

DETERMINANTS OF HOUSING PRICE IN MALAYSIA

Shaliza Azreen^{1*}
Nurul Farah Wahida²
Noor Sharida³
Zunairah Hasan⁴

¹Faculty of Business and Management, Universiti Teknologi MARA Perlis Branch, Arau Campus, Malaysia
(E-mail: shaliza@uitm.edu.my)

²Madasai Generic Chemical Sdn Bhd, Malaysia (E-mail: nfarahhanas@gmail.com)

³Faculty of Business and Management, Universiti Teknologi MARA Perlis Branch, Arau Campus, Malaysia
(E-mail: sharida699@uitm.edu.my)

⁴Faculty of Business and Management, Universiti Teknologi MARA Perlis Branch, Arau Campus, Malaysia
(E-mail: sharida699@uitm.edu.my)

Article history

Received date : 15-2-2024

Revised date : 16-2-2024

Accepted date : 22-4-2024

Published date : 6-6-2024

To cite this document:

Shaliza, Farah, Sharida & Zunairah (2024).
Determinants of housing price in Malaysia.
*International Journal of Accounting, Finance and
Business (IJAFB)*, 9 (55), 41 - 53.

Abstract: *The purpose of this research is to study the determinants of housing prices in Malaysia by using annual time series data for the period of 30 years from 1991 to 2021. To get meaningful results, Dynamic Ordinary Least Squares (DOLS) method is used. Housing prices is selected as dependent variable and gross domestic product, interest rate and unemployment as independent variables. Other than that, it also aims to find if there is a long-run relationship between the independent and dependant variables. Based on the estimated results, it is revealed that some of the variables tested in this study do affect the housing prices significantly, while some are not. In details, the findings show that interest rate and unemployment do have short run relationship while GDP has no short run relationship with housing price. Moreover, it is also revealed that no long-run relationship exists between the independent variables and housing prices.*

Keywords: *Housing prices, Gross domestic product, interest rate & unemployment*

Introduction

Housing affordability has emerged as a main concern in major cities particularly in those in developing countries. While the definition of affordability varies by country, it is characterized as the ability to purchase a residential property or house that fits basic living necessities in terms of cost, quality, and location (Thaker, 2022). The Central Bank of Malaysia considers a residence to be affordable if its cost does not exceed 30 percent of an individual's gross income. Everywhere in the world, the problem of rising housing price has hindered people to own a house. Few factors have been identified to this problem, mainly due to increase in material costs. For example, Hung (2022) stated during the economic recovery in 2021 after pandemic Covid-19 driven Malaysian Movement Control Order (MCO), crude oil prices have grown by more than 60 percent, which is important because oil is crucial to the building sector. Meanwhile, steel prices have reached an all-time high worldwide, including in Malaysia. Meanwhile, prices in China and Europe have more than doubled from the pandemic's lows. Thirdly, as the world economy recovers from the Covid-19 outbreak, copper prices have risen by more than a quarter since the beginning of the year.

The issue of affordability of housing in Malaysia also highlighted by Ling et. al., (2017). They found that that there is a mismatch between supply and demand. Since 2012, new house supply has continually fallen short of satisfying household demand. Between 2014 and 2016, there was an average supply of 114,000 new housing units, which was much lower than the number of new households, which was 154,000. The serious supply-demand imbalance has led in an increase in the number of unsold residential properties in Malaysia, which reported 146,497 unsold units in the second quarter of 2017 compared to 130,690 unsold units in the first quartile of 2017. Almost 82 percent of these unsold homes were priced over RM250,000 in the second quarter of 2017. Secondly, there is a proclivity for new house releases in the unaffordable range. Between 2016 and the first quarter of 2017, only 35 percent of Malaysian families could afford homes worth more than RM250,000. However, just 24 percent of new home launches were in the affordable category, indicating a lack of affordable house and a tendency of constructing high-end residential units.

Having a shelter is a basic human right. Back in the days where owning a house is a simple matter, however today, owning a house is a privilege. While there is abundance of housing projects have been or being developed, finding a house to own, let alone to find a right one, is a challenge. The construction and occupation of decent housing have an impact on economic development through its impact on employment, savings, investment, and labour productivity. However, despite all these positive impacts, the housing issue, particularly in developing countries, has been the subject of ongoing debate in housing decision-making circles since the 1970s (Kabine, 2022). Even so, the significant number of unsold homes is still high due to a mismatch between the cost of new releases and the affordability of households. According to Lin et al. (2017), just 21 percent of new launches from 2016 to 1Q 2017 were for properties priced below RM250,000. This is insufficient to fit the income affordability profile of around 35 percent of Malaysian households. Next, the mismatch was compounded by the slower growth of median household wages at 9.6 percent in comparison to median housing prices at 15.6 percent. As a result, this made Malaysian house prices to become extremely unaffordable.

House prices in Malaysia have continued to rise substantially in recent years. This is backed with reports from Khazanah Research Institute and Bank Negara Malaysia that stated Malaysian property prices have become unaffordable. Furthermore, the government has devised various programs and ways to increase Malaysians' capacity to buy a home, including

housing programmes to aid poor and middle-income households in acquiring homes. In the Twelfth Malaysia Plan (12th MP) The government aims to provide quality, affordable housing for Malaysians, especially the B40 and M40, with another 500,000 units of affordable homes to be built during the duration of the 12MP, as well as improve financing facilities, such as the Fund for Affordable Housing (Twelfth Malaysia Plan, 2021 – 2025 Report). Nevertheless, the problem of rising house price and availability of affordable house remain unsolved despite many attempts of overcoming it. Therefore, this research is conducted to study the determinants of housing prices in Malaysia by using annual data of 30 years from 1991 until 2021. Specifically, it aims to get meaningful result by using gross domestic product, interest rate and unemployment as independent variables.

Literature Review

Malaysian housing prices or property values have varied dramatically during the previous decade. This type of hesitation has a clear impact on persons looking to invest in or buy house in Malaysia. The current study intends to discuss on determinants of housing prices in Malaysia. The study had identified dependent variable, namely housing prices, and independent variables; gross domestic product (GDP), interest rate and unemployment rate for purposes of discussion.

Housing is an important sector in a developing country's economic performance since it meets the residential demands of its citizens. Housing is one of the most basic needs since it gives physical protection from the elements. Every sensible human being wants to possess a home, but this has never been simple for them due to limited or poor income, particularly in developing countries. In recent years, housing prices have been a major concern in Malaysia. Furthermore, the market demand for housing has increased, but Malaysian supply is still insufficient to meet market demand. In addition, Ling et al. (2017) noted three major factors that led to Malaysian housing unaffordability: a mismatch between housing supply and demand; pricey new launches; and a rate of household income growth that could not keep up with the rise in home prices.

Gross domestic product

Gross domestic product (GDP) is a standard measure of the value added created by a country's production of goods and services in a specific period. As a result, it also evaluates the money generated by that output, as well as the total amount spent on final goods and services (Pillaiyan, 2015). The GDP plays a part in the elements that impact home prices, and it is known that if house prices rise, the wealth effect is likely to induce an increase in consumer spending, which leads to higher aggregate demand and an increase in GDP and a higher rate of economic growth. This theory is aligned with the study of Kok et al. (2018) who argued that the effect of real GDP on house prices and transaction volumes persist comparably longer and stronger. In research on 24 nations, it was found that GDP growth is extremely significant, demonstrating that changes in income are positively related to changes in house price (Savva, 2018). This is supported by finding based in Malaysia and Singapore by Azlan and Lee (2022) from 1979 to 2019 and Zulkarnain and Nawi (2024) based on Malaysia pre and post Covid-19, where there is a positive and significant relationship between GDP and housing prices. In addition, next researcher who conducted a study on factors determining housing prices in Pakistan from 2013 to 2020 discovered that the effect of the GDP on housing prices is positive and significant (Khan et al., 2022). However, a study by Kabine (2022) on determinants of housing prices in Malaysia from 1991 to 2016 and Zulkarnain et al. (2024) pointed an insignificant relationship in the short run. Moreover, Liu and Ma (2021) on determinants of house prices in China during period of 2000 to 2018 also stated that GDP has no significant influences on house prices. On the contrary,

GDP showed a negative significant result using the Auto Regressive Distribution Lag (ARDL) regression in the long run on a study of internal and external determinants of housing price booms in Hong Kong from 1999 to 2018 (Taghizadeh-Hesary et al., 2019).

Interest rate

The interest rate is often referred to as the lending rate charged by the bank to receive the loan. Generally, interest rate is referred to the lending rate charged by the bank to obtain the loan which borrowers can borrow money from lenders to make credit purchases. Increase in interest rate holds several crucial impacts on the economy. It enables savings more meaningful for the household and leads to discouraging investment and consumer demand, as high-interest rate leads to an increased cost of financing (Kabine, 2022). According to a study conducted in Malaysia, the interest rates is positively significant affecting housing prices (Latif et al., 2020). This study also stated that interest rates can have a delayed influence on housing prices. This is in line with Mokhtar et al. (2021) finding on macroeconomic determinants of Malaysian housing prices from 1989 till 2018. Interest rate is positively significant macroeconomic variable that explain the volatility of housing prices in Malaysia. A similar result also found by Lim and Lau (2018) based in Malaysia for the period of 2000 to 2016. A significant negative finding was discovered by Raza et al. (2023) in Spain for the period of 2010 until 2022. Meanwhile, a different result was observed by Azlan and Lee (2022) from 1979 to 2019 based on Malaysia and Singapore where there is an insignificant relationship. In addition, Kabine (2022) research in Malaysia from 1991 to 2016 found that both short and long run, interest rate has positive and significant effect to housing prices.

Unemployment

The unemployment indicates the amount of labour utilization as well as the incapacity of the proportion of employees actively looking for work to find one (Institute of Labour Market Information and Analysis, 2017). A growth in unemployment level may discourage individuals to purchase houses. A lower in unemployment may decrease affordability constraints due to the increased purchasing power associated with higher incomes. A high unemployment leads to a negative significant impact on housing prices (Ciarlone, 2015). This is found true in research by Nistor and Reianu (2018) based on Canada from 2001 to 2011, revealed that the unemployment is negatively significant with the average home price. In addition, a similar result on determinants of housing prices in Hungary from 2001 to 2011 and Malaysia 1991 to 2019 were also discovered (Czinkan and Horvath, 2019; Zulkarnain and Nawi, 2023). Moreover, De Wit et al. (2013) concurred rising unemployment rate due to rising non-graduation rates has a negative impact on housing market price conditions because of negative impact on earnings. Meanwhile, Zulkarnain et al. (2024) found significant positive relationship where higher unemployment causes higher increment in housing prices in east coast Malaysia. On the other hand, a previous study by Azlan and Lee (2022) on determinants of housing prices in Malaysia and Singapore conducted from 1979 to 2019; together with study by Raza et al. (2023) in Spain from 2010 to 2022, the results show no relationship between the unemployment and housing prices. In addition, according to Asal (2018) who conducted long-run drivers and short-term dynamics of Swedish real house prices from 1986 to 2016 revealed that unemployment are insignificant in determining housing prices in both short and long-run analyses.

Methodology and Data Analysis

Data Collection Process

This study investigates the relationship between independent variables which is Gross Domestic Product (GDP), interest rate, and unemployment with relation to the housing price as dependent variable. The sample for this study uses 30 years of annual data, covering from year 1991 to 2021 for both dependent and independent variables. This study uses secondary data where the data is collected through sources such as journals, articles, historical data, past record, and even conference papers. Data of each variable was derived from the World Bank, Department of Statistics Malaysia (DOSM), and National Property Information Centre (NAPIC).

Research Variable

This part will explain about all the variables used to analyse and identify the relationship between the dependent and independent variables. The variables are listed below as shown in Table 1.

Table 1: Variables, Proxy, Unit and Sources of Data

Variables	Proxy	Unit	Sources
Housing Price	Housing Price Index (HPI)	Index	NAPIC
Gross Domestic Product (GDP)	Gross Domestic Product	Ringgit Malaysia	World Bank & DOSM
Interest Rate	Lending Interest Rate (INT)	Percent	World Bank
Unemployment	Unemployment Rate (UEM)	Percent	World Bank & DOSM

In addition, the theoretical framework is shown as in figure 1.

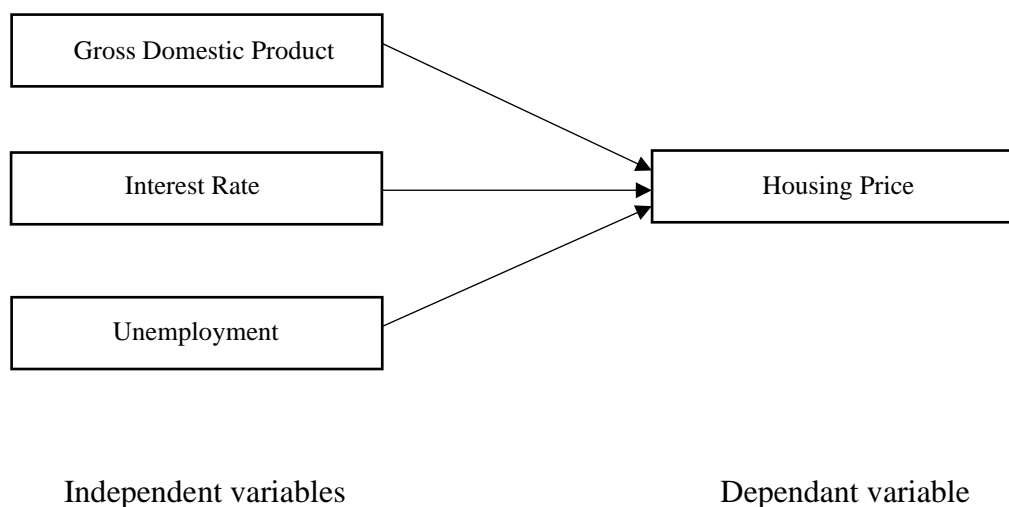


Figure 1: Theoretical Framework

The hypothesis of this study are as follows:

- H1 : There is no significant relationship between GDP and housing price.
H2 : There is no significant relationship between interest rate and housing price.
H3 : There is no significant relationship between unemployment and housing price.

Methodology

The data of both independent and dependent variables are collected from World Bank, Department of Statistics Malaysia, National Property Information Centre (NAPIC). Aside from that, this study includes data processing to provide a picture of how this study will turn meaningless data into meaningful information by utilizing E-views 12 sampling techniques. Furthermore, this study will use Dynamic Ordinary Least Squares (DOLS) to identify the relationship between endogenous and exogenous variable, as well as the relevance of each individual exogenous variable on endogenous variables and the overall model's reliability. The tests conducted in this study such as correlation test, unit root test, cointegration test, long-run estimates, and granger causality test will be described in depth. To further get a meaningful analysis for this study, the model of study is written as below:

$$\ln HPI_t = \alpha + \beta_1 \ln GDP_t + \beta_2 \ln INT_t + \beta_3 \ln UEM_t + \varepsilon_t$$

Data Analysis

Correlation Test

The correlation test is a bivariate study that determines the strength of connection and the direction of the link between two variables. The correlation coefficient has a value between +1 and -1 depending on the strength of the association. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value approach towards 0.8 and above, the relationship between the two variables will be strong correlation. Correlation coefficients whose magnitude are between 0.5 and 0.7 indicate variables which can be considered as moderately correlation. When the correlation coefficient value approach towards 0, the relationship between the two variables will be weaker correlation.

Unit Root Test

When addressing stationary and non-stationary time series, an alternative technique known as the unit root test has lately gained popularity. This test is significant since it aids in avoiding the issue of false regression. Harris (1995) argues that if a variable has a unit root, it is non-stationary, and unless it joins with other non-stationary series to establish a stable cointegration relationship, regression using the series might incorrectly infer the presence of a significant economic link. The two types of unit root testing used in this study are the Augmented Dickey Fuller (ADF) test and the Phillip-Perron test. A typical method for assessing the unit root null hypothesis is the augmented Dickey-Fuller (ADF) test. A hypothesis test is used in this test, with a null and alternate hypothesis used to produce the test statistic and p-value. The null hypothesis is based on the presence of a unit root. The p-value generated must be less than the significance level to reject the null hypothesis. As a result, it is possible to assume that the series is stationary.

Cointegration Test

Cointegration tests detect situations in which two or more non-stationary time series are integrated together in such a way that they cannot stray from equilibrium over time. The tests

are designed to determine how sensitive two variables are to the same average price over a certain period. For this test, Lc statistic must be more than 0.2 where it indicates the series are cointegrated in null hypothesis. If the value is greater than 0.2, then it resulted as failed to reject the null hypothesis which led to existing in long run equilibrium.

Long-run Estimates

Long-run relations are commonly related with the steady-state solution of a structural macroeconomic model. Long-run equilibrium relationship can be estimated consistently by Dynamic Ordinary Least Squares (DOLS). DOLS is an estimator suggested to solve the finite sample bias of OLS caused by endogeneity issue when estimating regression models based on cointegrated variables. For long run estimates, If the absolute value of the t-statistic is larger than the 1, 5 or 10 percent critical threshold, the hypothesis decision is to reject the null hypothesis.

Granger Causality Test

The structures of the causal relationships between variables which is relationship of independent variables toward dependent variable were analysed through the Granger causality approach. The Granger causality test is a statistical hypothesis test used to determine if one time series may be used to predict another. If the probability value is less than 0.01, 0.05, or 0.10, the hypothesis is rejected. Short-run causality denotes a causal link between variables in the short term. Short run causality is based on joint significance of first difference variable in the vector error correction equation using pairwise that can be calculate in granger causality.

Results

Correlation Test

Correlation test is statistical method that is used in this study to discover if there is a relationship between two variables, and how strong that relationship may be.

Table 2: Correlation Test

	LHPI	LGDP	LR	LUEM
LHPI	1.000000	0.198743*	0.097528*	-0.124840*
LGDP	0.198743*	1.000000	-0.897283*	0.025517
LR	0.097528*	-0.897283*	1.000000	-0.215890*
LUEM	-0.124840*	0.025517	-0.215890*	1.000000

Notes: The asterisks * imply significance at 5%

Based on table 2, it shows the correlation test between gross domestic product (GDP), interest rate and unemployment as independent variables. The estimated values of correlation coefficients quantify the direction and strength of the linear association between the variables. The result between independent variables shows that there is no multicollinearity problem because it proves that strong correlation does not exist. Moreover, there is positive relationship between unemployment and GDP (0.02552) while opposite relationship between interest rate and GDP (-0.8973); also, unemployment and interest rate (-0.2159). From the result, the moderate correlation is between interest rate and GDP and weak correlation are between unemployment and GDP, also unemployment and interest rate.

Unit Root Test

Unit root test in time series has been used before applying cointegration and long-run estimation to determine if the variable's time series is stationary or non-stationary. The values in the following table are derived from the t-statistic.

Table 3: Unit Root Test

Series	Level		First Difference	
	ADF	PP	ADF	PP
LHPI	-1.493311	-1.493311	-4.558270***	-4.512952***
LGDP	-2.496593	-2.411101	-6.923325***	-7.149219***
LR	-2.601055	-2.591664	-5.114837***	-6.872024***
LUEM	-2.521195	-1.931669	-4.840098***	-6.836325***

Notes: The asterisks ***, **, and * imply significance at the 1%, 5%, and 10% levels, respectively.

Table 3 shows the results of the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root test for housing price, gross domestic product (GDP), interest rate and unemployment for first difference. All variables under consideration are non-stationary in their levels and become stationary when they are first differenced. The level of significance at first difference for ADF and PP statistics of all variables is 1 percent. The ADF values that are significant at first difference are -4.5583 for housing prices, -6.9233 for GDP, -5.1148 for interest rate and -4.8401 for unemployment. Furthermore, PP value that are significant at first difference is -4.5129 for housing prices, -7.1492 for GDP, -6.8720 for interest rate and -6.8363 for unemployment. Therefore, the null hypothesis is rejected implying all variables have no unit root and the study proceeds with further investigation.

Cointegration Test

This test will determine the existence of long-run equilibrium. This test used Hansen Parameter Instability and HAC (Newey-west) to get the result. If the Lc statistic is 0.2 or above, it indicates the null hypothesis is failed to be rejected indicating the existence of the long-run equilibrium.

Table 4: Long–Run Estimation

Cointegration Test - Hansen Parameter Instability				
Equation: UNTITLED				
Series: LHPI LGDP LR LUEM				
Null hypothesis: Series are cointegrated				
Cointegrating equation deterministic: C				
HAC score variance				
	Stochastic	Deterministic	Excluded	
Lc statistic	Trends (m)	Trends (k)	Trends (p2)	Prob.*
0.157752	3	0	0	> 0.2
*Hansen (1992b) Lc (m2=4, k=0) p-values, where m2=m-p2 is the number of stochastic trends in the asymptotic distribution				

Referring to table 4, Lc statistic is recorded at 0.1578, which is less than the probability value of 0.2, leading to the result of no cointegration. As a result, null hypothesis is rejected, which means there is no long-run equilibrium for the model of this study. Therefore, the Granger

causality test must be employed to find the short-run equilibrium between GDP, interest rate, and unemployment as independent variables and housing prices as dependent variable.

Long-Run Estimation

Due to no cointegration result from the previous test, long-run estimation cannot be identified. However, it is worth noting that according to table 5, the results for GDP, interest rate, and unemployment are all found to be insignificant.

Table 5: Cointegration Test

Dependent Variable: LHPI				
Method: Dynamic Least Squares (DOLS)				
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Cointegrating equation deterministic: C				
Fixed leads and lags specification (lead=2, lag=2)				
HAC standard errors & covariance (Bartlett kernel, Newey-West fixedbandwidth = 3.0000)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP	0.659343	0.506588	1.301536	0.2343
LR	0.229952	0.124216	1.851237	0.1066
LUEM	1.241899	1.446885	0.858326	0.4191
C	-4.052624	7.334235	-0.552563	0.5978
R-squared	0.891005	Mean dependent var		4.926362
Adjusted R-squared	0.610731	S.D. dependent var		0.281225
S.E. of regression	0.175460	Sum squared resid		0.215504

Nevertheless, the adjusted R-squared value is 0.6107, indicating that 61 percent of housing price can be explained by GDP, interest rate, and unemployment, while the remaining 39 percent may be explained by other unknown factors. Below are the long-run equation that is derived from the cointegration test:

$$\ln HPI_t = -4.052624 + 0.659343 \ln GDP_t + 0.229952 \ln INT_t + 1.241899 \ln UEM_t + \varepsilon_t$$

(1.301536)
(1.851237)
(0.858326)

Granger Causality Test

The Granger causality test has been used to examine whether there is a link between the dependent variable and the independent variables in the short-run. This test's significance is defined by the probability value.

Table 6: Granger Causality Tests

Pairwise Granger Causality Tests			
Sample: 1991 2021			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LGDP does not Granger Cause LHPI	29	0.44574	0.6455
LHPI does not Granger Cause LGDP		0.71212	0.5007
LR does not Granger Cause LHPI	29	7.11475	0.0037
LHPI does not Granger Cause LR		1.73532	0.1977
LUEM does not Granger Cause LHPI	29	5.38926	0.0117
LHPI does not Granger Cause LUEM		0.61038	0.5514

As indicated in table 6, interest rate is significant at 1 percent with the value of 0.0037. Thus, the null hypothesis is rejected, suggesting that interest rate has relationship with housing price in the short run. In addition, unemployment is similarly found to be statistically significant at 5 percent with the value of 0.0117. Thus, the null hypothesis is rejected, suggesting that unemployment has a short run relationship with housing price. In contrast, GDP demonstrates that the variable is insignificant at any significant level where the value is 0.6455. Thus, the null hypothesis is failed to be rejected, demonstrating that GDP has no relationship with housing price. To sum up, only interest rates and unemployment have short-run relationship with housing price, but GDP has none.

Discussion

According to the estimated results, the gross domestic product (GDP) has an insignificant influence on housing prices in short-run equilibrium. This finding is corroborated by previous studies by Kabine (2022) and Ma (2021). The insignificant relationship between GDP and housing prices may have been contributed by income factor. This is because the wage growth in Malaysia does not keep pace with economic development. According to Bank Negara Malaysia (2017) in its report, a slower growth in household income relative to housing prices may lead the household to be unable to afford acquiring a house. Moreover, sustained strong economic growth may over encourage residential development, resulting in excessive residential construction, or, in other words, an oversupply that contributes to a supply-demand imbalance in Malaysia's housing market. Thus, GDP has no impact on the rising housing prices.

Next, interest rate was found to be statistically significant with housing prices. This is in line with Kabine (2022) and Mokhtar et al. (2021) where the interest rates have a positive significant impact on housing prices in the short run that explain the volatility of housing prices in Malaysia. The predicted sign differs from the outcome because when interest rates are higher, developers would borrow at a greater cost or borrow less from banks (Wu et al. 2022). Due to a lack of funding, this will reduce the supply of houses on the market (Liew and Haron, 2013). As a result, the housing prices increase.

Then, in the short-run unemployment has a statistically significant influence on housing prices. The finding is supported by the study of Zulkarnanin and Rawi (2024); Czinkan and Horvath (2019); Nistor and Reianu (2018) which stated the unemployment has significant negative relationship with the average housing price. The relationship between unemployment and

housing prices are inverse because those who are unemployed cannot afford to purchase a house since they are unable to earn income. An excess supply of houses will lead to a drop in its price. Therefore, to avoid abundance of unsold houses, housing prices will decrease to match the current demand. As a result, the higher the unemployment, it will lead to decrease in housing prices.

Recommendation

Property is a basic requirement for many Malaysians, yet few can afford it. Government needs to increase consumer credit, where the house demand will dry up, resulting in a reduction in residential investment. On the other hand, policymakers in Malaysia should restrict the rising movement of the bank's interest rate because it is favourably associated to house prices. Thus, Malaysian authorities (central bank) should interfere at all times to reduce interest rates in the banking sector in order to have a favourable influence on housing price control through reserve requirements, open market operations, and overnight lending rate policy. Other than that, the authorities need to have strict control on the housing developers by increasing the difficulty in getting loans to fund their projects. The leniency in this process has led them to build more “unaffordable” house which eventually would be bought by foreigners who gain from rent and re-selling the properties. Future researchers may experiment with various data types, such as panel data, to achieve more diverse results. Furthermore, researchers can use different method other than Dynamic Ordinary Least Squares (DOLS).

Conclusion

This study essentially evaluated some literature on housing prices as well as tested some actual data to verify the hypothesis. The purpose of this research is to study the determinants of housing prices in Malaysia by using annual time series data for 30 years from 1991 to 2021. The sources of data that have been used in this study is World Bank, Department of Statistics Malaysia (DOSM), and National Property Information Centre (NAPIC). This research achieves its objective in identifying the relationship and the most significant independent variables. At the end of the study, it is learned that some of the variables tested in this study do affect the housing prices significantly, while some are not. The findings show that GDP has no short run relationship with housing price, while interest rate and unemployment have short run relationship with housing price. Moreover, it was also revealed that no long-run relationship exists between the independent variables and housing prices.

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