

Middle Income Household Spending Patterns on Housing in Malaysian State Capital Cities: Where Does All the Money Go?  
(*Corak Perbelanjaan Kumpulan Pendapatan Menengah ke atas Perumahan di Bandar-Bandar Malaysia: Ke Manakah Wang Tersebut Dibelanjakan?*)

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**ABSTRACT**

*This paper examines the factors influencing the expenditure pattern of middle-income households on housing in selected state capital cities in Malaysia by focusing on mortgage and rental expenses. Three state capital cities were chosen (George Town in Pulau Pinang, Kuala Lumpur and Johor Bahru in Johor) and a survey was carried out with 473 observations that were used for estimations by using a censored Tobit model. The results indicate that household income is statistically significant and does indeed affect mortgages but not the rental expenses in the selected state capital cities. Moreover, there is strong evidence of a relationship between family size and the number of rooms with the mortgage and rental expenditure. The analysis also indicates that there is a different pattern of expenditure on mortgage and rental between the different ethnic groups in Malaysia. The Chinese and Indian races tend to spend more on mortgages and less on rental compared to the Malays. Further, the gender and age of household heads are found to be insignificant in terms of influencing mortgages but do affect rental expenditure. In addition, middle-income households in Johor Bahru pay more on mortgages and in Kuala Lumpur such households pay more for housing rental. It is concluded that changes in spending patterns are starkly different across state capital cities in Malaysia and mortgage repayments represent a large proportion of household expenditure.*

*Keywords: housing; mortgage; middle income; rental; Tobit*

**ABSTRAK**

*Kertas kajian ini menguji faktor-faktor yang mempengaruhi corak perbelanjaan kumpulan pendapatan menengah ke atas perumahan di bandar-bandar terpilih di Malaysia dengan memberi tumpuan kepada perbelanjaan gadai janji dan sewa. Tiga bandar telah dipilih (George Town di Pulau Pinang, Kuala Lumpur dan Johor Bahru di Johor) dan kaji selidik telah dilakukan dengan 473 pemerhatian telah digunakan untuk penganggaran dengan menggunakan model ditapis Tobit. Hasil kajian menunjukkan pendapatan isi rumah signifikan dan mempengaruhi gadai janji tetapi tidak mempengaruhi perbelanjaan sewa di bandar-bandar yang terpilih. Selanjutnya, terdapat bukti yang kukuh hubungan di antara saiz keluarga dan bilangan bilik dengan perbelanjaan gadai janji dan sewa. Analisis juga menunjukkan terdapat perbezaan corak perbelanjaan ke atas gadai janji dan sewa di antara kumpulan etnik di Malaysia. Kaum Cina dan India lebih cenderung untuk berbelanja lebih ke atas gadai janji dan kurang ke atas sewa berbanding kaum Melayu. Seterusnya, jantina dan usia ketua keluarga didapati tidak signifikan dalam mempengaruhi gadai janji berbanding perbelanjaan ke atas sewa. Sebagai tambahan, kumpulan pendapatan menengah isi rumah di Johor Bahru berbelanja lebih ke atas gadai janji dan isi rumah di Kuala Lumpur membayar lebih untuk sewa rumah. Adalah dirumuskan bahawa terdapat perubahan corak perbelanjaan merentasi bandar di Malaysia dan pembayaran gadai janji mengambil bahagian yang besar dalam perbelanjaan isi rumah.*

*Kata kunci: perumahan; gadai janji; pendapatan menengah; sewa; Tobit*

## INTRODUCTION

Housing expenditure in Malaysia, also known as housing, water, electricity, gas and other fuels includes rental paid, imputed rent, materials and services for the maintenance and repair of a dwelling. On average, Malaysian households spend RM853.08 per month for housing in 2014 (Department of Statistics 2015c) or RM213.27 a week, compared to RM495 in 2009/10 (Department of Statistics 2011) or RM123.75 a week. Under the comprehensive definition of housing expenditure based on the classification of individual consumption by purpose (COICOP), there was an increase of 72 per cent within four years. Households in Kuala Lumpur recorded the highest housing expenditure among the three selected state capital cities in Malaysia, 95.2 per cent above the Malaysian average expenditure level, which was RM1,665.35 per month in 2014, compared to Penang (RM901.22) and Johor (RM822.91).

In addition, the average monthly spend on rental and imputed rent was RM411.65 and RM973.18 per month in Kuala Lumpur, RM106.76 and RM505 per month in Johor, and Penang with RM105.15 and RM599.57 per month, respectively (Department of Statistics 2015c). In contrast, the COICOP definition of housing expenditure in Malaysia does not include mortgage repayments. Thus, in this current analysis, the authors focus more on mortgage repayment and rental expenses because of the significant proportion and important elements of household expenditure on housing that they represent.

Analyses of rent and mortgage repayments tend to focus on middle-income households because there are high numbers of renters and low numbers of mortgage holders in middle-income groups. Moreover, the middle-income group is a large group that is caught in the affordable housing trap. This is because house prices continue to rise, housing loan approvals are becoming stricter and there are fewer options available for the middle-income group as they find it difficult to own a house at the location of their choice (Baqtaya et al. 2016). The elasticity of housing expenditure in Malaysia is 1.19 for rural areas and 1.35 for urban areas, which means that there is an increase in the standard of living that comes from housing expenditure (Abdul Wahab et al. 2018). Due to the inability of middle-income households to buy a medium-cost house, renting a home is one of the best options. The acceleration in housing prices has been so rapid to the extent that even middle-income households cannot afford to purchase a house (EPU 2015; Raja Ariffin et al. 2015).

There is no standard definition for middle income and most economists define middle income in terms of the income or consumption level. For the purpose of this analysis, the authors define the middle-income group as those individuals whose income is between 75 per cent and 125 per cent of the society median per capita income (Birdsall et al. 2000). Thus, the current authors define the middle-income group as those whose earnings are between RM2,992.50 to RM8,999 a month for a single person. The term 'middle income' which is commonly used in Malaysia is based on a household and income share of 40 per cent from the Household Expenditure Survey (HES) report which is around RM3,800 to RM8,999 in 2014. For this study, the authors took into account the median monthly household income and income share not only based on the HES report, but also the Household Income and Basic Amenities Survey as well as the Salaries and Wages Report median income of the education sector workers in 2014 (Department of Statistics 2012; 2013; 2014; 2015a; 2015b; 2015c; 2016) to define the middle income group. As might be expected, spending on housing tends to increase as income increases. In 2014, the average spending of middle-income households on housing was RM793 per month or 21.8 per cent out of RM3,629 a month of the total expenditure (Department of Statistics 2015c). Thus, the question is does all the money go to mortgage and rental expenses only and what are the factors that influence the spending pattern of middle-income households on rent and mortgage repayments, particularly in Malaysian state capital cities. For this study, we have defined the mortgage repayments is the amount of monthly payment or instalment for housing or if the household rents a house, the monthly rent expense is the rental expenditure in this study. Therefore, this paper examines the factors influencing the expenditure pattern on rent and mortgage repayments in selected Malaysian state capital cities. It examines the influence of household socio-economic characteristics on rent and mortgage repayments.

The following Section 2 will elucidate the literature review, followed by the methodology in Section 3. The empirical results and discussion are presented in Section 4. Lastly, the conclusion of this study is laid out in Section 5.

## LITERATURE REVIEW

In order to understand economic security, an understanding of the spending pattern of household expenditure is an important factor. Expenditure on housing (More 1913; Haworth & Rasmussen 1973; Deaton et al. 1980; Renwick 1998; Allegretto 2006; Flanagan & Flanagan 2011; Dudek & Koszela 2013; Fisher & French 2014) and electricity (Flanagan & Flanagan 2011; Dudek & Koszela 2013; Fisher & French 2014) have become major priorities. According to Renwick (1998), Allegretto (2006) and Fisher and French (2014), housing expenditure is one of the important parts of household expenditure in the United States. Similarly, More (1913), Ismail (1971), Allegretto (2006), Flanagan and Flanagan (2011), Sekhampu and Niyimbanira (2013) and Fisher and French (2014) found that housing and rent are necessary expenditures.

More (1913) indicated that very poor families must spend as high as 30 to 35 per cent of their income just on rent. This result is supported by Renwick (1998) who found that the cost of a two-bedroom apartment has grown faster than the Consumer Price Index (CPI) in the central city and suburban areas. Moreover, Flanagan and Flanagan (2011) indicated

that the cost of housing services is the largest component of the regional price index. Their study revealed that spending on housing is more favoured, where housing cost is the first priority that creates housing stress<sup>1</sup>.

Housing is also the largest component in the cost of living index, and the coefficient for housing is positive and highly significant (Soberon-Ferrer & Dardis 1991; Nelson 1991; Blanciforti & Kranner 1997; Khandker & Mitchell 1998). Further, living in urban areas tends to be more expensive than the rural areas, where housing costs are a key component of the overall cost of living (Blanciforti & Kranner 1997). The increasing cost of living in Malaysia has promoted more money borrowing activities between two major income groups namely lower and middle class society (Rahman 2007).

From the household expenditure theory, income is one of the dominant factors that influence the household expenditure pattern. This statement is supported by a study by Kulub Abd. Rashid et al. (2010) who found that the income level within society is the main factor that determines individual consumption spending and has a positive relationship with total expenditure (Benus et al. 1976; Kulub Abd. Rashid et al. 2010; Sekhampu & Niyimbanira 2013). Further, Kulub Abd. Rashid et al. (2010) also revealed that the total expenditure of households varies slightly between the states of Kelantan, Pahang and Terengganu. Most of the household income in these three states is utilised for housing loans, vehicle loans and expenditure on food and education. The middle-income groups spend a higher share on housing as the household income rises. The housing loan taken by Malaysian household has contributed about 45 per cent of the total household debt (Tan et al. 2015) that implies buy a house is the single, most expensive and major decision that any household has undertaken. At the Malaysian macroeconomic level, the house prices respond to most of the macroeconomic shocks and the impact of real gross domestic product (GDP) appears to be stronger, which is 60 per cent change in house prices can be explained by real GDP either in the short-run or the long run (Shiau et al. 2018). The studies also reveal that monetary liquidity plays a major role and this implies that mortgage lending may have an impact on housing demand. Hamzah and Ismail (2018) study found that mortgaged home ownership caused uncontrollable house price escalation and contributed to the critical level of household debt. This leads to the proportion of housing spending as a top priority for every household in Malaysia.

The socio-demographic characteristics such as the age of the household head and family size were the most important factors in order to influence the expenditure pattern of households that live in urban areas (Regmi et al. 2015). There is a significant and positive relationship between family size and household expenditure (Benus et al. 1976; Battese & Bonyhady 1979; Kulub Abd. Rashid et al. 2010; Sekhampu & Niyimbanira 2013). Meanwhile, Sekhampu and Niyimbanira (2013) found that the gender and age of the household head have positive relationships with household expenditure. However, the relationships were not statistically significant (Kulub Abd. Rashid et al. 2010). In the Malaysian context, young people under 25 years do not have ability to become homeownership as compared to people from the age groups of 40 years and above (Alias et al. 2018). It can be seen that younger group struggle to own a house and being a tenant is only the first and last option they only have and also need to pay rent for a home. Study by Pahl (1990) found, the spending pattern also reflects who controls the money within the household. The findings showed that men as a household head (generally) contribute more to household expenditure compared to women.

Further, a study by Hu et al. (2013) indicated that home values are influenced by two factors, namely environmental information that includes location, local economic activity, air quality and others as well as information concerning the characteristics of the property such as lot and house size, number of rooms and so on. Two houses on the same street might differ in size and number of rooms and this might have an impact on the sale price and mortgage repayment or rentals. According to Karanka et al. (2013), the number of rooms has a greater influence on house price than any other characteristic. The house prices might change as the number of bedrooms increases. Similarly, Hu et al. (2013) also concluded that home values are closely related to the number of rooms and other characteristics. A large house would be expected to have more rooms than a small house. The current authors also anticipate that the proportion of spending on a larger house is higher than for a smaller house. Moreover, the price of a larger home is more expensive compared to a smaller one.

Lastly, a study by Schill and Wachter (1995) indicated that housing market constraints contribute to spatial stratification of the United States population by income and race. This is because of the local and federal regulatory policies or due to housing market discrimination by private and public buyers. There is a tendency to exclude low- and moderate-income households in the United States. According to a study by Krivo and Kaufman (2004), it has been pointed out that there are significant gaps in housing equity among ethnicity (blacks and Hispanics, but not for Asians) compared with whites in the United States of America. Furthermore, these two ethnicities in the United States uniformly receive less benefit from mortgage and housing characteristics than do the whites. This implies that the spending pattern of a household could be different in terms of ethnicity.

## METHODOLOGY

Since the current study uses cross-sectional data, a survey will be carried out using a structured questionnaire. All the respondents in the sample were government servants in the education sector group or teachers in the three state capital cities, namely, Kuala Lumpur, George Town in Pulau Pinang and Johor Bahru. There are several reason why teachers has been used as a benchmark for middle-income group which is the highest number of teachers in primary and secondary

schools in 2014 of 412,456 (Ministry of Education 2014) that fall within the middle income group definition. Teacher's income also more stable and has frequently been taken as a benchmark for other civil service groups in the government annual budget and by others. Paying various taxes such as personal income tax, goods and services tax, local government tax, road tax and others has become a middle income responsibility to ensure the sustainable of economic development. Teachers are also entitled to a grade 41 salary scale with a starting salary of RM1,917 and a maximum salary of RM11,864 a month at grade 54 (Department of Civil Services 2015). The Salaries and Wages Report also indicated that the highest median salary was recorded by employees in the education sector in Malaysia with RM2,803 a month in 2010 and rose to RM3,990 a month in 2015 (Department of Statistics 2012; 2016). From a different perspective, a middle income household is indirectly a reflection of first degree holders as this study used teachers as a benchmark.

Meanwhile, these three state capital cities (Kuala Lumpur, George Town and Johor Bahru) have demonstrated a high cost of living, with a higher frequency of being significantly different and a high variance based on analysis of variance and multiple comparison tests. Other than that, as indicated by the Department of Civil Services (2014), the variation in the cost of living can be shown by the area where Kuala Lumpur, Pulau Pinang, Selangor and Johor Bahru are classified as area A with a RM 300 cost of living allowance (COLA) per month. Further, according to Hamburg (1974), in order to achieve the desired degree of precision a simple random sample of at least 385 respondents would be required and the number of samples should be distributed proportionately according to the number of teachers in the representative state capital cities as shown in Table 1. The survey was conducted randomly and clustered by geographical location over the month of September 2016. A total of 642 questionnaires were distributed and with a high response rate meaning that some 473 samples were eligible as the sample for this study.

TABLE 1. The sample size

Capital City	Number of Teachers			%	Sample Size (n = 385)	Sample	
	Primary	Secondary	Total			Total	%
Kuala Lumpur	4 692	3 835	8 527	37.8	146	146	31
Johor Bahru	4 798	3 812	8 610	38.2	147	170	36
George Town	2 549	2 859	5 408	24.0	92	157	33
Total	12 039	10 506	22 545	100	385	473	100

With a constrained dependent variable, and in order to avoid any clustering that may produce inconsistency and biased results by using OLS, the authors employed the Tobit Model developed by James Tobin. This is because some of the households may not incur any expenditure on housing and thus have zero expenditure on mortgage repayments and rental expenses. The standard Tobit model according to McDonald and Mofitt (1980) and Wooldridge (2002) is as follows:

$$y_i^* = x_i\beta + \varepsilon_i \quad \text{with } \varepsilon_i \sim N(0, \sigma^2) \quad (1)$$

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \quad (2)$$

where:

- $y_i$  = actual observed household level of expenditure
- $y_i^*$  = households level of expenditure (latent variable)
- $x_i$  = individual characteristics
- $\beta$  = parameters to be estimated
- $\varepsilon_i$  = normally distributed error term

The log likelihood function for this estimation is as follows:

$$LL = \sum_0 \ln \left[ 1 - \Phi \left( \frac{x_i\beta}{\sigma_i} \right) \right] + \sum_+ \ln \left[ \frac{1}{\sigma_i} \phi \left( \frac{y_i - x_i\beta}{\sigma_i} \right) \right] \quad (3)$$

where:

- 0 = summation over the zero observations in the sample ( $y_i = 0$ )
- +
- = summation over positive observations ( $y_i > 0$ )
- $\Phi$  = cumulative distribution function (cdf)
- $\phi$  = probability density functions (pdf)

Next, the probability of a positive value:

$$P[y_i > 0|x] = \Phi \left( \frac{x_i\beta}{\sigma_i} \right) \quad (4)$$

The level of expenditure conditional on  $y_i > 0$  can be written as:

$$E[y_i|y_i > 0, x] = x_i\beta + \sigma_i * IMR \quad (5)$$

where:

$$IMR = \text{inverse mills ratio} = \left( \frac{\phi\left(\frac{x_i\beta}{\sigma_i}\right)}{\Phi\left(\frac{x_i\beta}{\sigma_i}\right)} \right)$$

To calculate the marginal effects for the probability of a positive value is as follows:

$$\frac{\partial P[y_i > 0|x]}{\partial x_j} = \frac{\beta_j}{x_i} \phi\left(\frac{x_i\beta}{\sigma_i}\right) \quad (6)$$

The marginal effects for level of expenditure on  $y_i > 0$  is as follows:

$$\frac{\partial E[y_i|y_i > 0, x]}{\partial x_j} = \beta_j \left( 1 - IMR * \left[ \frac{x_i\beta}{\sigma_i} + IMR \right] \right) \quad (7)$$

Lastly, the marginal effect of the unconditional expectation:

$$\frac{\partial E[y_i|x]}{\partial x_j} = \beta_j \Phi\left(\frac{x_i\beta}{\sigma_i}\right) \quad (8)$$

The dependent variable for this analysis is middle-income household expenditure in the selected state capital cities on rent and mortgage repayments. There are two equations used for estimation in this study, namely rent and also mortgage repayment expenditure among the three state capital cities in Malaysia. The explanatory variables are total household income (M), family size (FS), the gender of the household head (GH), the age of the household head (AH) and the number of rooms (NR). The binary variables were also included in order to measure the effect of race (Malay (DM), Chinese (DC), Indian (DI) and others (DO)) and the state capital cities (Kuala Lumpur (KL), George Town (GT), Johor Bahru (JB)). The Malay race (DM) and Kuala Lumpur (KL) variables were omitted in order to avoid perfect collinearity in the model and as a benchmark for comparison or a reference group.

TABLE 2. Summary of explanatory variables

Explanatory Variable	Description
Total Household Income (M)	Total monthly income household income (in RM)
Family Size (FS)	Number of family members in the household
Gender of Household Head (GH)	1 if male; 0 otherwise
Age of Household Head (AH)	Age of household head (in years)
Number of Rooms (NR)	Number of bedroom (units)
Malay (DM)	Omitted / Benchmark variable
Chinese (DC)	1 if Chinese; 0 otherwise
Indians (DI)	1 if Indians; 0 otherwise
Other races (D <sub>0</sub> )	1 if Other races; 0 otherwise
Kuala Lumpur (KL)	Omitted / Benchmark variable
Johor Bahru (JB)	1 if Johor Bahru; 0 otherwise
George Town (GT)	1 if George Town; 0 otherwise

## RESULTS AND DISCUSSION

The summary statistics for M, FS, GH, AH, NR and NC are presented in Table 3. The measures of central tendency for the variables are positive and total household income has the largest dispersion or spread. The skewness denotes the existence of both positive peaks for all variables except for gender. In addition, the kurtosis indicates that the distribution is peaked (leptokurtic) relative to the normal for all variables.

TABLE 3. Descriptive statistics of the variables

	Rent	Mortgage	M	FS	GH	AH	NR
Mean	225.28	826.31	8120.53	3	1	37	3
Median	0.0000	800.00	7620	4	1	35	3
Maximum	1600.0	6000.0	17923.36	9	1	72	8
Minimum	0.0000	0.0000	2222.4	1	0	1	0
Std. Dev.	322.45	842.18	3459.30	1.76	0.39	9.29	0.89
Skewness	1.2878	1.2897	0.6129	0.2801	-1.5957	0.5092	0.5125
Kurtosis	3.8926	6.3641	2.7099	2.4588	3.5464	3.1309	6.7911

A total of 473 samples were approved and qualify to be a sample, which exceeds the necessary requirement. Out of 473 the samples, 157 samples are from George Town respondents, 170 from Johor Bahru and 146 samples from Kuala Lumpur. There are 310 respondents or 65.54 per cent Malays, 117 respondents or 24.74 per cent Chinese, 40 respondents or 8.46 per cent Indians and 6 respondents or 1.27 per cent of other races in this study. Among them, a number of 268 respondents (56.66 per cent) are in grade 41 salary scale, 141 respondents (29.81 per cent) are in grade 44, and another 56 respondents (11.84 per cent) are in grade 48. In terms of gender, there are 384 male respondents or 81.18 per cent, and 89 female respondents or 18.82 per cent (see Table 4).

TABLE 4. Respondent profile

Respondents	Kuala Lumpur		Johor Bahru		George Town		Sum		
	Total	%	Total	%	Total	%	Total	%	
Total	146	30.87	170	35.94	157	33.19	473	100.00	
Race	Malay	90	61.64	140	82.35	80	50.96	310	65.54
	Chinese	41	28.08	24	14.12	52	33.12	117	24.74
	Indians	12	8.22	6	3.53	22	14.01	40	8.46
	Others	3	2.05	0	0.00	3	1.91	6	1.27
Grade	41	97	66.44	81	47.65	90	57.32	268	56.66
	44	37	25.34	62	36.47	42	26.75	141	29.81
	48	10	6.85	26	15.29	20	12.74	56	11.84
	52	1	0.68	1	0.59	5	3.18	7	1.48
	54	1	0.68	0	0.00	0	0.00	1	2.11
Gender	Male	118	80.82	135	79.41	131	83.44	384	81.18
	Female	28	19.18	35	20.59	26	16.56	89	18.82

## RENTAL EXPENDITURE

As illustrated in Table 5, the estimated coefficients (b) are presented in the 2<sup>nd</sup> column. The 3<sup>rd</sup> column shows the marginal effect of the explanatory variables on the expected value of the dependent variable. Meanwhile, the marginal effect on the expected value of the dependent variable for observations exceeding the threshold value is shown in the 4<sup>th</sup> column. The 5<sup>th</sup> column depicts the marginal effect on changes in the probability for those who did not spend on rental expenditure but might, which refers to observations at the limit. Next, the results showed that the model is a good fit and statistically jointly significant at 1 per cent.

The results show that household income (M) is not statistically significant in explaining expenditure on rental. It is not surprising that the household income does not affect rental expenses. Practically in Malaysia, there is a contract agreement between the tenants and the owners for a long period of rental such as for 1 or 2 years. Any renewal contract agreement will take full consideration of the financial ability of the tenant to pay the rent as monthly fixed expenses for a certain period of time. Other than that, family size, gender and the age of the household head as well as the number of rooms appear to affect the rental expenditure and is statistically significant among the three state capital cities.

The results indicate that as the number of household members increases by one person, the expected value of the latent variable will decrease by RM90.52 a month. In considering the entire sample, household expenditure on rental will fall by RM34.85 a month if the household size expands by an additional person. *Ceteris paribus*, an increase in household size by one person will lead to a fall of RM27.56 a month in household expenditure among those who have spent on rental during the survey period. Meanwhile, for those who have not spent on rental, the probability of them making expenditure on rental will fall by 6.1 per cent if there is an additional person living in the household. A greater number of family members will spend less on rental because this type of family has a high disposable income and most of the members are working.

The results also show that age is statistically significant in explaining rental expenditure in the three state capital cities. The results indicate that when the age of the household head increases, then household expenditure on rental will decrease. The negative relationship between these two variables is probably because younger people tend to spend more on housing as a first priority compared to older people. An increase in age by one year will cause the expected value of the latent variable to fall by RM11.44 a month. Additionally, there will be a decrease of RM4.41 a month in household expenditure on rental for the total sample if the age of the household head increases by one year. The results also show that for those who have spent on rental during the survey period, a year increase in age would lead to a fall of RM3.48 a month in rental expenditure, *ceteris paribus*. The probability of spending on rental for those who have not spent on rental falls by 7 per cent as the age of the household head increases by one year.

Next, if the household head is a male, the rental expenses will be higher than for a female household head by RM142.87 a month. When considering the total sample, male household heads are likely to spend more on rental compared to female household heads by RM54.99 a month. Holding the other parameters constant, household expenditure among those who have spent on rental during the survey period will increase by about RM43.50 a month. For those who have not spent on rental expenditure, their probability of spending increases by 9.6 per cent.

TABLE 5. The Tobit Estimated Coefficient and Marginal Effect of Rental Expenditure

(1)	(2)	(3)	(4)	(5)
Variables	Coefficient	$\frac{\partial E[y_i x]}{\partial x_j}$	$\frac{\partial E[y_i y_i > 0]}{\partial x_j}$	$\frac{\partial P[y_i > 0 x]}{\partial x_j}$
C	1367.0*** (7.4155)	526.24	416.26	0.9147
M	0.0035 (0.2583)	0.0014	0.0011	2.3538
FS	-90.522*** (-3.5632)	-34.85	-27.56	-0.0606
GH	142.87** (1.6479)	54.99	43.50	0.0956
AH	-11.444*** (-2.4613)	-4.41	-3.48	-0.0077
NR	-185.79*** (-4.2662)	-71.52	-56.57	-0.1243
Dc	-562.53*** (-5.8070)	-216.55	-171.29	-0.3764
D <sub>I</sub>	-611.18*** (-4.1519)	-235.28	-186.10	-0.4089
D <sub>O</sub>	-199.31 (-0.7113)	-76.72	-60.69	-0.1334
JB	-284.36*** (-3.5202)	-109.47	-86.59	-0.1902
GT	-150.01** (-1.9196)	-57.75	-45.68	-0.1004
Log-likelihood	-1598.9	$x\beta$	-167.09	
Wald Statistic	11.083***	SF <sub>1</sub>	0.3849	
Uncensored Obs	189	SF <sub>2</sub>	0.3045	

Source: Author's calculations.

Note: The number in the ( ) show the z-statistics.

\*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively.

SF<sub>1</sub> Scale factor or adjustment factor in equation (7)

SF<sub>2</sub> Scale factor or adjustment factor in equation (8)

In addition, as presented in Table 5, if there are a greater number of rooms<sup>2</sup> in the house then the middle-income households tend to spend less on rental by RM185.79 a month. When considering the total sample, if the number of rooms increases by one unit, this leads to a reduction of RM71.52 a month in household expenditure on rental. The household expenditure among those who spent on rental during the survey period will fall by RM56.57 a month for each additional one unit increase in the number of rooms. For those who have not spent on rental, their probability of spending on this item will fall by 12.4 per cent. Essentially, the larger the house, the house will be more expensive with a greater number of rooms and a higher disposable income within the household.

In terms of ethnicity, there is a significant difference between races and their spending pattern on rental. The expected value of the latent variable for Chinese and Indian races shows that they tend to spend less than the Malays by RM562.53 and RM611.18 a month respectively. For the entire sample, the Chinese and Indians will spend less than the Malays by RM216.55 to RM235.28 a month on rental expenditure respectively. The expenditure on rental for those who spent on this item is expected to be less than the Malays by RM171.29 and RM186.10 if their race is Chinese or Indian respectively, assuming other factors are held constant. Among Chinese and Indians who have not spent on rental their ethnicity will reduce the probability of making less expenditure on rental compared to the Malay race.

Finally, the results also reveal that there is a difference in terms of rental expenditure among the three state capital cities in Malaysia. Another possibility is that middle-income households in Johor Bahru have to spend less by RM284.36 and RM150.01 a month in George Town compared to Kuala Lumpur, respectively. When considering the entire sample, Johor Bahru households have to spend less by RM109.47 and RM57.75 a month in George Town. *Ceteris paribus*, the households in Johor Bahru and George Town will spend less on rental during the survey period by RM86.59 and RM45.68 a month, respectively, compared to Kuala Lumpur. Lastly, for households in Johor Bahru and George Town that do not spend on rental, the probability of them paying less than Kuala Lumpur on rental will fall by 19 and 10 per cent respectively.

## MORTGAGE REPAYMENT EXPENDITURE

As shown in Table 6, the model is considered to be a good fit and jointly significant at the 1 per cent level. The total household income (M), family size (FS) and the number of rooms (NR) are statistically significant and do affect the mortgage repayment expenditure among the three state capital cities in Malaysia. Meanwhile, gender and age of household head would appear not to influence mortgage repayments and are statistically not significant.

TABLE 6. The Tobit Estimated Coefficient and Marginal Effect of Mortgage Repayment Expenditure

(1) Variables	(2) Coefficient	(3) $\frac{\partial E[y_i x]}{\partial x_j}$	(4) $\frac{\partial E[y_i y_i > 0]}{\partial x_j}$	(5) $\frac{\partial P[y_i > 0 x]}{\partial x_j}$
C	-1922.4*** (-6.9664)	-1363.49	-961.53	-0.6858
M	0.0620*** (3.4044)	0.04	0.03	0.0000
FS	149.72*** (4.2472)	106.19	74.89	0.0534
GH	143.01 (1.0503)	101.43	71.53	0.0510
AH	7.5081 (1.1715)	5.33	3.76	0.0027
NR	170.63*** (2.8788)	121.02	85.35	0.0609
Dc	892.34*** (7.0230)	632.91	446.33	0.3183
Di	1055.7*** (5.9606)	748.76	528.03	0.3766
Do	355.92 (0.8315)	252.44	178.02	0.1270
JB	463.25*** (3.7930)	328.57	231.71	0.1653
GT	24.549 (0.1999)	17.41	12.28	0.0088
Log-likelihood	-2611.7	$\chi^2$	529.58	
Wald Statistic	21.172***	SF <sub>1</sub>	0.7093	
Uncensored Obs	301	SF <sub>2</sub>	0.5002	

Source: Author's calculations.

Note: The number in the ( ) show the z-statistics.

\*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively.

SF<sub>1</sub> Scale factor or adjustment factor in equation (7)

SF<sub>2</sub> Scale factor or adjustment factor in equation (8)

The effect of monthly household income on mortgage expenditure is positive and statistically significant. The expected value of the latent variable increases by RM6 a month when monthly household income increases by RM100. When considering the total sample, an increase in monthly household income by RM100 leads to a rise of RM4 a month in household expenditure on a mortgage. By holding other things constant or *ceteris paribus*, household expenditure among those who spent on a mortgage during the survey period rises by RM3 for each additional of RM100 in monthly household income. For those who do not spend on a mortgage, their probability of spending on this item is none or 0 per cent if the monthly household income increases by RM100. Therefore, it can be concluded that middle-income households with a greater disposable income have the tendency to spend more on a mortgage compared to households with a tighter budget constraint.

Moreover, family size significantly influences the mortgage repayment and the results indicate that as the number of household members increases by one person, the expected value of the latent variable increases by RM149.72 a month. Household expenditure on the mortgage will rise by RM106.19 a month if the household size increases by one person when considering the entire sample. Further, an increase in family size by one person will lead to a rise of RM74.89 a month in household expenditure among those who have spent on a mortgage during the survey period. The probability for those who have not spent on a mortgage will increase by 5.3 per cent if there is an increase in family members by one person.

From a different point of view, the middle-income households that participated in the survey tend to pay more for a mortgage by RM170.63 a month if the house has an increase in the number of rooms by one additional unit. By looking at the total sample, if the number of rooms increases by one unit this leads to an increase of RM121.02 a month in household expenditure on a mortgage. The household expenditure among those who spent on a mortgage during the survey period

will rise by RM85.35 a month for each additional one unit of the number of rooms. The probability for those who have not spent on the mortgage will increase by 6.1 per cent.

Moreover, there is a significant difference between races and their spending pattern in terms of a mortgage. The Chinese tend to spend more than Malays by RM892.34 a month compared to Indians at RM1,055.7 a month on a mortgage. After considering the entire sample, the Chinese are still willing to pay more than Malays by RM632.91, while Indians pay more than Malays by RM748.76 a month in mortgage expenditure. Those who spend on mortgage expenditure are expected to pay more by RM446.33 a month if they are Chinese and RM528.03 if Indian, *ceteris paribus*. The probability of Chinese and Indians who have not spent on a mortgage will pay more than Malays is 31.8 and 37.7 per cent respectively.

Lastly, there is a significant difference between household expenditure on a mortgage in Johor Bahru and Kuala Lumpur. A middle-income household in Johor Bahru will pay higher than Kuala Lumpur by RM463.25 a month on a mortgage. Considering the entire sample, households in Johor Bahru pay more than Kuala Lumpur by RM328.5 a month on mortgage expenditure. By assuming all other parameters are held constant, the households in Johor Bahru will spend more on a mortgage during the survey period by RM231.71 a month compared to Kuala Lumpur. There is an increase in probability by 16.5 per cent of Johor Bahru households who do not spend on a mortgage will pay more compared to Kuala Lumpur. However, there is no difference in terms of the mortgage expenditure pattern between Kuala Lumpur and George Town.

## CONCLUSION

From the study, it can be concluded that rental and mortgage repayments are two different types of expenditure that have different expenditure patterns among households and cities. Analysis of the results revealed that total household income directly influences mortgage expenditure but not rental. The existence of a rental agreement between tenants and owners for long rental periods affects the spending pattern for the households in the three state capital cities. It stands to reason that the housing price must be at a reasonable rate and that people must be able to afford it. Financial approval that is too strict and the house prices being too high relative to disposable income affect the spending pattern of middle-income households in terms of mortgage repayment. Homeowners' wellbeing depends on the ability to repay the loan and housing costs. We also recommended to the government to have enacted any consumer financial protection acts particularly to protect housing loan borrowers. The skyrocketed prices have driven house buyers to take back breaking mortgages and combine their income in order to qualify for a mortgage, thus leaving them with very little or no savings after paying the monthly instalments. This will place families at risk as they could fall into a deficit situation if any sudden emergencies happen to either of the borrowers.

As part of this, family size and the number of rooms are two indicators that are statistically significant and tend to influence mortgage and rent expenditure, as expected. To counteract this, the authorities or the government should regulate the housing price and control the rental price in the capital cities. Therefore, there is a need to establish a housing rental act in the state capital cities. Indeed, such an action is highly recommended. The federal and state governments should also provide the land and other forms of incentives to encourage private developers to lend their support for affordable housing. Housing affordability is a grave concern to average Malaysians, and the supply of affordable housing is insufficient in the current residential property market. There is a need for government to pay more attention to housing needs of middle-income groups. It is imperative for the Malaysian government to put in further efforts to control housing prices in order to maintain affordability of homeownership. The abnormal mortgage delinquencies can serve as indicators of changes in economic fundamentals and early signs of a mounting housing crisis.

Empirical analysis also denotes that there is a different pattern of expenditure on mortgage and rental between Chinese and Indians compared to Malays, where these two races (Chinese and Indian) tend to spend more on a mortgage and less on rental compared to the Malay race. There are big gaps in disposable income between races in Malaysia and the ability of the Malay race to buy a big house with more rooms would appear to be very limited as they have only a low purchasing power. Therefore, the extension of the New Economic Policy (NEP) fundamentals should be continued in order to minimise the disposable income inequality among races. Although the National Housing Policy (DRN) was established to provide affordable housing to young married couple and those who aged 30 years and below, the skyrocketed of housing prices has increased the occupancy of squatter house particular for Malays. Other than that, the results indicate that most of the Malays are tenants or are renting in the state capital cities.

Finally, the results also reveal that Johor Bahru is the most expensive city to live in as residents pay more for a mortgage compared to Kuala Lumpur. However, Kuala Lumpur is still recorded the most expensive city with regard to housing rental. Therefore, it is concluded that changes in spending patterns are starkly different across the selected state capital cities in Malaysia. The authorities must look forward and carefully plan in terms of interpreting the expenditure pattern on mortgages and rental among households in the state capital cities.

## NOTES

<sup>1</sup> Paying the highest proportion of their income on housing (Flanagan & Flanagan 2011).

<sup>2</sup> Buying or renting a new house that has a greater number of rooms than the previous house.

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