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Estimating Expenditure Pattern and Permanent Income Hypothesis: Evidence from Kelantan Malaysia

(Anggaran Pola Perbelanjaan dan Hipotesis Pendapatan Tetap: Kajian di Kelantan Malaysia)

Ahmad Fahme Mohd Ali
Naziatul Aziah Mohd Radzi
Ruzanifah Kosnin
Suchi Hassan
Siti Salina Saidin
Universiti Malaysia Kelantan

ABSTRACT

The purpose of this paper is to investigate the consumption function among households in Kelantan Malaysia based on the Permanent Income Hypothesis (PIH). This study used secondary data obtained from annual reports, as well as from published and non-published data between 2000 and 2016. The ARDL bound testing approach to deal with cointegration was applied to estimate the long run correlation between the variables. Meanwhile, the error correction method (ECM) was used to determine any short run correlation. This study found a large disparity between the elasticity to consume from current income and the elasticity to consume from permanent income among households in Kelantan. Therefore, it can be concluded that in the case of Kelantan, the PIH is valid.

Keywords: Permanent income hypothesis; income and expenditure elasticity; poverty; Kelantan; Malaysia
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ABSTRAK

Artikel ini bertujuan untuk menganalisa perbelanjaan masyarakat di Kelantan Malaysia berdasarkan kepada keadah Hipotesis Pendapatan Tetap (PIH). Kajian ini menggunakan data sekunder yang merangkumi tempoh 2000 sehingga 2016. Kaedah ARDL digunakan untuk mencari korelasi hubungan jangka panjang antara pemboleh ubah. Manakala kaedah pembetulan ralat (ECM) digunakan untuk mencari kolerasi jangka pendek. Kajian ini mendapati terdapat perbezaan yang besar antara keanjalan dari pendapatan semasa dan dari pendapatan tetap di kalangan isi rumah di Kelantan. Oleh itu, dapat disimpulkan bahawa, PIH adalah sah di Kelantan.

Kata kunci: Hipotesis pendapatan tetap; keanjalan pendapatan dan perbelanjaan; kemiskinan; Kelantan; Malaysia

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INTRODUCTION

According to the 2020 Index of Economic freedom, Malaysia ranked 24th in the world, and 6th among 42 countries in the Asia-Pacific region. The index track over two decades in the advancement of economic freedom, prosperity, and opportunity shows that Malaysia is moving towards a free market system. One of the contributing factors is the gradual energy subsidy rationalisation which started in 2016. Energy subsidy reforms could promote sustainable development through the effects on energy consumption, pricing system, resource allocation, and emissions through technological efficiency in the long run. However, several studies suggested that the removal of subsidy leads to significant reductions in both income and consumption expenditure among rural and urban households, which subsequently decreases their welfare (Hamid & Rashid, 2012; Solaymani 2016). The direct effect of subsidy removal is the increase in consumer level prices (Hamid & Rashid 2012), which affects various groups from the population in different ways. The T20 (Top 20 per cent) group might not be affected as much as the M40 (Middle 40 per cent) group, but the B40 (Bottom 40 per cent) will eventually be hit the most. The slight changes in price of consumer products, especially of basic necessities, will affect the lowest income group severely due to their relatively low level of income compared to those of other groups.

Based on a study, there is an association between consumption expenditure pattern and household income, indicating that a one per cent increase in income can result in an increase of 0.5 per cent in total spending (Yusof & Duasa 2010). In 2019, the income threshold for the B40 group was RM4,849, which covered only 16.0 per cent of the total household income. Meanwhile, the income threshold for the M40 group was between RM4,850 and RM10,959, with a

46.8 per cent income distribution, and the T20 group with income more than RM10,960 constituted 37.2 per cent. In terms of spending, the B40 group, with the lowest income in Malaysia, allocated almost 80 per cent of their household income on basic necessities such as food, non-alcoholic beverages, housing, water, electricity, and transportation, whereas the M40 and T20 groups allocated only 64 and 48 per cent, respectively, on the same goods. With an income balance of only 20 per cent, the B40 group may lack access to a healthy diet, savings, and other necessities such as health care and education. This in turn will lead to adverse impacts on the group in the long run due to the limitation in social and economic development opportunities; thus, hindering poverty alleviation efforts.

From 2016 until 2019, Malaysia's mean monthly household expenditure had increased by 3.9 per cent per annum resultant of a 4.2 per cent moderate growth of the mean monthly household income during the same period. The mean monthly household expenditure had risen from RM 4,033 (2016) to RM 4,534 (2019), which was also an increase in the median from RM3,314 in 2016 to RM3,654 in 2019. The differences in price for commodity, level of income, and the capability for households to survive with rising prices have shown a different cost of living among states. States with larger urban areas such as Selangor, F.T. Putrajaya, F.T. Kuala Lumpur, Melaka, Johor, and Penang recorded the highest mean monthly household expenditure which exceeded the national mean (RM4,534) in 2019.

The household expenditure on basic necessities continues to be the main component of consumption, which contributes more than 60 per cent of the total expenditure (Figure 1). Basic necessities, such as housing, electricity, water, and other fuels (23.6 per cent); food and non-alcoholic beverages (17.3 per cent); restaurant and hotels (13.9 per cent); and transport (13.5 per cent) are the main consumption for households in Malaysia. Consequently, all these values have been supported in the study by Rashid et al. (2011), indicating that income expenditure in eastern states (Pahang, Kelantan, and Terengganu) were allocated for housing loans, automobile loans, and education funds. Tan et al. (2010) posited that Chinese households have higher gambling probabilities included in their expenditure compared to Indian households and those of other ethnic backgrounds. While Islam et al. (2010) pointed that Malaysian households spend more on dining out, as they have to spend more time at work and less time for preparing food at home.

Although countless studies have been done on the expenditure pattern among consumers, studies on the effect of socio-backgrounds on the expenditure pattern, especially in Malaysia, are still in the infancy stage. Moreover, studies have only focused on the general population or specific commodities, neglecting the true consumption expenditure among the poor. For example, Ong et al. (2008) only focused on the types of expenditure among households aged 55 years and above, while Sheng et al. (2008) only focused on the variations in food expenditure among Malaysians. Furthermore, Nik Mustapha (1994) only focused on the top income group among Malaysian households and found that 28 per cent allocated their expenses for transportation. In another study, as much as 34 per cent of the total expenditure by Malaysians were found to be for the purchase of food items (Heng et al. 2007). Meanwhile, Mohamad Idham et al. (2014) discovered a significant relationship between food and transportation, and the spending pattern among Malaysian youths. The result

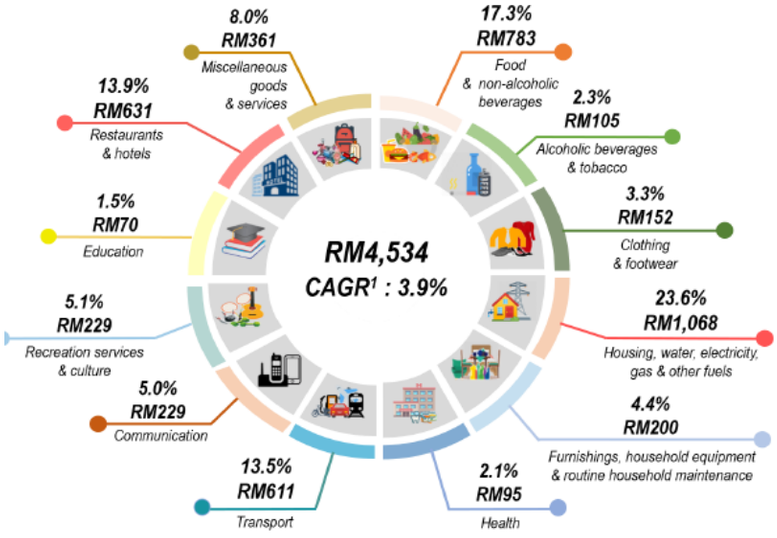

FIGURE 1. Expenditure percentage per household in Malaysia (2019)
Source: Malaysia Household Expenditure Survey 2020

showed that food, transportation, entertainment, sports activities, and electronic gadgets have a significant effect on the spending pattern among Malaysian youths. Thus, it was concluded that the majority of Malaysian youths spend most of their income on food and transportation.

The objectives of this paper are to estimate the consumption pattern and to test the Permanent Income Hypothesis by Friedman on the consumption expenditure among households in Kelantan from annual time series data over the period of 2000 until 2016. The remaining parts of this study are organised as follows: the theoretical framework of the study is presented in Section 2, while Section 3 focuses on the literature review. Section 4 explains the methodology used in this study, while results and discussion are elaborated in Section 5. Finally, concluding remarks are presented in Section 6.

THEORETICAL FRAMEWORK

In his 1936 research on the psychological law of consumption, Keynes discovered that consumption relies only on disposable income in the current period, which has been a positive but declining function of aggregate income (Keynes 1936). Duesenberry, however, questioned Keynes' theory of aggregate consumption in 1948 by adding other psychological variables correlated with habit formation and problems of social interdependencies on relative income that were later known as the relative income hypothesis (Duesenberry 1949). According to Duesenberry, the consumption of a household depends not just on the household's current disposable income, but also on the household's current income in comparison to the highest amount of income previously obtained and relative to other households' income. In 1954, Franco Modigliani and Richard Brumberg introduced the Life-Cycle Hypothesis (LCH), and later Milton Friedman introduced the Permanent Income Hypothesis in 1957, which suggests that consumption is a function and cannot measure total income, demonstrating the average expected income of lifetime resources as introduced by the Keynesian consumption function (Friedman 1957).

The objective of this paper is to test Friedman's Permanent Income Hypothesis in describing consumption expenditure among households in Kelantan based on annual time series data over the period of 2000 until 2016. Despite its simple intuitive appeal, the PIH has an inter-temporal optimisation model of consumer behaviour, which is the most coherent and logically consistent model at present. Although this model traced its roots to Irving Fisher (1907) and Ramsey (1928), it has endured so much in many ways and has dominated consumption theory for the last fifty years (Mayer 1972; Blinder & Deaton 1985; Mankiw & Campbell 1990; Manitsaris 2006). This study attempts to revive Friedman's classification tests using the Household Expenditure Survey (HES), a comprehensive household expenditure data. The HES data is far superior to those available to Friedman since it includes extensive information on socioeconomic and demographic variables in households and offers a precise and independent measure of expenditure and income for household consumption. Thus, the objectives of this paper are to model the consumption function among households in Kelantan using the Permanent Income Hypothesis and to assess the consistency of the final consumption for Kelantanese households based on the PIH method.

LITERATURE REVIEW

The Permanent Income Hypothesis (PIH) is a consumer purchasing theory, explaining that individuals invest their income at a pace consistent with their predicted future average income. The projected future benefit level thus becomes the level of "permanent" money that can be easily invested. An employee can invest only if one's present salary is higher than the predicted amount of permanent income, to prevent potential income reductions (Kagan 2020). In the last fifty years, Friedman's permanent income theory dominated market philosophy. Friedman's theory implies that permanent compensation is equivalent to previous annual income, plus a percentage of income adjustment occurring between the past year and the present year. He suggested that short run consumption function curves are flatter than long run consumption function curves, which shows that the short run Marginal Propensity to Consume (MPC) is smaller than long run MPC. This is caused by income growth volatility, whether the growth will proceed over the longer duration or not, which decides the expenditure habits of the consumer. Consequently, consumers' expenditure will focus on the short run average tendency to spend and will decline when income rises because citizens are unsure if the rise in income would continue or not, although they adapt consumption completely to their higher permanent income when expressed in the long run consumption function (Friedman 1957).

Empirical studies on the PIH in both developed and developing countries have shown numerous results. De Juan and Seater (1997) found that countries with high-quality national income accounts tend to be consistent with PIH, while countries with low-quality income accounts do not support PIH, which suggests that this is due to the state of a country's economic development as well as the quality of national income accounts. Meanwhile, a study in West-German states showed that the response of consumption to income was weak, which revealed that the response of consumption to income was asymmetric for the individual states and

for Germany as a whole. The result failed to validate the PIH hypothesis by Friedman (Dejuan et al. 2004). Different results occurred in Osei-Fosu et al. (2014), Manitsaris' (2006), and Kundu and Mukhopadhyay's (2011) studies, which concluded a proportional relationship exists between the permanent consumption and the permanent income, suggesting that the PIH strongly holds. Devereux et al. (2009) and Amin (2011) discovered a positive relationship between expectations of relative consumption growth and real depreciation across countries. They noticed that through the panel cointegration test of the consumption, income and wealth are co-integrated in their components. Meanwhile Singh (2015) used the ADF Test, VECM, and Granger Causality Test to examine the relationship between income, wealth, and consumption. The results showed that at least one co-integration exists between the variables and the bi-directional causal relationship presence. This finding is consistent with results by Ighodaro (2010), Awomuse and Alimi (2012), and Alimi (2014), in which the causality test proved the existence of a bi-directional causality that runs from National Income to Government expenditure, and there is a long-term relationship between two variables among African countries.

Roche (1995) point out two reasons for testing and examining the PIH; first, the consequence for policymakers is mostly on policies that affect the disposable income of households, such as income tax. If the government reduces or cuts down on the tax, the impact on household consumption is perceived by consumers as a permanent policy. Thus, reducing the tax aimed at those who are at the bottom side of income distribution can be more expansionary than reducing the tax aimed at higher income earners since lower income households have a higher MPC or Marginal Propensity to Consume (Palley 2008). Second, the method (PIH) combines other important theoretical development parts, such as the expansionary fiscal contractions argument. Thus, a reduction in government expenditure can result in the reduction of income tax in the future. Meanwhile, Elwood (1997) tested the permanent and transitory components of GDP based on consumption theories to estimate how households distinguish between the expected and unexpected change in the GDP and its transitory and permanent components. Results showed an excess responsive connection between consumption and income. Nonetheless, a study on changes of wealth perception and consumption by Heymann and Sanguinetti (1998) showed that a household's planning for current consumption is based on future expectations on credit supply, production, and economic performance. It was suggested that any positive expectation on the economy will increase a household's consumption, but it would be harder to decide if the economy undergoes a series of political and economic reforms.

Meanwhile, a study by Harris, Loundes and Webster (1999) on factors of saving among Australians, based on a household saving survey, showed that current income and demographic composition are the key determinants of saving. A different study by Ahumada and Garegnani (2000), which included the exchange rate and highest income as the proxy of wealth on the aggregate dynamic consumption for Argentina, showed that only households' disposable income is the determinant of ARPC in the long run. Meanwhile, Singh (2004) discovered that in short run and long run elasticity, income, wealth, and real interest rate will affect the Aggregate Real Private Consumption (ARPC) of Fiji. However, the interest rate does not affect the ARPC in the long run. A same result was shown by Shirvani and Wilbratte (2009) when they tested PIH on 5 main industrial countries (USA, France, Canada, UK and Italy). The results supported the PIH concept of consumption for all of these countries.

In another study, De Castro (2006) discovered that a high response in consumption of disposable income is caused by high-interest rate and unemployment rate, which contribute to high liquidity constraints on disposable income. Manitsaris (2006) estimated the consumption function for 15 European countries based on annual data from 1980 to 2005 and found that the PIH and consumption are consistent for all 15 European countries. Furthermore, Kandil and Miezaie (2006) showed that a change in the ARPC in developing countries is caused by unexpected changes in income, while fluctuations in the currency exchange rate cause varied effects on the aggregate private consumption. This suggests that a decrease in government size and an increase in monetary policy can stimulate the ARPC in developing countries. A study by Horipka (2013) on the main determinants of private consumption for G7 countries (Canada, France, Germany, Japan, Italy, UK, and USA) found that wealth, income, GDP, saving, and employment are the main determinants of private consumption. It was also highlighted that during 2002–2007, private consumption among Japanese households remained stagnant, caused by the constancy in household saving and stagnation in household wealth and income.

RESEARCH METHODOLOGY

The state of Kelantan has been selected as a study area. Kelantan has been selected because it has the highest poverty incidence in Peninsular Malaysia (EPU 2017). Furthermore, this state has a lot of poverty alleviation resources, such as zakat (Farouk, Md Idris & Saad 2018), which is among the highest zakat collection states in Malaysia that can be utilised as poverty alleviation fund (Saad, Sawandi & Muhammad 2016). However, to implement the policy, it is important for policymakers to know the pattern of consumption at the household and individual levels (Mok et al. 2007). The Kelantan

state consists of ten districts, namely Kota Bharu, Pasir Putih, Pasir Mas, Kuala Krai, Gua Musang, Tumpat, Bachok, Jeli, Tanah Merah, and Machang. In Kelantan, 95.3 per cent of the population are Muslims (Kelantan Economic Report 2015). Kelantan was the poorest state in Malaysia in 1976. Statistics show that the majority of the Kelantan people (67.1 per cent) is below the poverty line. This statistic was then changed in 1997 when Sabah became the poorest state in Malaysia (22.1 per cent). The rate of poverty in Kelantan started to decrease gradually in the following years. For example, the poverty rate in Kelantan had dropped from 0.9 per cent in 2014 to 0.4 per cent in 2016 (Department of Statistics Malaysia 2019).

DATA

The data for this study are time series data from annual reports, and published and non-published data from several agencies, such as Malaysia's Department of Statistics (DOS), Malaysia's Economic Planning Unit, and the Central Bank of Malaysia (CBN) Statistical Bulletin, covering the period from 2000 to 2016. The data which include household consumption (Cons) and income (GDP) are of prior interest; however, other control variables, such as Prime Lending Rate (INT), largely account for the determinants of consumption as proposed by the PIH. Gross domestic product (GDP) is used as a proxy for household income because GDP is highly correlated with labour income and its real value is obtained by deflating it with consumption deflator. The long-term deposit rate is used as a proxy of real interest rate after inflation adjustment. The data on Real GDP (GDP), Household Expenditure (Cons), and Real Interest Rate (INT) are gathered from published and non-published data of Malaysia's Department of Statistics (DOS), Malaysia's Economic Planning Unit, the Central Bank of Malaysia, and International Financial Statistics. Data for Real GDP (GDP) and Household Final Expenditure are in Malaysian Ringgit (MYR) while Real Interest Rate (INT) is in percentage. The Real GDP (GDP) and Household Consumption Expenditure (Cons) are converted to logarithm form to stabilise the variance and to reduce or remove the skewness of the original data. All variables are measured in real terms.

ECONOMETRIC MODEL

Following the theoretical background of consumption analysis, this paper employs the PIH approach. According to PIH, consumption is based on anticipated lifetime income. This theory divides the income and consumption measures into permanent and transitory components, respectively, with some restrictions which include zero correlation between the permanent and transitory component of income and consumption, and zero serial correlation in transitory components. Based on Milton Friedman's (1957) hypothesis on permanent income, the actual consumption consists of two parts of income, namely permanent and transitory. This can be expressed as follows:

$$C_t = C_t^P + C_t^T \quad (1)$$

where C_t is the actual income, C_t^T is the transitory consumption, and C_t^P is the permanent income. The actual income Y_t is the amount of permanent income, Y_t^P and transitory income, Y_t^T which is:

$$Y_t^T = Y_t^P + Y_t^T \quad (2)$$

Furthermore, the permanent consumption expenditure is assumed to be determined by the permanent income, which is:

$$C_t^P = \alpha + \beta Y_t^T \quad (3)$$

where α and β are parameters to be estimated. Since Y_t^T and C_t^P are not easily captured and not directly observable, the instrument that generates permanent income and permanent consumption is required. Based on Daka. L. (2016), Manitsaris' (2006) and Gujarati's (2004), the combination of Cagan's adaptive expectation hypothesis is:

$$Y_t^P - Y_t^T{}_{,} = \delta(Y_t - Y_t^P{}_{,}) 0 < \delta < 1 \quad (4)$$

where δ is the adaptive expectation coefficient. Substituting (1) into (3), the results are expressed in following equation:

$$C_t = \alpha + \beta Y_t^P + C_t^T \quad (5)$$

which is written in econometric terms as:

$$C_t = \alpha + \beta Y_t^P + u_t \quad (6)$$

for

$$u_t = C_t^T + \varepsilon_t \quad (7)$$

from (7)

$$Y_t^P = -(\alpha/\beta) + ((1/\beta) \times C) - ((1/\beta) \times u_t \quad (8)$$

Lagging (8) one period yields:

$$Y_t^P{}_{,} = -(\alpha/\beta) + C_t{}_{,} - ((1/\beta) \times u_t{}_{,} \quad (9)$$

By substituting (8) and (9) in the equation (4), the following equation is obtained:

$$C_t = \alpha\delta + \beta\delta Y_t + (1-\delta)C_t{}_{,} + [u_t - (1-\delta)u_t{}_{,}] \quad (10)$$

Equation (10) can be restated as follows:

$$C_t = \theta_1 + \theta_2 Y_t + \theta_3 C_{t-1} + \omega_t \quad (11)$$

where θ_1 is the autonomous consumption ($\alpha\psi$), $\theta_2 = \beta\delta$ is the short run MPC where $\beta = (\theta_2/\delta)$ is the long run MPC, and δ is the adjustment coefficient given as $\theta_3 = 1-\delta \rightarrow 1-\theta_3$. Equation (11) is the short run consumption function under the PIH and the adaptive expectation model is estimable since all variables involved are expressed in actual and not in observable variables. Further, the effects of interest rates *(INT)* are incorporated into an estimable function in equation (10) in order to assess the effects on consumption. This yield:

$$C_t = \theta_1 + \theta_2 Y_t + \theta_3 C_{t-1} + \varphi INT_t + u_t \quad (12)$$

In order to achieve stationarity in the series and reduce the heteroscedasticity and autocorrelation, the log-linear form in equation (12) is estimated. Furthermore, based on the log-linear form, the model allows the regression coefficients to be interpreted as elasticity. Therefore, the model in equation (12) is estimated as:

$$lnC_t = \theta_1 + \theta_2 lnGDP_t + \theta_3 lnCons_{t-1} + \theta_4 INT_t + \mu_t \quad (13)$$

where θ_i are the elasticity coefficients, $GDP_t = Y_t$ and $Const = C_t$.

UNIT ROOT TEST

The stationarity test or unit root test of variables is the most important asymptotic property of the time series data. The process of checking stationarity is called unit root testing. This is important because the non-stationary data will lead to incorrect conclusions under the standard OLS regression procedures (Asteriou and Hall 2007). From the previous literature, the integration of the DF (Dickey & Fuller 1979) and the PP (Philip & Perron, 1988) tests has been used extensively. Thus, the Augmented Dickey-Fuller (ADF) test is used to examine the stationarity of the variables, which can cause impulsive results in a time series analysis. The ADF test is more powerful and can handle more complex models than the Dickey-Fuller (DF) test. Besides, if a unit root is present in more than one variable, the error correction model (ECM) and the Johansen system cointegration tessts are further constructed, which will enable the analysis of the short run, long run, and the adjustment coefficient of the variables. Moreover, all the terms used in the ECM model are stationary, permitting the standard OLS estimation. After testing, proper econometric models are selected for the data processing.

THE ARDL COINTEGRATION APPROACH

The first approach in the ARDL model determines the presence of any long-term relationship among the variables of interest, based on F-test. The next step is to estimate and determine the value of the long-term relationship coefficients, followed by estimating the short run elasticity based on error correction representation of the ARDL model. Furthermore, the ECM version of the ARDL enables the determination of the speed of adjustment to equilibrium (Pesaran and Pesaran 1997). The ARDL model for estimating the PIH in Kelantan, as adopted for this study, is defined as follows:

$$lncons = \beta_0 + \theta_1 lncons_{i-1} + \theta_2 lngdp_{i-1} + \theta_2 lnint_{i-1} + u_i \quad (14)$$

Where lncons is the natural log of consumption, lngdp is the natural log of income, and lnint is the natural log of the interest rate. This involves choosing the orders of the ARDL (p, q1, q2,) model in the three variables using the Akaike Information Criterion (AIC). An Error Correction Model (ECM) is then estimated to capture the short run dynamics of the system. Meanwhile, the ECM can provide a way of reconciling the economic variables between the short run behaviour and its long run behaviour. The ECM is specified as follows:

$$\Delta lncons = \gamma + \beta_{1i}\Delta lncons_{t-i} + \beta_{2i}\Delta lngdp_{t-i} + \beta_{3i}\Delta lnint_{i-k} + \rho ECM_{t-1} + u_t \quad (15)$$

From the equation above, the remaining expression with summation sign (β_3 - β_0) is the short run dynamics coefficients of the model's convergence to equilibrium. ECM_{t-1} is the Error Correction Model.

RESULTS

AUGMENTED DICKEY -FULLER UNIT ROOT TEST RESULTS

Results from the Augmented Dickey-Fuller (ADF) unit root test (Table 1) show that the unit-root null hypothesis is rejected for income (GDP) at 1 per cent significance level, which indicates that the income variable (GDP) is stationary at its natural log level. Meanwhile, consumption (Cons) and interest rate (INT) have a unit root at their log level but achieve stationarity at their first difference at 1 per cent significant level.

In addition, the Phillips-Perron (PP) test was also conducted with level and first difference in order to crosscheck the ADF result and to confirm the non-stationarity of the variables. The PP unit root test results (Table 3) show that the same results reconfirm some series contain unit root and become stationary at

TABLE 1. ADF and PP unit root test: Level and First Difference

	Augmented Dickey-Fuller test				Phillips-Perron test			
	Level		First Difference		Level		First Difference	
Variables	T-value	P-value	T-value	P-value	T-value	P-value	T-value	P-value
LogCons	-1.45	0.87	-5.36**	0.04	3.06	0.10	1.23**	0.03
LogGDP	2.70	0.00	5.82***	0.00	2.83	0.19	6.51***	0.00
INT	-1.25	0.32	-5.31***	0.00	1.27	0.88	3.51***	0.00

Note: *Numeric values between (…) express corresponding P-values, and non-parentheses are absolute t-statistics.

level or at first difference. In conclusion, all series are a mix of I(0) and I(1); thus, the results allowed a further estimation of the data series based on the ARDL model. Results from Table 3 also prove that not all series are stationary at their levels. All series are determined to be stationary when their differences have been removed. Table 3 also indicates that under the two-unit root test, only GDP is stationary at level and then all variables become stationary at their first difference. It can be observed from the table that the estimated ADF test statistics (both Level and First Difference) are less than 5 percent level of significance for most of the series at their levels. It suggests that the null hypothesis of a unit root in the level series cannot be rejected. However, the first difference of all variables appears stationary.

Since the traditional cointegration test cannot be applied when some of the series are stationary at level I(0) and some of them are stationary at first difference level I(1), Pesaran, Shin, and Smith (2001) developed a model called 'Autoregressive Distributed Lag (ARDL)' bound test (Pesaran & Pesaran, 1997; Pesaran et al., 2001). This technique has a number of advantages because the model has more statistically significant approaches to determine the cointegration relation in small samples (Ghatak et al. 2001). Furthermore, the model's advantage means that it does not need to pre-specify which are I(0) or I(1) in the cointegrating relationship; thus, it can be either I(0) or I(1). Compared to Johansen's co-integration technique which requires large data samples for validity, the ARDL model can determine the cointegration relation in small samples (Pesaran et al. 2001). Furthermore, the model can be applied without integrating the regressors in the same order which can avoid the pre-testing problems from the standard cointegration, that requires the variables to be classified into I(1) or I(0) (Pesaran et al. 2001).

The first step in the ARDL model is to determine any long-term relationship among the variables of interest by using F-test. Further, the ARDL Error Correction Model (ECM) is to be applied, which will determine the speed of adjustment to equilibrium (Pesaran & Pesaran 1997). Table 2 shows that results for the Error Correction Model measure the speed of adjustment to obtain equilibrium in the event of shocks. Another key assumption in the ARDL / Bounds Testing methodology is that if the F-statistic is greater than the significance levels (10, 5, and 1 per cent), then null hypothesis is rejected, or there is a long-term relationship among the variables (Pesaran et al. 2001). Table 2 shows the results for bounds test for cointegration estimation, which was also based on the Akaike Information Criterion (AIC) test for model selection.

TABLE 2. Bounds test for cointegration test: Akaike Information Criterion (AIC) test

F-statistics	5.417	
Significance level	I(0)	I(1)
1 per cent	2.61	3.66
5 per cent	3.12	4.24
10 per cent	4.18	5.50

The result in Table 2 shows that the F-statistics (5.417) is higher than 5 per cent level of significance at the upper bound critical value, indicating the null hypothesis of no cointegration cannot be accepted at 5 per cent level, which shows a cointegration relationship among the variables. It also shows that the F-statistics values are higher than upper bound in all cases, which also indicates that long-term relationships exist among variables in the model. Therefore, the coefficients for the ARDL long-term model proceed based on equation (12) and the result is presented in Table 3.

SHORT RUN ELASTICITY AND LONG RUN ELASTICITY

The long run elasticity to consume out of the current income is (0.2253), which suggests that if there is an increase of 1 per cent in the current income of households in Kelantan, the current consumption will increase by 2.3 per cent (ceteris paribus) (Table 3). The GDP also shows a positive relation, which suggests that an increase of 1 percent in the current GDP, will increase consumption ultimately by 8 per cent (ceteris paribus). The real interest rate shows a negative relationship between the current consumption and the interest rate. This suggests that a 1 per cent rise in the interest rate reduces the current consumption by 2.4 per cent. The results for the Short Run Elasticity of consumption function are shown in Table 4.

TABLE 3. Kelantan long run consumption function under PIH, 2000–2016

Variable	Coefficient	Std. Error	t-Statistic	Prob-value
C	-13.7055	4.4373	-1.82	0.006
lnGDP	0.8023	0.1488	6.21	0.000
lnCons (-1)	0.2253	0.1207	1.88	0.003
lnINT	-0.2442	0.0332	-2.35	0.001

Dependent Variable: *lnCons*

Results from Table 4 show that the Short Run Elasticity of current consumption with respect to the current income for Kelantan households' consumption function is 0.35 per cent. This implies that based on real lnCons, 1 per cent rise in the current income of Kelantan households will reduce the current household final consumption expenditure by 1 per cent in the short run. It also indicates that the current consumption among Kelantan households is considerably less responsive to changes in the current income. Furthermore, the short run elasticity to consume out of the current income is statistically significant at 5 per cent level, which is coherent with apriority expectations. The GDP shows that if there is a 1 per cent increase in the current GDP, the current consumption will increase by 3.5 per cent, whereas the interest rate shows an increase of 1.5 per cent in the current consumption if there is an increase of 1 per cent in the current interest rate.

The results from short run elasticity (-0.10 per cent), long run elasticity (0.23 per cent), and the adjustment coefficient (-0.327 @ -0.33) suggest that in any given period, the Kelantan households change consumption by 3.3 per cent towards the long run level. In other words, it shows how quick the households in Kelantan achieve equilibrium in the next period from disequilibrium. Thus, it can be concluded that in Kelantan, the Permanent Income Hypothesis is valid since there is a small coefficient of expectation and the elasticity to consume out of the permanent income, while at the same time, there is a negative difference in elasticity to consume out of the current income. This study shows that the elasticity to consume with respect to the actual income is 0.10 (negative). It shows that in the short run, a MYR 1 increase in the current or observed real income (measured by real GDP) will reduce the mean expenditure by about RM 0.10. Meanwhile, in the long run, the Marginal Propensity to Consume (MPC) is higher, which suggests that in Kelantan, when there is MYR 1 change in income, consumption will increase ultimately by about MYR 0.22 in the long run.

DIAGNOSTIC TEST

The diagnostic test statistics (Table 4) show a high coefficient of determination (0.7813), and the Durbin-Watson statistics (2.253) indicate the non-appearance of a serial correlation since the range is less than 2.5. The values for the Durbin-Watson statistics between 1.5 and

TABLE 4. Kelantan short run elasticity of consumption function

Variable	Coefficient	Std. Error	t-Statistic	Prob-value
C	*-19.41243*	*6.317926*	*-3.17*	*0.003*
d.lnGDP	*0.3476352*	*0.7313005*	*-0.42*	*0.006*
d.lnCons(-1)	*-0.100332*	*0.116007*	*1.88*	*0.004*
d.INT	*0.1538271*	*0.041128*	*3.26*	*0.000*
Ecm(-1)	*-0.3271858*	*0.1443576*	*-2.43*	*0.002*
R2=0.7813		*JB = 2.066 (p value = 0.346)*		
Adj. R2=0.6031		*ARCHLM test =0.241(p-value =0.7015)*		
Ramsey F=0.28 (p-value = 0.0653)		*Durbin –Watson d statistic = 2.253352*		
Breusch-Pagan LM = 3.79 (p value = 0.0562)				
Breusch – Godfrey LM = 0.18 (p-value = 0.3252)				

Dependent Variable: *d.logCons*

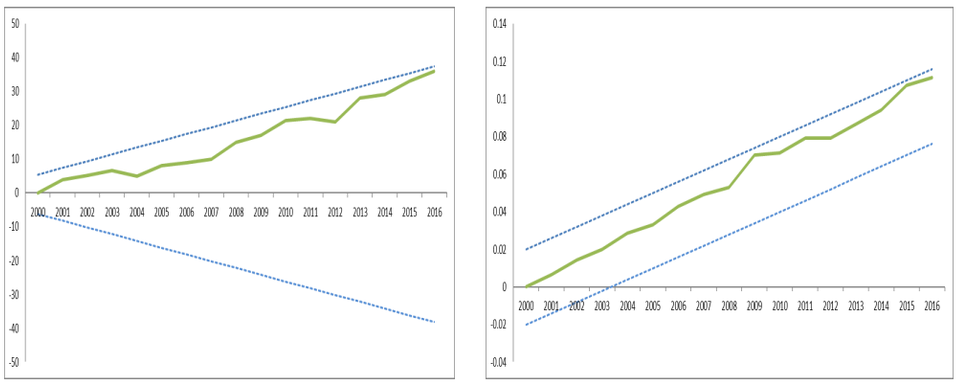

FIGURE 2. CUSUM and CUSUMSQ tests

2.5 are relatively normal, while the values outside of this range could be a cause for concern (Field 2009). The Ramsey RESET test shows that the F-statistics for the null hypothesis is 0.28 with a p-value of 0.0653, which implies that the hypothesis is not rejected at the 5% level. Therefore, at 5% significance level, the Ramsey RESET test null hypothesis of correct specification cannot be rejected, which indicates a correct functional form, so this study's model does not suffer from omitted variables. Meanwhile, the Breusch-Pagan *(LM)* test is 3.79, although the p-value (0.0562) shows a higher amount ($p > 0.05$); thus, the null hypothesis of homoscedasticity in the variance of the residuals is not rejected for the model. Results from the Jarque-Bera test (2.066) show that the probability of obtaining normality assumption is about 34.6 per cent. Therefore, since the error terms are normally distributed, the hypothesis is not rejected.

STABILITY OF THE MODEL

To examine the robustness of models, the stability for the long run trends and the short run movements of the variables is tested by applying the axis cumulative sum of recursive residuals (CUSUM) and the cumulative sum of recursive residuals squares (CUSUMSQ) approaches proposed by Pesaran and Pesaran (1997), Borensztein et al. (1998), Bahmani et al. (2005), and Almasaied (2007). The graphical representations of CUSUM and CUSUMSQ are given in Figure 2.

Based on Figure 2, this study model's plots of the CUSUM and the CUSUMSQ statistics remain within the critical 5% bounds, confirming the long-term relationships among variables; thus, the model's parameters are stable and consistent.

CONCLUSION

The ultimate goal of this study is to examine the consumption function among households in Kelantan under the Permanent Income Hypothesis based on time series data on Real GDP (GDP), Household Consumption Expenditure (Cons), and Real Interest Rate (INT) between 2000 and 2016. The study estimated the long run and the short run Marginal Propensity to Consume (MPC) by employing the Autoregressive Distributed Lag (ARDL) model, which shows a long-term relationship between consumption and income; thus, reconfirming that consumption function under the PIH is valid among households in Kelantan. It can be concluded from the study that the expected future income largely influences the consumption behaviour of the poor in Kelantan.

The implication of this study suggests that short-term government policies on income will not have a significant impact on the final household consumption expenditure. The main reason that influences the current and future consumption among the poor is disposable income. Thus, in order to bring about the desired changes in the level of disposable income that affects household consumption among the poor, economic policies must be structured towards long-term sustainability. Therefore, continuous efforts in improving fiscal strength such as through tax reforms will have a huge impact towards increasing the national disposable income. Consequently, for the government to bring about the desired changes in the level of household consumption, the policy must be sustained for a long period. Finally, since Kelantan households' consumption function follows the PIH, it can be concluded from this study that old age and the prevalence of post-retirement poverty in the country are not only adduced to poor planning, but also to low permanent income. Accordingly, the government should try to improve household income by raising the level of permanent income to ease post-retirement and old age poverty in Kelantan.

Results of coefficient lagged consumption provide empirical evidence supporting the short run Marginal Propensity to Consume (MPC), i.e., an increase of MYR 1 in the current disposable income will reduce household consumption by RM 0.33. This study also shows that the Short Run Elasticity of consumption with respect to actual income is negative (-0.10). In order words, the short run MPC for the current income is about -0.10, suggesting that an increase of MYR 1 in the current real income will reduce the mean consumption by about MYR 0.10. Meanwhile, the Long Run Elasticity of consumption suggests that if consumers in Kelantan had time to adjust to the MYR 1 change in income, they would have increased consumption by MYR 0.22.

Results of this study indicate that households in Kelantan are futuristic, since their behaviour is based on future income. The households in Kelantan, therefore, maintain consumption and increase savings as income increases. Interest rate is found to be an important determinant of consumption in Kelantan. It is found that interest rate and consumption are not only negatively related, but also the interest rate elasticity of consumption is also highly statistically significant. To sum up, results of the study show that consumption is high in the short run and in the long run, indicating that households or consumers in Kelantan can predict the permanent income both in the short run and in the long run. Therefore, the Permanent Income Hypothesis holds true for the poor in Kelantan.

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Ahmad Fahme Mohd Ali *
Faculty of Hospitality, Tourism and Wellness
Universiti Malaysia Kelantan
Kampus Kota, Karung Berkunci 36,
Taman Bendahara, 16100 Pengkalan Chepa, Kelantan
MALAYSIA
E-mail: fahme.ma@umk.edu.my

Naziatul Aziah Mohd Radzi
Faculty of Hospitality, Tourism and Wellness
Universiti Malaysia Kelantan
Kampus Kota, Karung Berkunci 36,
Taman Bendahara, 16100 Pengkalan Chepa, Kelantan
MALAYSIA
E-mail: aziah.mr@umk.edu.my

Ruzanifah Kosnin
Faculty of Hospitality, Tourism and Wellness
Universiti Malaysia Kelantan
Kampus Kota, Karung Berkunci 36,
Taman Bendahara, 16100 Pengkalan Chepa, Kelantan
MALAYSIA
E-mail: ruzanifah@umk.edu.my

Suchi Hassan
Faculty of Hospitality, Tourism and Wellness
Universiti Malaysia Kelantan
Kampus Kota, Karung Berkunci 36,
Taman Bendahara, 16100 Pengkalan Chepa, Kelantan
MALAYSIA
E-mail: suchi.h@umk.edu.my

Siti Salina Saidin
Faculty of Hospitality, Tourism and Wellness
Universiti Malaysia Kelantan
Kampus Kota, Karung Berkunci 36,
Taman Bendahara, 16100 Pengkalan Chepa, Kelantan
MALAYSIA
E-mail: salina.s@umk.edu.my

*Corresponding author