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Promoting Housing Affordability in Malaysia: Can Islamic Finance Play a Role?

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ABSTRACT

This study seeks to investigate the relationship between affordability of home ownership in Malaysia and the role played by Islamic banks in promoting affordable financing. By establishing the link between affordability (measured by median house price/gross domestic product per capita) and total home financing by Islamic banks, the study seeks to decipher the issues of homeownership affordability. At the same time, it attempts to shed some light on the role of Islamic finance in providing a *syariah* based and *syariah* compliant alternative of a fair-priced home loan in promoting homeownership affordability in Malaysia. The study employs autoregressive distributed lag model on quarterly data from 2007 until 2014 to investigate the link between affordability and selected banking variables such as total home financing by Islamic banks and overnight policy rate. Data were extracted from the National Property Information Centre and Bank Negara Malaysia Monthly Statistical Bulletin. Our findings suggest that Islamic banking plays a bigger role in promoting affordability by offering a fair and sustainable financing. The study highlights that Islamic banking to a certain extent has managed to live up to its ideals in achieving the *maqasid al-shariah*.

Keywords: Homeownership, Housing Affordability, Autoregressive Distributed Lag, Islamic Finance, Malaysia

JEL Classifications: C22, R21, G210, E1

1. INTRODUCTION

Affordability of homeownership and affordable housing finance is a policy concern for economic growth and sustainability, particularly for a developing country like Malaysia. In the wake of a weakening currency, higher inflation rate, rising interest rates and increased economic vulnerabilities, promoting homeownership efforts has become more challenging.

Surging house prices is one of the main obstacles towards increasing home ownership affordability for any economy. In Malaysia, despite government efforts in promoting home ownership and anti-speculation measures, house prices continue to increase over the last 5 years with some variations across markets and localities. During the last Quarter of 2014, the national house price index decreased by 8.0% and decreased further to 5.4% in Q3 2015. However, the decrease in the house price index is not

significantly reflected by the actual house prices in the market. The house price hikes has by far not commensurate with the increase in income in recent years. This has indeed impacted the homeownership affordability which is commonly measured as the ratio of house prices to income.

The measure taken by Bank Negara Malaysia (BNM) in lowering interest rates for the mortgage market also bring new phases of challenges. In December 2013, the average lending rate fell to 4.56%, which in fact is significantly lower than the historic rates. The overnight policy rate (OPR) is 3% despite the base lending rate increase to 6.53% in December 2011 (Financial Overview, 2014). Despite these efforts, Malaysia's household debt increased by 12.7% annually from 2003 to 2013, reaching 86.8% of gross domestic product (GDP). Statistics from BNM also showed the ratio of household debt to GDP in Malaysia has reached 83% in 2014, compared to 70% in 2009. This figure also ranks us as having

the highest ratio of debt to GDP level for developing countries in Asia compared to Thailand (30%), Indonesia (15.8%), Hong Kong (58%), Taiwan (82%), Japan (75%) and Singapore (67%) (Ho, The Star, 2015). Amid the lower economic growth, the ratio of household debt to GDP continues to elevate to 89.1% in 2015 (BNM, 2015).

Growth in the property market seems to have stabilized in 2015 as both buyers and developers were cautious in risk taking towards speculative activities. From the demand side, the housing transaction was reported to be slower especially in the high-priced category and at the same time, there appears to be an increased in demand for the affordable homes category. Accordingly, the supply side seems to re-balance as the supply of affordable homes was increased by both the government as well as the private sectors. This measure was expected to contain a significant hike in house price (BNM, FSPS Report, 2015).

Despite the current scenario, the mortgage market for affordable homes is adversely affected for borrowers who are usually in the low to middle income groups. With more stringent lending guidelines, loan seekers who are considering purchasing their new homes might find it difficult in securing home loans as a result of a lengthy housing loan process. Coupled with the introduction of My First Home Scheme, this in a way has brought mixed signals for potential home buyers.

The continuous sharp increase in house prices has sparked many debates on the causes and determinants, its economic implications the future prospects of housing markets that are consistent with the national objective of promoting home affordability. For financial institutions, providing fair-priced home loans remains a challenge given escalating inflation rates and a moderate or stagnant income increase within the local and global economic vulnerabilities outlook.

This study therefore seeks to decipher the issues of homeownership affordability and at the same time attempts to shed some light on the role of Islamic finance in providing a syariah-based and syariah-compliant alternative of a fair-priced home loan in promoting homeownership affordability in Malaysia. It also attempts to investigate the determinants of affordability of homeownership and eligibility and their links with home financing as offered by both conventional and Islamic banks.

The next section discusses the concept of affordability based on existing literature and examines the barriers to affordability of homeownership. Section 3 highlights the Malaysian Scenario focusing on the initiatives of the government in promoting affordable homes as well as the types of home-financing offered by financial institutions. Section 4 discusses the methodology employed and the empirical models. Section 5 presents the results and analysis and finally Section 6 concludes.

2. HOUSING AFFORDABILITY

United Nation (UN Habitat, 2009) highlights the theme of the 22nd Session of the Governing Council of UN-HABITAT,

which was “Promoting affordable housing finance systems in an urbanizing world in the face of the global financial crisis and climate change”. Housing affordability remains a policy concern for any economy. The United Nation (2012) asserts the importance of affordable housing activities for economic development. It is also seen as a catalyst for economic growth and therefore there is a need for stabilizing and reducing the volatility of the housing markets.

Defining housing affordability is crucial in order to fully understand its link with affordable financing. This in turns affects the housing market, leading to economic growth and future sustainability. As shown in Appendix Table 1, the main determinants of housing affordability are income, housing and non-housing expenses, and the ability to borrow which in fact, also takes into account both income and household expenses.

The notion of housing affordability first emerged in the 1980s where it was defined as the challenge of the household in facing the housing and non-housing expenditures (Stone, 2006). However, according to Montagnoli and Nagasayu (2013), there is no explicit definition of the term “affordability.” As highlighted in Appendix Table 1, according to Quigley and Raphael (2004), the concept of housing affordability is not specifically defined since it includes a number of factors such as house price, household income both in the long and short term, and financial market imperfections. Meanwhile, Gans and King (2004) explains that long term affordability is normally a situation when there is unlikely for individuals to have sufficient income to pay for a house while short term affordability is concerned with those who have sufficient income to purchase a house but face short term restrictions in financing it. Based on Appendix Table 1, the concept of housing affordability is generally associated with income, costs related to housing expenses and the ability to borrow. Ndubueze (2007) further elaborates that housing affordability covers not only housing per se, but also on the quality of housing, and whether there is sufficient remaining balances for the households to spend on other necessities.

Affordability can also be measured in terms of how much a household is able to pay for the monthly loan repayment to the financial institutions. Baqutaya et al. (2016), Litman (2015) and CSD California (2013) unanimously agree that housing affordability is achieved when households pay no more than 30% of their income for housing including utilities.

In Malaysia, affordability can be defined as an expression of social and materials experiences of middle income households in relations to their housing situations (Aziz et al., 2009). They found that each state has different levels of middle income group (low-middle income, middle-middle income and upper-middle income) and affordability. Aziz et al. (2009) further asserted that there is a mismatch between affordability and house price for the middle income group which leads to unaffordability of homeownership.

MacDonald (2011) expresses housing affordability in Malaysia in terms of the monthly loan installment which must not exceed

1/3 of the gross monthly household income. If the household has spent more than 30% of their income on housing, it will fall under housing stress category.

Meanwhile, Md Sani (2013) echoes the definition by Ndubueze (2007) that housing affordability is the ability of the households to pay the price of the house, i.e., monthly instalment and at the same time still have a remaining balance of income for other expenses.

Against the backdrop of the above discussion, this paper adopts the notion of housing affordability as a concept that relates to income, housing expenses and non-housing expenses and at the same time can be measured in terms of the monthly loan instalment not exceeding one third of the household income.

3. BARRIERS TO AFFORDABILITY OF HOME OWNERSHIP

According to Wilson and Callis (2013), the challenges that are faced by individuals to afford a home include high debt, insufficient cash for down payment, a poor credit history and interest rates that are too high for monthly instalments to be maintained at existing level of income for the potential home buyers. Berry and Hall (2001) suggest several factors that affect housing affordability, particularly in the long run. These variables are repayments required (e.g., inflation, interest rate and real interest rate), capacity to pay (e.g., incomes and earnings), market participation (e.g., employment and unemployment conditions), payment requirements (e.g., residential prices and rents) and saving capacity (e.g., mortgage and repayments) which is the ability to increase the housing consumption.

A survey on the Gen Y housing affordability reveals that insufficient funds to pay for the deposit, increasing house prices, lack of affordable housing programs, low income received, difficulties in obtaining a housing loan, and size of the house is too small are among the factors that hinder homeownership (Bujang et al., 2015).

Md Sani (2013) also provides evidence that household income, household expenditure, type of occupation, level of education, working household and monthly instalment paid for a house are significant variables in determining affordability. By employing three different tests namely odds ratio, significance level and omnibus tests, the study also provides evidence that having

children is not significantly linked to affordability. Table 1 provides the results of the three tests carried out by Md Sani (2013).

Meanwhile, by linking affordability to mortgage financing, Trimbath and Montoya (2002) have identified three determinants of affordability which include house price, household income and mortgage interest rate. These factors are also identified by Baqutaya et al. (2016), Md Sani (2013), and Md Sani et al. (2012).

Yates et al. (2008) has illustrated the drivers of Australian housing affordability (Please refer to Appendices).

Worthington and Higgs (2013) assess the issue of housing affordability in Australia. They employ the autoregressive distributed lag (ARDL) approach and divide the variables into six groups which are housing finance, housing construction activity and costs, economic growth, demographics, alternative investment and taxation. Their findings suggest that the drivers of long run housing affordability are housing finance, dwelling approvals and financial assets. It is interesting to note that economic growth has a negative effect on short run housing affordability while taxation has a limited impact in the long run.

Our present study differs from the above studies by linking Islamic finance to affordability of home ownership. It seeks to unravel the role of Islamic finance in providing a fair and sustainable home financing to further promote housing affordability. We further posit that Islamic finance offers home financing that is not dependent on interest rate, asset based, reflecting the true value of the property, less susceptible to the speculative elements of property prices and yet reflecting the macroeconomic fundamentals without compromising on the *shariah*-compliance aspect.

From an Islamic perspective, prominent *shariah* scholars have also unanimously agreed that the use of actual rental value of property as a benchmark brings many benefits including a better reflection of the market condition and presents a true value of the property besides being free from interest. Usmani (2004) emphasizes that the rental must be determined at the time of the contract for the whole leasing period and it is permissible to have rental fixed at different phases of the tenure, provided that the rental amount is specifically determined for a specified tenure and subject to the mutual consent of both the lessor and the lessee. If the rental for subsequent phase of tenure is not yet determined at the onset of the first phase of the tenure and is

Table 1: Results of three different tests affecting

Affected	Affordability		
	Odds ratio	Significance level	Omnibus tests
Affect of affordability to own a house	Household income	Household income	Household income
	Household expenditure	Household expenditure	Household expenditure
	Types of work	Types of work	Types of work
	Monthly installment	Level of education	Level of education
	Having children	Working household	Working household
Does not affect affordability to own a house	Level of education	Monthly installment	Monthly instalment
	Working household	Having children	Having children

Extracted from Md Sani (2013)

left only at the option of the lessor, the lease is considered invalid. This view supports that of Al-Zuhayli (2003) who concludes that a sale without a price is invalid and thus renting without a price is also considered invalid. Al-Zuhayli (2003) further highlights that a sale should not comprise of uncertainty or ignorance, coercion, time restriction, uncertain specification, harm and corrupting conditions (Meera and Razak, 2009). The scholars further opine that although the use of interest rate as a benchmark is permissible, Islamic banking operators need to change their mind-set and develop their own benchmark (Meera and Razak, 2009).

4. THE MALAYSIAN SCENARIO

Khazanah Research Institute (2015) recently reveals that houses in Malaysia are moderately to severely unaffordable with median house price is in fact, 4.4 times the median household income. According to National Property Information Centre (2015), the residential sub-sector has been the prime mover of the property market in Malaysia, accounting for more than 60% of the total property transactions. The financial sector has also been supportive throughout the period of 2007 till 2014 where loans provided by banks for the purchase of residential property increased annually between 7% to almost 14%. The flexibility in terms of ease in financing, low interest rate regime, low entry and exit costs are also identified as contributing factors that lead to a sharp increase in transaction value from RM29.45 billion in 2007 to RM72.06 billion in 2013. It was also reported that this volume of transaction registered a moderate growth in 2013.

In terms of the range of house prices, the transaction of houses priced at more than RM500k registered a double digit growth since 2010. On the contrary, there seems to be a contraction in the volume and value of transactions at prices below RM200k detected in 2012 onwards. Nevertheless, houses in the price range of between RM200k-RM500k indicated steady growth during the period between 2007 till 2014. BNM (2016) also reports a demand-supply gap for affordable housing where the demand for affordable housing continues to increase in 2015 amid the increase in supply of higher-priced segment of residential houses.

As shown in Appendix Table 2, the average income increases from RM3443.94 (in 2005) to RM5000 (in 2012) where except for 2009, the average income maintains a growth rate of 6% until 2012. The house price index on the other hand, increases sharply from 5.24% in 2006 to 19.8% in 2012. While maintaining the same age group demographic factor, the amount of financing disbursed for house purchase shows a volatile trend with significant reduction in 2012 to 67% compared to an increase to 134% in the previous year.

The sharp increase in house price which does not commensurate with sufficient increase in income perhaps, have resulted in banks to be more stringent in their approval of loan applications as well as being overly prudent in their financing policies.

Against the scenario described above and compounded with the recent outlook of the economy together with the weakening of the ringgit, expected higher interest rates and increased economic volatilities, owning an affordable home is an even more

challenging task. Financial institutions particularly Islamic banks are sought to play a bigger role in providing affordable home financing to cater to the needs of the individuals as owning a house is regarded as one of the basic necessities in life. Higher-income nations like those in Gulf Cooperation Council countries normally provide social housing for the population compared to a developing country like Malaysia. While this seems to be an overly ambitious role for Malaysia, providing a fair and sustainable financing seems to be the best option at this juncture.

5. ISLAMIC HOME FINANCING IN MALAYSIA

In this section, we highlight the modes of financing offered by Islamic banks for house purchases. Malaysia has a dual banking system where the Islamic banks operate side-by-side with the Conventional banks. The first Islamic bank, Bank Islam Malaysia Berhad was established in 1983. Currently, there are 16 Islamic financial institutions operating in Malaysia where all of them provide home-financing products.

In Malaysia, there are several sources that a potential buyer may seek for home financing. These sources are from private financial institutions such as conventional and Islamic banks, and financing from the public sector specifically for civil servants. The financing from the public sector is from Housing Loan Division, Ministry of Finance Malaysia or commonly known as “Bahagian Pinjaman Perumahan.” As an alternative, individuals can also withdraw their savings from the Employees Provident Fund or known as “Kumpulan Wang Simpanan Pekerja.” However, private financial institutions remain as the main sources of home financing. In this study, we specifically focus on home financing as offered by Islamic banks. The list below provides the current modes of home financing offered by 16 Islamic financial institutions in Malaysia.

Table 2 summarizes the modes of financing and the underlying contracts that are associated with the home financing products offered by each Islamic bank. The modes of financing offered are mostly based on *Musyarakah Mutanaqisah* (MM) and Commodity *Murabahah* or Tawarruq. MM or Diminishing Partnership is a relatively new innovation in Islamic home financing products which is not found in Islamic classical literature. Unlike the other products which to some extent are dependent on interest rate benchmarks, MM should be based on the actual rental value of the property and as such is deemed more *shariah-compliant*. BNM (2007) has highlighted the importance of a possible enhancement of MM Contracts and provides a recommendation for rental rate which is more indicative of the actual rental price to be considered while taking into account the competitiveness of the product.

6. GOVERNMENT INITIATIVES FOR AFFORDABLE HOUSING IN MALAYSIA

Realizing the importance of promoting affordable home ownership among its citizens, the government of Malaysia

Table 2: List of current modes of Islamic home financing

Name of Islamic bank	Facility offered	Concept
Bank Islam Malaysia Berhad	Baiti HF-i	Tawarruq
Bank Muamalat Malaysia Berhad	Wahdah Home Refinancing-i	Not stated in their website
RHB Islamic Bank Berhad	Smart Pembiayaan Perumahan 1 Hutang	Musarakah Mutanaqisah
CIMB Islamic Bank Berhad	Equity Home Financing-i	Tawarruq or Commodity Murabahah
	Variable Home Financing-i	Ijarah Muntahiyah
	Ijarah Property Financing-i	Bittamlik
Maybank Islamic Berhad	Flexi Home Financing-i	Murabahah via Tawarruq or Commodity
	Commodity Murabahah Home Financing-i	Murabahah
	HomeEquity-i	Musarakah Mutanaqisah
Public Islamic Bank Berhad	Home Equity Financing-i	Musarakah Mutanaqisah
	ABBA Financing-i	BBA
AmIslamic Bank Berhad	Home Financing-i	BBA
	Flexi Home Financing-i	
Affin Islamic Bank Berhad	Affin Home Invest-i	Musarakah Mutanaqisah
	Affin Home Assist Plus-i	Tawarruq
	Affin BNM Priority Sector Home Financing-i (For low and low medium cost housing)	
	Affin Premier Corporate Home Financing-i	
	Affin Tawarruq Home Financing-i (Under construction)	
HSBC Amanah Malaysia Berhad	HomeSmart-i	Musarakah Mutanaqisah
OCBC Al Amin Bank Berhad	Manarat Home-i	Ijarah Muntanahiyah Bithamlik
Hong Leong Islamic Bank	CM Flexi Property Financing-i	Musarakah Mutanaqisah
Alliance Islamic Bank Berhad	i-Wish Home Financing-i	Murabahah via Tawarruq
Kuwait Finance	i-Wish Flexi Home Financing-i	BBA
House (M) Berhad	Ijarah Muntanahiyah Bithamlik Asset Acquisition	Ijarah Muntanahiyah Bithamlik
Asian Finance	Ijarah Mawsufah Fi Al-Zimmah Asset Acquisition Financing-i	Ijarah Mawsufah Fi Al-Zimmah
Bank Islamic Standard Chartered	Home Financing-i	Not stated in their website
Saadiq Berhad	Saadiq My Home-i	Musarakah Mutanaqisah
Al Rajhi Banking and Investment Corporation (M) Berhad	Saadiq My HomeOne-i	
	Home Financing-i	BBA

has initiated various programs that are targeted to address this issue. Malaysian housing programs are clearly presented in the Malaysian Development Policies and the causes of affordability gap varies from the first to the present Eleventh National Plan. The National Economic Plan (NEP) was formed as a result of racial riots in Kuala Lumpur in May 1969. The ultimate aim of NEP 1971-1990 is on national socio-economic integration. The NEP was intended to promote socio-economic integration through two-pronged strategies of eradicating poverty and restructuring society so as to blur distinctions among ethnic groups by their economic functions and geographic locations. The housing programs were developed by identifying the poorest households need for affordable homes. Next, different assessments were done in the National Development Plan 1991-2000 (NDP), which were also geared towards promoting home ownership affordability among Malaysian households. However, the NDP objective needed further extension and was later pursued by the Vision Development Plan 2001-2010. During these three phases, extensive special low cost housing programs evolved and are parallel with the new strategies.

The phenomenon of the special low cost housing industry started with integrated housing programs known as Program Perumahan Rakyat and Rumah Mesra Rakyat. This is followed by the evolvement of 1 Malaysia People's Housing Program (PR1MA), My First Home (MFH) and MyHome programs which were mandated to increase the supply of affordable houses to enable home ownership among citizens. These new strategies require intensive involvement of the private sector and raise new implementation issues such as sites of the projects, financing, construction and purchasers. The list of programs and initiatives are listed in the Appendix Table 3.

Comparing MFH and PR1MA, the two channels of initiatives undertaken by the government of Malaysia, we conclude that both channels are indeed customer-friendly with flexibilities given to potential house buyers. A close scrutiny of these initiatives would shed further lights as to the efficiency and the success of these channels. However, this requires further research and thus is not within the purview of our current study.

7. METHODOLOGY

7.1. ARDL Model

In this analysis, we adopt the bound testing and ARDL model which was developed by Pesaran et al. (1996). The reason for choosing this method is because it is relatively simple and does not require all variables to be I(1) like Johansen. Moreover, this method is also more reliable for a small sample such as in our study where we only have 32 observations. In addition, Narayan (2006) reaffirms that ARDL model approach is efficient and unbiased. At the same time, ARDL cointegration model is also able to capture the short run and long run components of the model simultaneously.

Generally, ARDL requires a standard procedure which comprises stationary test and cointegration test. Stationary test can be done through unit root test while cointegration test can adopt the ARDL bound testing approach. ARDL bound testing approach requires several steps. Firstly, we need to identify whether there is cointegration between the selected variables through the error correction model procedure. Secondly, we need to estimate the long-run relationship between housing affordability and the selected variables. Lastly, we have to check for serial correlation, functional form, normality and heteroscedasticity by using the residual diagnostic test. To test the structural stability of our variables, we perform cumulative sum of recursive residual (CUSUM) and cumulative sum of square recursive residual (CUSUMSQ). The optimal lag length selected is based on the Akaike information criteria (AIC) which is considered to be equal to 2. The ARDL model used in this study can be articulated as follows:

$$Aff = \alpha_0 + \alpha_1 EMPL + \alpha_2 HF + \alpha_3 OPR + et \quad (1)$$

Where,

Aff = Affordability

EMPL = Number of Employed Persons

HF = Islamic Home Financing

OPR = Overnight Policy Rate

et = Error term

Appendix Table 4 displays the details of the variables used while Appendix Table 5 depicts the sources of data.

7.2. Unit Root Test

In this study, unit root test is used to verify whether all the selected variables are stationary at level I(0) or stationary at first differencing I(1). The existence of a unit root indicates that a particular variable is not stationary. This study applies the augmented Dickey Fuller

(ADF) test in order to test for the presence of a unit root in all variables. The regression of ADF serves to solve the problem of serial correlation at the first differences.

7.3. Variance Decomposition (VDC) and Impulse Response Function (IRF)

In interpreting the estimated linear and nonlinear multivariate time series model, VDC and IRF are used in this study. VDC provides a breakdown of the change in the value of the selected variables in a given period which arises from changes in the same variable in addition to others in the previous period. Therefore, it identifies the strength of each variable effect on housing affordability. An IRF on the other hand, traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables.

8. RESULT AND ANALYSIS

Affordable housing issues have become a greater focus of many researchers. The exact definition of affordable housing is a very complex matter, which has been the subject of various analyses and continuous debate among experts. Beyond the details of this debate, there is a general consensus about the definition of affordable housing, which is centered on the idea that “households should pay no more than 30% of their income for housing, including utilities (O’Dell et al., 2004). In this study, housing affordability in Malaysia is measured by the Median House Price over GDP per capita. Based on this calculation, Appendix Figure 1 displays the trend of Homeownership Affordability in Malaysia.

The Appendix Figure 1 depicts the level of affordability of homeownership from 2007 until 2014. Malaysia seems to be having periods of unaffordability of homeownership since 2007. This finding echoes the recent findings of KRI (2015) that houses in Malaysia are generally non-affordable. This finding justifies the needs to investigate the determinants of housing affordability and investigate the role of Islamic finance in promoting affordability.

Prior to the testing of cointegration, we conducted a pre-testing in order to determine whether or not an ARDL model should be used for the study. Table 3 presents the results of the unit root test for each variable used.

Based on Table 3, it can be concluded that consistent with Pesaran et al. (2006), our results suggest that the selected variables are integrated of order 0 or 1 and thus justify the ARDL cointegration test. Table 4 below shows the results of the ARDL cointegration tests with a selected AIC lag equals to 2.

Table 3: Unit root test

Variables	Level		First difference	
	Intercept	Trend and intercept	Intercept	Trend and intercept
Affordability	0.030815	-1.819691	-2.179868	-2.047850
Number of employed persons	-0.540734	-3.573551**	-7.002385***	-6.820822***
Total of home financing	0.619353	-3.713841**	-2.212274	-2.276262
Overnight policy rate	-2.225743	-2.558552	-3.589998***	-3.651021**

***Significant at 1% level, **Significant at 5% level, *Significant at 10% level

As shown in Table 4, the computed F-statistics for both models suggest that there are cointegrating relationships among all the selected variables at the selected lag length. The findings also suggest that in the long run, housing affordability is significantly affected by both Islamic home financing and other variables.

The next step is to estimate for the long-run coefficients of the ARDL models for Islamic home financing and conventional home loan. Table 5 presents the findings for both models.

The results show that OPR is less significant than Islamic home financing. This is due to the fact that financing by Islamic banks has stronger link to the real movement in economic activity (Yusof et al., 2011). This is further suggested by Yusof et al. (2011) whereby rental rate are suggested to replace the interest rate. In addition, Islamic Home financing is significantly linked to affordability which suggests that a significant role is played by Islamic banks in promoting affordability which is not significantly linked to interest rates.

Furthermore, our finding on employment is consistent with the findings of Davernport (2013) and Berry and Hall (2001) where they affirm that employment significantly affects housing affordability in the long run. Nevertheless, in the case of Malaysia for the period 2000 till 2014, the number of homeownership shows a drop from 67.3% to 59% despite of a decrease in the

unemployment rates from 3.5% to 3.0% in the same period (DoS).

In order to test for the stability of the long run relationship in both models, the CUSUM and CUSUMSQ tests were carried out. Based on the results shown in Appendix Figure 2, there is no evidence of any significant structural instability.

The results of the Granger Causality test in Appendix Table 6 shows two uni-directional relationships. First, there is a uni-directional relationship between employment and affordability suggesting that affordability of home financing and home financing is significantly affected by employment. This result provides support to our earlier findings based on the ARDL model. The result is consistent with our ARDL model which shows that home financing offered by Islamic banks is significant in causing affordability.

Appendix Figure 3 and Table 6 show the results of the IRF and VDC. The results of IRF show that the responses of Islamic home financing to housing affordability are not statistically significant in the short run.

VDC is an alternative method to IRF for examining the effects of shocks to the dependent variables. It determines how much of the forecast error variance for any variable in a system is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system. From Appendix Table 6, the VDC substantiate the significant role played by number of employment, Islamic home financing and OPR in accounting for fluctuations in home affordability. At the 2-year horizon, the fraction of Malaysian home affordability forecast error variance attributable to variations in the number of employment, Islamic home financing and OPR are 0.02%, 3.03% and 0.41% respectively.

The portion of home affordability variations explained by all explanatory variables continuously increase at longer horizons. Interestingly, at longer time horizons, Islamic home financing continues to explain the fluctuations in home affordability. For instance, at the 10-year horizon, the fraction of Malaysian home affordability forecast error variance attributable to variations in Islamic home financing is 7.21%. The results again strengthen the findings that Islamic home financing has a significant role in determining Malaysian home affordability.

Table 4: Bound testing procedure results

Cointegration hypotheses	ARDL model	F-statistics
$Aff = \alpha_0 + \alpha_1 EMPL + \alpha_2 HF + \alpha_3 OPR + \epsilon_t$	(1, 0, 0, 1)	10.03508***

F statistics exceeds the ***1% upper bounds; the relevant critical value bounds are taken from Narayan's (2005) Appendices A1-A3 for Case IV: With unrestricted intercept and restricted trend; number of regressors=3, number of observations=31. They are 4.29-5.61 at the 99% significance level, 3.23-4.35 at the 95% significance level and 2.72-3.77 at the 90% significance level. ARDL: Autoregressive distributed lag, OPR: Overnight policy rate

Table 5: Long-run ARDL model estimates results

Variables	Affordability _(tB)	t-statistics
C	-70.6893**	-2.38612
Number of employed persons	2.134915	0.886483
Islamic home financing	1.843609***	4.406656
OPR	0.084291	0.773445

***significant at 1% level, **significant at 5% level, *significant at 10% level. ARDL: Autoregressive distributed lag, OPR: Overnight policy rate

Table 6: Variance decomposition of home affordability

Period	SE	DAFFORDABILITY	DEPLOYMENT	DHF	DOPR
1	0.316455	100.0000	0.000000	0.000000	0.000000
2	0.334924	96.54391	0.019890	3.025832	0.410367
3	0.380396	90.38240	0.261927	6.604475	2.751198
4	0.392310	88.73873	1.246173	7.212050	2.803051
5	0.408993	82.69476	6.842052	7.131796	3.331387
6	0.410227	82.26071	7.283353	7.109679	3.346262
7	0.413482	82.33163	7.281494	7.079247	3.307624
8	0.415399	82.22015	7.342582	7.158970	3.278302
9	0.416358	81.92261	7.521202	7.205383	3.350802
10	0.416477	81.91058	7.526987	7.212535	3.349894

9. CONCLUSION

This study employed ARDL model to investigate the existence of a long run equilibrium relationship between Islamic home financing and Malaysian home affordability. The results provide strong evidence that Islamic home financing do play a role in determining the long run behavior of home affordability. The policy implication that could be drawn from this study is that the policy makers should encourage the use of Islamic home financing in financing a house. Notwithstanding the existence of various housing schemes and programs for low and medium income households, there are still various difficulties from the demand side such as difficulty in paying the deposit, house prices are too high and do not commensurate with buyers' income, lack of supply of affordable houses in the market due to low profit margin for developers, and unable to secure a housing loan. In this case, policy intervention to stimulate housing affordability must primarily focused on the demand side either by the direct provision of low-cost or medium-cost houses, by subsidizing a housing costs or by making home financing cheaper. On the other hand, policy intervention to stimulate home financing by Islamic banks for the realization of housing affordability must focus on the fairness and equitable aspects which is consistent with *Maqasid Shari'ah*.

This study has focused on scrutinizing the determinants of housing affordability in Malaysia. Demand and supply factors are the most important factors to be considered in analyzing housing affordability in Malaysia. However, this study emphasizes only three selected variables and covers only 8 year period using quarterly data. Therefore, future researchers are recommended to expand the period of the study and include additional variables from the demand and supply sides. Future researchers are also recommended to consider the supply of affordable houses as one of the housing affordability factors in their study.

10. ACKNOWLEDGMENTS

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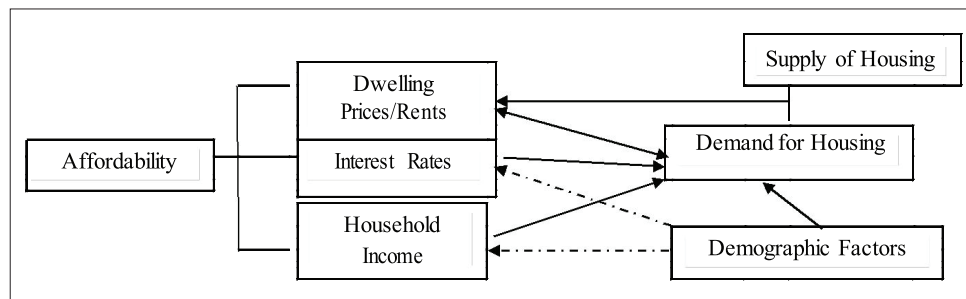
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APPENDIXES

Appendix Table 1: Housing affordability: Definitions and concepts

Authors	Year	Housing affordability: Definition and concepts										
		House prices	Quality of house	Income	Ability to borrow (loans, down payment)	Public policies on housing markets/national economy	Supply of housing	Non housing expenses	Costs related/ housing expenses	HP/I (W/O interest)	Spending less than 30% on housing	Rent/income (25%)
Lea and James	1996	x	x	x	√	x	x	x	x	x	x	x
Quigley and Raphael	2004	√	√	√	√	√	√	x	√	x	x	x
Gabriel et al.	2005	x	x	√	x	x	x	x	√	x	x	x
Hashim	2010	x	x	x	x	x	x	x	x	√	x	x
Chen et al.	2010	x	x	√	x	√	x	√	√	x	x	x
Housing Inquiry, NZ	2012	x	x	√	x	x	x	x	√	x	x	x
Tang	2012	x	x	√	x	x	x	x	x	x	x	√
US Common Service Department	2013	x	x	√	x	x	x	√	√	x	√	x
Stone	2006	√	x	√	x	x	x	√	√	x	x	x
Almaden	2014	x	x	√	x	x	x	√	√	x	x	x
Wan Abd Aziz et al.	2011	x	x	√	x	√	x	√	√	x	x	x
Litman	2015	x	x	√	x	x	x	√	√	x	√*	x
Gans and King	2004	x	x	√	x	√	x	x	x	x	x	x
Ndubueze	2007	x	√	√	x	x	x	√	√	x	x	x
Bujang et al.	2015	x	x	√	√	x	x	x	x	x	x	x
Md Sani et al.	2013	x	x	√	√	x	x	x	√	x	x	x

*Includes transportation costs (<45%)



Extracted from Yates and Milligan (2007)

Appendix Table 2: Demographic data of Malaysian population projected home ownership based on real financial indicators

Year	30-49 age group in the labour force (0.000)	Increase (%)	Bank financing disbursed for house purchase (0.000)	Increase (%)	Average income/month	Increase (%)	Sales of homes	Increase (%)	House price index change	Increase (%)
2005	5190.8	0.017	1067.9	-	3443.94		181,762	6.9	116.9	-
2006	5279.7	0.024	1688.3	58	3650.58	6.00	182,555	0.44	122.4	5.24
2007	5411.4	0.012	1683.7	-0.272	3869.61	6.00	199,482	9.3	125.9	3.5
2008	5477.0	0.026	2078.3	23	4101.79	6.00	216,702	8.6	129.0	3.1
2009	5623.4	0.027	2035.3	-2.07	4025.00	-1.87	211,653	-2.32	136.1	7.1
2010	7502.0	0.334	2292.5	12.6	4266.5	6.00	226,874	7.2	147.2	11.1
2011	6089.1	0.188	5358.4	134	4522.49	6.00	269,789	18.9	161.9	14.7
2012	6327.9	0.039	1761.8	-67	5000.00	10.56	272,669	1.1	181.7	19.8

Source: Bank Negara Malaysia Report 2006-2014; Department of Statistics Malaysia; National Property Information Centre 2001-2013

Appendix Table 3: List of programs for affordable housing in Malaysia

No	List of program	Details
1	Integrated housing program/squatters resettlement	To house squatters affected by Government development projects around the Federal Territory of Kuala Lumpur and the Klang Valley and enhanced integrated housing in the Seventh Malaysia Plan Implemented immediately due to the demand to provide housing for rent to squatters and to generate economic growth through construction sector activities The specification follows as per low cost and affordable public housing program
2	Low-cost housing program (LCH)/Rumah Kos Rendah	To provide residence for low income earners through a number of schemes, implemented by the public sector in the First Malaysia Plan and later by active involvement of the private sectors in the Fourth Malaysia Plan Targeted for groups earning RM1500 and below The estimated selling price per unit of the houses does not exceed RM42,000 and the minimum design to be specific, is as per Program Perumahan Rakyat and Rumah Mesra Rakyat Pricing and design are determined by the National Housing Department while the LCH area has to be in accordance with the guidelines of the state government
3	Housing Development Program for the Hardcore Poor/Program Perumahan Rakyat Miskin Tegar	Part of LCH program with floor area of 700 square feet, three bedrooms, two bathrooms, a kitchen, an area for drying clothes, and tiled floors The basic amenities include community halls, playgrounds, kindergartens, shops, stalls, prayer halls (surau) and parking areas The houses are priced between RM35,000 to RM42,000 per unit and dedicated for first-time home buyers aged 18 and above (no bracket), with an income of RM2,500 or below (per month)
4	Rumah Mesra Rakyat 1 Malaysia Program	Part of LCH program, to help low income groups who have no home or live in dilapidated houses, but has its own home ground The specification of the unit offered will be as minimum as PPR Applicants aged between 18 and 65 years, having a monthly income of RM3,000 and below The pricing for every house is RM70,000-RM80,000, out of which the government will be paying 2% interest on the loan subsidy
5	Jariah Charity Program	Introduced in Budget 2008 and involved funding of RM200 million shared with private GLCs for repairing dilapidated houses of hard core poor nationwide Applies the same concept of corporate social responsibility (CSR) as the private sector and this program is handled by Prokhas Sdn. Bhd., wholly owned by the Ministry of Finance

(Contd...)

Appendix Table 3: (Continued)

No	List of program	Details
6	Perumahan Rakyat 1 Malaysia/1 Malaysia People's Housing Program	Established under the PR1MA Act 2012, which was passed by Parliament on 29 November 2011, gazetted on 9 February 2012 to plan, develop, construct and maintain affordable housing for middle income households in key urban center The 2016 budget has planned around 175,000 houses that will be sold at 20% below the market price and the price range is RM100,000-RM400,000 Targeted to Malaysians with a monthly income between RM2,500-RM10,000 A moratorium of 10 years is levied on the property, during which it cannot be transferred nor sold without prior permission from PR1MA
7	Skim Rumah Pertamaku/My First Home Scheme	For those who are financially ready to own a home but not eligible in terms of providing enough down payment, as announced in Budget 2012 The house price range is RM220,000 and to the maximum of RM400,000 First home buyers are eligible to obtain 100% financing from financial institutions that will enable them to own a home without needing to pay a 10% down payment. This means that they are entitled to a loan of up to 110%
8	My Home Scheme	Announced by Dato' Sri Mohd Najib Tun Abdul Razak at the tabling of the Supply Bill 2014 in the Parliament on 25 October 2013 To encourage the private sector to build more affordable homes, incentives of up to RM30,000 per unit are given to benefit home buyers and private developers The houses are equipped with three bedrooms and two bathrooms and should be provided with basic amenities like a parking area, hall, prayer hall and a playground

Appendix Table 4: Selection of variables

Variables	Justifications
Housing affordability	Arnold and Skaburskis (1988) have used house price-to income as a tool to measure housing affordability KRI (2015) uses the median house price over the median household income to measure housing affordability in Malaysia
Number of Employed Persons	In our study, we have used median house price over GDP per capita to measure housing affordability Employment level is important to determine the potential house buyers' ability to engage in housing financing Financing from a financial institution to purchase a house requires evidence such as a pay slip and other certificates to support the application. Lack of job security and informal employment thus affect the ability for eligibility to housing financing. Based on BNM 2015, 13,835 millions of Malaysia were employed. According to the Department of Statistic, employment is defined as employed persons who work at any time at least one hour for a pay, profit or family gain either in work as an employer, employee, own account worker or unpaid family worker
OPR	The official interest rate in Malaysia is known as OPR. The decisions on this interest rate are taken by BNM. Changes in OPR trigger an effect on BLR and BFR. The BLR and BFR are usually adjusted by BNM corresponding to changes in OPR during Monetary Policy Meetings held by BNM
Total of Islamic home financing	The introduction of Islamic banking system has differentiated between Islamic instruments and conventional instruments. BNM has defined the amount of financing according to the completed price of the property. Starting 2007, BNM has segregated the total amount of home financing for conventional and Islamic financing. In Islamic home financing, the most common packages offered for home financing is <i>Musyarakah Mutanaqisah</i> and Commodity <i>Murabahah</i> or <i>Tawarruq</i>

OPR: Overnight policy rate, BNM: Bank Negara Malaysia

Appendix Table 5: Sources of data

Variables	Measurement	Period	Sources
Affordability of home financing	Median house price over GDP per capita (proxy for household Income)	1Q 2007 to 2014 4Q	National property Information center BNM Monthly Statistical Bulletin
OPR	BNM OPR-middle rate	1Q 2007 to 2014 4Q	BNM Monthly Statistical Bulletin
Number of employed persons	Malaysian number of employment	1Q 2007 to 2014 4Q	BNM Monthly Statistical Bulletin
Total of home financing	Amount of Islamic home financing	1Q 2007 to 2014 4Q	BNM Monthly Statistical Bulletin

OPR: Overnight policy rate, BNM: Bank Negara Malaysia

Appendix Table 6: Results of the Granger causality test for Islamic home financing

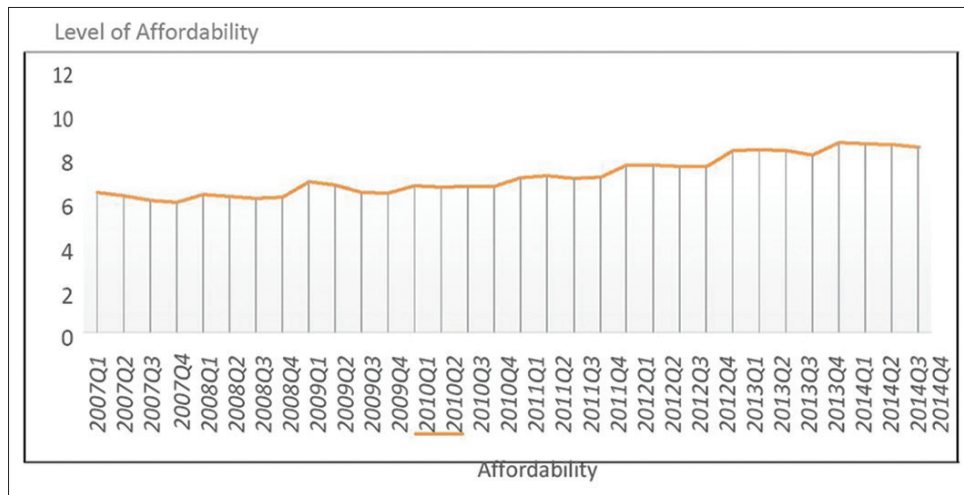
Null hypothesis	F-statistic	P
LN_EMPLOYMENT does not Granger cause AFFORDABILITY	4.18598**	0.0270
AFFORDABILITY does not Granger cause LN_EMPLOYMENT	0.98581	0.3872
LN_HF does not Granger cause AFFORDABILITY	3.44677**	0.0476
AFFORDABILITY does not Granger cause LN_HF	0.17314	0.8420
OPR does not Granger cause AFFORDABILITY	1.01892	0.3755
AFFORDABILITY does not Granger cause OPR	0.66697	0.5222
LN_HF does not Granger cause LN_EMPLOYMENT	1.83161	0.1810
LN_EMPLOYMENT does not Granger cause LN_HF	0.79301	0.4635
OPR does not Granger cause LN_EMPLOYMENT	1.63974	0.2142
LN_EMPLOYMENT does not Granger cause OPR	0.75214	0.4817
OPR does not Granger cause LN_HF	0.48978	0.6185
LN_HF does not Granger cause OPR	0.10877	0.8974

****and *denote significant at 1%, 5% and 10% significance level, respectively

Appendix Table 7: Housing affordability in Malaysia, 2014

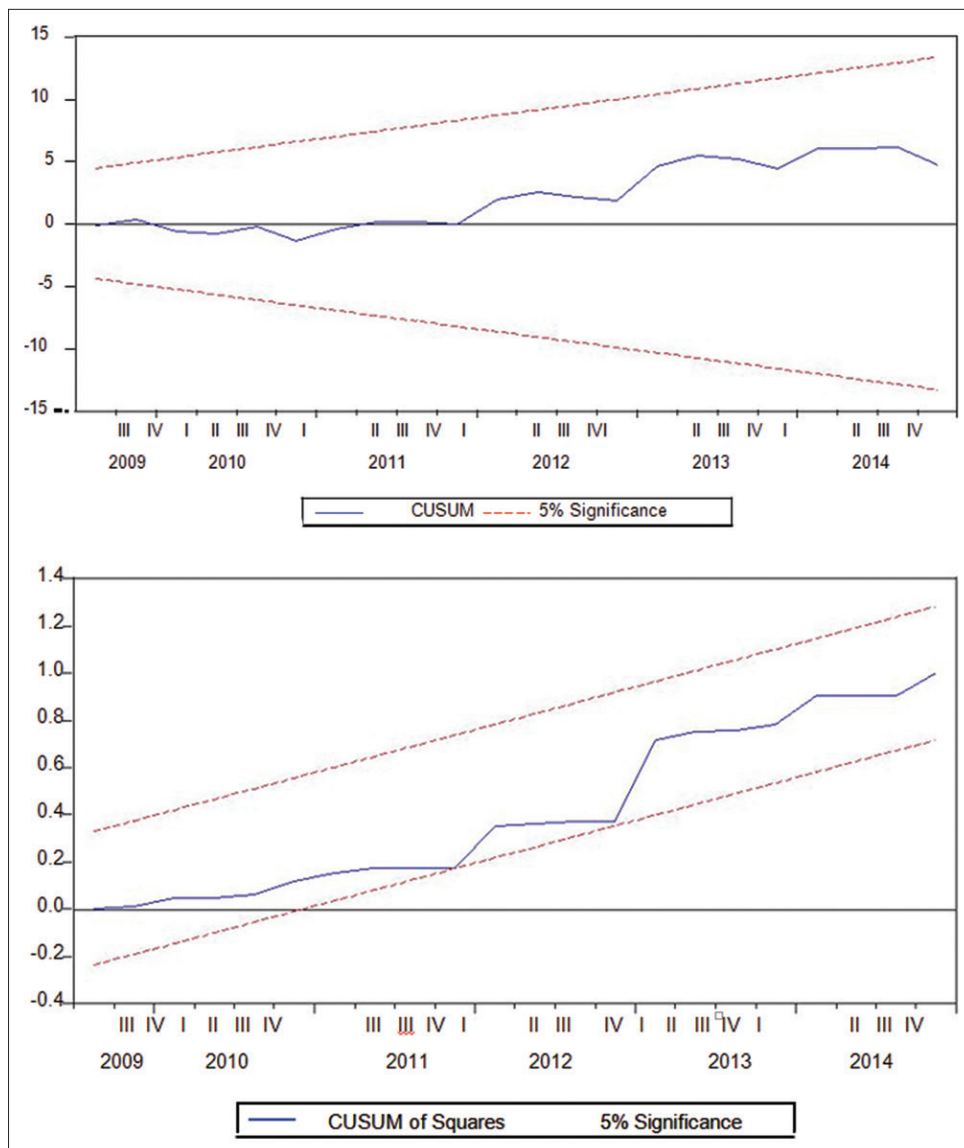
Area	Monthly median income	Annual median income	Market median – price	Median all-house price	Median multiple affordability	Affordability	Accounted living quarters by NAPIC 2010
Terengganu	3,777	45,324	135,972	250,000	5.5	5.1 over severely unaffordable	22%
Kuala Lumpur	7,620	91,440	274,320	490,000	5.4		88%
Pulau Pinang	4,702	56,424	169,272	295,000	5.2		74%
Sabah	3,745	44,940	134,820	230,000	5.1		24%
Pahang	3,389	40,668	122,004	200,000	4.9	4.1-5.0 seriously unaffordable	58%
Kelantan	2,716	32,592	97,776	157,740	4.8		16%
Malaysia	4,585	55,020	165,060	242,000	4.4		60%
Perak	3,451	41,412	124,236	180,000	4.3		57%
Perlis	3,500	42,000	126,000	181,000	4.3		34%
Johor	5,197	62,364	187,092	260,000	4.2		73%
Selangor	6,214	74,568	223,704	300,000	4.0	3.1-4.0 moderately unaffordable	81%
Negeri Sembilan	4,128	49,536	148,608	188,888	3.8		74%
Sarawak	3,778	45,336	136,008	164,667	3.4		32%
Kedah	3,451	41,412	124,236	140,000	3.4		50%
Melaka	5,029	60,348	181,044	180,000	3.0	3.0 and under affordable	64%

Appendix Figure 1: Trend of homeownership affordability in Malaysia



Source: Authors' calculation

Appendix Figure 2: CUSUM and CUSUMSQ tests for housing affordability and Islamic home financing



Appendix Figure 3: Impulse responses of housing affordability and Islamic home financing

