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HOUSING PRICE IN MALAYSIA: THE IMPACT OF MACROECONOMIC INDICATORS

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Abstract: *The objective of this study is to investigate the impact of macroeconomic variables on the housing price in Malaysia. This study uses time-series data for four variables which is collected on quarterly basis that covering 14-year period from year 2005 until 2019. The data was collected and computed based on their historical accounting from Malaysia Department Statistic and Valuation and Property Services Department. The findings showed that in the long run relationship, when cointegration test has been applied, the independent variables (interest rates, inflation rates and gross domestic product) are significant with housing price. The result also showed that all variables were influenced to the fluctuations and the growth of house prices in Malaysia. Through the equation derived, the interest rate and inflation rate have negative relationship with house price while gross domestic product show positive relationship with housing price. This indicates that all economic indicators are important factors, which will influence the changing and performance of the housing prices in future. In order to get a better result, further researcher is advising to take longer period of time in carrying out the study because it may influence accuracy of the result of the study. Moreover, more research regarding housing price is needed in order to oversee the changing of house price year by year based on different independent variables. This study provides clear implications related to the theory and contributes to the literature in the housing industry. The study also provides invaluable insightfulness to various stakeholders including policy makers, institutional support and small contractors about the increasing on demand of house and fluctuation of price has that can lead to the changes in the condition of housing market.*

Keywords *- Housing price index, Inflation rate, Gross Domestic Product, Interest rate, Housing industry*

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INTRODUCTION

Developments in the housing market can have an important impact on financial. As with most economies, the housing market in Malaysia is an important component of domestic economy. Malaysian has experiencing a rising of urban growth since 1950's due to the increased in population and other economic movement. The factors that contribute to the high rate of urban growth such as migration, the population size and income level have significantly influenced the housing market. Besides, the increasing on demand of house and fluctuation of price has led to the changes in housing market. In Malaysia, the affordability level is one of the keys driven for an individual to buy a real property such as house. Thus, affordability level is one of the important factors for an individual to buy and own a residential property.

Over the years, the Malaysia government continues to introduce new measures to facilitate the housing financing system and also to curb the housing price speculation. Between the years 1980-1990, individuals can withdraw from their account in Employees Provident Fund for the purchase of a house or redemption of an existing housing loan. In 2009, the tax relief has increased to RM 10,000 a year for three years on interest that was paid on housing loans. Moreover, in 2012, the government has revised real property gains tax (RPGT) rate from 10% to 15%. Currently, the Malaysia government has provided an adequate, affordable and quality houses for all Malaysian in various income levels with the introduction of many affordable housing schemes such as *Perumahan Rakyat 1 Malaysia* (PR1MA) and easier access to finance which is known as My First Home Scheme.

The development of housing market can give an important impact to the financial stability. The interest rate has fallen and the housing price also has increase in the global economy since the IT bubbles burst in 2000. According to Case and Shiller (2003), the ratio of house price per capita income raised from 6.5 in 2000 to 8.5 in 2003 in California. The investment on house construction also increased at a significant pace together with the rising of the house price.

Although housing price is increasing over a year, it still has a demand among the citizen. Malaysia was in the condition where the significant price expansion over the past fifteen years in the residential property markets. The economic theory has stated that house price movement is naturally moved with the regional economics and demographics factors such as; cost of capital, income, stock price and changes in population. However, when the price suddenly changes, it can affect home ownership to some extended. Malaysia has experienced the dramatically rises in housing prices between 2009 until 2012. According to Malaysia Deputy Finance Minister (2011), housing prices in Malaysia was increases up to 20% per year after 2007 in the average. As a result, it has led to the worrying trend to lenders and creates big issues.

Currently, people are afraid that they cannot get along with such a high and expensive property prices. So far, even the housing price increasing dramatically, yet the real factors behind the illogical rise are still do not have the answer. The value of house is likely

show the increase in growth in the future years, with a strong economy and expansion in the domestic demand. Therefore, the aim of this study is to identify the relationship between economic variables which are inflation rate, interest rate and gross domestic product towards the housing price.

LITERATURE REVIEW

Housing Price Index

The developments in the housing market can provide an important impact on the financial stability. Changes in housing prices will affect directly and indirectly the demand for credit by households and their ability to repay the debt. If the price of housing was not accompanied by the lending standards tight, it will result in excessive debt accumulation by households and housing developers. Furthermore, if housing prices fell sharply, the impact on the banking institutions can be so bad that will pose a significant risk financial stability. Housing market is an important component in Malaysia to the national economy. During 1st quarter in 2010 to 2nd quarter in 2012, housing prices in Malaysia, as measured by the Malaysian House Price Index (MHPI) has recorded an increase of 9.1% per year, outpacing the increase in the annual average of 3.2% for the last 10 years. During the same period, banking financial for acquisition and development of properties has increased in annual growth and double-digit rate since February 2008. Bank lending (including holdings of debt securities by banks) is more focused on the real estate market, especially in the residential segment. Aggregate financing by the banking system for procurement and property development amounted to RM454.3 billion or 41% of total financing in the end of 2012, while holdings of private debt securities (private debt securities, PDS) by the bank amounted to RM4.6 billion.

Bank exposure to the property market residence of residential properties stood at RM303.9 billion or 27.4% of the total banking system loans (2011: RM269.2 billion), while total RM19 billion is working on capital loans and bridging loans for construction property. However, the market lending for purchase of residential property is competitive and relatively evenly across all institutions, with the index Herfi Dahl-Hirschman normalized (normalized Herfi Dahl-Hirschman Index, HHI) are valued at 00:08 at the end of the year 2012. As a preliminary step, macro prudential policy introduced by the Bank at the end of the year 2010 to address the issue of development of the property sector is not sustainable. This measure is accompanied by a more rigorous regulatory oversight practice of bank lending without any signs overall easing in prudent lending. Banking industries has taken initials action to address shortcomings in the practice of pricing housing loans in some banking institutions. The assessment has been made by the Bank to find the risks of financial stability due to the price changes in housing market. Impaired financing system banking (impaired financing) for the residential property sector remained low at 1.9% of the amount of financing for the purchase of residential property (end of 2011: 2.3%).

Housing price index is always used to differentiate the changes in living cost for one year to another by comparing the average price of a basket of goods between two periods. The housing price index is also used to indicate how much the house price is change over the time. As a way to overcome the heterogeneity of houses, Keng (1997) suggested that by

using hedonic approach to the Price Index, it is enables a full appraisal of the effect of housing attributes on house prices. Cocco (2004) indicates that housing is the largest investment in the most country. Hence house price risk can be considered to be major financial risk and suggested public and policymakers monitor the housing price development closely.

The instability in housing price has significant affect in the economic conditions of the population and society as well affecting housing growth in the market. Therefore, the housing price tends to increase because of imbalance demand between buyers and sellers where the number of buyers is relatively more than seller. This will lead to a self-fulfilling speculative of the price bubble (Tse, 1999; Levin & Wright, 1997). Glindro and Vic (2010) found a correlation between price bubbles with the house price overvaluation. This is due to the resistance in the house market that includes the lags in supply and credit market imperfections, which caused the house prices to deviate from its values in the short term.

Interest Rate

It is the interest that charged by lenders as a compensation for the loss of the asset use. Base Lending Rates (BLR) is a minimum interest rate that is calculated using a certain formula by the financial institution which is takes into the account for institutions cost of funds and other administration costs. Tan (2010) in his study concluded that the best key determinant for residential housing activities in Malaysia is base lending rates. However, when there was a mismatch between current and desired housing of all household, the changes in price of house may not necessarily influence by the residential housing activities in the country.

In addition, the interest payment also will be increase if the interest rate is higher. Therefore, this will lead to the reduction in the supply of credit to households (De Greef, & De Haas, 2000). Similarly, Barakova, Bostic, Calem, and Watcher (2003) argue that the availability of credit will cause the demand for housing to increase when the household are borrowing constrained. As a matter of fact, the increase in demand will give impact to the increase in housing prices since the relationship between housing price and household borrowing is two sided. Zhu (2004) strictly mentions that the economic growth, inflation, interest rates, bank lending and equity price has significant on the determinant of housing price. Therefore, this hypothesis was developed:

Hypothesis 1

H_1: There is a significant relationship between housing price and interest rate.

Inflation Rates

During inflation, the price of goods and services is rise and the value of currency is reduced. Put differently, as inflation rises, every dollar you own buys a smaller percentage of a good or service. Therefore, with the reducing unit of currency people can only buy fewer goods and services. It is usually measured by Consumer Price Index (CPI) and Producer Price Index. CPI is a comprehensive measure that is used to estimate the price changes in a basket of goods and services that represent the consumption

expenditure in an economy. The percentage in the index over a period of time gives the amount of inflation over that specific period. Zhu (2004) in her study concluded that there was strong and long-term relationship between inflation and housing price. Inflation affects different people in different ways, with some benefiting from its effects at the expense of some who lose out.

According to Walentin (2014) the decrease in house price means that the opportunities for households to borrow will fall and that the consumption and inflation therefore react more strongly to the monetary policy. Meanwhile, Christiano and Fitzgerald (2003) argue that a positive shock in inflation and employment will increase the real housing prices and will lead to lower demand for housing. It must be noted that increasing in money supply during inflation makes the house price to increase. Tan (2011) added that the economic factor that relates with the housing price in Malaysia includes per capital income, unemployment rate and inflation rate.
Piazzesi and Schneider (2009) in their study stated that there is a positive relationship between housing price and inflation rates. They commended that higher expected inflation tends to lead to an increase in the price-dividend ration on houses. However, a study done by Tan (2011), revealed that the inflation rates has moderate negative value with housing price or in the other words, inflation rate is not significant determinant of housing price. Thus, this hypothesis was developed:

Hypothesis 2
H1 : There is a significant relationship between housing price and inflation rate.

Gross Domestic Product (GDP)
The gross domestic product (GDP) is a comprehensive scorecard of the country's economic health. GDP represents the market value of all goods and services produced by the economy during the period measured, including personal consumption, government purchases, private inventories, paid-in construction costs and the foreign trade balance (exports are added, imports are subtracted). Usually GDP is calculated in annual basis. GDP consists of the total value of the nation's production and is made up of purchases of domestically produced goods and services by individuals, businesses and the government. This will include all the public and private consumption, government outlays, investment and export less value of import within a define territory.

Numerous studies have used gross domestic product to show economic conditions because of the relationship between the macroeconomic activity and the housing price. In addition, the demand for house will give positive increase in housing industry investment and can help to recover the GDP growth rate (Qing, 2010; Wheller and Chowdhury, 1993). GDP is the most popular indicator in macroeconomics used by researchers to represent economic condition (Maclennan & Pryce, 1996). According to Hii, Latif and Nasir (1999), fluctuations in GDP significantly related to the number of various type of houses construction. That means buyers are not influenced by the GDP when making buying decision. However, a study by Ley and Tutchener (2010) on house price movements in eight metropolitan areas in Canada stated that growth in GDP rate towards housing prices was significance increased.

There are too many arguments by other researcher which is differs with one another on how GDP rate give impact to the price of house. Therefore, everyone will bring the attention to find out the most significant driver on the housing market. Thus, the hypothesis was developed:

Hypothesis 3
H_1 : There is a significant relationship between housing price and gross domestic product.

METHODOLOGY

The below framework is formulated to explain the relationship of the independent variables and dependent variable.

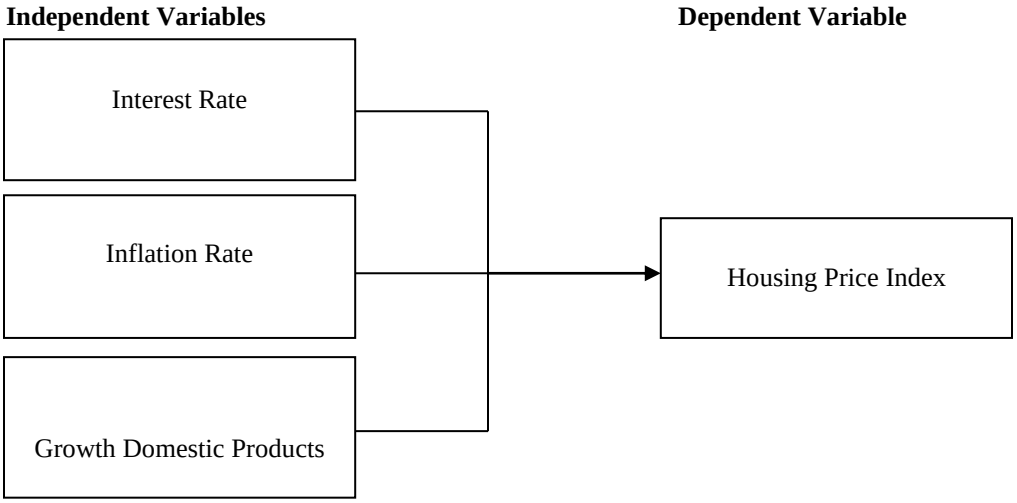

Figure 1: Diagrams for the Theoretical Framework

This study uses time-series data for four variables which is collected on quarterly basis that covering 14-year period from year 2005 through 2019. The data was collected and computed based on their historical accounting from Bursa Malaysia, Bank Negara Malaysia, Department Statistic of Malaysia and also Valuation and Property Services Department. The housing price index is used as an indicator to measure the factor influence on the housing price. While interest rate is measure using base lending rate (BLR), consumer price index is used to measure inflation rate and GDP per capita is used to represent the income. The time series data methods are employed written as follow:

$$(HPI_t) = \alpha + \beta 1\ (INT_t) + \beta 2\ (INF_t) + \beta 3 ln\ (GDP_t) + \varepsilon$$

Equation 1
Where:

- HPI = House Price Index
- INT = Interest Rates
- INF = Inflation Rates
- GDP = Gross Domestic Product

- *ln* = log natural
- α = constant term
- ε = error term

Descriptive statistics has been used to give fundamental idea on the characteristics for each variable. Augmented Dickey Fuller (ADF) test was used in order to examine the stationary level for each variable. Further analysis has been done based on value stated by FPE, AIC, HQIC, and SBIC indicators. Since all variables did not station at the first difference, second difference should be done in order to makes all the variables stationary. After all the variables have been stationary at second difference, Vector Error Correction Model (VECM) was chosen to investigate long run relationship between the variables.

DATA ANALYSIS AND DISCUSSION

Descriptive Statistic

Table 1: Descriptive Statistics

STATS	HPI	INT	INF	GDP
mean	128.4927	6.360179	92.75357	140024.1
max	194.4	6.79	108.9	206334
min	97.9	5.51	80.3	85033
Std	25.77504	0.36797	9.045319	37120.01
cv	0.200595	0.057855	0.09752	0.265097

Based on the Table 1, it shows that the entire variables have the positive mean which indicates the average value of each stated variables. Overall, in the average, Housing Price Index (HPI) in Malaysia is 128.49 with the standard deviation of 25.78. The minimum and maximum of HPI are 97.9 and 194.4 respectively. The result shows that the higher coefficient of variation is gross domestic product while the lower is interest rate. Therefore, interest rate is the most consistent variable by having a lower value in coefficient of variation (CV). From the result, the dispersion gap between variables is consistent since the value in CV does not show large dispersion gap between each variable.

Stationarity Test (Unit Root Tests)

To prove the stationarity status, the study employs ADF unit root test for all variables at first difference to determine the series order of integration which is stationary for the series. After employ Johansen cointegration test, all variables are stationarity at I (1).

Table 2: ADF unit root test

Variables	Level	1st difference	Stationary at
HPI	1.0000	0.0002*	I (1)
INT	0.2945	0.0000*	I (1)
INF	0.9926	0.0000*	I (1)
GDP	0.8423	0.0000*	I (1)

*represent that the variables is stationary at 5% significance level.

From the table, it can be concluded that all variable is significant at first difference level since the value for all variables are less than 5% significant level. Thus, the values for all variables approve to proceed to the next step.

Cointegration Test

Table 3: Lags Order Selection Criteria for Vector Auto Regression (VAR)

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-326.787				5.0559	12.972	13.0299	13.1236
1	-14.7273	624.12	16	0.000	.000046	1.36185	1.65135	2.11943*
2	8.09434	45.643	16	0.000	.000036	1.09434	1.61543	2.45798
3	31.3743	46.56*	16	0.000	.000028*	.80885*	1.56153*	2.77855
4	36.9823	11.216	16	0.796	.000044	1.21638	2.20066	3.79215

Referring to Table 3, lag 3 has the most star compare to lag 1 which is only one star. Johansen cointegration test can only be conducted if all variables are integrated at the same order. Moreover, it is also capable in determining more than one cointegrating vector. Therefore, if there are one or more than one cointegrating vectors, then the long run combination among the variables can be found, even though they may drift apart in the short run.

Table 4: Johansen Test for Cointegration

Johansen tests for cointegration

Trend: constant — Number of obs = 52
Sample: 2000q4 - 2013q3 — Lags = 3

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	36	4.188321	.	55.3369	47.21
1	43	19.066243	0.43573	25.5810*	29.68
2	48	27.322486	0.27207	9.0686	15.41
3	51	31.397625	0.14507	0.9183	3.76
4	52	31.856768	0.01750		

Table 4 shows the result obtained by using Johansen Cointegration Test. According to Parlow (2010), by looking at the * value, there is no cointegrating relationship if the * is detected at 0. This study however finds out that the * is not fall on zero. As a result, there is a cointegrating equation in the model. The result shows that the 5% critical value is at Rank 1. It means that, there is one cointegration relationship that can be derived from identified variable. In other words, the housing price and other variables move closely to achieve the long run equilibrium. Since independent variable co-integrated, it is essential to figure out the significance of co-integration relationship.

Table 5: Vector Error Correction Model VECM Estimation

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	3	30.48158	0.0000

Identification: beta is exactly identified
Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
y_hpi	1	.	.	.	.	.
x1_intr	239.1703	60.98332	3.92	0.000	119.6452	358.6954
x2_cpi	65.7119	12.5473	5.24	0.000	41.11965	90.30415
lnx3_gdp	-1516.18	315.7956	-4.80	0.000	-2135.128	-897.2318
_cons	10579.02	.	.	.	.	.

Table 5 shows that the result for the Cointegrating Equations Test. It is proven that there is a significant long run relationship between three variables and the dependent variables because the P-value of all variables is significant at 1% level. Thus, null hypothesis is rejected, which means that the interest rates, inflation rates, and gross domestic product are significant in influencing the growth of housing price in the long run. Furthermore, p>chi2 is 0.0000, meaning that the variables could also effectively influence the movement of housing price in long run. The most influential macroeconomic factor for the housing price is the inflation rate which is 5.24. Thus, the results show the highest value of z. In order to overcome the issues of elasticity and the direction of relationship between variable, the result is extracted and expressed in the following co-integration equation as below:

The estimated co-integrating equation is derived as follows:

$$\mathbf{HPI = -10579.02 - 239.1703\ INT^{***} - 65.7119\ INF^{***} + 1516.18\ \textit{ln}\ GDP^{***} + \varepsilon}$$

Equation 2

Note: * denotes 1% significance level**

Based on the equation 2 above, there is a negative and significant relationship between interest rate and house price. The result shows 1% increase in interest rates will decrease 239.1703% of house price in Malaysia. The result is consistent with those studies of Barakova (2003) and Zhu (2004). When there was a better availability of credit it will increase the demand for house when household get opportunity to borrow.

Regarding inflation rate, the above equation presents a trend value at 65.7119. It means, 1% increase in inflation rate, will decrease 65.7119%in house price. The inflation rate has negative relationship with the house price because when the inflation rate increases, the house price decrease. This result was supported by Tan (2011) who found that the inflation rate is not significant determinant of housing price. During higher inflation situation, the prices of house become decrease than usual due to the lower of purchasing power. Demand and supply theory are discussing that the price will decrease

if there is no demand. Hence, the inflation and housing price relates each other in negative way.

GDP move directly to the housing price in positive way. A 1% increase in gross domestic product (GDP) will increase 1516.18% in housing price. Therefore, there is a positive relationship between these two variables by means, when the GDP increase, the housing price will increase. The findings support to those of Ley and Tutchener (2010), Qing (2010) and Wheller and Chowdhury (1993) previous study. As a conclusion, a country with higher GDP is a good sign of healthy economy, thus contributing in increasing the demand of housing. Thus, this study suggests that the higher GDP will positively affecting the housing price in the long run.

CONCLUSION AND RECOMMENDATION

The purpose of this study is to find out whether there is significant relationship between the stated variables. Therefore, 14-year period from year 2005 through 2019 has been chosen to meet the objectives of this research. Specifically, the objectives stated in this research has been observed and achieved successfully. The study successfully proved that in the long run relationship, when cointegration test has been applied, the independent variables (interest rates, inflation rates and gross domestic product) are significant with housing price as dependent variable which is 0.0000 at 1% significant level. The result showed that all of these variables were influenced to the fluctuations and the growth of housing prices in Malaysia. Through the equation derived, the interest rate and inflation rate have negative relationship with housing price while gross domestic product show positive relationship with housing price. Generally, from the finding in the long run relationship, we can see that not all the independent variables are consistent with the economy theory. This indicates all economic indicators are important factors, which will influence the changing and performance of the housing prices in Malaysia. This study has identified the last objective by showing the highest value of z is inflation rates as the most influential factors of the housing price in Malaysia. When this study was conducted, the data gathered for HPI only in quarterly basis and the data available from 1999 until current year. To get a better result, further researcher is advised to take longer period of time in carrying out the study because it may influence the result of the study and more accurate the result will be found. Therefore, more research about housing price is needed in order to oversee the changing of housing price year by year based on different independent variables.

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