**PLANNING MALAYSIA:**
*Journal of the Malaysian Institute of Planners*
**VOLUME 20 ISSUE 1** (2022), Page 112 – 124

# THE IMPACT OF MONETARY POLICY ON HOUSING AFFORDABILITY IN MALAYSIA

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## Abstract

Housing affordability is a global concern, especially among researchers and policymakers around the world in both developed and developing countries. In Malaysia, it has been a decade since the median multiple house price reaching more than a tripled median household income threshold in term of housing affordability. This indicates that housing in Malaysia is seriously unaffordable. In general, this study was conducted to examine the impact of monetary policy on housing affordability in Malaysia. This study focuses on investigating both short and long-run relationships between money supply and interest rate on housing affordability. To achieve this goal, Autoregressive Distributed Lag (ARDL) estimation techniques were employed on a quarterly data from the first quarter of 2008 until the first quarter of 2021. The findings showed the existence of long-run cointegration between all indicators except for the interest rate. In addition, money supply, interest rate, and employment were found to be significant in the short run. In the matter of policy implication, it is best for policymakers to focus on regulating money supply rather than controlling interest rate in promoting housing affordability.

***Keywords**:* housing affordability, monetary policy, money supply, interest rate

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## INTRODUCTION

Monetary policy is a mechanism or instrument used to control the money supply and interest rates in an economy (Zakaria, Sarmidi, Mohd Salleh & Othman, 2013). This policy is adopted by the monetary regulator of a country with the ultimate goals of maintaining price stability, and supporting the sustainable growth of the country (Bank Negara Malaysia, 2020). Interest rate, reserve requirements, credit policy, and open market operations serve as the main instruments of governmental intervention to economic activities through the monetary policy to achieve the goals (Xu & Chen, 2012).

Expansionary monetary policy is employed by the regulator to upsurge the money supply in the market by reducing the interest rate, decreasing reserve requirements, and purchasing government security. In contrast, contractionary monetary policy is the one that tends to restrict the supply of money through the selling of government securities, increasing the interest rate, and raising reserve requirements (Naylor, 1967). Nevertheless, the uses of the instrument differ among countries depending on the development level of the money and capital markets of the country (Karim, Harif & Adziz, 2006). In Malaysia, the Central Bank of Malaysia or Bank Negara Malaysia (BNM) has control over the monetary policy, so long as they comply with the Central Bank of Malaysia Act 2009 (Bank Negara Malaysia, 2020).

Recently, the housing market and the monetary policy have shown their links between each other, leading to the reception of an enormous amount of attention from investors, academicians, and policymakers around the world – regarding such connection (Reed & Ume, 2013; Ume, 2018). This is due to the vital role of monetary policy that plays its part as the engine of a country's economic growth (Yu & Zhang, 2019). In addition, monetary policy is an essential instrument which bridges the government's interventions towards economic activities in Malaysia.

Nevertheless, most previous studies explored the issues of monetary policy on macroeconomic determinants, market dynamics (Wilhelmsson, 2008), housing prices, monetary policy transmission, and credit channels in the housing market (Yu & Zhang, 2019), but studies on the empirical relationship between monetary policy and housing affordability are still scarce. This motivates and justifies the need for this study to empirically unveil their relationships (monetary policy and housing affordability) especially in the Malaysian context that has not been empirically tested to date. The understanding of their relationship is crucial to ensure the formulation of effective policies in addressing the problem of housing affordability (Squires & Webber, 2019).

Money supply and interest rates play a significant role in influencing the level of housing affordability. The definition of money supply is the complete money value that runs around an economy at a point of time, entailing the currency, printed notes and deposit accounts' money, along with those of liquid

assets. A rise in the money supply will lead to an increase in consumer spending, as there is more capital available in the economic system and sequentially leading to a higher price (Liu, 2013; Taghizadeh-Hesary, Yoshino & Chiu, 2019) which therefore, worsen the housing affordability. Figure 1 shows the rising trend of money supply in Malaysia from 2010 to 2020. The value of the money supply in 2017 increased to RM1736440 from RM1655220 million in 2016. The amount of money supply continued to increase for another two consecutive years by 8.3 per cent (RM1894520 million) in 2018, and 3.5 percent (RM1961550 million) in 2019. In 2020, the amount of money supply continued to increase by 4 per cent to RM2040993 million.

In Malaysia, the Overnight Policy Rate (OPR) that is benchmarked for the interest rate is determined by the Central Bank. A higher OPR will increase the bank's lending rate along with the cost of borrowing – which ultimately worsens the housing affordability level. Figure 1 shows an irregular rising and falling of OPR in Malaysia. In 2009, the OPR was set at 2.00 and it increased tremendously to 2.75 in 2010. The OPR continued to rise to 3.00 in 2011 and 3.25 in 2014. However, the OPR decreased slightly in 2016 by 0.25, but it remained above 3.00 and rose again to 3.25 in 2018. In 2019, the OPR was marginally reduced to 3.00 before plummeting to 1.75 in 2020. This trend may affect the housing affordability as households will face hardship in securing a loan to purchase their house.

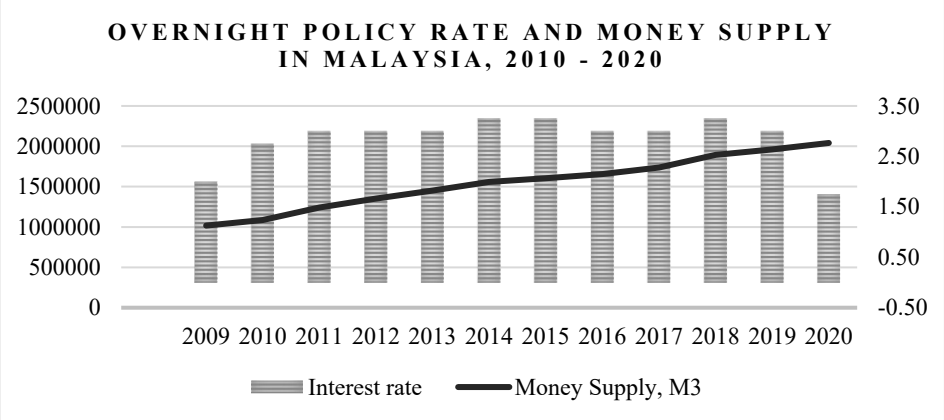


**Figure 1**: Overnight Policy Rate and Money Supply, M3 in Malaysia, 2010 – 2020
*Source: Bank Negara Malaysia, 2021*

Against this background, the effects carried by monetary policy on housing affordability were examined, hoping that the results carry a substantial weight to the comprehension of the effects carried by monetary policy on housing affordability. Such understanding allows policymakers to either review existing

policies or develop new strategies that are more applicable in improving housing affordability in Malaysia.

## LITERATURE REVIEW

Monetary policy may affect housing affordability through various channels such as the interest rate, money supply, and the bank's credit policy (Xu & Chen, 2012). Firstly, when the central bank modifies the long-term benchmark bank loan rate, the interest rate and demands for loans will also experience shifts, which impact the real estate's condition. Hui & Yue (2006) argued that monetary policy through the rise of interest rates would cause a decrease in housing demand that eventually leads to the depreciation of house price and vice versa. Other markets of financial assets could be substituted by the housing markets in which the investors will transfer their portfolio from housing to other financial assets if the return available is higher due to the rise of interest rates. This will cause a decline in housing prices and an increase in the ability of buyers to purchase houses, until the balance of returns from holding distinct classes of assets is achieved (Elbourne, 2008). This is further explained by Zhu, Betzinger, & Sebastian (2017) in their study where the higher mortgage interest rate builds a reduction in the real estate market and consequently carries an impact on housing affordability level. Secondly, the level of interest rate may be increased or decreased due to money supply change; hence, will affect the ability of making loans from commercial banks. In addition, changes in interest rate will lead to the change in spending and saving patterns; thus, will affect the decision on purchasing houses (Damen, Vastmans, & Buyst, 2016). Interest payment constitutes a significant portion of the cost of property purchase, a high number of interest rates can cause a fall in the demand of housing which results in house price depreciation and vice versa (Elbourne, 2008). Thirdly, through mortgage down payment requirements, the central bank can encourage or discourage the supply of mortgage credit in the housing market. The ability to purchase houses declines if the mortgage down payment requirement is high.

Studies by Liu & Liu (2010), Liu & Liu (2012), Xu & Chen (2012) and Yu & Zhang (2019) found a significant relationship between monetary policy and housing affordability. Nevertheless, they conflict with the results of studies conducted by Squires & Webber (2019), and Wadud, Bashar, & Ahmed (2012). Liu & Liu (2010) empirically studied the consequences of monetary policies on housing affordability in eight capital cities of Australia, and they discovered huge effects on housing affordability when the monetary policy changes, as the adjustments of money supply and interest rate happen. Specifically, this study that uses the Structural Vector Autoregression Model (SVAR) on the data from 1998 to 2009 found positive effects carried by the money supply on the housing affordability in Australia, while interest rate brings a negative influence on it. The justification of the conventional macroeconomic theory fits this finding.

Furthermore, Liu & Liu (2012) found that expansionary monetary policy played a role in influencing housing affordability in Australia when interbank rate is decreased, while the money supply is increased. It significantly caused a reaction on the pricing of houses in eight major cities. This is because expansionary monetary policy allows residents of Australia to have easier access to apply for housing loans which therefore, expand the demand for housing and increase the price of houses. Affordability and house price volatility are inseparable (Maclennan, 2008), in which an increase in housing price may mean a decline in affordability across the regions and vice versa (Gan and Hill, 2009; Hui & Yue, 2006).

Xu & Chen (2012) verified the vital role played by monetary policy on housing affordability issues in China. The empirical evidence of this study suggests that monetary policy actions through the instrument, including long-term benchmark bank, loan rate, money supply growth, and mortgage credit policy are the main reasons why house prices are experiencing changes, and this phenomenon is growing across China. Thus, when a decision is made about the process of monetary policy, it is vital to be concerned with housing development.

As monetary policy receives adjustments, some major political issues could build up and affect housing affordability. This is consistent with the latest study by Yu & Zhang (2019) in China who employed the ARDL bounds testing approach and error correction model. The result showed that bank lending growth rate, money supply and inflation growth positively influence housing price growth, while reserve requirement ratio and benchmark lending rate carry negative impact on housing price growth in the long run. Nonetheless, the bank's lending offers, money supply and inflation will affect the price of housing positively, but it reacts negatively to reserve requirement ratio in the short run.

In contrast, a study by Squires & Webber (2019) revealed that there was no statistically significant relationship between monetary policy through its instrument mortgage rate and housing affordability. The research that uses the trajectory regression technique concluded that the regional house affordability trajectories were irresponsive to mortgage rate changes. They also questioned the adequacy of monetary policy through mortgage rate to deflate house affordability bubbles in New Zealand and believes that housing affordability could now be more in tune with conspicuous consumption activities that housing wealth affords. Wadud, Bashar & Ahmed (2012) found that contractionary monetary policy significantly limits activity in the housing market but does not exert any significant adverse effect on the real house price in Australia.

The discrepancy in these research findings is consistent with Reed & Ume's (2019) view that the consequences of monetary policy are not symmetrical across varied segments in the economy because of the differences in regional economic background, the use of various indicators as well as the application of mixed analytical methods between these studies. The degree of responsiveness

for the housing sector towards monetary policy can be varied from time to time and across nations (Berger-Thomson & Ellis, 2004). The past research have shown that both money supply and interest rate are the two critical instrumental variables of the monetary policy.

## RESEARCH METHODOLOGY

This study uses secondary data extracted from numerous credible sources such as National Property Information Centre (NAPIC) for housing price in Malaysia, Department of Statistic Malaysia (DOSM) for Gross Domestic Product per capita (GDPP), and employment rate and Bank Negara Malaysia (BNM) for interest rate, money supply, and inflation rate. The time series data used is on a quarterly data which involved 61 observations starting from the first quarter of 2006 until the first quarter of 2021. Data of money supply is expressed as the natural logarithm to normalise the data and reduce possible heteroscedasticity. Other variables such as housing affordability, interest rate, employment rate, and inflation rate are expressed without logs due to their percentage/index/ratio forms. Table 1 summarizes the measurement of all variables used in this study.

**Table 1**: Measurement of Variables

| Variables | Classification | Data Measurement | Unit | Sources |
|---|---|---|---|---|
| Housing Affordability (HA) | Dependent Variable | Overall House Price Over GDPP | Ratio | NAPIC & DOSM |
| Interest Rate (IR) | Independent Variable | Overnight Policy Rate | Percent | BNM |
| Money Supply (MS) | Independent Variable | Money Supply, M3 | RM million | BNM |
| Employment (EMP) | Control Variable | Percentage of Employment | Percent | DOSM |
| Inflation (INF) | Control Variable | Consumer Price Index | Percent | BNM |

This study employed the Autoregressive Distributed-Lag (ARDL) bound testing approach proposed by Pesaran et al. (2001) to measure the impact of monetary policy that is proxied by interest rate and money supply on housing affordability. The ARDL technique is said to be more flexible, attractive, and versatile than other alternative techniques (Menegaki, 2019). The key advantage of ARDL technique is the provision of more reliable results for a small sample size data, while other alternative cointegration methods like Johansen test necessitates a larger sample size for a robust estimation (Ghatak & Siddiki, 2001). It is suitable for this study which uses a small sample size of quarterly data

covering the years of 2006 until 2021. This technique also requires zero pre-testing of variables and can be applied whether the variables are stationary at levels, first differences or the mixture of both (Pesaran et al. 2001). However, ARDL cannot be applied if any variable in the study is stationary at second difference. In addition, the ARDL technique allows different variables to have different optimal number of lag terms (Laurenceson & Chai, 2003) and this technique provides Unrestricted Error Correction Model (UECM) which integrates both short run and long run equilibrium without losing any information about the long run.

For data analysis, several procedures had to be followed. It started with the test of stationarities of the data by using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test. For ADF test, the optimal lag length was selected automatically using the Schwarz Info Criteria (SIC) while for PP unit root test the bandwidth was selected by using the Newey–West method. Based on ADF and PP tests, the variables in this study were determined based on whether it was stationary purely at level I (0), stationary purely at first difference I (1) or mixture of level and first difference. This information is imperative because it is the foundation for the selection of the best statistical models that is used for analysis purposes. If the t-statistic is more than the critical value, or the probability value is lesser than selected significant level, the hypothesis $\beta = 0$ (the data are non-stationary) can be rejected; hence, indicates the series is stationary.

Next, cointegration test was used to establish a possible long-run relationship between several time series. To foresee the presence of this relationship, the ARDL bound F-test was applied based on the constructed Unrestricted Error Correction Model (UECM). Should the computed F-statistics being larger than the upper bound critical value, the null hypothesis of no cointegration will be rejected. This indicates the presence of cointegration and long run relationship between time series. If cointegration exists between all the variables tested, the next step is to estimate the ARDL model in the long run.

Finally, to ensure the reliability of the study's results, diagnostic tests were run using Lagrange Multiplier Serial Correlation (LMSC) tests to detect the presence of autocorrelation. To check the existence of heteroscedasticity problem, the White's heteroskedasticity test was carried out. If the test statistic has a probability value (p-value) lesser than selected significant level (for instance at 0.01, 0.05 or 0.1) then the null hypothesis is rejected; thus, indicating the autocorrelation and heteroscedasticity.

In addition, Ramsey Regression Equation Specification Error Test, or abbreviated as Ramsey RESET test was used to examine the possibilities of functional misspecification. The null hypothesis is rejected if the value of F-test statistics is higher than the value of F critical, indicating some sort of specification error in the equation.

Lastly, two tests proposed by Brown, Durbin and Evans (1975) namely Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUMSQ) tests were used to examine the stability of the model's parameters, across the different data subsamples. Both tests generated recursive residual charts for analysis purposes, and to test the null hypothesis of parameter constancy over the sample. The movement of the cumulative sum and cumulative sum of squares within the critical line suggests that the residual variance is stable.

## RESEARCH FINDINGS AND ANALYSIS

### Unit Root test results based on ARDL models

Table 2 unveils the results of the ADF and PP unit root tests for all variables in this research.

**Table 2**: ADF and PP Unit Root Test

| Level I (0) | ADF Unit Root | | | | PP Unit Root | | | |
|---|---|---|---|---|---|---|---|---|
| | Intercept | | Intercept and Trend | | Intercept | | Intercept and Trend | |
| HA | -2.602 | * | -3.899 | ** | -2.351 | | -3.839 | ** |
| LNMS | -2.503 | | -0.891 | | -2.316 | | -0.983 | |
| OPR | -2.186 | | -1.156 | | -1.777 | | -1.759 | |
| INF | -2.725 | * | -3.140 | | -2.949 | ** | -3.416 | * |
| EMP | -0.924 | | -2.604 | | -1.116 | | -2.604 | |
| **Level I (1)** | **ADF Unit Root** | | | | **PP Unit Root** | | | |
| | **Intercept** | | **Intercept and Trend** | | **Intercept** | | **Intercept and Trend** | |
| HA | -6.902 | *** | -7083 | *** | -11.61 | *** | -19.37 | *** |
| LNMS | -5.652 | *** | -6.158 | *** | -5.698 | *** | -6.134 | *** |
| OPR | -5.213 | *** | -5.179 | *** | -5.222 | *** | -5189 | *** |
| INF | -6.268 | *** | -6.169 | *** | -6.557 | *** | -6.389 | *** |
| EMP | -6.682 | *** | -6.921 | *** | -6.682 | *** | -6.917 | *** |

Note: ***, ** and * are 1%, 5% and 10% of significant levels, respectively.

Based on the ADF test, most of the variables are found as non-stationary at level at 5 percent significant level except for HA (at intercept and trend). However, all variables are detected as stationary at first difference at 5 percent significant level. The PP unit root test confirms that most of the variables are non-stationary at level except for HA (at intercept and trend) and INF (at intercept) but all variables become stationary purely at first difference. There is no single variable integrated at order two in which the ARDL models will not be an accurate estimator if the variable is integrated at order greater than one (Dogan,

2015). Accordingly, the cointegration test is allowed to be conducted by using ARDL estimation.

**Co-integration Test Result**

The ARDL cointegration test result is reported in Table 3. The value of F-statistics is 9.481, that is, higher than the upper value of critical bound that is 4.01 at 5 percent significance level. The null hypothesis of no cointegration can be rejected; thus, indicating the presence of long run association between dependent variables of housing affordability, and all independent variables including interest rate, money supply, employment rate and inflation rate in Malaysia. As the cointegration exists between all the tested variables, the estimation using ARDL model in both long and short runs should follow suit.

**Table 3**: Bound Test for The Existence of Co-integration

| Model | Max Lag | Lag order | F statistics |
|---|---|---|---|
| HA = F(LNMS, OPR, EMP, INF) | 1,1 | 1,1,0,1,1 | 9.481*** |
| **Critical Values for F stat** | | **Lower I(0)** | **Upper (1)** |
| 10% | | 2.45 | 3.52 |
| 5% | | 2.86 | 4.01 |
| 1% | | 3.74 | 5.06 |

Note: ***, ** and * are 1%, 5% and 10% of significant levels, respectively.

**Estimated Short-run and Long-run Analysis Results**

Table 4 displays the findings of the long-run and short-run analysis. The money supply is found to be a positive and significant influence on housing affordability at 5 percent significance level in the long run. In particular, a 1 percent increase in money supply will increase the housing affordability index by 4.917 percent. This is consistent with the findings by Liu (2013) and Taghizadeh-Hesary, Yoshino, & Chiu (2019) who explained that when money supply goes up, the consumer spending rises too, as there is more capital available in the economic system and consequently, leading to a higher price and worsening the housing affordability. In the short run, money supply displays a coefficient value of 2.423 and significantly affects the housing affordability index.

Next, the estimated coefficient for interest rate is revealed as negative but it is found to be statistically insignificant in determining housing affordability in the long run. It is based on the p-value that is relatively high at 0.069 as compared to the most common significance level of 0.05. However, the interest rate postulates a negative and significant relationship with housing affordability in the short run. Technically, increasing the interest rate by 1 percent will decrease the housing affordability index by 1.299 in the short run. The negative sign implies that housing affordability improves when interest rates are increased, and housing affordability deteriorates when interest rates are decreased. Higher

interest rates will raise the cost of borrowing, particularly in the housing sector, where interest payment constitutes a significant portion of the cost of homeownership. As a result, people are discouraged from borrowing and spending, reducing housing demand, lowering housing price and therefore, improving housing affordability in the short run.

**Table 4**: Short-run and Long-run Analysis

| Variables | Coefficient | t-stat | Prob | |
|---|---|---|---|---|
| **Long-run Analysis** | | | | |
| Money Supply | 4.917 | 6.668 | 0.001 | *** |
| OPR | -0.636 | -1.864 | 0.069 | * |
| EMP | 0.850 | 2.951 | 0.005 | *** |
| INF | 0.261 | 2.267 | 0.028 | ** |
| C | -142.054 | -3.943 | 0.001 | *** |
| **Short-run Analysis** | | | | |
| Money Supply | 2.423 | 4.770 | 0.001 | *** |
| OPR | -1.299 | -4.732 | 0.001 | *** |
| EMP | -0.54 | -3.058 | 0.003 | *** |
| INF | 0.002 | 0.053 | 0.957 | |
| ECT | -0.492 | -4.989 | 0.001 | *** |

Note: ***, ** and * are 1%, 5% and 10% of significant levels, respectively

Employment is found to be positively and statistically significant in determining the housing affordability index in the long run. The p-value recorded a reasonably low at 0.005 as compared to the significance level of 5 per cent. A 1 per cent rise in the employment rate would result in a 0.85 percent increase in the housing affordability index, indicating a deterioration of the housing affordability level in Malaysia. Furthermore, the result of this study shows that employment is significant at a 5 percent significant level and is negatively associated with housing affordability in the short run. The rise of employment rates signifies that there are more people who have a stable income; therefore, improving the ability of people to purchase a house. However, it will increase the total housing demand and housing prices in the long run; hence, reducing consumers' ability to own a home.

The study's findings indicate that there is a positive relationship between inflation rate and housing affordability at 5 percent level of significance in the long run. It demonstrates that a 1 percent rise in inflation increases the Malaysian housing affordability index by 0.261 percent. This is in line with a study conducted by Kiong & Aralas (2019) using the ARDL method, which concluded that an increase in the inflation rate will eventually result in an increase in housing prices in Malaysia. Haibin (2004) clarified that inflation would increase the price of raw materials used for the construction sector and hence,

increase the construction cost of housing projects. In response, the housing developers will increase the housing price to cover the increase in expenses. The increase in house prices will eventually decrease the ability of consumers to buy a house. This is further reinforced by Kleshcheva (2021), who concluded that inflation directly impacts the housing affordability index in Russia. He noted that the rise in the inflation rate is an indicator that housing becomes less affordable.

The estimated ECT for the model used in this study has a negative sign and is statistically significant at 5 percent significance level. More specifically, the ECT has a coefficient of -0.492 indicating that about 49.2 per cent of the disequilibrium is corrected to reach its long run equilibrium within one-year time. In summary, the model used in this study is desirable since the ECT coefficient has a negative sign, statistically significant and its value is in the range of 0 to -1 (Dhungel, 2014).

**Diagnostic Test Results**

The revealed diagnostic test results in Table 5 confirm that the model estimated in this research is valid and acceptable. First, the p-value of Lagrange Multiplier Serial Correlation (LMSC) tests is 0.478, leading to the non-rejection of the null hypothesis of no autocorrelation in the original equation. Second, the White heteroscedasticity test has a p-value of 0.147 that is higher than the significant level of 0.05 that indicates the nonappearance of heteroscedasticity in the error term. Third, the Ramsey RESET test specifies that the functional form of the model is correctly specified as the p-value (0.113) is greater than the significant level (0.05). In addition, the movement of CUSUM and CUSUMQ test statistics is within the 5 percent significant level suggesting that all parameters in the model are stable across various subsamples of the data.

**Table 5**: Diagnostic Tests

| Model | Autocorrelation [p-value] | Functional Form [p-value] | Heteroscedasticity [p-value] |
|---|---|---|---|
| HA = F(LNMS, OPR,EMP,INF) | 1.474 [0.478] | 2.613 [0.113] | 1.685 [0.147] |

## CONCLUSION

The existence of long-run cointegration between money supply and housing affordability in conjunction with its significant short-run relationship has highlighted the imperative role played by money supply in influencing housing affordability. Undoubtedly, money supply, as a monetary policy instrument, can effectively influence housing affordability. Evidently, interest rate mechanism is only effective in the short run and is inoperative in the long run for Malaysian housing market. Therefore, for urban planning and development, the intervention of BNM in monitoring interest rates as a cost of borrowing to promote

homeownership is deemed to be crucial. In the long run; however, more fiscal side policies such as increasing the government expenditure for developmental expenses and taxes in promoting homeownership, particularly if targeted to urban areas, could be seen as an alternative and thus, requires to be explored further in Malaysian context.

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Received: 13th February 2022. Accepted: 12th April 2022

 