

The Influence of Macroeconomic Factors on Residential Property Prices in Malaysia Before and During COVID-19

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Received: 17th February 2022/ **Revised:** 12th October 2022/ **Accepted:** 12th October 2022

How to Cite: Isyanto, P., Zulkarnain, S. H., & Nawi, A. S. (2023). The Influence of Macroeconomic Factors on Residential Property Prices in Malaysia Before and During COVID-19. *Binus Business Review*, 14(1), 111–120.
<https://doi.org/10.21512/bbr.v14i1.8225>

ABSTRACT

The macroeconomic environment directly and significantly impacts a country's economy. For example, residential property prices in Malaysia have steadily increased in recent years. It has become a significant issue during the COVID-19 pandemic since a home is one of the essential items for each living human being. The research identified a few macroeconomic factors, such as Gross Domestic Product (GDP), private consumption, government expenditure, and household saving which influenced Malaysian residential property prices. The research applied a regression model to analyse the data to encounter the uncertainty problem related to Beaver univariate analysis. All data were collected by the Department of Statistics Malaysia, the National Property Information Centre (NAPIC), The World Bank Data, and other data streams. Then, the research was tested using the time series method to predict and forecast the model. Based on the findings, the research shows that the distribution data for all variables are not normal. Overall, the variables are significant using the time series regression with the level of significance at 1%, 5%, and 10%. All variables tend to have a positive impact on residential property prices. The findings have significant policy consequences. Hence, it is critical to understand the pathways through which housing influences the economy to develop beneficial policies, as housing price declines are frequently cited as the primary constraint on household expenditure.

Keywords: macroeconomic factors, residential property price, Malaysia, COVID-19

INTRODUCTION

Residential property is a basic need for all residents for shelter. The need for residential real estate is very dynamic, especially in large cities with a high total community population. Various factors influence house prices. Those factors are often considered in terms of the characteristics of the house and the environmental conditions where the house is located,

in addition to micro and macroeconomic elements (Karagöz & Özkubat, 2021).

Since the World Health Organization (WHO) announced the spread of COVID-19 as a global pandemic on March 11, 2020, the impact of COVID-19 has been felt across the world. The economic sector has almost reached a standstill due to the massive and unprecedented cessation of operations as a feature in the corporate world, and the pandemic has created new

norms in everyday life (Craighead, 2020). Specifically, the residential real estate market has also experienced a drastic impact causing a fall in property values across the state (Williams, 2020). During a pandemic, prices for residential property have dropped significantly compared to their value a year ago. Housing is a vital investment for individuals because it significantly contributes to social interaction and socioeconomics (Yeee, Sufahani, Abd Wahab, & Idrus, 2021). The impact of COVID-19 on the real estate industry has various implications on the activities and nature of work amongst the property players. Several game-changing technological developments in the real estate industry, especially in Asia, are made possible by significant growth in trends in broadband and Internet access. Consumers also have easy accessibility and increased digitalization (Nanda, Xu, & Zhang, 2021; Ying & Alias, 2022).

Various factors need to be considered in determining the residential property price, including macroeconomic factors, such as Gross Domestic Product (GDP), private consumption, government expenditure, and household saving. According to Furnival and Wilson (2000), the common macroeconomics variables are justified as a wider term influencing the entire economic state of the nation. The relationship between all these variables can be developed using an econometric model. Hence, the novelty of the research is based on the Ordinary Least Square (OLS) regression method. The development of OLS includes estimating the coefficient of variables, then computing each variable's discriminatory score and classifying the variables. This model is commonly used when theoretically appropriate variables are selected.

The macroeconomic environment has a direct and significant impact on the country of any country's economy, as it is frequently observed. Residential property prices in Malaysia have steadily increased in recent years. It has become a significant issue during the COVID-19 pandemic since a home is one of the most important items for each living human being. The research identifies a few macroeconomic factors, which have previously discussed Malaysian residential property prices, to analyze their influence on the current state of the economy today. According to Öztürk, Kapusuz, and Tanrıvermiş (2018), macroeconomic variables drive house prices in Ankara. Although the scope of the research is narrow, it uses the symmetric price assumption, as recently supported by Vatansever, Demir, and Hepşen (2020). It shows the real estate market in Turkey exhibiting features of homogeneity.

The field of economics is no exception, as economists use many acronyms. GDP is one of the most widely used words. It appears in publications, news programs, government, banking systems, and business publications on a regular basis. It has grown to be a reliable indicator of national and global economic health. It is the total value of products and services produced inside a country's borders during a given period, such as monthly, quarterly, or

yearly. The GDP growth rate is perhaps the strongest predictor of economic growth, whereas GDP per capita has a significant relationship to the pattern of life quality over time (Liu & Ma, 2021). When GDP rises, workers and businesses are usually better off, especially if inflation is not an issue.

GDP is important since it offers information about an economy's growth and performance. GDP is typically defined as the output of goods and services produced by labor inside a country and is widely regarded as a measure of economic success (Rui, 2015). The real GDP growth rate is commonly cited as a barometer of the economy's overall health. An increase in GDP is regarded as a sign that the economy is doing well in general. In addition, employers are more likely to hire extra workers for their factories when real GDP increases fast, and individuals have more money in their pockets. However, employment generally declines when GDP falls, as has happened in many countries during the current global economic crisis. In certain cases, GDP may rise, but not rapidly enough to generate enough jobs for those seeking employment.

There are a lot of mixed results on the influence of GDP on residential property prices. Previous research investigates the impact of macroeconomic variables on housing prices in Malaysia. It uses data from 2005 to 2019 and an estimation method with an econometric model. It estimates the impact of economic factors on housing prices. The results show that all the macroeconomic factors influence house price fluctuation in Malaysia. It proves that GDP has a positive relationship with housing prices. It indicates that economic indicators are crucial for the changing and performance of housing prices. The country with a higher GDP shows how good and healthy the economy performs, which contributes towards increasing the demand for housing. In addition, the higher GDP positively affects housing prices in the long run (Baharuddin, Mohd Isa, & Mohd Zahari, 2019).

According to Duja and Supriyanto (2019), there is an influence of determinants of residential property price in Indonesia by determining the relationship between residential property price with GDP, investment interest rate, wages inflation, and the exchange rate against the US Dollar. With the secondary data from 2002 to 2014, it uses the Eagle-Granger cointegration test and the error correction model to see the relationship between both variables in the short-term and long-term periods. The result shows that GDP is significantly related to residential property prices in Indonesia in the long-term period. Indonesia's government has issued a policy related to GDP, which implements a small residential property subsidy mechanism. When GDP increases, the prosperity of society also increases.

Another previous research is by Zandi, Supramaniam, Aslam, and Theng (2015) to look at the economic variables that influence the price of residential property in the Malaysian state of Penang. Secondary data are gathered from Bank Negara

Malaysia, the Department of Statistics Malaysia, the Ministry of Finance Malaysia, and the Valuation and Property Service Department. From 2007 to 2014, all economic indicators have reported yearly, and the methodology is exploratory research. The GDP rate is shown to have a positive relationship with residential property prices. However, the association is not statistically significant. The positive link between GDP rate and housing price is predicted, which aligns with the hypothesis first formed. The most important aspect, GDP, as a major factor, influences property values in Penang.

According to Ozan and Filiz (2019), there is an interaction between house prices and government expenditure, mortgage interest rates, and GDP in Turkey. The data are collected from 2010 to 2017, and the method is the Autoregressive Distributed Lag (ARDL) bounds test. The finding shows that government expenditure has a statistically positive significant effect on house prices in the short-term and long-term. The relationship between house prices and government expenditure has some important policy implications. Another policy implication is that the risk of creating a significant and sustainable increase in house prices may be somewhat suppressed by limiting government expenditure.

Personal spending or consumer expenditure is another term for private consumption. Private consumption refers to money spent by individuals on products and services. As other factors are equal, a rise in consumption boosts GDP by the same amount. Furthermore, considering current income (GDP) is a key driver of consumption, an increase in revenue will be caused by an increase in consumption, resulting in a positive feedback mechanism between income and consumption.

Another previous research uses a multilevel research design to examine the relationship between total public expenditure and housing prices. With data from January 2010 to June 2012 and econometrics method, the findings show that government expenditure positively correlates with housing prices. The finding suggests that the effects of public service supply and public expenditure on property prices may exacerbate the urban division between the affluent and poor. High-income households prefer districts with strong public facilities and greater redistributive services by paying higher home costs. Meanwhile, lower-income people, who may require more redistributive services, are forced to live in districts that must spend their limited resources on developmental programs (Li, Wang, Deng, Shi, & Wang, 2019).

A variable interaction approach is highly significant since Asia has experienced rapid expansion in private housing and market-based housing financing over the last decade. However, the country's developments have been irregular (Rui, 2015).

Similarly, previous research uses Chinese panel data of 30 provinces in China from 2007 to 2015 (due to a lack of data, Tibet and Ningxia are not included.).

It conducts empirical research on the influence of various state expenditures on housing prices. The data are derived from the China Statistical Yearbook of Territorial Resources, the China Statistical Yearbook of Real Estate, the China Statistical Yearbook, and the China Statistical Yearbook of Employment and Population. The research applies a natural logarithm operation to all variables and yields a new variable to eliminate the effects of heteroscedasticity and data volatility. Public education and public transportation spending have a strong positive impact on house prices. Among the different fiscal expansions, public education spending is the most successful in promoting commercial housing capitalization. The degree of capitalization of public expenditure can be seen as a criterion for determining citizens' willingness to pay for public goods. The positive impact of government spending on house prices demonstrates the growing demand for high-quality public services. However, the practical paradox is the imbalance of regional economic development and the disparity in local financial resources, which result in a huge disparity in per capita public expenditure among various areas and an imbalance in public goods provision. To encourage local governments to provide more balanced and appropriate public services for the masses and to promote the equalization of public services, the government shall reasonably guide consumers' expectations through various measures and control the excessive rise in housing prices in some provinces and cities (Li, 2018).

Next, the link between home prices and consumption in Norway using empirical analysis is analyzed based on county-level data. The data have largely been based on time series for the entire nation. Based on regional data for Norway, the previous research proposes alternative research on this connection. The regional data set allows the management of national driving forces that are difficult to capture in time series studies based on data for the entire country. The findings indicate that there is a strong positive connection between changes in property prices and household spending. The estimated effects are comparable with the findings of more recent studies based on Norwegian national data. However, they are mostly slightly weaker than the findings of similar studies in other countries (Grindaker, 2017).

As seen from Dutch administrative data, the role of house prices in driving household consumption is explored. The data applied are panel data with a sample period from 2007 to 2019 from Dutch household data. The method is also an econometrics model and robustness test to demonstrate the estimated result for insensitivity to alternative measures and specifications. The result shows that the relationship between house price and household consumption in Dutch positively correlates. The findings suggest that the incorporation of housing transaction data is a potential avenue in which the research may be expanded. The consumption behavior of movers may be better traced and analyzed using this data. It offers

additional insight into the link between housing prices, household mobility, and consumption (Zhang, 2019).

During the past 40 years, numerous studies have attempted to properly anticipate company or business failure by examining potential techniques. House Price Index is a real estate-related financial asset. The real estate sector contributes substantially to the economic growth and development of several countries (Kayapinar Kaya, Ozdemir, & Dal, 2020). The House Price Index (HPI) or Residential Property Price Index (RPPI) is used to track changes in the mean price of residential property sales in a country by the households. The non-household purchaser or self-builds house is specifically excluded from the RPPI because the land is purchased separately before the house. HPI in relation to the COVID-19 pandemic shocks at the regional level. As an example, the HPI of Kazakhstan is recognized in the global real estate transparency index (Aliefendioğlu, Tanrivermis, & Salami, 2022). The impact of the pandemic on different aspects of housing demand and supply is discussed as it impacts homeownership markets. The research also outlines the pressure points through which COVID-19 may impact the credit market (Allen-Coghlan, McQuinn, & O'Toole, 2020).

Previous research determines how home prices impact household consumption. It employs a microlevel data collection that follows the housing prices and spending of many households across four years. The main econometric approach is OLS regression. It presents compelling evidence that rising housing prices boost household spending, regardless of whether a household owns or rents. Furthermore, it discovers that both obtaining and losing homeownership have a negative impact on household spending. Further research indicates that the connection between house prices and household consumption has significant regional heterogeneity. Policymakers should encourage the growth of the housing or real estate sector. For example, the government can give a first-time homebuyer subsidy to encourage individuals to purchase a home. A more enticing return-risk relationship can be formed in the housing market (Yuan, Shen, & Zhou, 2020).

Next, a three-period life-cycle model is developed to demonstrate the impact of property prices on household savings in urban China. Panel data sets from China's 31 provinces are used, spanning 1996 to 2016. The theoretical model demonstrates that a predicted rise in property values in a household's middle age leads to increased household savings in the household's youth. Second, household savings at a young age are positively connected to both expected educational and medical expenditures in a family's middle age and pension expenditures in a household's old age. Third, the predicted property price has driven out educational and medical costs in the middle of a household's existence. According to the data, anticipated housing prices have a significant relationship with current household savings. On the other hand, the impact of the projected housing

price on existing household savings is greater than the impact of present family savings on the expected housing price. As a result, authorities should develop appropriate countercyclical housing measures to avert a housing bubble and stimulate household demand (Kuang, Li, & Xiao, 2020).

Moreover, the influence of home prices on household savings rates in urban China is examined. The data are from the Chinese Households Income Project (CHIP) in 2002 and 2007 and cross-sectional data, separately. The method applied is a robustness test to investigate the relationship between household savings rates and house prices. It demonstrates that fast appreciation of property values cannot account for high Chinese household savings rates and growth of Chinese savings rates. The empirical data show that property prices have a considerable negative influence on savings rates for both homeowners and renters. Moreover, the result finds a minimal indication that young house renters will save more for a home purchase if housing costs rise. The findings imply that rising home prices may not be the cause of China's high household savings rates. It also cannot account for China's growing household savings rates. In contrast, empirical findings suggest that rising property prices may reduce household savings rates (Li, Whalley, & Zhao, 2013).

Similarly, the influence of house price shocks is investigated on the savings behavior of Dutch homeowners over the years 2006 to 2011 by using unique administrative data and creating a balanced panel of slightly less than 2 million Dutch homeowners with information on property prices, wealth, income, and other background factors. It uses OLS to evaluate the equation and panel data with random and fixed effects to research the connection between changes in housing prices and savings behavior. The result is a negative connection between changes in home prices and savings, with the greatest effects on young households with negative housing equity. The baseline condition finds that home price rises have a bigger influence than house price declines. Households under 30 years old with loan-to-value ratios greater than one save around 3 Euro less for every 100 Euro increase in property prices while saving approximately 1 Euro more for each 100 Euro drop. Certain specifications exhibit an unbalanced effect of price decreases vs. price increases (Van Beers, Bijlsma, & Mocking, 2015).

Next, it is revealed that the behavior of household savings, which is a prior stage to increase the ratio of Turkey's national savings rate, contributes to economic development (Çebi Karaaslan, Oktay, & Alkan, 2022). Moreover, the government should spend a substantial portion of its idle saving to deal with social discontent over low real income and low housing affordability and to prevent social tensions (Zhao, Li, Gu, & Lei, 2021).

In the research, the relationship between residential property prices and a series of macroeconomic factors is discussed using the Hedonic

Price Index theory (Hülagü, Kızılkaya, Özbekler, & Tunar, 2016). It reflects the changes in residential property prices that have been analyzed through the econometrics method. Residential property as durable consumer goods has an important share in household expenditure and wealth, whether for residential property or investment purposes. On the other hand, the residential property sector occupies an important place in the economy when it is considered together with its forward and backward connection. For these reasons, residential property inevitably has an important contribution to the economy.

Based on the previous literature reviews, the research determines the impact of macroeconomic conditions on residential property prices in a country like Malaysia. Malaysia's population and, accordingly, residential property demand and supply are growing rapidly. The research is also expected to benefit the more efficient operation of the residential property market and the prediction of supply and demand shock.

METHODS

From the previous elaboration on independent variables, the theoretical framework for analyzing the influencing factors on housing price fluctuations is shown in Figure 1. It shows the independent variable of Gross Domestic Product (GDP), private consumption, government expenditure, and household saving. Those factors influence the research outcomes, which are the dependent variable, namely Residential Property Price Index (RPPI). The research derives the following hypotheses from the relationship between the factors influencing the HPI.

- H1: Growth rate of GDP has a significant influence on the RPPI
- H2: Private consumption has a significant influence on the RPPI
- H3: Government expenditure has a significant influence on the RPPI
- H4: Household saving has a significant influence on the RPPI

The research aims to critically examine the different elements with an impact on Malaysia's HPI since the country experienced the Asian Financial Crisis in 1996 and the Global Financial Crisis in 2008 (Chong, Li, & Yip, 2021). The research uses secondary data on private consumption, GDP, government expenditure, household saving, and HPI in Malaysia.

The data are obtained from existing data. The data are collected from the Department of Statistics Malaysia, the National Property Information Centre (NAPIC), and other data streams. Data used are a quarterly data set from 2000 to 2020.

The research utilizes the regression method to analyze data gathered to encounter uncertainty problem related to the Beaver univariate analysis. The research is further tested using the time series method. The time series method feature gives the researchers versatility in making and forecasting a prediction on the analysis model. Econometric tools are used to further analyze the data with Eviews10 software.

Descriptive analysis is the sort of data research enabling data points to be described, shown, or summarised constructively so that patterns are developed to satisfy all data conditions. It is one of the essential phases in the analysis of statistical data. It can conclude the data distribution, find types and outliers, and uncover commonalities between variables. Hence, the researchers can perform further statistical studies.

Data aggregation and mining are two methods used to obtain historical data from descriptive analysis. Data are first gathered and sorted in the data aggregation to make datasets more manageable. Descriptive approaches frequently contain tables of quantities and means and dispersion methods such as variance or standard deviation and cross-tabulations, which can be used to implement many different hypotheses. These theories often reveal disparities between subgroups.

Measures, such as segregation, discrimination, and inequality, are investigated using expert descriptive approaches. Then, audit studies or decomposition methods are used to measure discrimination. More segregation based on inequality of the results does not have to be totally good or bad but is frequently seen as a marker for unfair social processes. So, adequate assessment of the many phases in time and place is necessary to comprehend such processes.

Next, the OLS consists of three developments. It estimates the coefficients of variables, followed by computing the discriminatory score of each case and the classification of the instances. This model applies a model fit technique, which permits the predictor variables to be included solely based on their contribution. A model fit technique is generally used when selecting theoretically appropriate predictor variables (Low, 2001). The estimation complies with the data gathered from 2000 to 2020. The OLS equation function is seen in Equation (1). Equation (1)

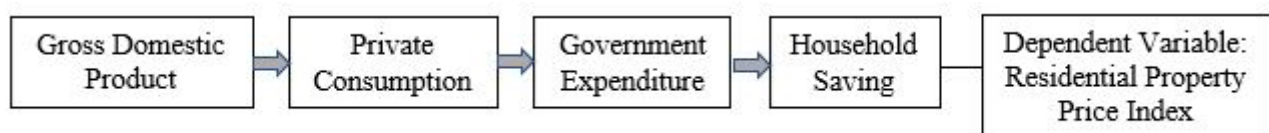


Figure 1 Theoretical Framework

shows Y as the discriminant score, a as the estimated constant, $\beta_1, \beta_2 \dots \beta_n$ as the estimated coefficients, $X_1, X_2 \dots X_n$ as explanatory variables, and E as an error term. So, it models Equation (2) with *MRPPI* as Malaysia RPPI, X_1 as GDP growth rate, X_2 as private consumption, X_3 as government expenditure, X_4 as household saving, and E as an error term.

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + E \quad (1)$$

$$MRPPI = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + E(3) \quad (2)$$

Pearson's correlation coefficient is a test statistic to determine the statistical relationship between two continuous variables. It is recognized as the best way to measure the connection between the interest variables since it is based on the covariance technique. It provides information on the size and direction of the connection or correlation. There are several assumptions of Pearson. First, in the circumstances, the cases should be independent of one another. Second, two variables should be linearly linked to one another. It may be determined using a scatter plot by plotting the values of variables on a scatter diagram and determining if the plot produces a reasonably straight line. Third, for homoscedasticity, the scatterplot of residuals should be approximately rectangular.

In addition, there are properties of Pearson. First, it is the limit. Coefficient values may vary from +1 to -1, with +1 for an ideal positive relationship, -1 for an ideal negative relationship, and 0 for no relationship exists. Second, there is a pure number. It is an independent unit. For instance, if one variable is measured in inches and the other in quintals, Pearson's correlation coefficient remains constant. Third, the coefficient of correlation between two variables is symmetric. It indicates that the coefficient value remains constant between X and Y or Y and X .

The F test is utilized as a doorway to statistical inference. The F test analyzes whether the X variables explain a substantial percentage of the Y variance. A link is established and may be explored and explained further if it is significant. If it is unimportant, it may also have a lot of unconnected random integers as no explanation can be found practically. Do not forget that it is a weak conclusion anytime the null hypothesis is accepted. It has not shown that no relationship exists. However, there is just no persuasive evidence that a relationship exists. There may be a link, but the data cannot be detected because of randomness or limited sample size.

The null hypothesis (H_0) for the F test asserts that the X and Y variables in the population are not predictive. It means that Y is pure randomness and does not consider the values of the X variables. This assertion corresponds to $Y = \alpha + \mathcal{E}$, which occurs whenever all population regression coefficients are 0, by looking at the multiple linear regression model.

However, the alternative hypothesis (H_1)

for the F test suggests that the population has a predictive connection between the X and Y variables if regression coefficients is not 0. Therefore, Y is more than simply randomness and must rely on at least one of the X variables. Therefore, the research hypothesis suggests that at least one of the regression coefficients is not 0. However, it is not required to impact Y for each X variable. It is sufficient to have only one. The hypotheses equation for the F test can be seen as follows.

$$H_0: \beta_1 = \beta_2 \dots = \beta_k = 0$$

$$H_1: \text{at least one of } \beta_1, \beta_2, \dots, \beta_k \neq 0 \quad (3)$$

In the research, the F test should be performed to seek the suitable p -value in the computer analysis and interpret the results. If the p -value exceeds 0,05, the result is not significant. Meanwhile, the result is significant if the p -value is less than 0,05. However, if the p -value is less than 0,01, it is very significant.

An important method of thinking about the significance of the F test is to understand that evaluating the R^2 determination coefficient is the same as seeing whether more of the Y variance is explained than normal because of random chance alone. The p -value for the F test is the chance to see such a big R^2 value (as observed in the data) or higher if no actual relationship exists (i.e., null the hypothesis) while maintaining the same sample size and X variable.

RESULTS AND DISCUSSIONS

The variables are RPPI, GDP, private consumption, government expenditure, and household saving. It is a time series analysis involving only one specific unit of analysis, Malaysia, and covers 20 years, starting from 2000 until 2020. The results of the descriptive analysis in Table 1 show that the average residential property price is 193,7714, with a maximum value of 273,0000 indexes in 2020. The maximum percentage among all variables is from private consumption at 75,20%, with an average value of 62,1401% in 2020 in Malaysia. Meanwhile, the minimum value is from a Gross Domestic Product of 5,5877% in 2020, with an average value of 4,5526%.

The distribution data for all variables is not normal, as shown by the probability value. Since the unit measures are not the same, it implies that the null hypothesis of normal data distribution can be rejected. Therefore, all the variables are logged through correlation and regression analysis.

From Table 2, residential property price and Gross Domestic Product has a correlation of 0,0741, which is not close to 1. It means residential property prices and Gross Domestic product do not have a strong positive correlation. If residential property price rises, Gross Domestic Product will not rise. However, if residential property price decreases, Gross Domestic Product will increase. In contrast, the relationship between residential property price and

private consumption correlates with 0,9659, which is close to 1. It means residential property prices and private consumption have a strong positive correlation. If residential property price rises, private consumption will also rise. Similarly, if residential property price decreases, private consumption will decrease too.

Next, the relationship between residential property price and government expenditure with a correlation of 0,3058 is a weak positive correlation. It is positive in value that is close to 1. If residential property price increases, government expenditure will also increase and vice versa. As for the relationship between residential property price and household saving, it has a strong positive correlation with a correlation of 0,9773, which is close to 1. If residential property prices increase, household savings will also increase. Moreover, if residential property price decreases, the household saving will decrease.

The time series regression results show that all the variables are significant at 5% and 10%, except Gross Domestic Product at 1% as shown in table 3. However, the model is fit since the F-Statistic (P-value) is significant at 0,0000%. It concludes that all variables tend to have a positive impact on RPPI.

Therefore, the regressions results accept alternative hypothesis (H_1) and reject null hypothesis (H_0). The finding is consistently in line with Öztürk et al. (2018). The R-squared and Adjusted R-squared results (97,49% and 96,77%) are quite high. It indicates that the dependent variable, residential property price, is explained highly by all the identified independent variables, as seen in Table 3.

The research method that has been developed is not applied in any research before. It is considered a contribution to the body of knowledge and innovation. The factors affecting residential property price are often considered in terms of the characteristics of the residential property and the environmental conditions where the residential property is located. Therefore, in a framework that can be characterized as micro level, there are also contributions to the relationship between residential property and macroeconomic variables. However, in the research, especially in the case of Malaysia, the macro level research is quite scarce. Hence, the relationship between residential property price and the macroeconomic variable discussed in the example of the Malaysia case is the personal contribution to the research.

Table 1 The Results of Descriptive Analysis

	RPP (Index)	GDP (%)	PC (%)	G (%)	HS (%)
Mean	193,7714	4,5526	62,1401	12,4142	49,4630
Median	166,0000	5,3321	61,2387	12,5799	48,1166
Maximum	273,0000	8,8589	75,2000	13,8421	60,8770
Minimum	146,4000	-5,5877	53,9196	10,1652	43,7544
SD	47,8024	3,1641	6,0189	0,9259	5,5471
Probability	0,2546	0,0000	0,4961	0,5857	0,3470
Observation	21	21	21	21	21

Note: Residential Property Price Index (RPPI), Gross Domestic Product (GDP), Private Consumption (PC), Government Expenditure (G), and Household Saving (HS)

Table 2 The Result of Correlation Analysis

Correlation	RPPI	GDP	PC	G	HS
RPPI	1,0000				
GDP	0,0741	1,0000			
PC	0,9659	-0,0441	1,0000		
G	0,3058	-0,0376	0,4495	1,0000	
HS	0,9773	-0,0409	0,9858	0,2933	1,0000

Note: Residential Property Price Index (RPPI), Gross Domestic Product (GDP), Private Consumption (PC) Government Expenditure (G), Household Saving (HS)

Table 3 The Result of Regression Analysis

Dependent Variable: RPPI				
Method: Least Squares				
Variable	Coefficient	Std. Error	T-Statistic	Probability
C	5,2476	4,7073	1,1148	0,2837
GDP	0,0485	0,0171	2,8354	0,0132
PC	-18,2051	9,7046	-1,8759	0,0817
G	3,6718	1,9239	1,9085	0,0770
HS	16,8661	7,8233	2,1559	0,0490
R-Squared			0,9749	
Adjusted R-Squared			0,9677	
F-Statistic			136,1279	
Prob (F-Statistic)			0,0000	

Note: Constant (C), Residential Property Price Index (RPPI), Gross Domestic Product (GDP), Private Consumption (PC), Government Expenditure (G), Household Saving (HS)

CONCLUSIONS

Based on the results, the distribution data for all variables is not normal, as shown by the probability value. The overall variables are significant using the time series regression with a significance level of 1%, 5%, and 10%. It can be concluded that all variables tend to have a positive impact on RPPI. The findings reveal that residential property prices in Malaysia exhibit positive behaviors against macroeconomic indicators. The macroeconomic indicators, such as GDP, private consumption, government expenditure, and household saving, reflect consumers' expectations for the future of the macroeconomic structure. The research reveals that the relationship between macroeconomic indicators and residential property price displays a dynamic scenario in the real estate market in Malaysia.

The findings have significant policy consequences. Understanding the pathways through which housing influences the economy to develop beneficial policies is critical. Meanwhile, housing price declines are frequently cited as the primary constraint on household expenditure. Potential directions may be broadened by including home transaction data. The consumption behavior of movers may be better traced and evaluated using these data. The link between housing prices, government expenditure, and private consumption is also better understood because of it.

For the recommendation, every variable changes during this pandemic. Even the raw data itself, the changes before and during the pandemic. It can happen because Malaysia's current situation is at the top of the worst regarding business stability, economic performance, health condition, and more. In this situation, people tend to save money to survive during the pandemic. However, the government is also busting the financial burden to help the citizens by lowering the loan payment term, giving a bit of

financial aid, and others. The government can focus on the basic component to improve the GDP sector by sector. The quote "the rich become richer, and the poor become poorer" can be implemented to the current situation. Property prices are going down, and the rich take the opportunity to add personal assets. However, the poor need to let go of their property to continue their survival during this pandemic.

However, since the outbreak of the COVID-19 pandemic, this reality has changed. The real estate players across the entire industry have been severely impacted and have had direct negative effects on the real economy via collateral, wealth, investment, and employment. The transmission of the COVID-19 pandemic creates few limitations of research because it is the world's first experience. The limitation involves time constraints, resources, and money that need to be considered and restriction regulation of movement control order implemented by the Malaysian Government during COVID-19.

Last, there are several suggestions for future research. A few methods can be applied to improve the findings using advanced economic models, such as Breusch-Pagan, Jarque Bera, and Breusch-Godfrey, to enhance future research. The advanced economic model can identify heteroscedasticity, serial correlation, and autocorrelation.

REFERENCES

- Allen-Coghlan, M., McQuinn, K., & O'Toole, C. (2020). Assessing the impacts of COVID-19 on the Irish property market: An overview of the issues. *ESRI Special Article*, 3–22. https://doi.org/10.26504/qec2020aut_SA_Allen-Coghlan
- Aliefendioğlu, Y., Tanrivermis, H., & Salami, M. A. (2022). House Price Index (HPI) and COVID-19 pandemic shocks: Evidence from Turkey and Kazakhstan. *International Journal of Housing*

- Markets and Analysis*, 15(1), 108–125. <https://doi.org/10.1108/IJHMA-10-2020-0126>
- Baharuddin, N. S., Mohd Isa, I. N., & Mohd Zahari, A. S. (2019). Housing price in Malaysia : The impact of macroeconomic indicators. *Journal of Global Business and Social Entrepreneurship (GBSE)*, 5(16), 69–80.
- Çebi Karaaslan, K., Oktay, E., & Alkan, Ö. (2022). Determinants of household saving behaviour in Turkey. *Sosyoekonomi*, 30(51), 71–90. <https://doi.org/10.17233/sosyoekonomi.2022.01.04>
- Chong, T. T. L., Li, X., & Yip, C. (2021). The impact of COVID-19 on ASEAN. *Economic and Political Studies*, 9(2), 166–185. <https://doi.org/10.1080/20954816.2020.1839166>
- Craighead, C. (2020). *Remote work may trigger a 'suburban boom' in real estate*. Retrieved from <https://komonews.com/news/local/remote-work-may-trigger-a-suburban-boom-in-real-estate>
- Duja, B., & Supriyanto, H. (2019). The influence of GDP, interest rate, wage, inflation and exchange rate on residential property price in Indonesia. *Planning Malaysia Journal*, 17(9), 389–400.
- Furnival, G. M., & Wilson, R. W. (2000). Regressions by leaps and bounds. *Technometrics*, 42(1), 69–79. <https://doi.org/10.2307/1271435>
- Grindaker, M. H. (2017). *House prices and household consumption* (Staff memo). Norges Bank.
- Hülagü, T., Kızılkaya, E., Özbekler, A. G., & Tunar, P. (2016). A hedonic house price index for Turkey (Working paper). Central Bank of the Republic of Türkiye.
- Karagöz, K., & Özkubat, G. (2021). Impact of macroeconomic factors on housing prices: An analysis for Aegean Region. *Journal of Yaşar University*, 16(62), 867–889. <https://doi.org/10.19168/jyasar.846027>
- Kayapınar Kaya, S., Ozdemir, Y., & Dal, M. (2020). Home-buying behaviour model of Generation Y in Turkey. *International Journal of Housing Markets and Analysis*, 13(5), 713–736. <https://doi.org/10.1108/IJHMA-05-2019-0048>
- Kuang, W., Li, T., & Xiao, J. (2020). Housing prices and household savings: Evidence from urban China. *Economic and Political Studies*, 8(1), 96–114. <https://doi.org/10.1080/20954816.2019.1699722>
- Li, H., Wang, Q., Deng, Z., Shi, W., & Wang, H. (2019). Local public expenditure, public service accessibility, and housing price in Shanghai, China. *Urban Affairs Review*, 55(1), 148–184. <https://doi.org/10.1177/1078087417702504>
- Li, S., Whalley, J., & Zhao, X. (2013). Housing price and household savings rates: Evidence from China. *Journal of Chinese Economic and Business Studies*, 11(3), 197–217. <https://doi.org/10.1080/14765284.2013.814461>
- Li, S. (2018). Study on the impact of local public expenditure on housing price—An empirical analysis based on provincial panel data. *Modern Economy*, 9(2), 247–262. <https://doi.org/10.4236/me.2018.92016>
- Liu, M., & Ma, Q. P. (2021). Determinants of house prices in China: A panel-corrected regression approach. *The Annals of Regional Science*, 67, 47–72. <https://doi.org/10.1007/s00168-020-01040-z>
- Low, M. B. (2001). The adolescence of entrepreneurship research: Specification of purpose. *Entrepreneurship Theory and Practice*, 25(4), 17–26. <https://doi.org/10.1177/104225870102500402>
- Nanda, A., Xu, Y., & Zhang, F. (2021). How would the COVID-19 pandemic reshape retail real estate and high streets through acceleration of e-commerce and digitalization? *Journal of Urban Management*, 10(2), 110–124. <https://doi.org/10.1016/j.jum.2021.04.001>
- Ozan, Y. M., & Filiz, Y. Ö. (2019). The dynamics of house prices and fiscal policy shocks in Turkey. *Economic Annals*, 64(220), 39–59. <https://doi.org/10.2298/EKA1920039O>
- Öztürk, A., Kapusuz, Y. E., & Tanrıvermiş, H. (2018). The dynamics of housing affordability and housing demand analysis in Ankara. *International Journal of Housing Markets and Analysis*, 11(5), 828–851. <https://doi.org/10.1108/IJHMA-08-2017-0079>
- Rui, L. (2015). *Analysing the demand factors affecting housing price index in China* (Master thesis). Universiti Utara Malaysia.
- Van Beers, N., Bijlsma, M., & Mocking, R. (2015). *House price shocks and household savings: Evidence from Dutch administrative data*. Retrieved from <https://www.cpb.nl/sites/default/files/publicaties/download/cpb-discussion-paper-299-house-price-shocks-and-household-savings.pdf>
- Vatanserver, M., Demir, I., & Hepşen, A. (2020). Cluster and forecasting analysis of the residential market in Turkey: An autoregressive model-based fuzzy clustering approach. *International Journal of Housing Markets and Analysis*, 13(4), 583–600. <https://doi.org/10.1108/IJHMA-11-2019-0110>
- Williams, D. (2020). *Seattle-based brokerage redfin starts to see coronavirus impact on housing market*. Retrieved from <https://www.forbes.com/sites/dimawilliams/2020/03/05/seattle-based-brokerage-redfin-starts-to-see-coronavirus-impact-on-housing-market/?sh=6baf29c07440>
- Yee, G. F., Sufahani, S. F., Abd Wahab, M. H., & Idrus, S. Z. S. (2021). Factors influence the housing price in Kuala Lumpur by using AHP. *Journal of Physics: Conference Series*, 1793, 1–10. <https://doi.org/10.1088/1742-6596/1793/1/012027>
- Ying, Q. X., & Alias, A. (2022). Preliminary study on the critical success factors of shopping mall developments in Klang Valley, Malaysia. *Journal of Building Performance*, 13(1), 1–9.
- Yuan, X., Shen, Y., & Zhou, H. (2020). House price and household consumption in China: Evidence from micro-level data. *International Journal of Housing Markets and Analysis*, 13(3), 475–501. <https://doi.org/10.1108/IJHMA-10-2019-0103>
- Zandi, G., Supramaniam, M. A., Aslam, A., & Theng, L. K. (2015). The economical factors affecting residential property price: The case of Penang Island. *International Journal of Economics and Finance*, 7(12), 200–210. <https://doi.org/10.5539/ijef.v7n12p200>

- Zhang, L. (2019). *Do house prices matter for household consumption?* (CPB discussion paper). CPB Netherlands Bureau for Economic Policy Analysis.
- Zhao, Q., Li, G., Gu, X., & Lei, C. K. (2021). Inequality hikes, saving surges, and housing bubbles. *International Review of Economics & Finance*, 72(March), 349–363.