Headship Rate Projections for Housing Demand in Johor, Malaysia

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Abstract. Household formation trend is closely linked with the numbers of population. Meanwhile, the formation of households is largely influenced by the composition of the adult population that are measured by headship rate. This paper attempts to project headship rate which acts as a main predictor in determine potential housing demands. Population and Housing Census data from year 2000 and 2010 has been used in this projection headship rate for Johor state. Modified two-point exponential method was applied to determine the headship rate. All the data was categorized into five years interval for the ages between 15 to 80+ years old. Results indicate that the projected headship rates for age 15-19 and 20-24 are significantly decrease. However for the age’s groups 40-44, 50-54, 55-59 75-79 and 80+ years old, the projected headship rate increased until year 2020. This demonstrates, the decreasing ability of young people under 25 years to become homeownership as compared to people from the age groups of 40 years and above. The findings of this study could be used as a basis for the government to identify numbers of potential housing demand in Johor.

1. Introduction

In 2010, 7,345,900 housing units were recorded in Malaysia with a 3.2% average growth rose rate compared to year 2000 [1]. According to [2] & [3], high population will increase potential for housing demand. Therefore, many researchers use the population as an indicator to predict the number of housing needs or demands for the long term [4, 5, 6]. In Malaysia, the projection of housing is made for immediate, medium and long term based on population growth and household size [4]. However, based on the report issued by Valuation and Property Services Department [7] & [8], there are a lot of numbers overhang and unsold properties recorded around the country. Under that report, Johor is identify retained the highest number of overhang in the country.

Pozdena [7] highlights the assessment of housing demand or needs is not just about the number of population growth, the most importance thing that need to know is related to individual (residents).
Thus, to understand the behavior of housing demand, the process of household formation, number of households and the composition of the household is necessary to be known before determining housing demand [7].

According to [8], if population increase, the households formation is expected to be increased, but in different rates. This happen because household formation was influenced by the composition of the adult population, rather than population growth only consider the numbers of people. Headship rate method commonly used to determine the composition of the adult population. Generally, the definition of headship rate can be determine as the ratio of heads to the size of the adult population outside of group quarters [9]. In Malaysia, head of household is based on who give high contributes in the economy of a household, and it is basically related to men [10]. In this paper, it should be highlighted that the headship rate multiplied by the corresponding population in the number of households by age group are key variables for the analysis of the potential demand which reflect to homeownership.

2. Population, household formation and headship rate

Refer to [11] and the Government of Uganda reports [12], the number of housing units required are usually measured through population growth rates. National Economic and Social Council [13], in its report states, the change in household number due to population growth and migration rates affecting the number of household formation and housing demand. While [14] found the growth of population and the characteristics of household formation will increasing of housing demand.

Reference [15], explains the things that must be considered before projecting housing demand is population growth. Clara [16], highlights the number of housing in an area affected by the number of household formation, which leads to the growth of housing demand. Therefore, extensive research were made by researchers to see the relationship between housing demand and household formation. The findings shows that there is an association between population, household formation and age levels in determining housing demand [17],[18] & [19].

The level of household composition among young adults living families (parents) had an impact on home ownership and the number of new housing construction [20]. Results from the study shows, the percentage of young adults aged 18 to 34 years old living with family (parents) increased from 27% to 31% (approximately 22 million people) from 1990 to 2006. Those age group traditionally been the biggest contributor in the purchase of the first house [20]. Because of that, the rate of household formation and housing demand a bit low compare to other years.

The prototype of headship rate has begun to be used in the United States since 1938 to project the number of households with the assumption that the headship rate is constant throughout the year [21]. Until 1993, the headship rate projection was used by institutions and researchers at least 15 countries [22]. In recent decades, many researchers come out with household modelling and household projecting methods such as dynamic macro-demographic models, micro-simulation and probabilistic household forecast [23]. Despite this, however, statistical agencies widely use the simplest method by headship rates and its extensions. The headship rate method were most often used by researchers and institutions in determining household formation because it is not too complex in term of understanding and an analysis [24]. In addition, this method have advantages over other methods, because it reflects with expected changes in the population age structure and sex [25]. Due to the changing of time, this method is suitable to use for a long term projection.

3. The conceptual framework

3.1 Headship rate method

The headship rate method is based on the assumption that the number of households is equivalent to the number of housing demand. Basically, the determination of headship rates can be made in a various ways including age-populations, age-sex, age-ethnic and age-marital status [26]. According to [17] & [18], in order to find the headship rate, only one census data is needed, where the number of households is classified according to the age of the household head. In this paper, headship rate is
determine using age-specific headship rates decomposed by household size suggested by [23] using equation (1).

\[ H_{St} = \frac{H_t}{P_t} \]  

Where,

\( H_{St} \) = headship rate  
\( H_t \) = number of head in specific group  
\( P_t \) = number of population in specific group

A total of 2% population census data in Johor were used in determining the headship rate for year 2000 and 2010 respectively (obtained from Department of Statistics, Malaysia). For the first step, manual calculation was used to calculate exactly number of head of household in each age groups for specific data census. Then, both data census (2000 & 2010) were used to make projection headship rate.

### 3.2 Projection headship rate

The constant headship rate method was widely used in various government agencies and institutions in 1950s to determine household and family projections using one census data [22]. While Statistics Research Agency [27], has been using the modified two-point exponential method in determining projection headship rate in United Kingdom. Through that method, projections headship rate are determined through two years of census data (current and base year). In this paper, modified two-point exponential method has been implemented because availability of data and it seen more accurate because based on current changing of data. The general equation for the two-point exponent modification method is shown in equation (2).

\[ y_i = k + ab^{x_i} \]  

Where,

\( i \) = the year of the projections  
\( y_i \) = headship rate in year \( i \)  
\( k \) = 1 if the current household head rate is \( \geq \) base year  
\( 0 \) if the current household head rate is \( \leq \) base year  
\( a \) = headship rate of base year - \( k \)  
\( b \) = (headship rate year \( i \) - \( k \))/(headship rate base year - \( k \))  
\( x_i \) = (\( i \) -base year)/(current year-base year)

### 3.3 Classification of data

Based on data released by the Department of Statistics, Malaysia through population quick info, age distributions are listed by groups (0 to 80+ years) with 5 years intervals [28]. Therefore, same approach have used in this paper. For initial age groups set up, some modification has been made in line with the studies conducted by [25], [27], [28], [29] that using 15 year old. The age selection was made to counter overall level of headship rate for all backgrounds including the younger generation (15-24), working age (25-65) and the elderly (65 years and above) [31].

### 3.4 Period of projection

The Population and Housing Census in Malaysia is conducted once in every 10 years [32]. Therefore in projecting headship rate, the data was set until 2020 because the next census is expected to be carried out in 2020. Once the new census data is ready, the process will be repeated with 2020 as a current year and 2010 as a base year.
4. Results and discussions

4.1 Headship Rate

Figure 1 shows the pattern of headship rate for each group with difference census data (2000 and 2010) in Johor.

![Figure 1. Headship rate for census data 2000 and 2010](image)

Referring to Figure 1, the age group 15-19 years old recorded the lowest headship rate for both census data with an average of 0.011 (1.1%). Based on that figure, it can be noted that the probability of a person between the ages of 15-19 to be homeownership is only 1% in that particular group age. This happen because most people in that particular group age are still in school and do not have stable job and income to buy a house. For age groups 20-24 until 40-44, the pattern of headship rate start increasing without any significant difference between year 2000 and 2010. Means that, probability to become homeownership for those groups are remaining same.

The percentage of average headship rate for group 45-49 until 75-79 is very high, which is more than 0.5 (50%) recorded until it reach almost 0.6 (60%) for age group 65-69. Furthermore, the pattern of headship rate declining until it reached 0.41 (41%) for age groups over 80 years.

4.2 Projection headship rate

Using the data calculation from figure 1, the projection of headship rate for 5 years were determined up to year 2020 as shown in Figure 2. Example calculation for headship rate group 15-19 years old for year 2018 using equation (2) is shown below:

Data from headship rate analysis (Figure 1),
Headship rate year 2000 (base line) = 0.016
Headship rate year 2010 (current year) = 0.002

$$y_{2018} = k + ab^x$$

Where,
$$k = 0$$ (Headship rate decreased over the period)
$$a = 0.016 - 0 = 0.016$$
\[
b = \frac{(0.002 - 0)}{(0.016 - 0)} = 0.125
\]
\[
x_i = \frac{(2018-2000)}{(2010-2000)} = 1.8
\]

Therefore,
\[
y_{2018} = 0 + 0.016 \times 0.125 \times 1.8 = 0.000379 \approx 0.0004
\]

5. Conclusion

Based on projection headship rate, it can be seen that younger group especially for 20-34 years old struggle to own a house. Projection headship rate in age group 40-44 is higher, means more residents can only afford a house when becoming 40 years old and above. This increase the occupancy of squatter houses despite the main objective of the National Housing Policy (DRN) is to provide affordable housing to young married couple and those who aged 30 years and below. Therefore, findings of this research is hoped could be used as a basis for the government to plan for reasonable amount of housing units to accommodate the demand of different group of age.
6. Recommendation
This paper would like to recommend that; (1) Headship rate – It is better to have specific age reflect to actual housing demand instead of age group; (2) Age range – Some of age is not give effect to headship rate can be neglected because it not give any significant effect.

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