Research Article

The Influence of Inflation, Exchange Rate, BI Rate, and Economic Growth on Mortgage Volume (KPR) in the Covid-19 Era

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Abstract.
The financial technology industry is one of the most consequential sectors influencing various countries' economies. Fintech has great potential and can bring in many opportunities for developing MSMEs, especially in Indonesia. Since the beginning of 2020 the Covid-19 pandemic has affected the Fintech industry, which has started to be cultivated by the MSME sector, especially in Malang. The present study aims to determine the impact before and after the COVID-19 pandemic on the development of the financial technology industry in MSMEs in Malang City using the critical thinking review model. This research uses primary data from 151 MSMEs in Malang City. The results of this study show that 73% of MSMEs in Malang City did not use Fintech accounts before the COVID-19 pandemic. However, since the pandemic, 98% of MSMEs in Malang City have used the fintech platform in their product payment activities. Therefore, there are positive implications due to the pandemic condition. In addition, the public has started using various fintech services, which leads to increasing financial literacy and indicates the growth of financial inclusion.

Keywords: industry financial technology, critical thinking model, MSME

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1. Introduction

People must meet their basic needs, namely clothing, food, and shelter. One of the needs that still need to be solved is boards or shelter. According to the Director General of Housing at the PUPR Ministry, the growth in the number of families is very high, around 700-800 thousand per year (Properti Indonesia, 2022). In addition, there is a housing backlog (lack of occupancy) based on the National Socioeconomic Survey in 2020 of 12.75 million housing units (Ministry of Administrative Reform, 2022). Therefore, the government is trying to increase access to livable housing for low-income people by subsidizing assistance through a Mortgage of 11 million (Ministry of Public Works and Public Housing, 2022).

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Mortgages (KPR) are a subsidy for home ownership financing. The government has provided a state budget of 2.6 trillion to support this program as a stimulus for the real sector (Ministry of Finance, 2021). Furthermore, the government chose the Bank Tabungan Negara (BTN) as the housing finance service provider to become the only bank focusing on the housing business (BTN, 2019). BTN is growing, and even the housing business has been adopted by other banks. Market strategy is needed by knowing future conditions through predictions of mortgage history data to win the market competition.

The development of KPR in Indonesia is increasing every year, along with population growth. It is evidenced in the table below:

TABLE 1: Development of KPR 2016-2018.

No	Year	KPR volume (billion rupiah)
1	2016	368,317
2	2017	410,135
3	2018	467,119

Source: Bank Indonesia, 2019

However, in 2019 the Covid-19 pandemic began to emerge, which affected economic conditions even globally. The impact caused by this phenomenon is a slowdown in Indonesia's economic growth in the second to fourth quarters of 2020 due to a decrease in people's purchasing power. In addition, based on Bank Indonesia's 2021 Residential Property Price Survey (SHPR) in the second quarter, property prices have increased and decreased demand (Setyaningsih, 2021). So the government must implement an economic recovery strategy. The effect of this recovery on KPR was an increase of around 3.02% or a value of 324.3 trillion. During the start of the Covid-19 pandemic, economic growth fell, while the number of mortgages slowed to only 2.3% (Indonesia Data, 2022).

In 2023, the government predicts terrible news, namely the 2023 recession, which will again affect economic activity. The 2023 recession is predicted to be more severe than the crisis in the Covid-19 pandemic, so it can worsen conditions with an increasingly stringent credit process so that credit applications slow down (Bandung City Public Relations, 2022). The condition may affect the number of mortgages in Indonesia, and the number of housing backlogs will increase proportionally to population growth and housing needs. Thus, research is needed to be conducted to find out the macro variables that can affect the volume of mortgages in Indonesia so that they can predict future mortgage conditions using data during the pandemic, namely 2019-2021.

As per the findings of Siravati (2018), Rombe et al. (2021), and Gunarti (2021), it has been suggested that the volume of mortgages can be impacted by several factors. Notably, interest rates, specifically the BI Rate, and inflation are believed to exert a negative influence, whereas economic growth is seen as having a positive effect on the number of mortgages. However, the research conducted by Djati et al. (2020) presents a contrasting viewpoint, asserting that economic growth, as measured by GDP, has a detrimental effect on mortgage numbers, while interest rates do not exhibit a significant impact. Furthermore, Rasyidah (2021) posits that inflation does not play a role in affecting credit.

In the work of Maharani & Setiawina (2017), certain variables are identified, suggesting that currency exchange rates have a notable and positive effect on credit. In contrast, another study conducted by Pratiwi and Hanafi (2019) suggests that exchange rates do not hold significant sway over the mortgage landscape within a given country.

2. Literatur Review

Mortgages (KPR) is a loan from a bank that focuses on buying houses from debtors with a credit scheme of up to a certain percentage of the total price of the house or its construction (Housing and Residential Areas, 2020). In addition, KPR can also facilitate home renovation (Hardjono, 2008:25). The types of mortgages that apply in Indonesia consist of two types, namely subsidized and non-subsidized mortgages (UMA Master of Law, 2022). The difference lies in market share. Subsidized KPR is specifically for low-income people and first homes, while Non-Subsidized KPR is for all people with an adequate income level.

As per Bank Indonesia (2020), inflation is characterized by a sustained rise in the prices of goods and services over a specific period. This upward price movement can occur universally across various goods or even trigger price hikes in other related products. Such inflationary conditions can stem from supply-side pressures, known as cost-push inflation, demand-side forces, referred to as demand-pull inflation, or inflation expectations. Cost-push inflation emerges when an economy faces a downturn, resulting in reduced production and subsequently driving up the prices of goods and services. Conversely, demand-pull inflation occurs when demand surpasses the capacity of supply, leading to an escalation in prices for goods and services. This type of inflation is often observed during significant holidays, such as Ramadan, Eid al-Fitr, and New Year.

The foreign exchange rate represents the valuation of one country's currency relative to another country's currency, determined by the equilibrium point between the supply and demand for both currencies (Abimanyu, 2004). Currency values are subject to fluctuations based on economic and socio-political conditions within a country and globally, causing them to appreciate or depreciate. Each country's central bank also possesses the authority to regulate currency exchange rates under specific circumstances to align with prevailing market values.

The BI Rate serves as the benchmark rate for setting interest rates for commercial banks, established on a monthly basis during the Board of Governors' Meeting. In accordance with Karl & Fair (2001), interest rates represent the percentage of interest payments made by borrowers over a one-year period on loans, calculated as the annual interest received divided by the loan amount.

A rise in the BI Rate corresponds to an increase in loan interest rates, whereas a decrease in the BI Rate leads to lower loan interest rates. Adjustments to the BI Rate are made to align with the economic growth conditions in Indonesia.

According to Jhingan (2000), economic growth denotes a country's ability to fulfill the economic needs of its society across various dimensions. Meanwhile, as outlined by Lincoln Arsyad in 1999, economic growth is characterized by an increase in Gross Domestic Product (GDP) or Gross National Product (GNP), excluding population growth considerations.

In 2016, Ali Ibrahim Hasyim defined economic growth as continuous improvement in a country's economic conditions, progressing positively over a specific timeframe. To achieve this, three essential components are required: a consistent increase in the supply of goods, advancements in technology to boost growth rates by enhancing the variety and quality of goods, and the adoption of appropriate technology aligned with institutional and ideological factors to stimulate innovation in science and technology for effective and efficient utilization.

Inflation and credit exhibit a direct relationship. Both phenomena are intertwined because when inflation rates rise, Bank Indonesia typically reduces interest rates, incentivizing individuals to borrow rather than save. This increased borrowing activity leads to higher spending and contributes to economic growth. Conversely, when inflation rates decrease, interest rates tend to rise, prompting individuals to prioritize savings over borrowing, resulting in a decrease in credit volume (Pustikom University of Bung Hatta, 2020). These findings align with the research findings of Pinto et al. (2020) and Husriah (2020), indicating that inflation has a positive impact on lending, leading to an increase in...

The first hypothesis posits the following:

H1 = Inflation has a positive impact on the volume of mortgage loans.

Drawing from Mankiw (2000), exchange rates can exert an influence on financing within a country. This influence stems from fluctuations in a country's currency value, which can impact the prices of various products, particularly those involving imports or raw materials sourced internationally. As the prices of goods within a country rise due to these currency fluctuations, they can affect decisions related to credit, including mortgages. This perspective aligns with the assertions of Rohman & Zulaikha (2019), Abdi (2018), and Maharani & Setiawina (2017), who argue that currency exchange rates have a significant positive effect on credit. However, it's worth noting that Pratiwi and Hanafi (2019) found no significant influence of exchange rates on KPR (mortgages) in a country.

The second hypothesis can be stated as follows:

H2 = Exchange rates have a positive impact on the volume of KPR (mortgages).The BI Rate can be used as a reference for making credit because the BI Rate can affect loan interest rates. On credit, the higher the interest rate, the greater the return on the loan that society has to pay. In addition, interest rates can reduce the amount of production and consumption. An example of a decreased amount of production is meant because of a decrease in the volume of credit; it could even be 0. As for the amount of consumption that has decreased, for example, people are experiencing a decrease in interest in buying houses or other properties (Tjoe et al., 2020). This statement is supported by research from Astuti & Dewi (2017), Rombe et al. (2021), and Mariam (2021), which states that the BI Rate has a negative effect on KPR volume.

The third hypothesis is:

H3 = BI Rate has a negative effect on KPR volume

It is increasing economic growth (in this study taken based on GDP). A higher GDP indicates an increase in production output from the community. This condition can show that people's welfare is increasing. Based on Keynesian theory regarding the consumption function, public consumption will also increase if people's income increases—Vice versa. If income rises, there is a possibility that people will be interested in applying for credit. This condition is in line with research conducted by Siravati (2018), Rombe et al. (2021), Putra (2018), and Anastasia & Hidayat, 2019). Economic growth has a positive effect on the number of mortgages.

The fourth hypothesis is:

H4 = Economic Growth has a positive effect on KPR volume

3. Method

This research falls under the category of quantitative research, which involves the utilization of numerical data to derive conclusions. The primary focus of this study is to investigate the impact of several factors, namely the inflation rate, exchange rate, BI rate, and economic growth, on mortgages across Indonesia over a 36-month period. The selection of this timeframe is based on the presence of critical phenomena that influenced societal purchasing decisions, specifically the periods before Covid-19, during the Covid-19 pandemic, and after its occurrence.

The research population comprises mortgage data from all banks spanning the years 2019 to 2021, covering a duration of 36 months. The choice of this dataset is based on the year of the Covid-19 pandemic's onset until the most recent year it affected. The data collection method employed in this study is non-probability sampling, specifically saturated sampling, as it encompasses a finite population. The sample size consists of data from 36 months, spanning the years 2019 to 2021.

The data utilized in this research is of a secondary nature, meaning it is obtained indirectly. The data sources are derived from reputable literature, including journals, institutions, and similar reliable sources. The research data is collected from the internet through trusted sources such as Bank Indonesia (BI), the Financial Services Authority (OJK), and the Central Statistics Agency (BPS). The collection methodology involves conducting a literature review to gather data and relevant information pertinent to the research objectives.

This study incorporates two types of variables: exogenous and endogenous variables. Exogenous variables are independent variables capable of influencing the dependent variable. Specifically, these variables are Inflation (X1), Exchange rate (X2), BI Rate (X3), and Economic Growth (X4). On the other hand, the endogenous variable in this study is KPR volume (Y), which is subject to influence by the independent variables.The variables used in this study are described as follows:

1. Independent Variable.

Independent variables, including:

a. Inflation

Inflation is a process of increasing prices continuously due to market mechanisms.

b. Exchange rate

The exchange rate is an agreement to pay two currencies in a country or region.

c. BI Rate

The BI Rate is a policy in determining the interest support level set by BI, which aims to support monetary policy in Indonesia.

d. Economic Growth

Economic growth is a change in a country's economic level but depends on the development of the population, usually measured by the Gross Domestic Product (GDP).

2. Dependent Variable

The dependent variable of this study is the number of KPR (Y). The number of mortgages is the level of demand for housing loans that occur in the community.

The technique used is Multiple Linear Regression. This technique determines the influence of more than one independent variable on the dependent variable. Advantage of this method is to explain the influence of variable independents to variable dependen. Disadvantage is just explain one way.

In this research, several stages were carried out to test the validity of this research data, namely:

1. Multicollinearity Test

2. Correlation Test

3. Heteroscedasticity Test

4. Normality test

Next, a hypothesis test was carried out to determine whether the hypothesis in this study was accepted or not through the test:

1. F test

2. T-test

The formula used in this study:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e$$

Information

Y = number of mortgages

a = Constanta

b = Coefficient value

X_1 = Inflation

X_2 = Exchange Rate

X_3 = BI rate

X_4 = Economic Growth

4. Result and Discussion

This study processes research data using the SPSS application. Various tests have been carried out as follows:

Regression Model Equations

TABLE 2: Coefficient Table.

Coefficients					
Model		Unstandardized Coefficients		t	Sig.
		B	std. Error		
1	(Constant)	3125284677.244	368215026718	8,488	<.001
	INFLATION	72139014.575	18238399.327	3,955	<.001
	EXCHANGE RATE	28035.391	17062.355	1,643	.110
	BI RATE	-219012678.119	16529933.403	-13,249	<.001
	ECONOMIC GROWTH	602,266	37,547	16,040	<.001

Based on the table, it is known that there are three significant variables because their value is below 0.05% as the standard error rate. So, the regression equation can be formed as follows:

Y = a + X1 + X2 + X3 + X4 + e

Y =3125284677.244+72139014.575X1+28035.391X2-219012678.119X3+602,266X4 + e

The interpretation of the table is as follows:

1. Constant Value 3125284677.244. This number means that if the other variables have a value of 0, then the mortgage volume will increase by3125284677.244

2. The value of the coefficient on inflation is 72139014.575means that if the inflation rate rises by 1 percent, then the volume of mortgages increases by 72139014.575 million rupiahs and vice versa.

3. The coefficient value on the exchange rate is 28035.391, meaning that if the exchange rate increases by 1 rupiah, then the volume of mortgages increases by 28035.391 million rupiahs and vice versa.

4. The coefficient value on the BI Rate is -219012678.119, meaning that if the BI Rate increases by 1 rupiah, then the volume of mortgages decreases by -219012678.119 million rupiahs and vice versa.

5. The coefficient value of economic growth is positive, namely 602,266. This number means that if economic growth increases by 1 billion, the volume of mortgages will increase by 602,266 million rupiahs and vice versa.

TABLE 3: Coefficient Table.

Coefficients						
Model	Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
	B	std. Error			tolerance	VIF
1 (Constant)	3125284677.244	368215026718	8,488	<.001		
INFLATION	72139014.575	18238399.327	3,955	<.001	.240	4,169
EXCHANGE RATE	28035.391	17062.355	1,643	.110	.761	1,314
BI RATE	-219012678.119	16529933.403	-13,249	<.001	.181	5,521
ECONOMIC GROWTH	602,266	37,547	16,040	<.001	.587	1,702

VIF values for the variables inflation, exchange rate, BI Rate, and economic growth are 4,169, 1,314, 5,521, and 1,702. These values are not more than 10, so it can be said that these variables do not contain multicollinearity.

Double Correlation Test ® and Coefficient of Determination Test (R2)

The coefficient of determination test is carried out to simultaneously determine the correlation between two or more variables on the Y variable. R2 value has a scale of 0-1. If the value of R2 tends to be close to 1, it can be said that these variables are getting stronger, but if it is close to 0, the relationship is weakening. The results of the R multiple correlation tests and the Coefficient of Determination Test (R2) follow.

TABLE 4: Double Correlation Test R and Coefficient of Determination Test (R2).

Summary model					
Model	R	R Square	Adjusted R Square	std. The error in the Estimate	Durbin-Watson
1	.990a	.981	.978	39418440.43840	.878
a. Predictors: (Constant), ECONOMIC GROWTH, EXCHANGE_RATE, INFLATION, BI RATE					
b. Dependent Variable: KPR VOLUME					

According to the table, the adjusted R-value stands at 0.990. This figure indicates a robust relationship between the independent and dependent variables, with a strength of 99%. Additionally, the R2 value, at 0.981, signifies that it collectively influences the dependent variable by 98%, leaving the remaining influence to external variables. The Standard Error of the Estimate measures the extent of errors in the regression model when predicting the value of the Y variable. In Table 2, the value is recorded as 39418440.43840, indicating the number of errors in forecasting the Y variable, specifically the KPR volume.

To assess autocorrelation in this study, the Durbin-Watson test was employed. This test aims to ensure that the research data is free from autocorrelation. Table 4 reveals a Durbin-Watson value of 0.878, considering the presence of four independent variables. The dL value is 1.2358, and the dU value is 1.7245. It is crucial for the DW value to fall between 1.7245 and 2.275 to confirm the absence of autocorrelation. However, the value obtained falls within the range indicating positive autocorrelation, necessitating the implementation of a Run Test to address this issue. The ensuing section presents the outcomes of the Run Test conducted using SPSS.

TABLE 5: Test results on SPSS.

Run Test	
	Unstandardized Residuals
Value test	1004729.37606
Cases < Test Value	18
Cases >= Test Value	18
Total Cases	36
Number of Runs	14
Z	-1,522
Symp. Sig. (2-tailed)	.128
a. Median	

a value is needed *asymp Sig (2-tailed)* below the error value of 0.05% to overcome autocorrelation. In Table 3, Asymp. Sig (2-tailed) number is 0.128, which means more than 0.05, so the autocorrelation problems that cannot be overcome in the Durbin-Watson test can be overcome using this test.

The next test uses the heteroscedasticity test to ensure that the research data does not contain heteroscedasticity. This test uses a scatterplot to test that the distribution of points does not form a specific pattern through researchers' observations. Here is the scatterplot:
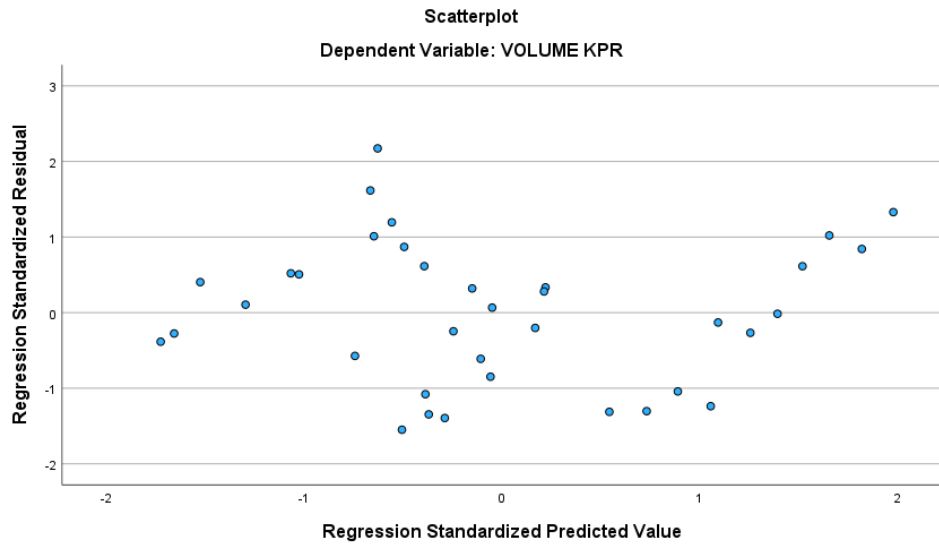
Figure 1: Scatterplots.

From the figure, it can be seen that the dot distribution does not form a specific pattern, thus indicating that this study does not contain heteroscedasticity.

This test is carried out to determine whether the (residual) data is usually distributed using the following Normal PP Plot image.
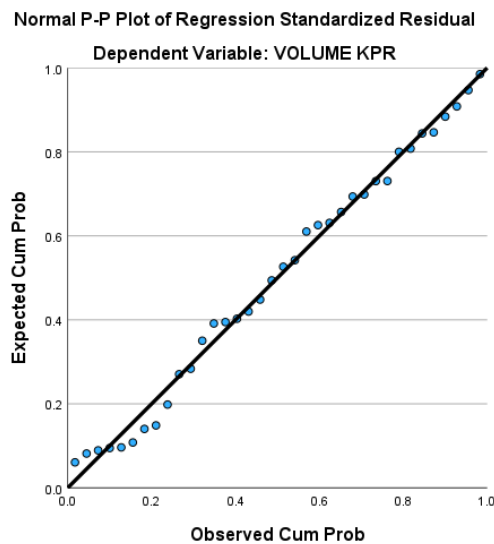

Figure 2: Normal PP Plot.

From the figure, the distribution of points is close to a straight line, which means that the data is usually distributed.

a. *Model Reliability Test (F Test)*

The purpose of this test was to assess the validity of the predicted regression model and its suitability for elucidating the impact of the independent variable on the dependent variable. The results of this evaluation are presented in the ANOVA table below:

TABLE 6: ANOVA Test.

ANOVA						
Model	Sum of Squares	df	MeanSquare	F	Sig.
1 Regression	2472152655823908400.000	4	618038163955977090.000	397,756	<.001b
residual	48168216844458480.000	31	1553813446595434800		
Total	2520320872668366800.000	35			

Prob value. F count is shown through the Sig column of <0.001, which means it is smaller than 0.05, thus indicating that the linear regression model is appropriate for use to explain the effect of inflation, the BI rate, the rupiah exchange rate, and economic growth on mortgage volume in Indonesia.

The t-test is intended to test whether the regression coefficients and constants in estimating the regression model equation are the correct parameters. The point is to be able to explain the independent variable in influencing the dependent variable.

The following are the results of the t-test.

TABLE 7: Coefficient Table.

Coefficients				
Model	Unstandardized Coefficients		t	Sig.
	B	std. Error		
1 (Constant)	3125284677.244	368215026718	8,488	<.001
INFLATION	72139014.575	18238399.327	3,955	<.001
EXCHANGE RATE	28035.391	17062.355	1,643	.110
BI RATE	-219012678.119	16529933.403	-13,249	<.001
ECONOMIC GROWTH	602,266	37,547	16,040	<.001

If the calculated probability (p) value in the "sig" column is below 0.05, it signifies a notable influence of the independent variable on the dependent variable. Conversely, when the "sig" value exceeds 0.05, the independent variable is regarded as having an insignificant impact.

In the provided table, the "sig" value for the inflation variable stands at less than 0.001, clearly indicating that it falls below the 0.05 threshold. Consequently, it can be inferred that the inflation variable indeed has a significant effect on the volume of KPR

(mortgage) in this context. In contrast, the exchange rate variable exhibits a "sig" value of 0.110, surpassing the 0.05 cutoff point, implying a lack of significant impact on KPR volume. Likewise, the BI Rate variable records a "sig" value of less than 0.001, affirming its substantial influence on KPR volume.

Furthermore, the economic growth variable also registers a "sig" value of less than 0.001, emphasizing its significant role in shaping KPR volume.The results from the multiple linear regression analysis demonstrate that inflation has a substantial impact on mortgage volume in Indonesia. This can be attributed to government-initiated restructuring efforts aimed at delaying loan payments, leading to an increase in borrowers. These findings are consistent with previous studies conducted by Pinto et al. (2020) and Husriah (2020), which also found a positive correlation between inflation and lending. Furthermore, the inflation variable supports the theory that an increase in inflation prompts the central bank (BI) to lower interest rates, leading to increased credit activity and vice versa. In partial testing, the inflation variable, as a macroeconomic factor, positively and significantly influences mortgage volume in Indonesia. Conversely, when considering all variables simultaneously.

The exchange rate variable does not exhibit a significant effect on the volume of mortgages in Indonesia. This contrasts with research on debt restructuring that delays borrower payments, as conducted by Rohman & Zulaikha (2019), Abdi (2018), and Maharani & Setiawina (2017), which suggests a positive impact of the exchange rate variable on KPR volume. However, Pratiwi and Hanafi (2019) support the findings of this study, asserting that fluctuations in exchange rates do not influence mortgage volume in Indonesia. Moreover, the exchange rate variable in this study contradicts the theory that an increase in the value of the Indonesian rupiah should lead to higher credit volume and vice versa. When examined individually, the exchange rate variable does not affect KPR volume in Indonesia. Similarly, when considering all variables simultaneously...

The BI Rate variable negatively impacts KPR volume. This is because an increase in the BI Rate leads to higher lending rates and, consequently, higher interest costs for borrowers, which in turn reduces the inclination to take out mortgages. This conclusion aligns with the research of Astuti & Dewi (2017), Rombe et al. (2021), and Mariam (2021), all of which assert that the BI Rate negatively influences KPR volume. Furthermore, the BI Rate variable adheres to the theory suggesting that higher BI Rates lead to lower credit volume and vice versa. When assessed in isolation, the BI Rate variable significantly affects KPR volume. Simultaneously...

The economic growth variable in this study indicates a positive correlation with mortgage volume. This is because economic recovery has boosted sales across various

industries and created more job opportunities, leading to an increased interest in obtaining mortgages. These findings align with the research of Siravati (2018), Rombe et al. (2021), Putra (2018), and Anastasia & Hidayat (2019), all of which argue that economic growth positively impacts the number of KPRs. The economic growth variable supports the theory that higher GDP corresponds to increased credit volume and vice versa. In partial analysis, the economic growth variable significantly influences mortgage volume. When considering all variables simultaneously...

5. Conclusions

The results show that the variables inflation, BI Rate, and economic growth significantly affect mortgage volume. Meanwhile, the exchange rate variable has no significant effect on KPR volume because . This condition means that the inflation, BI rate, and economic growth variables accept the hypothesis, while the exchange rate rejects the hypothesis

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