A Micro-Level View of Housing Affordability in Malaysia Using an Age Cohort-housing Type Analysis

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Abstract: Housing affordability has been an important issue for both developed and developing countries. Prior literature has used the price-income ratio as the main standard to assess housing affordability with the median disposable household income of the sample population commonly used. As such, conclusions drawn from macro-level analyses lack practical policy considerations. This paper attempts to address the problem in greater detail by considering age cohorts, income percentiles and different house types. The results show that for those aged 20-24 and 60-64, housing is severely unaffordable across all house types, except for the 75th income percentile group. The most expensive – semi-detached and detached housing types – remain unaffordable to all income and age groups, except for the 75th income percentile group aged 30 and above. Terrace and high rise housing types are the most affordable across each income percentile. Based on the results, we extend the housing affordability literature through recommendation of several policy measures that may ameliorate the affordability conundrum.

Keywords: Age cohort, cubic spline, housing affordability, housing types, information asymmetry, Malaysia
JEL classification: R31, R38, R21

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1. Introduction

The of-late hotly debated issue of housing affordability in Malaysia stems from the exponential increase in housing prices across the country, which has outpaced the increase in household incomes ("Key Issues Facing", 2014; Lee & Lye, 2014). The debate has also been exacerbated by variants in definitions provided by the government, industry and academic scholars, sometimes resulting in contentious conclusions made about the overall extent of affordability.

Several proposals have been implemented to bridge the affordability gap. Demand-driven proposals seek to increase the ability of households to purchase property. They include the proposal for developers to be housing loan providers, commercial banks extending the tenure of housing loans from 35 years to 40 years, and the Employee Provident Fund (EPF) allowing contributors to withdraw more of their retirement funds to buy homes (Gho & Willy, 2016). Other proposals are supply-driven, which involve providing affordable housing according to certain income target groups and new methods of construction such as implementation of the industrialised building systems (IBS) that lowers construction costs and ultimately leads to lower house prices. Apart from private sector initiatives, the government has also stepped up its role to alleviate the problem of affordability. These initiatives include the establishment of a National Housing Council (NHC) to develop appropriate measures and actionable plans to supply affordable housing ranging from RM150,000 to RM450,000, and the incorporation of Perbadanan PR1MA Malaysia (PR1MA) with the goal to plan, develop, construct and maintain high-quality housing with a lifestyle concept that is conducive to the middle-income group in urban centres ("Budget 2014", 2013).

Notwithstanding the progress that has been made by the initiatives outlined above, the goal of providing affordable housing to all across the specific target groups, such as first-time homebuyers, remains elusive, as evidenced by the 1.7 million households that have yet to own a home ("1.7 Million Households", 2013). Even government initiatives such as PR1MA have 'lost its focus' and have even allowed 'second-time house buyers' the opportunity to ballot and buy PR1MA developed housing despite a waiting-list of 1.3 million registrants (Gho & Willy, 2016; Surendran, 2016). The lack of affordable housing can lead to serious economic and emotional implications for households, especially for those in the low-to-moderate income group. For example, a longitudinal analysis of household movements in Australia found significant mental health deterioration of individuals living in low-to-moderate income households when housing costs exceed 30 percent of household income (Bentley, Baker, Mason, Subramanian, & Kavanagh, 2011). As such, the importance of understanding whether the current initiatives undertaken can resolve the housing affordability conundrum requires exploration of affordability from the perspective of house buyers.

This paper presents a micro-view of housing affordability for Malaysia over the time period from 1995 to 2014, addressing the issue at a greater level of detail by considering age cohorts and different house types, and subsequently provides case-specific policy recommendations. There are three reasons for undertaking this study. First, the micro-view stems from the premise that the issue of affordable housing should not only emphasise affordability at the median household income level but also

whether house prices are out of reach for those below the median household income (Gan & Hill, 2009). Moreover, a primary motivation for considering this micro-view is the serious concern over the uneven distributions of household incomes and housing in Malaysia (Mahalingam & Thean, 2018). This takes added importance as the Malaysian government has put great emphasis on uplifting the well-being of the bottom 40 percent household income group (B40 household) (Economic Planning Unit, 2015). Second, the level of housing affordability stress could also be unevenly distributed based on the demographics of age. This motivation stems from prior literature that different age groups experience differing levels of stress related to affordable housing (Bujang, Jiram, Abu Zarin, & Md. Annuar, 2015; Zielinski, 2016). Specifically, for the Malaysian context, prior research has indicated that those in the 24–35 year age category are especially disadvantaged when it comes to housing affordability (Khan, Mahmud, & Kamaruddin, 2012). Subsequently, by dissecting household income into various age groups, this paper provides a thorough analysis on identifying the age groups that are most vulnerable to housing affordability stress. Third, analysing the differences in affordability by type of dwelling can provide inputs for various housing supply strategies initiated by both the federal and state governments in Malaysia through the National Housing Council.

To the best of our knowledge, this paper is one of the first to address the problem of housing affordability in Malaysia through an in-depth analysis across the age-income-cohort spectrum. In contrast, prior literature have approached the issue of housing affordability from narrow perspectives such as focusing on affordability for either a specific age cohort or for a certain housing type (Ong & Chang, 2013; Tan, 2012).

The remainder of the paper is organised as follows. Section 2 describes the key definitions and common measures of housing affordability and related prior literature examining the extent of housing affordability. Section 3 describes the data used in the analysis with explanations of the assumptions used to calculate the mortgage-income ratio. The following section after provides a thorough analysis of housing affordability stress faced by Malaysian households from 1995 to 2014, and the policy implications that authorities must address. Section 5 concludes the paper.

2. Literature Review

The literature on housing affordability indicates a symbiotic relationship between house prices, which are set by the housing developer in the primary market, and the interaction between demand and supply in the secondary market, the financial standing of the house buyer, and the ease of obtaining a loan from financial institutions. Gan and Hill (2009) characterised housing affordability using a multi-dimensional approach that divides affordability according to purchase affordability, repayment affordability and income affordability. A mismatch between the three may lead to unaffordability in a home purchase. Quigley and Raphael (2004) termed affordability in a much broader context encompassing several diverse concepts such as quality of housing, government policies that affect housing market conditions, income distribution, borrowing capability of households, distribution of housing prices, supply in the primary and secondary housing markets, and lastly, household choice of how much income should be allocated for housing vis-à-vis other consumption. From these perspectives, several approaches

have been outlined in the literature to measure housing affordability that typically use a 'ratios' approach in defining the interactions between housing costs and household incomes (Paris, 2007).

The first is the median multiple approach methodology developed by Demographia International, which uses the ratio of the median house price to the gross annual median household income. This methodology is recommended by the World Bank and the United Nations (UN) and is also used by the Joint Center for Housing Studies, Harvard University. It assumes that a median multiple of 3.0 or more would be indicative of an affordable housing situation. Based on this approach, this ratio measures purchase affordability as outlined by Gan and Hill (2009). In its report, the Khazanah Research Institute (2015) found that nationally, Malaysia had a median multiple of 4.4, with cities such as Kuala Lumpur and Penang recording median multiples of 5.4 and 5.2, respectively, which categorises these cities as severely unaffordable. The advantages of using this measure stem from the ease in calculation and comprehension. Furthermore, it also allows for cross-sectional comparison among countries and trend analysis within a country. The median multiple methodology gives policymakers a firm foundation for undertaking government intervention in alleviating a housing affordability problem within their jurisdiction (Demographia International, 2017). The use of this ratio, however, is not without its disadvantages (Stone, 2006b). The primary disadvantage is that it ignores the role of borrowing. It also ignores the distribution of household income as its focus is on median incomes. Litman (2014) argued that the median multiple approach does not take into account the various types of dwellings available in urban areas and critiqued whether the actual weights of different dwelling types are accounted for in Demographia International's housing affordability surveys. At best, the median multiple approach provides a macro view of the housing market in general.

While the price-to-income indicator measures access to housing, the housing expenditure-to-income ratio (or mortgage-income ratio) measures affordability after the household owns a home (Carter, 1997; Chen, Hao, & Stephens, 2010; Murray, 1998). Considering that a high proportion of the housing expenditure would be in the form of mortgage payments, this measure views that the household should not spend more than 30 to 35 percent of monthly income on monthly housing loan payments. Kutty (2005) also postulated that it is common for households to spend one-third of their income on housing, one-third on food and the balance on clothing, education, medical services, transportation, and other goods and services. In the American context, an average U.S. household spends approximately 25 percent of its income on housing expenditure. The percentage is even higher for poor and near-poor households where typically half of available income is devoted to housing (Quigley & Raphael, 2004). O'Neill, Sliogeris, Crabtree, Phibbs and Johnston (2008) conjectured that a 30/40 rule of thumb is the benchmark commonly used in Australia where 30 percent of gross income of households in the 40th income percentile is spent on housing. This is consistent with findings by Berry (2003), Kupke and Rossini (2011), and Lerman and Reeder (1987), whereby housing affordability has become a major issue not only for low-income households but also moderate-income households, especially in urban areas. They find that the majority of households cannot afford to pay 25 to 30 percent of their income on housing. In Australia, exceeding the 30 percent threshold would be indicative of housing

stress (Lamont, 2008). In essence, this could lead to what is termed by Kutty (2005) as housing-induced poverty, which occurs when housing expenditures exceed one-third of household income for households at the poverty line. The simplicity of this method has led it to become a standard tool to measure housing affordability (for example, the U.S. Department of Housing and Urban Development measure). The disadvantage of this measure stems from the rigidity of the 30 percent threshold. Stone (2006b) argued that maintaining this rigidity would mean that non-housing expenditure would decrease should income fall. Alternatively, the ratio must decrease to zero when incomes fall (refer to Hulchanski (1995); Thalmann (2003)). The accuracy of cross-country comparisons using this ratio could also be influenced by the cost of living differences and the structure of mortgage repayments across countries (Cheah & Almeida, 2016).

Critics of both these approaches argue that the rigid ratio measure is inequitable as higher income households will enjoy greater disposable incomes (Whitehead, 1991). For example, high-income households may spend a high percentage of income on high-end housing (which can be as high as 80 percent) while still maintaining a comfortable living standard. These households cannot be said to have an affordability problem. In contrast, low-income households may spend relatively little on housing but still struggle maintaining a basic subsistence level. This is then considered as housing induced poverty. Furthermore, Hancock (1993) argued that in between these two extremes lies those households who simply choose to under-consume housing services[1] (measured against a socially-desirable level). These drawbacks have led to an increasing number of scholars proposing the use of the residual income approach (Stone, 2006a). The residual income approach as proposed by Stone (2006b) generally postulates that housing costs become an issue only when the residual income after accounting for housing expenditure fails to support a socially acceptable level of non-housing expenditure. This approach relies on identification of non-housing expenditure and on how taxes are derived (Stone, 2006b). The major advantage of this measure stems from its consideration of the leverage effect and household spending patterns. Cheah and Almeida (2016) surmised that this measure better reflects the ability of households to purchase a house. The drawback to this approach stems from the lack of consensus as to what level of socially acceptable housing expenditure would be deemed as desirable (a normative approach) (Chen et al., 2010). This makes a cross-country comparison inherently difficult. In addition, the use of this approach requires detailed information on household income, household attributes, spending patterns and housing costs, which are generally unavailable in emerging market countries such as Malaysia.

Several studies have endeavoured to document improvements in these common housing affordability metrics. Díaz and Luengo-Prado (2008) showed that using a rental

[1] From a long-term neo-classical economics perspective, there is a distinctive difference between the term 'cost' and 'expenses' when an investment good generates a flow of services (Hall & Jorgenson, 1967). In the case of housing, these services refer to housing services. Therefore, it is housing services that are consumed, not the dwelling. The cost of using or consuming housing services is derived from the purchase price of the dwelling, changes in value of the dwelling, and maintenance costs of the dwelling (Haffner & Heylen, 2011). When a household is deemed to under-consume housing services, it means that the under-consumption is more of a deliberate choice based on personal utility preferences rather than due to a budgetary constraint (Chen et al., 2010).

equivalence approach in measuring the user cost of housing services is biased upwards as there are marked differences between renters and homeowners. Much of this has to do with the tax treatments on owner-occupied housing services and tax deductions on mortgage interest payments. Rather than using a one-dimensional median house price approach, Fisher, Pollakowski and Zabel (2009) proposed an amenity-based house pricing approach that takes into account structural differences across localities. These structural differences include locational amenity and direct commuting costs. Including these structural differences offers a more distributional disaggregated analysis of housing affordability. Nevertheless, although such an approach would increase accuracy in determining housing affordability, it requires enormous resources for micro-data collection of these variables on a nationwide basis. For example, Fisher et al.'s (2009) study was confined only to the Boston metropolitan area. Gan and Hill (2009) proposed a marked improvement to the median multiple approach by introducing an affordability at risk measure. Their measure disaggregates household income into different quantiles against a distribution of house prices by year. They also differentiate affordability between purchase affordability and repayment affordability. Their findings indicate that purchase affordability has remained rather constant for the Sydney housing market, but repayment affordability has diverged significantly over the years.

This study subscribes to the mortgage-income ratio approach whereby for housing to be considered affordable, the monthly mortgage payments should not exceed 30 to 35 percent of gross monthly income (Tan, 2013). Notwithstanding its limitations, the mortgage-income ratio allows for a descriptive analytics approach in determining the overall view of housing affordability in Malaysia, but at a micro-level. Prior literature addressing the affordability issue based on either median house prices or a distribution of house prices is an important step in improving our understanding of the phenomenon. However, the extant literature fails to answer the question of exactly what type of housing is affordable or unaffordable. This is particularly important for policy implementation. Detailed results with suitable proposed policy solutions are an important step in solving the housing affordability conundrum (Phang, 2010). We, therefore, contribute to the literature by analyzing affordability using a multi-dimensional framework, augmenting Gan and Hill's (2009) work by exploiting the availability of data on different housing types for Malaysia. The contextual nature of a segmented housing market by housing type affords us an in-depth view of housing affordability in an emerging market. We use this approach with the assumption that households are able to make good the necessary upfront costs of owning a home. This is typically the 10 percent down payment made by homebuyers. The focus of the paper is therefore on repayment affordability.

The affordability of repaying a mortgage has greater impact on housing affordability for several reasons. The high foreclosure rates during the U.S. housing market collapse, which started in 2006, bears great significance. In the second quarter of 2007, foreclosure rates reached an all-time high of 1.4 percent (Edmiston & Zalneraitis, 2007), which arose from mortgage defaults. Therefore, the housing crisis in the U.S. relates to homeowners being unable to make mortgage payments rather than being unable to afford the house in the first place. Second, borrowing from basic finance literature and assuming that most house buyers are rational, it would only make sense for buyers to

make the smallest possible down payment to secure a house as from the standpoint of present value, a dollar today is worth more than a dollar in the future. Evidence of this can be seen in the property market cooling measures undertaken by the Singapore government whereby one of the mechanisms to curb rising property prices is to limit the loan-to-value ratio, which in essence, increases the down payment of the house buyer (Phang & Helble, 2016). Essentially, down payments are market driven and usually are at the minimum unless there is specific intervention by the government.

3. Methodology

The calculation of the annual mortgage-income ratio first involved obtaining data from two data sources – the quarterly publications by Malaysia's National Property Information Centre (NAPIC), which provides data on average house prices and indices, and the Malaysian Department of Statistics, which provides data for household incomes.

We obtained the quarterly publications by NAPIC, which provided data on average house prices and indices for years 2003 to 2015. Specifically, for those years, data on house prices and indices were available for the four housing types in Malaysia: terrace, high-rise, semi-detached and detached housing, and also for the overall average house price.[2] For the years from 1988 to 2002, however, the NAPIC publications reported data only on the house price indices for the overall house price and the four housing types. Nevertheless, by using these house prices indices and matching the year 2015 house prices with their corresponding house price indices, it was possible to impute the average house prices for years 1988 to 2002.

Subsequently, using the five annual house prices (i.e., overall house price and prices for the four housing types) calculated for from 1988 to 2015, we proceeded to derive the associated monthly mortgage payments. For this paper, we assume that the starting present value of the mortgage would be 90 percent of that year's house price, as the minimum down payment is usually 10 percent of the house price, especially for first-time homebuyers. In recognising that homebuyers from different age groups are able to apply for loans of different tenures, we calculate the monthly mortgage payments based on loan tenures of 35 years, 30 years, 25 years, 20 years and 15 years using the following normal annuity formula:

$$C = \frac{P}{\frac{1}{r}\left(1 - \frac{1}{(1+r)^N}\right)}$$

where C = monthly mortgage payments, r = average monthly lending rate by commercial banks[3], N = number of monthly mortgage repayments, and P = 90 percent of the house price.

[2] The house price index for the overall average house price is referred to as the Malaysian House Price Index (MHPI). It is a measure of overall house prices, calculated as the weighted average of the four sub-indices measuring the house prices for the four housing types in Malaysia.

[3] Data for the average annual lending rates by commercial banks were obtained from Bank Negara Malaysia, the Central Bank of Malaysia.

Table 1. Assumed loan tenure periods for the respective age groups

Age group	Loan tenure (years)
20-24	35
25-29	35
30-34	35
35-39	35
40-44	30
45-49	25
50-54	20
55-59	15
60-64	15

Table 1 above lists the assumed loan tenures for the respective age groups. These assumed loan tenures are based on: (i) the setting of the maximum loan tenure at 35 years by Bank Negara Malaysia, and (ii) the fact that the maximum allowable age by which the mortgage should be repaid is 75 years old.

Household income data were obtained from Malaysia's Department of Statistics (DOS). As the DOS does not conduct its household income survey on an annual basis, household income data by age group were only available for the following survey years: 1995, 1997, 1999, 2002, 2004, 2007, 2009, 2012 and 2014. In particular, the DOS provided monthly incomes at the 25th, 40th, 50th and 75th percentiles for the respective age groups in those survey years. The age groups considered are also those listed in Table 1. As our interest is in tracking, on an annual basis, the affordability of housing from 1995 to 2014, we obtained the monthly household incomes for the missing years by interpolation via the cubic spline to obtain smoothed values of monthly household incomes for the years that DOS did not conduct the survey.

Finally, using the monthly mortgage payments derived from the prices of the overall housing and four dwelling types, combined with the monthly incomes, we are able to compute the associated mortgage-income ratios for households at the different income percentiles, categorised by their age groups, for years 1995 to 2014. We subsequently plot the time series line charts of these ratios to observe the overall movement of housing affordability in Malaysia.

In order to make formal statistical comparisons of housing affordability across the age and income groups, we estimate the following regression for *each* of the income percentiles:

$$ratio_{it} = \beta_0 + \beta_1 age25\_29_{it} + \beta_2 age30\_34_{it} + \cdots + \beta_8 age60\_64_{it} + \mu_{it} \quad (1)$$

The dependent variable $ratio_{it}$ refers to the mortgage-income ratio corresponding to the Malaysian overall house price for age group i in year t. The independent variables are age-group dummy variables, taking a value of 1 to represent corresponding age groups of the sample. The intercept β_0 represents the average mortgage-income ratio from 1995 to 2014 for homebuyers in the 20-24 age group, while the slope coefficient β_i represents the *difference* in the average mortgage-income ratio between homebuyers

in the 20-24 age group and the i^{th} age group. For example, β_1 represents the *difference* in the average mortgage-income ratio between homebuyers in the 20-24 and the 25-29 age groups. In all, our interest lies in comparing the coefficients across the age groups, and observing how these coefficients change over the income distribution.

4. Descriptive Analysis, Results & Policy Implications

4.1 Descriptive Analysis

The weights of the four dwelling types (i.e., terrace, high-rise, semi-detached and detached houses) used in computing the Malaysian House Price Index (MHPI) are 72.7 percent, 10.9 percent, 10.9 percent and 5.5 percent, respectively, as determined by NAPIC. It can be inferred from the weights that approximately three-quarters of households in Malaysia live in terrace houses. On average, house prices trend upwards from 1995 to 2015 for each dwelling type, as shown in Figure 1. There is a marked increase in prices after 2008, however, judging by the steeper trend observed for all housing categories. The price disparities between semi-detached and detached houses, and terraces and high-rises are significant. This difference stems from the fact that semi-detached and detached houses have more buildup and land area compared to terraces and high-rises.

Figures 2a to 2d show the age-income profile of household heads from 1995 to 2014, according to the four income percentiles. Several observations can be made. First, income levels across the four income percentiles have increased over the years, with the income increases for those in the 75th income percentile being larger than those in the lower income groups. This phenomenon is especially pronounced in the latter years, with the year-on-year income disparity between individuals in the 75th income percentile and those in the lower income percentiles growing larger. This lends

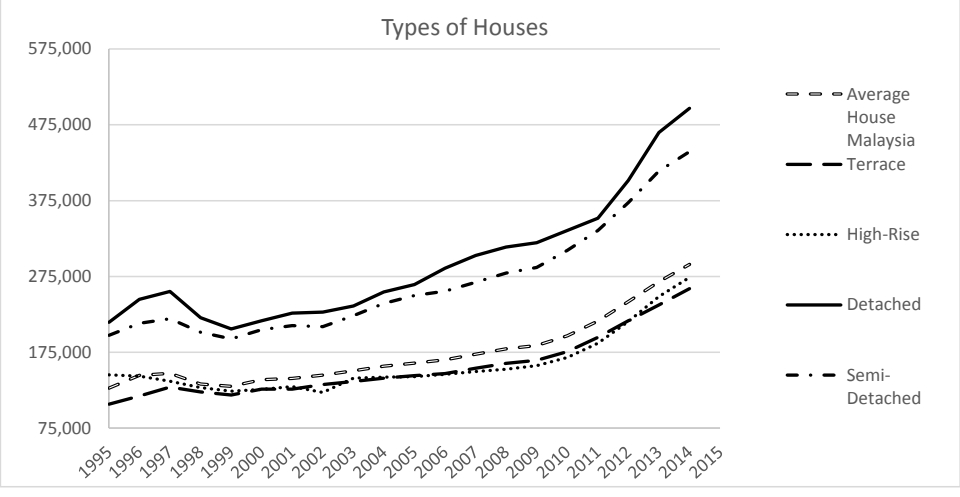

Figure 1. House prices (Ringgit Malaysia) by dwelling type
Source: NAPIC.

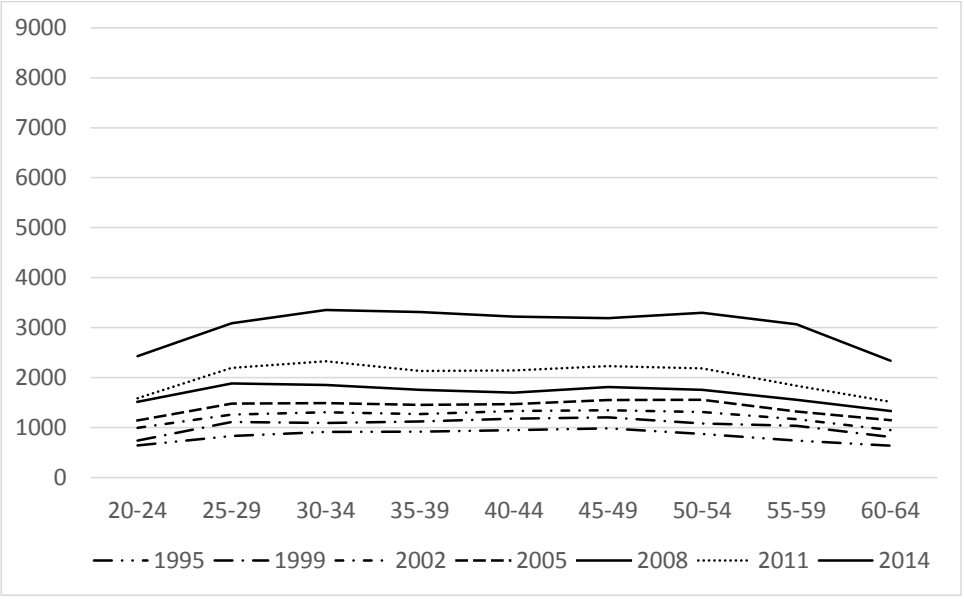

Figure 2a. Age-Income (Ringgit Malaysia per month) cohort profile for 25th percentile

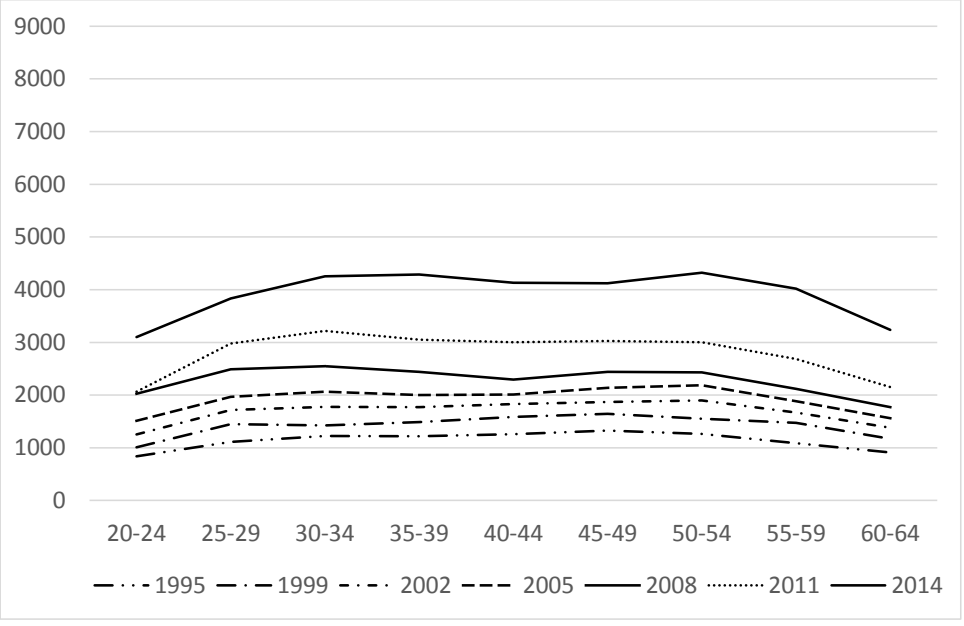

Figure 2b. Age-Income (Ringgit Malaysia per month) cohort profile for 40th percentile

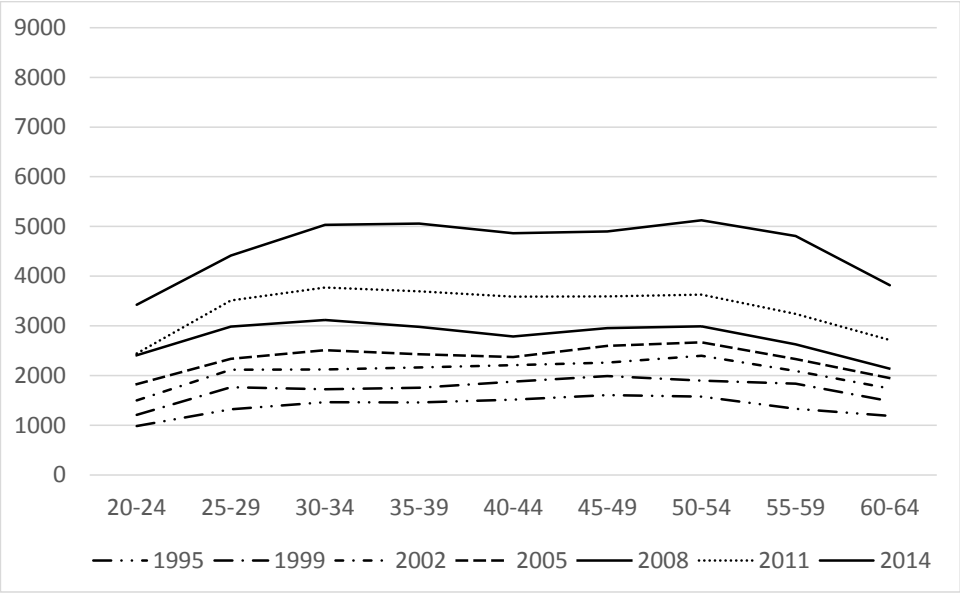

Figure 2c. Age-Income (Ringgit Malaysia per month) cohort profile for 50th percentile

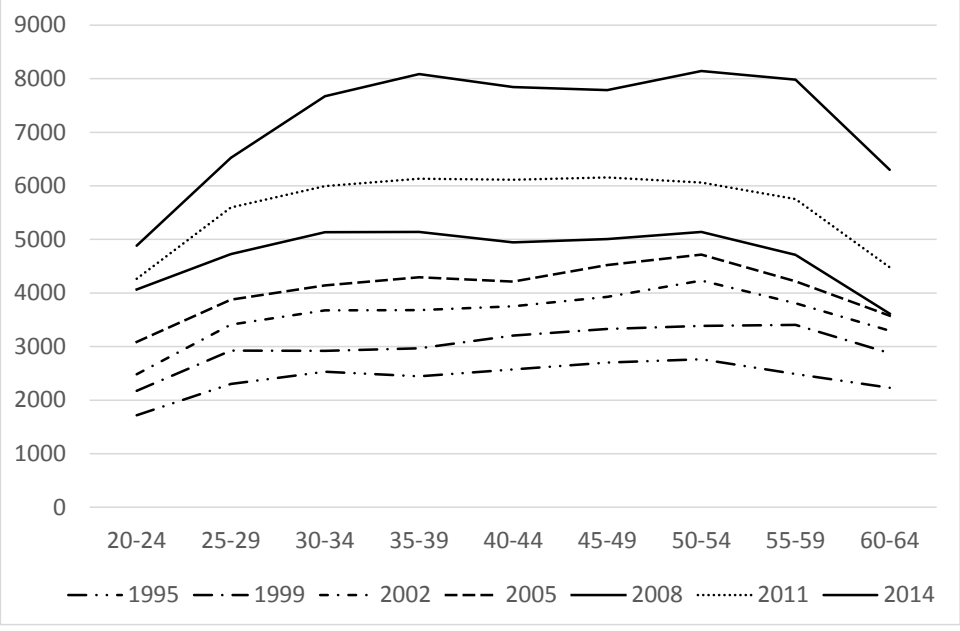

Figure 2d. Age-Income (Ringgit Malaysia per month) cohort profile for 75th percentile

evidence to suggest that homebuyers in this income group are better able to cope with the recent steep increase in house prices. Second, a similar pattern is observed in all income groups: income level peaks at the age of 30, after which incomes plateau for those aged 30-54, which is then followed by a subsequent decline in incomes for the elderly aged 55 and above. This anecdotal evidence hints at the possibility of individuals aged 30-54 being better positioned to afford a house. The results section seeks to confirm the two conjectures made based on the observations gleaned from Figures 2a to 2d.

5. Results

Figures 3 to 6 plot the mortgage-income ratios from 1995 to 2014 for homebuyers in the respective age groups at the 25th, 40th, 50th and 75th income percentiles, respectively. These ratios take into account the differing loan tenures as listed in Table 1. The mortgage-income ratios reported are for the overall house prices and four housing types.

The time series plots in the four figures include two horizontal lines at the ratio marks of 0.30 and 0.35. These values represent the affordability threshold and are set based on the basic rule of thumb that any single monthly loan repayment should not exceed a third of the borrower's monthly income. Therefore, any ratio values above these threshold lines indicate that more than a third of the borrower's monthly income is used to service the monthly mortgage, rendering the house unaffordable when measured against the household's income.

From the four figures, it can be seen that housing affordability has generally improved over the past two decades for all age groups and across the four income groups, as evidenced by the overall downward trend in the mortgage-income ratios. Moreover, none of the ratios in recent years exceed the value of 1 as per the experience in the mid-1990s, where mortgage-income ratios skyrocketed to as high as 3.4. Housing affordability has remained relatively stagnant over the past decade, however, as reflected by the plateaued ratios since 2005.

Housing affordability differs for homebuyers across the different income and age groups. For homebuyers in the 25th income percentile, except for those in the 30-34 and 35-39 age groups, even the cheapest housing types (i.e., terrace and high-rise housing) are out of their reach. The affordability issue is more pronounced for homebuyers in the older age groups who experience the highest burden of mortgage repayments relative to their income.

For homebuyers who are at the 40th income percentile, Figure 4 shows that housing affordability for the terrace and high-rise housing is the best for those who are in the 25-39 age range. For this category of homebuyers, the ratios for these two housing types have dipped below the 0.30 threshold in recent years. Housing affordability for these two housing types is marginally worse, but still affordable, for homebuyers in the 40-49 age range where the ratios rise to be within the 0.30 and 0.35 thresholds. Homebuyers in the youngest and oldest age groups face the greatest housing affordability difficulties, with all housing types remaining unaffordable for them over the past two decades.

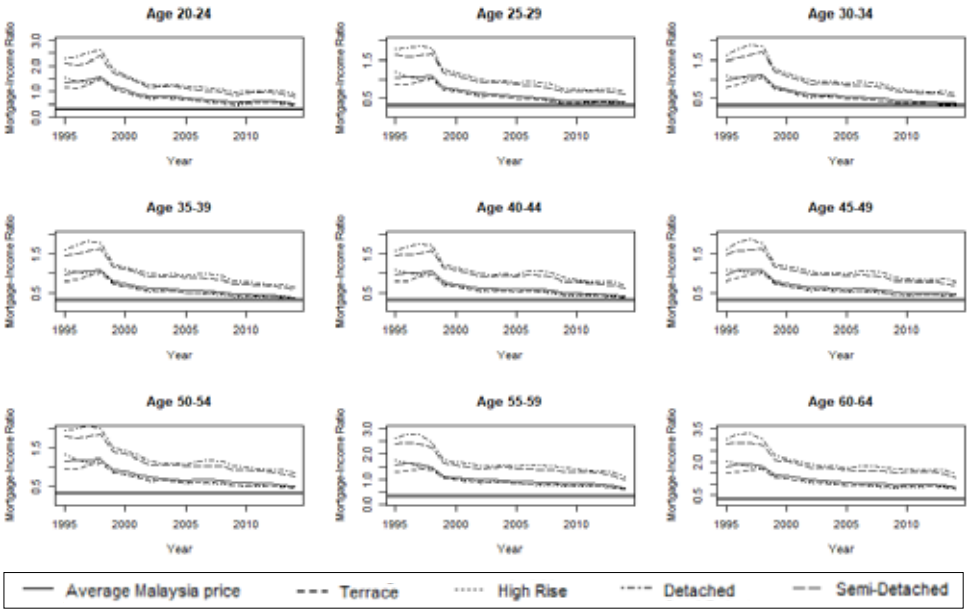

Figure 3. Mortgage-Income ratio from 1995 to 2014 across different house types for 25th income percentile households in respective age groups

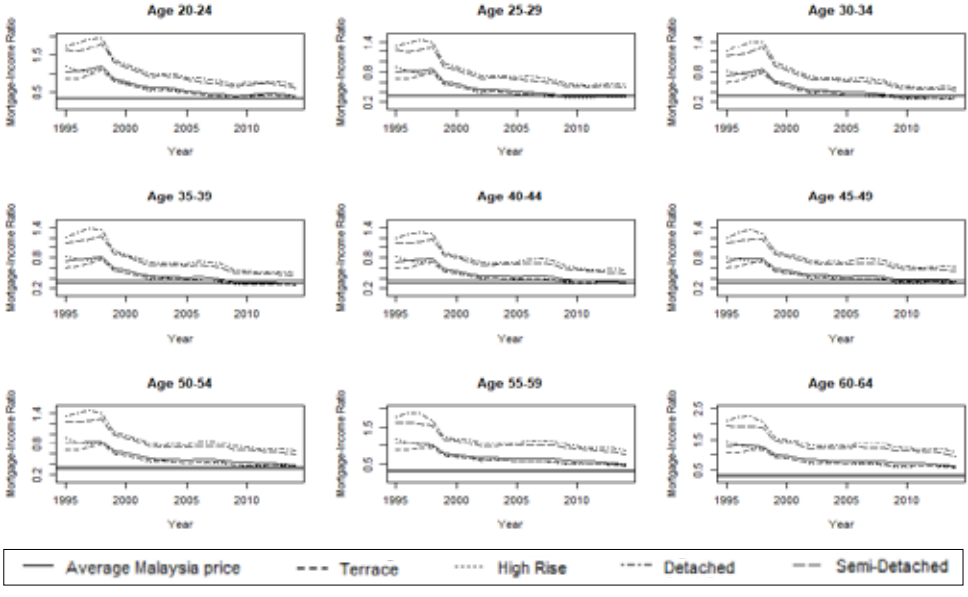

Figure 4. Mortgage-Income ratio from 1995 to 2014 across different house types for 40th income percentile households in respective age groups

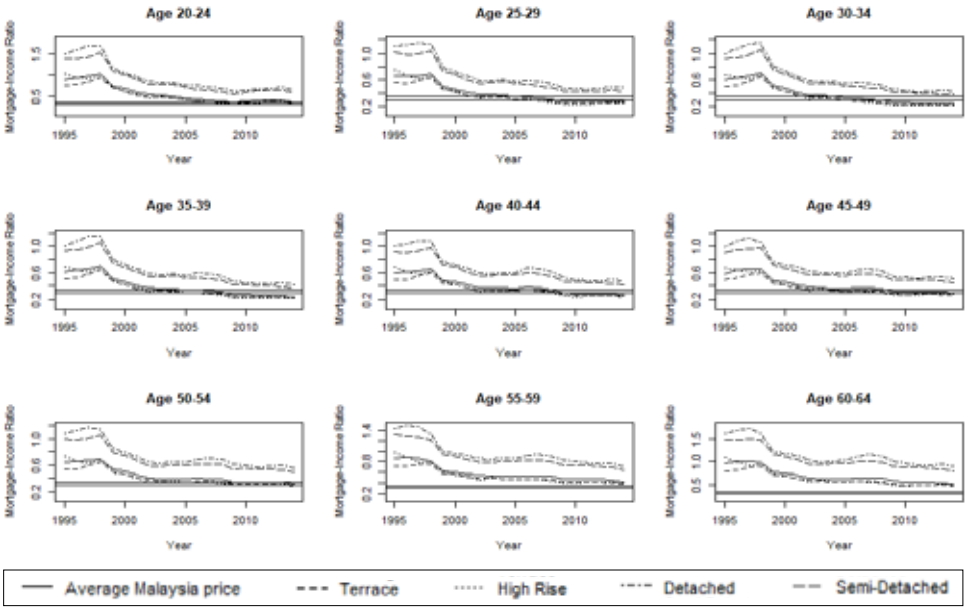

Figure 5. Mortgage-Income ratio from 1995 to 2014 across different house types for 50th income percentile households in respective age groups

Figure 6. Mortgage-Income ratio from 1995 to 2014 across different house types for 75th income percentile households in respective age groups

The housing affordability scenario for homebuyers earning the median income is similar to those at the 40th income percentile across all age groups. The exception is that younger median income earners aged 20-24 can also afford to own either a terrace or high-rise housing unit, since the mortgage-income ratios for these two housing types have dipped below 0.35 in recent years (see Figure 5). The affordability buffer for this age group of homebuyers, however, is only marginal when compared to homebuyers who are in the 30-39 age range, whose mortgage-income ratios for the terrace and high-rise housing types have dropped in recent years to be considerably lower than 0.30, averaging approximately 0.20.

The housing affordability situation for homebuyers at the 75th income percentile paints a rosy picture. Based on Figure 6, for this group of high-income earners, the high-end housing types (i.e., semi-detached and detached housing) are considered affordable for those in the 25-54 age range, where mortgage income ratios for these high-end housing types have remained below 0.35 since at least 2010. This is in contrast to Figures 3 to 5, which show that these higher-end housing types have remained unaffordable for lower income earners of all age groups over the past two decades. For this group of high-income earners, although those in the youngest and oldest age groups are unable to afford the high-end properties, they are more than able to afford either terrace or high-rise housing.

Based on the Figures, we summarise a few key points:

1. Overall, housing affordability has improved over the last two decades, as evidenced by the downward trend in the mortgage-income ratios.
2. Except for homebuyers in the 75th income percentile, homebuyers at the lower income levels struggle with housing affordability, with the high-end properties being out of their reach.
3. For homebuyers earning income at or below the median level, only terrace and high-rise housing are considered affordable for those aged between 30 to 39 years old.
4. Homebuyers in the youngest and oldest age groups face the most acute housing affordability pressures.

Before concluding this section, we report the regression estimates of equation (1) in Table 2 below and compare housing affordability across the age and income groups. In Column (1), the estimated intercept is 0.817, denoting the average mortgage-income ratio from 1995 to 2014 for homebuyers in the 25th income percentile and who are in the 20-24 age group. Subsequently, it is observed that the intercept coefficient decreases across the columns, depicting an income effect on housing affordability, whereby the average mortgage-income ratio decreases for homebuyers in the higher income groups.

Looking at the coefficients across the rows, we also observe an age effect on housing affordability. All the coefficients of the age dummies take on negative values, except for those corresponding to the age groups which are 55 years and above. These coefficients are also statistically significant. In other words, average housing affordability improves for homebuyers who are in the older age groups, but worsens for those who are 55 years old and beyond. The coefficients are the largest in magnitude for

Table 2: Estimated regression coefficients from equation (1)

Dependent variable: mortgage-income ratio

Variables	(1) 25th income percentile	(2) 40th income percentile	(3) 50th income percentile	(4) 75th income percentile
Constant	0.817*** (0.059)	0.667*** (0.042)	0.564*** (0.048)	0.335*** (0.026)
Age 25-29	-0.218*** (0.083)	-0.174*** (0.060)	-0.154*** (0.048)	-0.083*** (0.026)
Age 30-34	-0.230*** (0.083)	-0.193*** (0.060)	-0.170*** (0.048)	-0.099*** (0.026)
Age 35-39	-0.222*** (0.083)	-0.190*** (0.060)	-0.168*** (0.048)	-0.101*** (0.026)
Age 40-44	-0.212** (0.083)	-0.180*** (0.060)	-0.157*** (0.048)	-0.099*** (0.026)
Age 45-49	-0.186** (0.083)	-0.165*** (0.060)	-0.147*** (0.048)	-0.091*** (0.026)
Age 50-54	-0.089 (0.083)	-0.112* (0.060)	-0.113** (0.048)	-0.075*** (0.026)
Age 55-59	0.163* (0.083)	0.057 (0.060)	0.022 (0.048)	-0.014 (0.026)
Age 60-64	0.376*** (0.083)	0.215*** (0.060)	0.138*** (0.048)	0.053** (0.026)
Observations	180	180	180	180
R-squared	0.378	0.351	0.330	0.297

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

the 30-34 age group dummy variable, implying that housing is the most affordable for homebuyers within that age range. On the other hand, amongst all the age groups, average housing affordability is the worst for homebuyers in the 60-64 age group, given their positive and statistically significant coefficients.

Finally, on the basis of the reported coefficients, it is observed that the income effect has a larger influence on housing affordability than the age effect. For example, the mortgage-income ratio of 0.335 for homebuyers in the 75th income percentile in Column (4) is almost 2.5 times smaller than that of the mortgage-income ratio of 0.817 for those in the 25th income percentile. This huge improvement in housing affordability arising through income changes is unmatched by the age effects. In particular, let us consider a hypothetical homebuyer who is in the 25th income percentile and within the 20-24 age group. As this homebuyer ages and moves onto the 30-34 age group over time, this homebuyer will experience a reduction of the mortgage income ratio by 0.230 points: a 28.15 percent improvement in housing affordability. On the other

hand, if this same homebuyer had somehow managed to move up into the 75th income percentile, the homebuyer would experience a reduction of the mortgage income ratio by 0.482 points (0.817 – 0.335): a 59 percent improvement in housing affordability. Even if the homebuyer had fallen short and only managed to move up into the median income range, the reduction of the mortgage income ratio would still be larger than that of the age effect.

6. Policy Implications

Based on the results and analysis above, we propose several policy measures to resolve the housing affordability issue. First, as greater housing affordability stress is observed from the younger age cohort, it is therefore recommended that these age cohorts enter the rental market rather than going through the undue stress of owning a home. Bank Negara Malaysia has also emphasised the development of the rental market in its 2015 and 2016 annual reports. The rental market is an alternative to homeownership, particularly for relocations for job and education opportunities. The mentality that rented accommodations are the last resort for households, therefore, should be brought to an end (Mazlan, 2016). Reinforcing the legal frameworks underlying the rental market is necessary to safeguard the rights of tenants (e.g., deposit recovery) and landlords (e.g., use the deposit when the tenant breaches the tenancy agreement). Support measures by the federal and state governments to develop a vibrant rental housing market would help alleviate the pressures on these cohorts. For this purpose, regular sample household surveys can be conducted on a large scale. Such an initiative would gather greater impetus provided that the appropriate rental data be collected and made available for dissemination to the public at large.

The development of a rental market can be further enhanced with the establishment of a private real estate investment trust (REIT) consisting of both commercial and residential properties (Phang, Lee, Cheong, Phoon, & Wee, 2014). As of 30 April 2017, there are 18 listed REITs on Bursa Malaysia (Malaysia's stock market), with the REIT property sector portfolio in Malaysia made up exclusively of retail, industrial and commercial properties. Under this proposal, expansion of the property portfolio to include residential properties allows federal and state government agencies, or government-linked firms, tasked with the provision of affordable housing to sell a proportion of the completed units to the residential REIT for rental purposes. In this regard, the residential REIT will become an active participant in the affordable housing sector through the offering of rental and leaseback initiatives. The shares of the residential REIT can also be sold to EPF members who invest using their statutory contributions[4]. A federal or state government-linked firm will be appointed the REIT's manager with the authority to impose some form of rent control structure to decouple rent increases from market forces.

[4] EPF currently allows its members to invest in mutual funds using their contributions on the condition that should the investment be liquidated before a member's retirement age, the returns of the investment and the principal are to be credited back to the member's contribution account.

There are several advantages to the introduction of a residential REIT:

(i) The development of a residential REIT will provide further diversification of the property portfolio for its unit-holders as it will comprise a mixture of commercial and residential properties. Malaysia's commercial property vacancy rate stands at 10.8 percent, which is higher than the regional average of 6.6 percent and is deemed as unsustainable by Bank Negara Malaysia ("Bank Negara", 2017). This is perplexing for investors as commercial property constitutes a sizeable proportion of the property portfolio of all listed REITs.

(ii) A residential REIT with its lower rentals will create rental take-up opportunities, especially for lower and middle-income households. With its progressive development, it will exert downward pressure on rents in the private market that should help to reduce both foreign and local investment demand.

(iii) The tax-free rental income received by the residential REIT can enhance the returns received by EPF contributors. In Malaysia, if a REIT returns 90 percent of its total yearly income to unit holders, the REIT will be exempted from tax for that year of assessment. Distributed income to unit holders is taxed at a final withholding tax rate of 10 percent, which can be an advantage for those in the high-income bracket.[5] Furthermore, when REITs acquire properties, they are exempted from paying stamp duties, which can amount to a maximum of 3 percent of the purchase price. When they divest their properties, they are also exempted from paying Real Property Gains Tax (RGPT), where the maximum is 30 percent for firms.

Second, a more frequently updated (with a minimal quarter lag) and timely dissemination of the MHPI and sub-indices by the National Property Information Centre (NAPIC) would also help to reduce information asymmetry for would-be homebuyers. Malaysia has yet to collate data on rentals to develop rental indices for the country and across states, apart from the data on the house price index. A central repository system serving as an integrated database to capture the demand and supply of the housing market and oversee affordable housing conditions is required to monitor and manage the supply-demand imbalances ("Bank Negara", 2017). The development of timely and frequently updated rental indices is paramount in ensuring that would-be renters have the necessary decision-making information before committing to a rental contract. Although there has been progress towards the dissemination of online information by the Federal government[6], there is very little data and information on rentals by location. An example for Malaysia to emulate is the rental index published by the Urban Redevelopment Authority of Singapore (URA) on a quarterly basis. Furthermore, the proposed central repository system should also include data on land owned by all government levels. This would allow agencies such as 1PRIMA to identify suitable locations for affordable housing development and thus alleviate the current problem of supply mismatch due to the building of affordable housing in locations far away from urban centres.

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[5] The maximum tax rate payable for an individual is 28 percent.

[6] See http://www.housingwatch.my/index.html

Third, rising migration from rural to urban states and foreign purchases have undoubtedly enhanced the housing demand and pushed up house prices in urban areas. Residents who stay in urban states continue to face homeownership difficulties. Consequently, home buyers are increasingly relying on the private real estate market to meet their housing needs. The problem, however, lies in the shortage of the supply of reasonably priced private housing in major urban states. Our analyses indicate that certain housing types are more affordable than others. Government initiatives should, therefore, focus on increasing supply of the high rise and terrace segment, and correspondingly reduce housing starts for semi-detached and detached housing types. Holistic integrated town-planning coupled with increasing coordination among federal and state governments emphasising higher plot density with improved transportation infrastructure would lead to increased supply of these housing types on a large scale. The use of a more organised productivity-enhancing construction technique, such as the industrialised building system (IBS) suggested by the Khazanah Research Institute (2015), would improve labour productivity, shorten delivery time and reduce the overall cost of delivery.

Lastly, addressing the mismatch between demand and supply in the housing market, particularly in major urban areas, requires partnership between the public and private sectors. This partnership requires an attentive strategy of diversifying systematic risk by broadening the horizon funding along the housing supply chain through the use of different financial intermediaries and financial instruments, coupled with more efficient resource planning. There is also a need to reassess government policy at all levels to ensure that only the genuine first-time buyers are given the opportunity to buy the property out of need. For example, PR1MA, as an initiative to help young adults own their first house, should be strict in not allowing second-time house buyers qualify for PR1MA to purchase second homes. Otherwise, this will lead to deeper imbalances as we fail to satisfy the most deserving category.

7. Conclusions

We analysed the housing affordability of house buyers by comparing the mortgage-income ratios vis-à-vis a standard that a ratio of at most 0.3 to 0.35 would be deemed as affordable. The results showed that although housing affordability, in general, has increased since the beginning of the sample period, it has stagnated in the last 10 years. As such, various policies by the federal and state governments (either through coercive private sector prodding or direct interventionist measures like 1PRIMA) to provide affordable housing have failed to produce a sufficient supply of affordable housing, especially among the B40 households which our analysis confirms as the significant segment with the greatest housing affordability needs. We contribute to the extant literature with several targeted proposals. The development of a vibrant rental market would ameliorate the housing affordability problem. We also propose the establishment of a residential REIT that will be focused on providing affordable rental housing and indirectly exert downward pressure on rents in the private rental market.

The dissemination of timely information of both prices and rents will go a long way in reducing information asymmetry in Malaysia's housing market. Although the much-needed central repository system for data collection on house prices and rents have been mentioned, there has been a lack of progress at various government levels since the idea was first mooted. Increased willingness and coordination across government levels is needed to alleviate the housing affordability problem.

Notwithstanding the results, implications and policy measures, there are several limitations to this study. First, the measurement of household income by age cohort is static in nature and does not account for lifetime incomes. Possible future research should re-run the analysis by using lifetime household incomes. Second, housing affordability stress is not measured over time due to the lack of panel data household sampling methods conducted by the Department of Statistics Malaysia (DOSM). DOSM has provided indications that it will begin using panel sampling techniques in its household surveys in the future. This will provide future researchers with better data on measuring housing affordability longitudinally.

In conclusion, this study provides indicative evidence that housing affordability differs for home buyers along the age-income-cohort spectrum. From the results, various policies are discussed at length which impacts all interested parties in relation to the housing affordability problem.

References

1.7 million households yet to own houses. (2013, October 25). *The Star*. Retrieved from http://www.thestar.com.my/News/Nation/2013/10/25/17-million-households-yet-to-own-houses/

Bank Negara: Provide more affordable housing. (2017, May 26). *The Star*. Retrieved from http://www.thestar.com.my/business/business-news/2017/05/26/bank-negara-provide-more-affordable-housing/

Bentley, R., Baker, E., Mason, K., Subramanian, S.V., & Kavanagh, A.M. (2011). Association between housing affordability and mental health: A longitudinal analysis of a nationally representative household survey in Australia. *American Journal of Epidemiology, 174*(7), 753-760. https://doi.org/10.1093/aje/kwr161

Berry, M. (2003). Why is it important to boost the supply of affordable housing in Australia—and how can we do it? *Urban Policy and Research, 21*(4), 413-435. https://doi.org/10.1080/0811114032000147430

Budget 2014: Initiatives a big boost for affordable housing. (2013, October 26). *The Star*. Retrieved from http://www.thestar.com.my/Business/Business-News/2013/10/26/Initiatives-a-big-boost-for-affordable-housing/

Bujang, A.A., Jiram, W.R.A., Abu Zarin, H., & Md. Annuar, F.H. (2015). Measuring the Gen Y housing affordability problem. *International Journal of Trade, Economics and Finance, 6*(1), 22-26. https://doi.org/10.7763/ijtef.2015.v6.435

Carter, T. (1997). Current practices for procuring affordable housing: The Canadian context. *Housing Policy Debate, 8*(3), 593-631. https://doi.org/10.1080/10511482.1997.9521268

Cheah, S.L., & Almeida, S.J. (2016). *Demystifying the affordable housing issue in Malaysia* (Box Article). Retrieved from http://www.bnm.gov.my/files/publication/ar/en/2016/cp04_002_box.pdf

Chen, J., Hao, Q., & Stephens, M. (2010). Assessing housing affordability in post-reform China: A case study of Shanghai. *Housing Studies, 25*(6), 877-901. https://doi.org/10.1080/02673037.2010.511153

Demographia International. (2017). *13th annual Demographia international housing affordability survey: 2017: Rating middle-income housing affordability*. Retrieved from http://www.demographia.com/dhi.pdf

Department of Statistics Malaysia (DOSM). (various years). *Report of household income and basic amenities survey*. Putrajaya: Author.

Díaz, A., & Luengo-Prado, M.J. (2008). On the user cost and homeownership. *Review of Economic Dynamics, 11*(3), 584-613. https://doi.org/10.1016/j.red.2007.12.002

Economic Planning Unit. (2015). *Elevating B40 households towards a middle-class society*. (Strategy Paper No. 02). Retrieved from http://rmk11.epu.gov.my/pdf/strategy-paper/Strategy%20Paper%2002.pdf

Edmiston, K.D., & Zalneraitis, R. (2007). Rising foreclosures in the United States: A perfect storm. *Economic Review, Federal Reserve Bank of Kansas City, issue Q*(IV), 115-145.

Fisher, L.M., Pollakowski, H.O., & Zabel, J. (2009). Amenity-based housing affordability indexes. *Real Estate Economics, 37*(4), 705-746. https://doi.org/10.1111/j.1540-6229.2009.00261.x

Gan, Q., & Hill, R.J. (2009). Measuring housing affordability: Looking beyond the median. *Journal of Housing Economics, 18*(2), 115-125. https://doi.org/10.1016/j.jhe.2009.04.003

Gho, C.Y., & Willy, A.M. (2016, October 5). Likely higher EPF withdrawals for first-time home-buyers. *The Edge*. Retrieved from http://www.theedgemarkets.com/my/article/likely-higher-epf-withdrawals-first-time-homebuyers

Haffner, M.E.A., & Heylen, K. (2011). User costs and housing expenses. Towards a more comprehensive approach to affordability. *Housing Studies, 26*(4), 593-614. https://doi.org/10.1080/02673037.2011.559754

Hall, R.E., & Jorgenson, D.W. (1967). Tax policy and investment behavior. *American Economic Review, 57*(3), 391-414.

Hancock, K.E. (1993). 'Can pay? Won't pay?' or economic principles of 'affordability'. *Urban Studies, 3*0(1), 127-145. https://doi.org/10.1080/00420989320080081

Hulchanski, J.D. (1995). The concept of housing affordability: Six contemporary uses of the housing expenditure-to-income ratio. *Housing Studies, 10*(4), 471-491. https://doi.org/10.1080/02673039508720833

Key issues facing homeownership in Malaysia. (2014, February 4). *The Star*. Retrieved from http://www.thestar.com.my/Business/Business-News/2014/02/04/Address-affordability-accessibility-issues-says-Cagamas/

Khan, P.A.M., Mahmud, R., & Kamaruddin, N. (2012, 12-13 March). *An overview of housing affordability for first time home buyers in Malaysia*. Paper presented at the 3rd International Conference on Business and Economic Research, Bandung, Indonesia. Retrieved from https://www.academia.edu/3317794/3_rd_INTERNATIONAL_CONFERENCE_ON_BUSINESS_AND_ECONOMIC_RESEARCH_3_rd_ICBER_2012_PROCEEDING

Khazanah Research Institute. (2015). *Making housing affordable*. Kuala Lumpur: Author. Retrieved from http://www.krinstitute.org/kris_publication_Making_Housing_Affordable.aspx

Kupke, V., & Rossini, P. (2011). Housing affordability in Australia for first home buyers on moderate incomes. *Property Management, 29*(4), 357-370. https://doi.org/10.1108/02637471111154809

Kutty, N.K. (2005). A new measure of housing affordability: Estimates and analytical results. *Housing Policy Debate, 16*(1), 113-142. https://doi.org/10.1080/10511482.2005.9521536

Lamont, C. (2008). Housing affordability crisis: Fact or fiction? *Australian Economic Review, 41*(2), 194-199. https://doi.org/10.1111/j.1467-8462.2008.00499.x

Lee, P., & Lye, A. (2014, February 18). Salaries not going up as fast as prices of homes. *StarProperty*. Retrieved from http://www.starproperty.my/index.php/articles/property-news/salaries-not-going-up-as-fast-as-prices-of-homes/

Lerman, D.L., & Reeder, W.J. (1987). The affordability of adequate housing. *Real Estate Economics, 15*(4), 389-404. https://doi.org/10.1111/1540-6229.00439

Litman, T. (2014, August 15). What is a 'house'? Critiquing the Demographia International Housing Affordability Survey. *Planetizen*. Retrieved from https://www.planetizen.com/node/70829

Mahalingam, E., & Thean, L.C. (2018, November 17). Solving the residential housing overhang problem. *The Star*. Retrieved from https://www.thestar.com.my/business/business-news/2018/11/17/solving-the-residential-housing-overhang-problem/

Mazlan, M. (2016, September 21). Need to de-stigmatise renting. *New Straits Times*. Retrieved from https://www.nst.com.my/news/2016/09/174793/need-de-stigmatise-renting

Murray, M.S. (1998). Housing conditions of nuclear and extended households in the Miami-Fort Lauderdale area. *Population and Environment, 20*(1), 55-76. https://doi.org/10.1023/A:1023351918326

National Property Information Centre (NAPIC). (various years). *Malaysian house price index*. Putrajaya: Author.

O'Neill, P., Sliogeris, E., Crabtree, L., Phibbs, P., & Johnston, K. (2008). *Housing affordability literature review and affordable housing program audit* (Urban Research Centre, University of Western Sydney report). Retrieved from http://www.uws.edu.au/__data/assets/pdf_file/0004/164623/landcom_report_2008-07-21.pdf

Ong, T.S., & Chang, Y.S. (2013). Macroeconomic determinants of Malaysian housing market. *Human and Social Science Research, 1*(2), 119-127.

Paris, C. (2007). International perspectives on planning and affordable housing. *Housing Studies, 22*(1), 1-9. https://doi.org/10.1080/02673030601024531

Phang, S.Y. (2010). Affordable homeownership policy: Implications for housing markets. *International Journal of Housing Markets and Analysis, 3*(1), 38-52. https://doi.org/10.1108/17538271011027069

Phang, S.-Y., & Helble, M. (2016). *Housing policies in Singapore* (ADBI Working Paper Series). Retrieved from http://www.adb.org/publications/housing-policies-singapore/

Phang, S.-Y., Lee, D., Cheong, A., Phoon, K.-F., & Wee, K. (2014). Housing policies in Singapore: Evaluation of recent proposals and recommendations for reform. *The Singapore Economic Review, 59*(3), 1450025. https://doi.org/10.1142/S0217590814500258

Quigley, J.M., & Raphael, S. (2004). Is housing unaffordable? Why isn't it more affordable? *Journal of Economic Perspectives, 18*(1), 191-214. https://doi.org/10.1257/089533004773563494

Stone, M.E. (2006a). A housing affordability standard for the UK. *Housing Studies, 21*(4), 453-476. https://doi.org/10.1080/02673030600708886

Stone, M.E. (2006b). What is housing affordability? The case for the residual income approach. *Housing Policy Debate, 17*(1), 151-184. https://doi.org/10.1080/10511482.2006.9521564

Surendran, S. (2016, August 4). 'Serious mismatch' in housing supply. *The Edge*. Retrieved from http://www.theedgemarkets.com/my/article/%E2%80%98serious-mismatch%E2%80%99-housing-supply

Tan, T.H. (2012). Housing satisfaction in medium- and high-cost housing: The case of Greater Kuala Lumpur, Malaysia. *Habitat International, 36*(1), 108-116. https://doi.org/10.1016/j.habitatint.2011.06.003

Tan, W.K. (2013). *Housing the nation: Policies, issues and prospects*. Kuala Lumpur: Cagamas Holdings Berhad. Retrieved from https://www.cagamas.com.my/sites/default/files/publications/Housing%20the%20Nation%20-%20Policies,%20Issues%20and%20Prospects.pdf

Thalmann, P. (2003). 'House poor' or simply 'poor'? *Journal of Housing Economics, 12*(4), 291-317. https://doi.org/10.1016/j.jhe.2003.09.004

Whitehead, C.M.E. (1991). From need to affordability: An analysis of UK housing objectives. *Urban Studies, 28*(6), 871-887. https://doi.org/10.1080/00420989120081101

Zielinski, C. (2016). Housing affordability a growing issue for older Australians. *Domain*. Retrieved from http://www.domain.com.au/news/housing-affordability-a-growing-issue-for-older-australians-20160426-gob0vu/