by excessive credit growth with the potential to disrupt financial system stability. The additional capital buffer that must be maintained by banks during an expansionary period may be used when the banks experience pressures during an economic contraction, thus maintaining continuity of the bank intermediation function. The CCyB is dynamic within a 0-2.5% range of risk-weighted assets (RWA) in the banking industry. Therefore, Bank Indonesia evaluates the level of CCyB no less than once every six months.

In general, Bank Indonesia will increase the CCyB during an economic boom and decrease the level during an economic contraction. CCyB policy is inextricably linked to bank capital regulations issued by the Indonesian Financial Services Authority (OJK) and is expected to strengthen the resilience of the banking industry.

Loan to Value/Financing to Value

The Loan-to-Value or Financing-to-Value (LTV/FTV) Ratio is the ratio of the value of the loan/financing disbursed by a Conventional or Islamic Commercial Bank against the value of collateral in the form of property when the loan is originated based on the latest evaluation. On the other hand, a downpayment on an automotive loan/financing is the initial payment as a percentage of the value of the motor vehicle paid by the borrower or customer. Recently, rising property prices have become a growing risk faced in the financial system. One goal of LTV/FTV policy is to maintain financial system stability and mitigate systemic risk stemming from higher property prices. In addition, LTV/FTV policy is also a macroprudential instrument used to stimulate a balanced and quality bank intermediation function in order to support national economic growth while maintaining financial system stability. LTV/FTV policy is a countercyclical macroprudential policy instrument that can be adjusted to changes in economic and financial conditions.

Macroprudential Intermediation Ratio (MIR)

(Sharia) MIR policy accommodates diverse forms of bank intermediation by including bank investment in securities. Furthermore, (sharia) MIR policy also promotes the creation of a balanced and quality intermediation function, thus preventing and reducing risk and procyclical behaviour in the banking industry. This macroprudential policy instrument is countercyclical and can be adjusted in line with changes in economic and financial conditions. The (sharia) MIR Giro is the balance of the rupiah demand deposit at Bank Indonesia that must be maintained by conventional commercial banks, Islamic banks and Islamic business units to meet the (sharia) MIR.

Macroprudential Liquidity Buffer (MPLB)

The Macroprudential Liquidity Buffer (MPLB) and Sharia Macroprudential Liquidity Buffer (Sharia MPLB) are minimum liquidity reserves denominated in rupiah that must be maintained by conventional commercial banks and Islamic banks in the form of rupiah securities that can be used for monetary operations, the level of which is set by Bank Indonesia as a percentage of rupiah deposits.

The (sharia) MPLB is flexible, meaning that under certain conditions rupiah securities may be transacted through repurchase agreements (repo) with Bank Indonesia in terms of Open Market Operations as a percentage of rupiah deposits at the conventional commercial bank or Islamic bank. This macroprudential policy instrument is countercyclical and can be adjusted in line with changes in economic and financial conditions.

(Sharia) MPLB policy is expected to overcome procyclical liquidity issues as a liquidity-based macroprudential instrument applicable to all banks. MPLB must be met by all Conventional Commercial Banks and Islamic Business Units, while the sharia MPLB is only applicable to Islamic banks.

Short-Term Liquidity Assistance (PLJP)

Short-term liquidity assistance (PLJP) is provided by Bank Indonesia to the banking industry in order to overcome short-term liquidity difficulties. Meanwhile, sharia short-term liquidity assistance (PLJPS) is sharia-compliant financing provided by Bank Indonesia to Islamic banks experiencing short-term liquidity difficulties. Short-term liquidity difficulties are a condition experienced by a bank when fund inflows are insufficient compared to fund outflows denominated in rupiah, thus leaving the bank unable to meet minimum reserve requirements.

The Loan-to-Value or Financing-to-Value (LTV/FTV) in Indonesia

In order to grow bank credit and funding and preserve the stability of the financial system, Bank Indonesia will keep up its lax macroprudential policy in 2022. The loose macroprudential policy is implemented by offering incentives to banks that provide inclusive financing and/or credit/financing to priority sectors, as well as to banks that meet the RPIM objective, by reducing the daily reserve requirement by up to 100 bps, starting on March 1, 2022. Policy of macroprudence Loosening is also accomplished through the re-establishment of a low CCyB Ratio, flexibility in meeting the PLM ratio via repo to Bank Indonesia, and the FLTV/LTV KPR/KPA ratio of 100% and KKB down payment of 0% for banks that meet the low NPL/NPF criteria, which will be valid until the end of December 2022. (Indonesian Economic Report, 2021)

FTV is the ratio between the value of financing that can be provided by Islamic banks against the collateral value of the property at the time of the provision of financing by the price of the last assessment (Bank Indonesia Regulation No. 17/10/PBI/2015, 2015). This policy set the magnitude of the amount of credit that can be disbursed by banks to customers with a decrease or increase in payment (downpayment) (Budiyanti, 2015).

Table 1. FTV Ratios in the Model

Type of properties	Type of Contracts	Finance to Value Policy	
		Type 22-70m ²	Type >70m ²
House	Sale-based financing (<i>murabahah</i> and <i>Istishna</i>)	FTV_22-70_MB2	FTV_70_MB2
	leased-based financing (<i>MMQ</i> and <i>IMBT</i>)	FTV_22-70_MMQ2	FTV_70_MMQ2
Apartment	Sale-based financing (<i>murabahah</i> and <i>Istishna</i>)	FTVAPART_22-70_MB2	FTVAPART_70_MB2
	Leased-based financing (<i>MMQ</i> and <i>IMBT</i>)	FTVAPART_22-70_MB2	FTVAPART_70_MB2

Research Methods

Data

The objective of this paper is to analyze the effectiveness of finance to value policy in house financing default in Islamic Banks in Indonesia. The data used in this paper is monthly time series data from 2015 to 2021. The data is gathered from the bank Indonesia website (www.bi.go.id) and the financial services authority (OJK) (www.ojk.go.id). The independent variable in this paper is house financing default in Islamic Banks in Indonesia (NPFHOME). Meanwhile, we use four datasets for finance to value (FTV) as the Islamic macroprudential policy since the Bank Indonesia set different FTV policies based on the Islamic bank's contracts and the square meters of home financing. Hence, the FTV ratio is proposed by [Indrawan et al. \(2020\)](#) where not all the FTV ratios are used in this paper, we use only the second facilities based on the sale-based financing (*murabahah* and *istishna*) and leased-based financing (*musyarqah mutanaqisah* and *Ijarah Muntahiyah Bittamlik*) and based on the square meters home financing. Moreover, the Islamic bank characteristics are included in this study such as capital adequacy ratio (CAR), return on asset (ROA), finance to deposit ratio (FDR), and operational expenses to operational income (BOPO), while the macroeconomic variables including the interest rate and inflation are set in the model. For further use FTV ratios and detail variables can be seen in [Table 1](#) and [Table 2](#).

Table 2. Variables Explanation

Variables	Formula	Explanation
<i>Dependent Variable</i>		
NPFHOME	Total house financing default total house financing × 100	Percentage
<i>Independent Variables</i>		
FTV_22-70_MB2	The second financing facility in sale-based contracts for 22-70 square meters house	Percentage
FTV_70_MB2	The second financing facility in sale-based contracts for >70 square meters house	Percentage
FTV_22-70_MMQ2	The second financing facility in lease-based contracts for 22-70 square meters house	Percentage
FTV_70_MMQ2	The second financing facility in sale-based contracts for >70 square meters house	Percentage
FTVAPART_22-70_MB2	The second financing facility in sale-based contracts for 22-70 square meters apartment	Percentage
FTVAPART_70_MB2	The Second financing facility in sale-based contracts for >70 square meters apartment	Percentage
FTVAPART_22-70_MMQ2	The Second financing facility in leased-based contracts for 22-70 square meters apartment	Percentage
FTVAPART_70_MMQ2	The Second financing facility in leased-based contracts for >70 square meters apartment	Percentage
<i>Islamic Banks Characteristic</i>		
CAR	Capital risk-weighted asset × 100%	Percentage
ROA	Net income before tax total asset × 100%	Percentage
FDR	Total financing to the third party non-bank third party fund × 100%	Percentage
BOPO	Operational expense operational income × 100%	Percentage
<i>Macro Variables</i>		
BIRATE	Bank Indonesia 7 days interest rate	Percentage
INF	Monthly inflation	Percentage

Empirical Model

In this study Vector Error Correction Model (VECM) is used to analyze the data. However, VECM is a part of the Vector Autoregressive Regression (VAR) model, even though, the VAR model is restricted only to stationary data. However, the non-stationary data will analyze in the VECM model. Generating VECM has several steps, it begins with the unit root test then followed by the lag length selection, after that, the cointegration test, and VAR estimation are finally tested. Moreover, the model of this study is proposed by (Qoyum & Fauziyyah, 2018; Akbar & Wibowo, 2021) with the adjustment of the variable. However, due to the multicollinearity issue between the sale-based and leased-based FTV policy, in this paper, we develop the VECM into four models. The VECM equations are as follows:

$$NPFHOME_t = a + b_1 NPFHOME_{t-1} + b_2 DFTVMB_{t-1} + b_4 DCAR_{t-1} + b_5 DROA_{t-1} + b_6 DFDR_{t-1} + b_7 DBOPO_{t-1} + b_8 DBIRATE_{t-1} + b_9 DINF_{t-1} + E_t \quad (1)$$

$$NPFHOME_t = a + b_1 NPFHOME_{t-1} + b_3 DFTVMMQ_{t-1} + b_4 DCAR_{t-1} + b_5 DROA_{t-1} + b_6 DFDR_{t-1} + b_7 DBOPO_{t-1} + b_8 DBIRATE_{t-1} + b_9 DINF_{t-1} + E_t \quad (2)$$

$$NPFHOME_t = a + b_1 NPFHOME_{t-1} + b_3 DFTVAPART_MB_{t-1} + b_4 DCAR_{t-1} + b_5 DROA_{t-1} + b_6 DFDR_{t-1} + b_7 DBOPO_{t-1} + b_8 DBIRATE_{t-1} + b_9 DINF_{t-1} + E_t \quad (3)$$

$$NPFHOME_t = a + b_1 NPFHOME_{t-1} + b_3 DFTVAPART_MMQ_{t-1} + b_4 DCAR_{t-1} + b_5 DROA_{t-1} + b_6 DFDR_{t-1} + b_7 DBOPO_{t-1} + b_8 DBIRATE_{t-1} + b_9 DINF_{t-1} + E_t \quad (4)$$

Where $NPFHOME_{t-1}$ is the house financing default, $DFTVMB_{t-1}$ is a vector of the second facility in a sale-based contract with the 22-70 and > 70-meter square home. Meanwhile, $DFTVMMQ_{t-1}$ is a vector of the second facility in a leased-based contract with 22-70 and > 70-meter square homes. Meanwhile, $DFTVAPART_MB_{t-1}$ is a vector of the second facility in the sale-based contract with the 22-70 and >70-meter square apartments. $DFTVAPART_MMQ_{t-1}$ is a vector of the second facility in a leased-based contract with the 22-70 and >70-meter square apartments. Moreover, the Islamic bank characteristic is represented by $DCAR_{t-1}$ for capital adequacy ratio, $DROA_{t-1}$ for return on assets, $DFDR_{t-1}$ for finance to deposit ratio, and $DBOPO_{t-1}$ for the operational expenses to operational income. Furthermore, $DBIRATE_{t-1}$ and $DINF_{t-1}$ describe the macro variables of Bank Indonesia 7 days interest rate and inflation.

Results and Discussion

Result

The Vector Error Correction Model (VECM) has several steps to be measured, the first step of the VECM model is the unit root test, the VECM uses the first difference of the unit root test data. Augmented Dickey-Fuller and Philip Perron are used to measure the unit root test. The result of the unit root test is described in [Table 3](#).

Table 3. Unit Root Test

Variables	ADF		PP	
	level	1 st difference	level	1 st difference
NPFHOME	0.4275	0.0001***	0.4938	0.0001***
FTV_22-70_MB2	0.8127	0.0000***	0.8213	0.0000***
FTV_70_MB2	0.5470	0.0000***	0.5543	0.0000***
FTV_22-70_MMQ2	0.2730	0.0000***	0.2742	0.0000***
FTV_70_MMQ2	0.2730	0.0000***	0.2742	0.0000***
FTVAPART_22-70_MB2	0.8127	0.0000***	0.8213	0.0000***
FTVAPART_70_MB2	0.5470	0.0000***	0.5543	0.0000***
FTVAPART_22-70_MMQ2	0.8127	0.0000***	0.8213	0.0000***
FTVAPART_70_MMQ2	0.2730	0.0000***	0.2742	0.0000***
CAR	0.9544	0.0000***	0.9613	0.0000***
ROA	0.4694	0.0001***	0.4893	0.0001***
FDR	0.9114	0.0001***	0.9603	0.0001***
BOPO	0.7521	0.0000***	0.7694	0.0000***
BIRATE	0.8901	0.0000***	0.9210	0.0000***
INF	0.3287	0.0000***	0.0000***	0.0001***

Significance level at 1% ***, 5% **, 10% *

[Table 3](#) describes the unit root test. The Augmented Dickey-Fuller (ADF) test reveals that all the variables are stationary at the first difference level, while, the Philip Perron test (PP) shows that all the variables have stationary at the first difference but INF (inflation). Inflation (INF) has stationary at the level and first difference. After the unit root test, we test the lag length criteria, the test explains the lag that is used in the VECM model later. The lag length criteria are measured by several tests which are Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), Final Prediction Error (FPE), and Hannan-Quinn Information Criterion (HQ). The best lag chosen in the model is described by the sign * in each measure.

[Table 4](#) shows that in [Equations 1, 2, and 3](#), according to the result of Final Prediction Error (FPE), Schwarz Information Criterion (SIC), and Hannan-Quinn Information Criterion (HQ), the best lag chosen in the model is lag one, while according to Akaike Information Criterion (AIC), the best lag chosen is lag seven. Meanwhile, the equation 4, the best lag chosen in the model is lag seven, according to Final Prediction Error (FPE), Hannan-Quinn Information Criterion (HQ), and Akaike Information Criterion (AIC), while the Schwarz Information Criterion (SIC) chose the lag one as the best lag chosen in the model. However, in this model, the lag chosen is lag one in all the equations. The next VECM

step is the cointegration test. The VECM test is required to be cointegrated into all variables. If the variables are not cointegrated, the VAR model will be used. Moreover, the cointegration test will be measured by the value of the Johansen Cointegration Test. The variables are cointegrated when the probability of the Johansen value is less than 0,05 ($>0,05$). For further cointegration results of all variables are in [Table 5](#).

Table 4. Lag Length Criteria

	Lag	LogL	FPE	AIC	SIC	HQ
<i>Equation 1</i>						
	1	406.1235	2.23e-15*	-8.211000	-5.471487*	-7.115219*
	2	482.5512	2.72e-15	-8.092238	-2.887163	-6.010254
	3	530.9697	7.89e-15	-7.245966	0.424670	-4.177779
	4	618.0927	1.07e-14	-7.405006	2.731192	-3.350616
	5	715.8578	1.66e-14	-7.840463	4.761296	-2.799870
	6	866.8185	1.36e-14	-9.657623	5.409698	-3.630827
	7	1115.621	4.37e-15	-14.01613*	3.516748	-7.003135
<i>Equation 2</i>						
	0	-392.3767	4.54e-06	10.39940	10.64291	10.49680
	1	53.67386	2.24e-10*	0.476004	2.667614*	1.352628*
	2	118.6969	2.30e-10	0.449430	4.589138	2.105277
	3	160.5193	4.68e-10	1.025473	7.113279	3.460542
	4	229.1283	5.48e-10	0.905758	8.941662	4.120049
	5	301.7768	7.26e-10	0.681122	10.66512	4.674635
	6	386.6016	1.01e-09	0.140218	12.07232	4.912954
	7	522.8181	7.10e-10	-1.735534*	12.14466	3.816423
<i>Equation 3</i>						
	0	-92.18546	1.12e-10	2.628194	2.902145	2.737772
	1	406.1235	2.23e-15*	-8.211000	-5.471487*	-7.115219*
	2	482.5512	2.72e-15	-8.092238	-2.887163	-6.010254
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	7	1115.621	4.37e-15	-14.01613*	3.516748	-7.003135
<i>Equation 4</i>						
	0	-136.3818	3.53e-10	3.776150	4.050101	3.885728
	1	361.5543	7.08e-15	-7.053358	-4.313846*	-5.957577
	2	446.7811	6.88e-15	-7.163145	-1.958070	-5.081161
	3	496.8009	1.92e-14	-6.358466	1.312170	-3.290279
	4	586.3535	2.44e-14	-6.580611	3.555587	-2.526221
	5	698.0527	2.63e-14	-7.377993	5.223766	-2.337401
	6	849.9284	2.11e-14	-9.218919	5.848402	-3.192123
	7	1130.622	2.96e-15*	-14.40576*	3.127125	-7.392758*

As mentioned in [Table 5](#), the result of the Johansen cointegration test shows that all the variables in all equations have cointegrated in the long-term period. This indicates that all the requirements of the VECM model are fulfilled and the VECM model is used to analyze the data. Finally, the short-term and long-term VECM model is analyzed. The detailed result is in the table below.

The table describes the short-term effect of the FTV policy on house financing default in Islamic Banks in Indonesia (see [Table 6](#)). The results show that the FTV policy in a small house (22-70 m²) positively significantly influences the house financing default in sale-based contracts (see [Eq. 1](#)). In contrast, the FTV policy in leased-based contracts has a significant influence on the house financing default in a big house (>70 m²) (see [Eq. 2](#)). This indicates that the increase in FTV policy will raise the house financing default in short term period in the sale based and leased based contract for 22-70 m² and >70 m² house. However, the FTV policy has insignificantly influenced the house financing default in sale-based and leased-based financing for the >70 m² and 22-70 m². Moreover, in apartment financing, the FTV policy has a significant influence positively on the sale-based and leased-based

contracts for 22-70 m² apartments, while it has an insignificant influence on both sale and leased-based contracts in apartment financing for >70 m². This indicates that the FTV policy will raise the apartment financing default for small apartments (22-70 m²) in the short-term period.

Table 5. Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
<i>Equation 1</i>				
None *	0.590402	203.3787	197.3709	0.0243**
At most 1	0.400787	131.0797	159.5297	0.5887
At most 2	0.262743	89.59652	125.6154	0.8745
<i>Equation 2</i>				
None *	0.573100	171.8829	159.5297	0.0089***
At most 1	0.332637	102.9352	125.6154	0.5085
At most 2	0.251964	70.17713	95.75366	0.7166
<i>Equation 3</i>				
None *	0.590402	203.3787	197.3709	0.0243**
At most 1	0.400787	131.0797	159.5297	0.5887
At most 2	0.262743	89.59652	125.6154	0.8745
<i>Equation 4</i>				
None *	0.594306	205.9620	197.3709	0.0174**
At most 1	0.405538	132.8873	159.5297	0.5382
At most 2	0.274715	90.75935	125.6154	0.8517

Significance level at 1%***, 5%***, 10%*

On the other hand, the Islamic bank's characteristics have similar results in different equations. The capital adequacy ratio (CAR) and return on asset (ROA) have negative and significant influences on the house financing default in [Equations 1, 3, and 4](#), while both have insignificant influence in [Equation 2](#). Moreover, the financing deposit ratio (FDR) has positive and significant influences on the house financing default in all equations (1,2,3, and 4). Even though, operational expenses to operating income ratio (BOPO) have an insignificant influence on house financing default in all equations. In contrast, the macroeconomic variables, Bank Indonesia 7 days repo rate (BIRATE) and inflation (INF) have a negatively significant influence on house financing default in all equations. This indicates that the characteristics of Islamic banks and macroeconomic variables play a critical role in reducing house financing default in Indonesia.

The table shows the long-term effect of the FTV policy on house financing default in Islamic Banks in Indonesia (see [Table 7](#)). the results reveal that the FTV policy has significant positive influences on house financing in both sale-based contracts for 22-70 m² houses and apartments. In contrast, the FTV policy has an insignificant influence on the house and apartment financing default in the sale-based contracts for the >70 m². Even though the FTV policy has a positive significant influence on the leased-based contracts in apartment financing for 22-70 m², for the >70m² apartment and houses, the FTV policy has an insignificant influence on house and apartment financing default.

On the other hand, the FTV policy has an insignificant influence in the long-term period on all Islamic Banks' characteristics such as CAR, ROA, FDR, and BOPO. Moreover, the FTV policy also has an insignificant influence on the macroeconomic variables such as bank Indonesia 7 days interest rate and inflation. This indicates that in a long-term period, the FTV policy as an Islamic macroprudential policy has a crucial role in house and apartment financing default, especially in sale-based contracts for small houses and apartments (22-70 m²). On the contrary, in leased-based contracts, the FTV policy plays important role in small apartments (22-70 m²) in the long-term period.

Table 6. Short-Term Effect

Variables	Equation 1	Equation 2	Equation 3	Equation 4
DFTV_22-70_MB (-1)	(53.1805) [3.60564] ***			
DFTV_70_MB (-1)	(32.0725) [-1.08057]			
DFTV_22-70_MMQ (-1)		(25.2404) [0.05160]		
DFTV_70_MMQ (-1)		(27.6599) [3.60190] ***		
DFTVAPART_22-70_MB (-1)			(39.1377) [3.34538] ***	
DFTVAPART_70_MB (-1)			(35.2584) [-1.46863]	
DFTVAPART_22-70_MMQ (-1)				-284.946 [4.65180] ***
DFTVAPART_70_MMQ (-1)				(25.2404) [0.05160]
D(CAR(-1))	(0.32744) [-2.25023] **	(0.62477) [-0.69849]	(0.32744) [-2.25023] **	(0.41721) [-2.03458] **
DROA (-1,)	(2.75652) [-3.31567] ***	(4.46822) [-0.76607]	(2.75652) [-3.31567] ***	-348.994 [-2.66014] ***
D(FDR(-1))	(0.16503) [1.91454] *	(0.31346) [3.37860] ***	(0.16503) [1.91454] *	(0.21034) [2.30177] **
D(BOPO(-1))	(0.34340) [-1.42793]	(0.59190) [0.59392]	(0.34340) [-1.42793]	(0.43620) [-1.01510]
D(BIRATE(-1))	(3.56143) [-1.81013] *	(6.75085) [-2.26677] **	(3.56143) [-1.81013] *	-452.069 [-1.92237] *
D(INFLASI(-1))	(0.58566) [-4.59762] ***	(1.11833) [-6.74437] ***	(0.58566) [-4.59762] ***	(0.74244) [-5.78717] ***

() indicates a standard error, [] indicates t-statistics
Significance level at 1%***, 5%** , 10%*

Discussion

This study aims to analyze the effectiveness of the FTV policy as an Islamic macroprudential policy on house financing default in Islamic banks in Indonesia. Moreover, this paper also assessed the short and long-term impact of the FTV policy on house financing default based on sale-based and leased-based contracts depending on the square meter house. The discussion starts with the short-term effect then followed by the long-term effect of the FTV policy on house financing default.

In the short-term period of house and apartment financing, the FTV policy affects the house and apartment financing default positively for small houses (22-70 m²) in both sale and leased-based contracts of financing. Moreover, for the big house (>70 m²), the FTV policy affects positively the house financing default only in leased-based financing. This indicates that the FTV policy, in general, increases the probability of default on house and apartment financing in Islamic banks. Even though the FTV policy negatively affected the sale-based contracts in house and apartment financing for the big house and apartment (>70 m²), however, it is insignificant. The results argue that the FTV policy in Islamic banks in Indonesia is not effective in the sale and lease-based financing for small houses and apartments. Perhaps, it is caused by the house financing borrowers who are classified as middle level or below categories who cannot fulfill their obligations to the Islamic banks in a short term period, where at the same time the FTV policy reduces the down payment facilities for borrowers to have house financing. The lower down payment requirement (increasing the FTV ratio) will raise the probability of default on small house and apartment financing in a short time.

Table 7. Long-Term Effect

Variables	Equation 1	Equation 2	Equation 3	Equation 4
DFTV_22-70_MB (-1),2)	(44.0944) [2.02956]**			
DFTV_70_MB (-1),2)	(32.0725) [-1.08057]			
DFTV_22-70_MMQ (-1),2)		(14.1306) [1.54171]		
DFTV_70_MMQ (-1),2)		(14.1306) [1.54171]		
DFTVAPART_22-70_MB (-1),2)			(44.0944) [2.02956]**	
DFTVAPART_70_MB (-1),2)			(32.0725) [-1.08057]	
DFTVAPART_22-70_MMQ (-1),2)				(-185.833) [2.20243]**
DFTVAPART_70_MMQ (-1),2)				(18.6633) [-0.27266]
D(CAR(-1),2)	(0.25655) [-0.58854]	(0.26564) [-0.49716]	(0.25655) [-0.58854]	(0.26441) [-0.55148]
DROA (-1),2)	(1.67816) [-1.65719]	(1.58984) [-0.91504]	(1.67816) [-1.65719]	(-164.248) [-1.64620]
D(FDR(-1),2)	(0.11681) [0.72441]	(0.13425) [0.32082]	(0.11681) [0.72441]	(0.12118) [0.42451]
D(BOPO(-1),2)	(0.22086) [-0.32299]	(0.21999) [-0.20334]	(0.22086) [-0.32299]	(0.21804) [-0.58002]
D(BIRATE(-1),2)	(2.97168) [-0.37345]	(3.16631) [-0.47617]	(2.97168) [-0.37345]	(-304.438) [-0.38978]
D(INFLASI(-1),2)	(0.51571) [-0.53801]	(0.61327) [-0.55036]	(0.51571) [-0.53801]	(0.54011) [-0.51413]

() indicates a standard error, [] indicates t-statistics

Significance level at 1%***, 5%** , 10%*

Moreover, following the risk in the sale and lease-based contracts, theoretically, sale-based contracts (*murabahah* and *istishna*) have a lower risk compared to leased-based contracts. The *ujroh* (the lease ratio for Islamic banks) in leased-based contracts which are sensitive to interest rate change makes the lease-based contracts have higher risk rather than sale-based contracts. The lease ratio is adjustable to the market sensitive (interest rate risk), even though Islamic Banks are an interest-free banking system, however, they use the interest rate as the benchmarking of the margin and *ujroh* (lease ratio) of financing. Inversely, the sale-based contract is less sensitive to the market risk (interest rate change) due to the margin that is taken by the Islamic Banks is only once, if the borrowers can pay the settlement before the due date period, the Islamic banks will give the discount of margin for the borrowers (Wahyudi et al., 2012; Akkizidis et al., 2008b; Akkizidis et al., 2008a). Thus, the combination between the unique risk of Islamic Banks and the existence of the FTV policy could reduce house and apartment defaults in Islamic banks (Ascarya et al., 2016).

Interestingly, the FTV policy almost successfully reduced the house and apartment default in Islamic Banks for the big house and apartment financing (>70 m²) in sale-based contracts in a short-term period, even though it is not significant (see table 4.4). The results assume that the borrowers are categorized as middle-level income or above and have a stable income to pay the settlement. Moreover, as mentioned before, sale-based financing has a lower risk and gives more advantages to borrowers if they fulfill the settlement before the due date. The borrower's characteristics and the financing characteristic are critical for busting house and apartment defaults in Islamic banks (Agnello et al., 2020). Targeting the large home, the economic condition of borrowers, and sale-based contracts can be considered for Islamic banks to enhance their financing. Hence, (Allen et al., 2020) argued that macroprudential policies such as LTV/FTV can reduce house financing default rather than income-based policies.

Moreover, Islamic banks' characteristics and macroeconomic variables such as CAR, ROA, interest rate (BIRATE), and inflation (INF) play a significant role in the house financing default shrinking. The results argue that the individual Bank's soundness helps the Islamic Banks to recover and absorb the credit lost, especially their capital adequacy. Certain macroeconomic conditions and the borrower's capability to pay the settlement become "the double triggered" for the house financing default (Gornicka & Valderrama, 2020).

Furthermore, in the long-term period, the results are similar where the FTV policy has a positive significant influence on the house and apartment financing default. Like the short-term period, the FTV policy increases the probability of default in a small house and apartment financing (22-70 m²) in the sale and lease-based contracts. This indicates that the lower down payment rate (increases the FTV ratio) is used by the unstable income borrower to take the long period of house and apartment financing. Bian et al., (2018) argued that house financing escalations are caused by the bargaining power of sellers and the product of financing in financial institutions including Islamic Banks. This condition worsens the scenario that the FTV policy should reduce credit loss, but the opposite occurs (Gornicka & Valderrama, 2020). Hence, the higher credit risk in house and apartment financing raises the price of houses and apartments (Su et al., 2021). In contrast, the individual bank's soundness and macroeconomic variables are insignificant in the long-term period.

The paper has several implications, the first, for the authorities the results suggest that Bank Indonesia as bank central must consider the different ratios of each type of the FTV policy based on the square meter houses and based on the contracts (sale-based or lease-based). Especially, the FTV policy for small houses (22-70 m²) in sale-based contracts, the ratio should be lower than for big houses (>70 m²). According to Akbar and Wibowo (2021), macroprudential policy positively stimulates house credit growth. however, the trade-off seems undeniable if the FTV ratio decreases the borrower will hardly be afford to buy a house, on the other side, it gives the Islamic banks a guarantee that the borrower who is selected is consequently responsible for the settlement. Thus, selecting the appropriate FTV policy ratio to mitigate the house and apartment financing default in Islamic Banks is necessary. Moreover, authorities must consider the country's characteristics and financial system used, whether a dual banking system or a single banking system, in developing the FTV/LTV policy.

Second, for the Islamic Banks, the results suggest that considering the appropriate contracts (sale-based or lease-based) for a specified period of house financing is crucial since the longer period of financing holds the higher credit risk. Applying prudential banking is necessary to maintain lower financing default, capital adequacy must be highlighted by the Islamic banks to absorb credit loss. Strengthening the credit analysis of house financing for the small house (22-70 m²) is critical to assure the borrower can fulfill the settlement, particularly when the FTV ratio is increasing. Moreover, controlling the risk-taking behavior of Islamic banks is necessary when the macroprudential policy is low and vice versa (Zhang et al., 2018).

Third, for academicians, the findings can fill the gap in the literature on Islamic macroprudential policy in house financing default in the dual banking system, particularly in developing countries. Myriad studies have been conducted related to Islamic macroprudential policy in house financing default, however, the papers focus only on the impact of macroprudential policy on house financing defaults which in this paper discusses not only the impact of the FTV policy on the house financing default but also deeply discussed the unique risk of Islamic banks in their contracts for house financing. However, the paper has several limitations such as limiting the data to time series data only which cannot evaluate at the Islamic banks level. The country-specific sample is used (Indonesia case study), thus, the cross-country sample must be conducted to gain comprehensive results. The use of other tools of analysis can enhance the results in the next research.

Conclusion

The study aims to analyze the effectiveness of the FTV policy in house and apartment financing defaults in Islamic Banks in Indonesia. This study evaluates the short-term and long-term impact of the FTV policy based on the sale and lease contracts in Islamic banks depending on the square meters of houses and apartments. Moreover, the unique risk of Islamic banks in house financing contracts is also discussed in this paper.

The results show that the FTV policy in small houses and apartments (22-70 m²) positively significantly influences the house financing default in sale-based and lease-based contracts in both short and long-term periods. Moreover, the FTV policy in leased-based contracts has a significant influence on the house financing default in a big house (>70 m²) in a short-term period. On the other hand, the Islamic Banks' characteristics and macroeconomic variables such as CAR, ROA, BOPO, interest rate, and inflation influence negatively the house and apartment financing default in the short-term effect, while in the long-term has influenced insignificantly. In contrast, the finance-to-deposit ratio (FDR) has influenced insignificantly both in the short and long-term periods.

However, the paper has several limitations such as limiting the data to time series data only which cannot evaluate at the Islamic banks level. The country-specific sample is used (Indonesia case study), thus, the cross-country sample must be conducted to gain comprehensive results. The use of other tools of analysis can enhance the results in the next research.

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