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Household Income Groups**

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# The Marginal Propensity to Consume across Household Income Groups

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## Abstract

Understanding heterogeneity in the way households respond to income changes is crucial for policymaking, as shocks in the economy often affect specific groups of households differently. Using data from the Household Expenditure Survey (HES), this paper estimates the marginal propensity to consume (MPC) out of disposable income for Malaysian households and examines how the propensities differ across income brackets. We find evidence that the MPC out of disposable income for lower income households is higher than that for higher income households. The MPCs vary from 0.81 for those earning below RM1,000 to 0.25 for those earning above RM10,000. These MPCs allow policymakers in Malaysia to estimate more precisely the aggregate consumption effects of income shocks that affect households of specific income groups.

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## 1.0 Introduction

Households are subject to a wide range of economic and policy shocks, often with consequences on individual welfare and aggregate growth. In addition, the variety of the shocks tends to vary across low- and high-income households. For example, fluctuations in commodity prices lead to volatile incomes for farmers, most of whom are lower income earners. Meanwhile, the large decline in equity prices during the recent global financial crisis likely had a disproportionate negative wealth effect on high-income earners. To assess the aggregate implications from a given shock to households, it is therefore necessary first to identify which segment of households are affected by the shock and, secondly, how their expenditures are likely to change as a result.

The focus of this paper is on the second issue. We estimate the marginal propensity to consume (MPC) from disposable income - how household spending responds to changes in disposable income - across household income levels. Conceptually, consumption decisions should differ across income levels due to differing access to credit markets, ownership of assets and other behavioural attributes. This prediction is empirically validated in several studies that find evidence of heterogeneity in consumption functions across households with different characteristics. To our knowledge, no existing study has captured these consumption heterogeneities for the case of Malaysia. In addition to being relevant for economic surveillance and policy analysis, this paper therefore also contributes to the existing empirical literature on consumption functions.

In our analysis, we use household data from the 2009/2010 Household Expenditure Survey (HES) conducted by the Department of Statistics, Malaysia. This dataset contains information on income, expenditure and the debt burden for 21,641 households. We estimate consumption functions for seven income groups to derive the MPC from disposable income while controlling for other household characteristics such as the life-cycle stage of the household, employment status of the head of the household, as well as credit and wealth factors.

Our results show that the MPC out of disposable income is higher for lower income households than for higher-income households. Households earning a disposable income of less than RM1,000 per month will consume an average of RM0.81 from RM1 in extra

income, while households earning above RM10,000 are estimated to have an MPC of 0.25. Since the MPCs from the baseline regressions do not differentiate between permanent and transitory income, we use an instrumental variable (IV) approach to estimate the MPC from permanent income, by using education as an instrument for disposable income on the pooled sample. The IV estimation results indicate that the MPC from permanent income is higher with the MPC increasing from 0.35 using the OLS approach to 0.40 when the IV approach is used. Overall, these findings corroborate with the theoretical prediction and empirical results from other countries.

The remaining paper is organised as follows. Section 2 discusses conceptually why households across income brackets may be behaviourally unique. Section 3 details the empirical strategy while Section 4 presents the results. The final section concludes.

## **2.0 Heterogeneous Consumption Behaviour: Evidence from literature**

Standard consumption theories such as the permanent income hypothesis (Friedman, 1957) and the standard life-cycle hypothesis (Ando & Modigliani, 1963) are, on their own, unable to account for heterogeneity in consumption behaviour across income levels. These theories posit that households aim to maintain a stable standard of living by avoiding excessive fluctuations in consumption<sup>2</sup>. In these frameworks, households estimate the expected value of their lifetime resources and consume an appropriate fraction of it every period (Hall, 1978). Therefore, households will save more (or pay down debt) during periods of temporarily higher income and drawdown on savings or borrow during periods of temporarily lower income, allowing for a stable path of consumption over time. These arguments apply to both poor and rich households, thus providing no *a priori* reason as to why their marginal propensity to consume might differ.

These theories are, therefore, at odds with the empirical finding that poorer households tend to have a higher average and marginal propensity to consume from income. Using panel data on US households, Dynan, Skinner and Zeldes (2004) and McCarthy (1995) find that the MPC is higher for lower income households. Similarly, Jappelli and Pistaferri (2012) use data on Italian households and find that the MPC of households with lower cash-on-hand is higher

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<sup>2</sup> These results arise if households' utility functions depend on both current and future consumption, and have diminishing marginal utility of consumption in any given period.

compared to more affluent households. It is thus necessary to extend the standard life-cycle model of consumption to improve our understanding of households' consumption behaviour.

One explanation as to why poorer households have higher MPCs is that they are credit-constrained. Credit constraints or credit rationing arise when households cannot borrow the amount desired (Hayashi, 1985). Lower income households have less access to credit markets because of lower current and expected future incomes as well as lower ownership of assets that may be used as collateral for loans. Thus, during periods when income is lower, these households would like to but are unable to borrow against their higher expected future incomes. They therefore consume less than desired at that point and an increase in income will most likely be consumed rather than saved. Using a panel dataset of US households, Filer and Fisher (2007) identify households who are more likely to be credit constrained as those who have filed for bankruptcy in the past 10 years, and find that these households tend to earn lower incomes (before and after the bankruptcy filing) and display higher MPCs. These findings suggest that credit constrained households often have lower incomes and have higher MPCs.

Psychological aspects of consumption and savings behaviour can also explain the above observation. Katona (1951, 1975) argues that households' savings behaviour depend in part on their ability or willingness to do so in reality. Postponing consumption is in part a conscious decision requiring self-control. Households with limited financial resources, most of which are spent on necessities, are likely to be less willing to postpone current consumption despite the long-term need to smooth consumption over time (Beverly & Sherraden, 1999). This lack of savings subsequently renders their expenditures more sensitive to income. For example, a reduction in income will induce a household without savings to reduce their expenditures by a similar magnitude as the shock, particularly if they lack access to credit markets. Similarly, for a positive income shock, a lower income household will have more need to increase consumption of essential items rather than save, leading to a larger increase in consumption.

Moreover, Banerjee and Duflo (2011) argue that the self-control required to save is more difficult for the poor due to institutional factors. Richer households tend to have better access to contributory pension schemes, savings products that deduct income from source and

products such as mortgages that require households to save a fraction of income regularly. The lack of institutional support for lower income households thus makes it harder for them to pre-commit to a savings plan, tempting them to consume more from their current income. For example, Ashraf, Karlan and Yin (2006) find that randomly chosen individuals in Philippines who were offered commitment savings accounts saved an average of 81% more, compared to those who were not offered the account. Aportela (1999) finds that low-income households in Mexico, living in areas that received increased access to formal financial institutions, save 5.7-8.0% more than those who did not. This is evidence of the importance of institutional factors in facilitating a commitment to save.

Finally, Beverly and Sherraden (1999) postulate that financial literacy also plays a role in the savings and consumption behaviour of households. They argue that lower income individuals, who are often less educated also tend to be less financially literate. Meanwhile, Lawrence (1991) and Bucks and Pence (2008) argue that poorer households tend to have lower foresight when it comes to financial planning. Thus, lower income households tend to be less aware of the available saving vehicles and are less likely to forgo consumption to accumulate assets, making consumption more sensitive to income shocks. Moreover, the lower level of financial literacy makes lower income households less likely to purchase insurance, which helps smooth consumption from unanticipated income shocks. Meanwhile, Lusardi and Tufano (2009) highlight that low income households are less debt literate and more often engage in higher cost borrowing transactions. Given the theoretical predictions and empirical findings, we therefore postulate and test the hypothesis that the MPC from income is higher for lower income households in Malaysia.

### **3.0 Methodology**

#### **3.1 Estimation Approaches<sup>3</sup>**

In empirical studies of the consumption function, the first methodological choice is between aggregate and micro-level data. Historically, aggregate time series data was frequently used as it was more easily available and relatively comparable across countries. However, aggregate data is potentially subject to aggregation biases<sup>4</sup> and more importantly,

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<sup>3</sup> Refer to Jappelli and Pistaferri (2010) for a comprehensive survey of the empirical literature on the responsiveness of consumption to income changes.

<sup>4</sup> See Attanasio and Weber (1993) for a discussion on this issue.

conceals the heterogeneity in consumption behaviour across households. Since the purpose of this paper is to understand the heterogeneity in consumption behaviour across households in Malaysia, we follow the more recent literature in using household data for analysis.

The second methodological issue pertains to the identification strategy. As Jappelli and Pistaferri (2010, 2012) point out, differentiating between anticipated and unanticipated (exogenous) income shocks is necessary to estimate their impact on consumption. They highlight the three main techniques used in the literature: (a) a quasi-experimental approach that utilises events or policy measures that affect income unexpectedly, (b) making assumptions on the income process to derive the distribution of shocks, and (c) measuring the difference between survey-based expectations of future income and actual realisations. The quasi-experimental case is particularly prominent, with many studies utilising policy announcements and other unexpected events such as weather shocks to crops to obtain exogenous changes in income (Bodkin 1959, Browning and Crossley 2001, Gertler and Gruber 2002, Wolpin 1992, Paxson 1993). In our case, however, the unavailability of panel data on households limits our ability to identify expected and unexpected income changes. Our strategy instead focuses explicitly on the cross-sectional variation in income and consumption to understand how changes in income might affect consumption.

The final key aspect is how households are categorised to characterise the heterogeneity in consumption behaviour. The options include categorising households by the level of wealth (McCarthy 1995), cash-on-hand (Jappelli and Pistaferri 2012) and income (Bergen-Thomson et al. 2009). We split our sample by disposable income levels, as we believe that income shocks or policy measures such as tax changes or assistance are often determined by household income. Thus, for policy application purposes, understanding how different income groups respond to income changes is of interest to us.

### **3.2 Data Description**

Our dataset is the 2009/2010 Household Expenditure Survey (HES), conducted by the Department of Statistics Malaysia. This is a cross-section survey of 21,641 households conducted every five years. This survey contains detailed information on household income from employment and assets, household expenditure on goods and services, savings as well

as household debt repayments. Household characteristics, such as age and the education level of the head and employment industries are also available in the survey<sup>5</sup>.

### 3.3 Model Specification

We estimate consumption functions across income brackets to test our hypothesis that the marginal propensity to consume from income (MPC) declines as income increase. Our empirical goal is to estimate the MPC for households in each income bracket. We split households into seven income brackets: RM0-1,000; RM1,001-2,000; RM2,001-3,000; RM3,001-4,000; RM4,001-5,000; RM5,001-10,000; and above RM10,000. The Ordinary Least Squares (OLS) method is used to estimate the consumption function for each income bracket.

Our model specification is broadly consistent with other studies that use household information to estimate consumption functions<sup>6</sup>. Income, wealth, credit and other demographic factors are the usual determinants included, depending on the research objectives and data availability. Our empirical specification takes the following form:

$$Consumption_i = \alpha + \beta Income_i + \gamma'Z_i + u_i$$

*Consumption* refers to monthly expenditures on goods and services across twelve categories<sup>7</sup>. *Income* is gross income of all household members minus income tax and mandatory pension contributions to the Employee Provident Fund (EPF). The subscript *i* denotes individual households. Our main interest is on the coefficient,  $\beta$ , the MPC from income.

*Z* is a vector of control variables. If these variables are correlated with income, failing to control for them leads to an omitted variable bias on  $\beta$ . For example, if income is positively correlated with wealth,  $\beta$  will be biased upward if wealth is not controlled for, as  $\beta$  will

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<sup>5</sup> 40 households in the sample did not contain information on food expenditures. We dropped them from our sample since it is unlikely that a household does not have any expenditure on food.

<sup>6</sup> See Souleles (1999, 2002), Balvers and Szerb (2000), Berger-Thomson, Chung and McKibbin (2010), Rungcharoenkitkul (2011) and Gerlach-Kristin (2012) for some recent references.

<sup>7</sup> The twelve categories are: food and non-alcoholic beverages; alcoholic beverages and tobacco; clothing and footwear; housing and utilities; furnishing, household equipment and maintenance; health; transport; communication; recreation services and culture; education; restaurants and hotels; and miscellaneous goods and services.



reflect the propensity to consume from wealth and income, instead of just income. We construct proxies to control for wealth and credit factors. We proxy household wealth using the sum of income from property assets and imputed rent as a ratio of income (*wealth* variable)<sup>8</sup>. Income from property is scaled to total income to avoid this variable from picking up income effects on consumption.

We control for credit effects using the ratio of total debt repayments to income (*credit*) to proxy for household indebtedness. Higher values likely indicate higher indebtedness of the household, leading to higher debt repayments and lower household spending. However, higher values may also reflect greater access to credit markets, which enables higher consumption<sup>9</sup>. Given that indebtedness and access to credit have opposing effects on consumption, we caution against making causal inference from the credit-related coefficient. Nonetheless, this variable represents the most meaningful way permitted by our dataset to control for the role of credit on consumption.

The vector  $Z$  also includes a dummy variable, *employment*, which reflects the employment status of the head of household. The head of household is defined as employed if it has positive labour income and/or earnings from self-employment. This variable equals 1 if employed and 0 otherwise. This controls for unemployed households who, despite being placed in the lower income bracket, are able to engage in consumption smoothing or have access to sufficient financial resources to support consumption in the absence of income from employment. Thus, the income bracket of such households is, to some extent, *misclassified* and the employment variable controls for this.

$\alpha$  is a vector of three dummy variables that control for the age of the head of household. The three age groupings are defined as households whose head is aged under 30, between 30 and 50, and above 50<sup>10</sup>. This life-cycle attribute is important to control for because the stage of a household's life-cycle indicates its remaining expected income stream prior to retirement and hence its motivation to save/consume in the current period. In addition, younger households who are just entering the labour force are more likely to have lower savings or

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<sup>8</sup> We use these income proxies because the dataset does not contain balance sheet data of the households.

<sup>9</sup> See Leth-Petersen (2010) for a discussion of the impact of easing of credit constraints in Denmark on household expenditure.

<sup>10</sup> Our definition for the age of the households is exhaustive, thus eliminating the need for a constant in our regression.

financial assets compared to their older counterparts, and are likely to be more credit-constrained and have smaller families. A full description of variables used is presented in Appendix 1.

There are other behavioural attributes such as financial literacy that we are unable to capture adequately from our dataset, which may be correlated with income and consumption. This provides additional justification for our choice to split the regression by several income brackets. To the extent that the variation in these underlying characteristics is reduced within income brackets, the omitted variable bias is partially mitigated. Nonetheless, we conduct a robustness test by including possible proxies of financial literacy in Appendix 2 and find that our baseline MPC estimates are robust to this alternative specification.

## **4.0 Results**

### **4.1 Heterogeneity in the MPC from Income across Income Brackets**

Table 4.1 presents the baseline estimation results. The MPC from income,  $\beta$ , from the seven income brackets and pooled regression are statistically significant. We find that the MPC declines as household income increases, confirming our *a priori* prediction. Our results indicate that households earning less than RM1,000 will spend, on average, RM0.81 from RM1 in additional disposable income. The MPC gradually declines as income increases, with the results indicating that households earning over RM10,000 will spend merely RM0.25 more from an additional RM1 of income. These large differences in the MPCs imply that an income shock to lower income households will have a larger impact on aggregate consumption than an equivalent shock to higher income households.

The MPC out of income of 0.35 from the pooled regression (all households) is broadly in line with that of other similar studies. Kamath et al. (2012) estimate a pooled MPC of 0.4 for households in the UK, Rungcharoenkitkul (2011) estimate a pooled MPC of 0.57 for households in Thailand and Johnson, Parker and Souleles (2006) reported a range of 0.2 to 0.4 out of the tax rebate income in the United States.

**Table 4.1 Regression Results across Income Brackets****Dependent Variable: Household consumption**

Income bracket (RM '000)	0-1	1-2	2-3	3-4	4-5	5-10	>10	Pooled
<b>Income</b>	<b>0.81***</b> (0.02)	<b>0.74***</b> (0.02)	<b>0.54***</b> (0.03)	<b>0.48***</b> (0.05)	<b>0.40***</b> (0.08)	<b>0.37***</b> (0.02)	<b>0.25***</b> (0.02)	<b>0.35***</b> (0.02)
Age < 30	57*** (19)	106*** (29)	574*** (82)	631*** (192)	1,147** (504)	984*** (300)	1,218 (1,616)	626*** (42)
Age 30-50	67*** (17)	172*** (27)	649*** (80)	753*** (188)	1,293** (533)	1128*** (297)	1,240 (1,629)	751*** (45)
Age > 50	56*** (15)	131*** (26)	569*** (79)	682*** (190)	1,243** (502)	1172*** (295)	1,810 (1,606)	739*** (51)
Credit	-420*** (71)	-590*** (50)	-477*** (94)	-698*** (113)	-248 (302)	-362* (193)	780 (1,219)	429** (185)
Wealth	62** (25)	392*** (41)	712*** (92)	1,502*** (154)	2,043*** (439)	2,649*** (359)	3,516** (1,417)	476*** (95)
Employment	-22** (9.1)	-73*** (18)	-199*** (50)	-183** (84)	-494* (271)	-283 (255)	652 (1,536)	58* (34)
R-squared	0.507	0.300	0.092	0.069	0.013	0.122	0.350	0.557
Sample size	1,665	5,654	4,594	2,958	1,979	3,759	994	21,601

Note: \*\*\*, \*\* and \* denote statistical significance at the 1, 5 and 10 per cent level. Heteroscedasticity robust standard errors are reported in the parentheses.

Source: BNM Estimates based on HES 2009/2010, DOSM

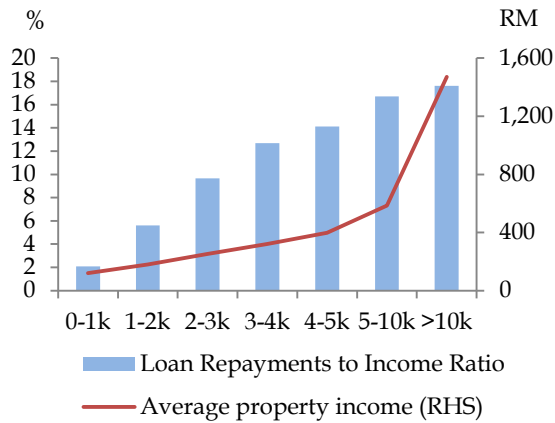
Our key regression result that the MPC out of income declines as household income increases is also supported by stylised evidence. In Section 2.0, we cited four potential reasons: poorer households are more credit-constrained, spend a larger proportion of their income on necessities and hence save less, have less access to institutional savings products and are less financially literate. Figures 4.1 to 4.4 present stylised facts supporting these hypotheses for households in Malaysia.

Figure 4.1 shows that, on average, debt repayments as a share to income increases with household income, suggesting that lower income households tend to be more credit constrained. This can somewhat be attributed to lower availability of collateral in the form of wealth, as evidenced by the lower income derived from property and imputed rent by lower income households.

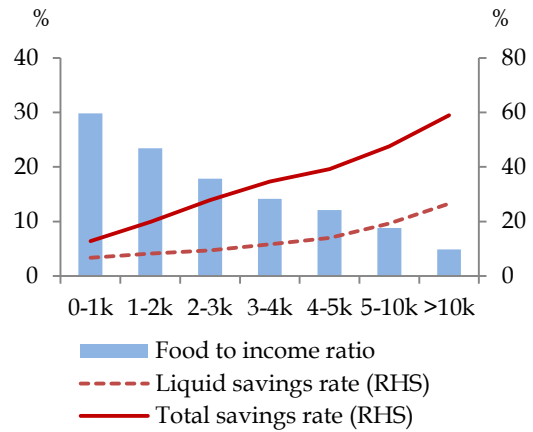
Figure 4.2 highlights the second stylised evidence that lower income households spend a higher proportion of their income on necessities, reflected in the food-to-income ratio, and are thus less able to save. Figures 4.3 and 4.4, meanwhile, show that lower income households, on average, save less via insurance products and have lower financial wealth. In general, the characteristics exhibited by Malaysian households are supportive of the

hypothesis that the poor tend to be less financially literate and have less access to institutional savings products.

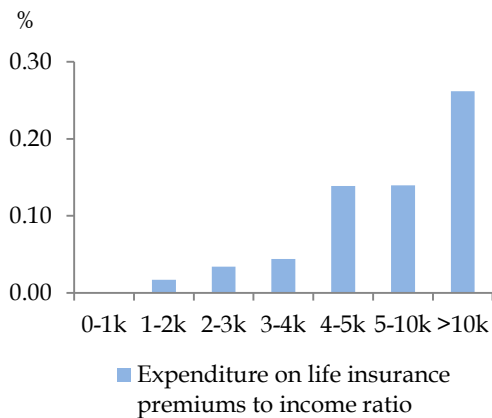
**Figure 4.1: Lower income households tend to be more credit constrained**



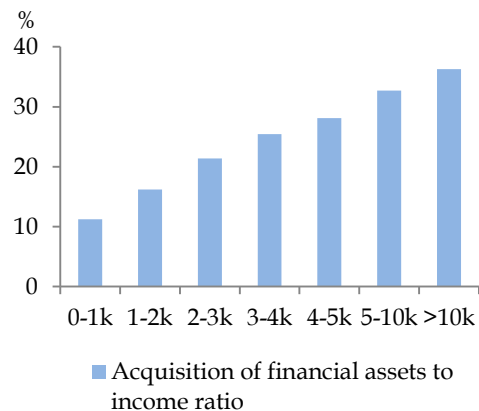
**Figure 4.2: Lower income households spend more on necessities and are less able to save**



**Figure 4.3: Lower income households spend less on life insurance**



**Figure 4.4: Lower income households tend to accumulate less financial assets**



Source: BNM Estimates based on HES 2009/2010, DOSM

## 4.2 Other Results

The regression results in Table 4.1 also shed light on other aspects of consumption behaviour among Malaysian households. First, we find a positive and statistically significant coefficient on wealth across all income groups. This provides evidence of positive wealth effects, with higher wealth increasing lifetime resources and enabling consumers to increase their consumption. Within most income brackets, the coefficient on employment is negative and significant. This suggests that households that are *unemployed* at any given time have

consumption higher than predicted by their income and other characteristics. This supports the earlier hypothesis that a proportion of unemployed households are either engaging in consumption smoothing to offset temporary income losses or have access to sufficient financial resources, removing the need to work to consume a given amount.

The coefficient on *credit* is negative for most income brackets except in the top income bracket and in the pooled regression. This is tentative evidence of higher debt burdens constraining consumption among lower income groups. However, we emphasise again that this coefficient should be interpreted with caution, as it picks up the opposing effects from indebtedness and access to credit on consumption.

The estimation results also provide some evidence of a distinction in the life-cycle consumption/savings behaviour of households across income brackets. The coefficients on the age dummies suggest that households earning below RM5,000 per month experience a drop in consumption after the age of 50, potentially due to retirement<sup>11</sup>. In contrast, households earning above RM5,000 per month do not experience a decline in consumption post-retirement. This is inferred from the relative size of the coefficient on “Age>50” compared to “Age 30-50”<sup>12</sup>. Further research is needed to explain the reasons for this result. Nonetheless, our preliminary assessment of these findings are that: (1) Lower income households do not save enough throughout their working years either because they are unable to or are not as forward looking as they ought to be in planning and saving for post-retirement expenditures; (2) Higher-income households are not only more able to save, but also accumulate financial assets which provide a continuous stream of income after they retire.

### **4.3 Limitations and Scope for Further Research**

While this study provides empirical evidence which highlights the heterogeneity in the MPC from income across income levels amongst Malaysian households, there remains scope for further research. First, the baseline regressions do not distinguish between permanent and temporary variations in income. Theoretically, differences in consumption should be driven to a greater extent by permanent rather than transitory income differences<sup>13</sup>. This means that

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<sup>11</sup> The retirement age for the private sector in Malaysia when this survey was undertaken is 55 years old.

<sup>12</sup> The difference is statistically significant at the 5% level for income groups RM1-2k, RM2-3k and RM3-4k.

<sup>13</sup> This concept was initially hypothesized in Friedman (1957) and has been empirically validated, for instance, by Johnson, Parker and Souleles (2006).

the MPCs from permanent income changes should be larger than the MPCs from temporary income changes. However, since we only observe one measure of income for each household in one period, it is difficult to distinguish between permanent and temporary income. We attempt to address this issue by using education as an instrument for income.

This method identifies income differences that are attributable to variations in education and are therefore more likely to be permanent in nature<sup>14</sup>. By analysing the impact of this permanent variation in income on consumption, we estimate the MPC out of permanent income. Given the small variation in education within each sub-group, we only apply this estimation in the pooled sample. The results from the instrumental variables (IV) and OLS regressions are shown in Table 4.2. The MPC from the IV regression is 0.40, higher than the MPC of 0.35 from the pooled OLS regression. This result suggests that the MPC from permanent income is higher than the MPC from temporary income<sup>15</sup>.

**Table 4.2: Comparison between OLS and IV regression results**

Dependent Variable: Household consumption		
Income bracket (RM '000)	OLS	IV
Income	0.35*** (0.02)	0.40*** (0.01)
Age < 30	626*** (42)	558*** (36)
Age 30-50	751*** (45)	645*** (35)
Age > 50	739*** (51)	620*** (37)
Credit	429** (185)	34.7 (113)
Wealth	476*** (95)	624*** (86)
Employment	58* (34)	7.4 (30)
R-squared	0.557	0.548
Sample size	21,601	21,601

**Note:** \*\*\*, \*\* and \* denote statistical significance at the 1, 5 and 10 per cent level. Heteroscedasticity robust standard errors are reported in the parentheses.

<sup>14</sup> This methodology is in line with numerous other studies which utilise education attainment to estimate measures of permanent income (see DeJuan and Seater (1999) as an example).

<sup>15</sup> The focus of this result should be in the *differences* in the estimated  $\beta$ s between the OLS and IV estimations rather than actual values for the MPC estimates. In the IV estimations, the instrument, education, may be correlated with other unobserved determinants of consumption such as financial literacy, hence biasing the MPC estimates.

Secondly, the nature of our data means that we are only able to estimate the MPC by comparing the difference in consumption between households of different income levels. We are unable to perfectly control for household characteristics that affect consumption and vary with income such as rate of time preference or the volatility of income. In future research, longitudinal data that tracks household behaviour over time would improve the robustness of our results. This would enable MPCs to be estimated by comparing changes in consumption behaviour over time for a single household, which reduces the scope for differences in unobserved household characteristics. Moreover, with longitudinal data, exogenous shocks to income such as tax changes can be identified, enabling the calculation of unbiased estimates of the MPC out of income.

Finally, the MPC is also influenced by the degree of credit constraints that households face, an aspect that we do not capture due to data limitations. Theory and empirical evidence from other countries suggest that households who face credit constraints are more sensitive to income shocks. Making such a distinction will improve the granularity of our MPC estimates by facilitating a derivation of MPCs of credit constrained and unconstrained households within income brackets.

## **5.0 Concluding Remarks**

This paper addresses a gap in the knowledge of private consumption in Malaysia; how different households may respond differently to income shocks. Using household survey data on Malaysia, we estimate households' marginal propensity to consume and examine how the propensity varies with income. We find evidence that the MPC from income for lower income households is higher, compared to higher income households. The MPCs vary from RM0.81 for those earning below RM1,000 to RM0.25 for those earning above RM10,000. This is consistent with our expectations that the former is more sensitive to income shocks because of difficulties in accessing credit, inability to save and possibly lower levels of financial literacy.

The empirical finding that the MPCs across households vary has useful policy implications as it allows policy makers in Malaysia to estimate more precisely the aggregate consumption effects of income shocks that affect households of specific income groups. This

is particularly relevant in light of the recent policies targeted at vulnerable households, such as the minimum wage<sup>16</sup> and *Bantuan Rakyat 1Malaysia* (BR1M)<sup>17</sup>.

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<sup>16</sup> The Minimum Wage policy, implemented on 1<sup>st</sup> January 2013, sets a minimum wage of RM 900 for workers in the Peninsula and RM 800 for workers in Sabah, Sarawak and Labuan.

<sup>17</sup> Cash transfers of RM500 and RM250, paid to Malaysian households earning below RM3,000 a month and individuals earning below RM2,000 a month respectively



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## Appendix 1: Definition of Explanatory Variables for Consumption

**Table A.1 List of Variables used for Estimation**

Variable	Definition
Consumption	Expenditure on goods and services across twelve categories*
Income	Gross income of all household members less income tax and mandatory pension contributions to the Employee Provident Fund (EPF)
Age	Age of the Head of Household
Credit	Total Debt Repayments**-to-Income Ratio
Wealth	Sum of imputed rent; rent from houses, lodging or other property; and total income from property as a ratio of income
Employment	Head of household considered unemployed if the sum of self- and paid-employment equals zero. Otherwise, he/she is considered employed
Education	Highest level of education attained by the Head of household***

\* The twelve categories are: Food and non-alcoholic beverages; Alcoholic beverages and tobacco; Clothing and footwear; Housing and Utilities; Furnishing, Household Equipment and Maintenance; Health; Transport; Communication; Recreation services and culture; Education; Restaurants and hotels; and Miscellaneous goods and services

\*\* This consists of the repayments of the following items: car loans, housing debt, business loans, housing loans, furniture and fittings loans, credit cards/retail goods loans, personal loans, education loans, and investment loans

\*\*\* The categories are: PMR/SRP, SPMV, SPM, STPM, Certificate, Diploma Institution, University Degree/Further Diploma, No Certificate, Unknown, and Not Applicable. This categorical variable is split into 10 dummy variables, one for each category.

## Appendix 2: Robustness of MPC estimates to the inclusion of additional control variables

This section examines the sensitivity of the baseline MPC estimates to the inclusion of additional control variables, particularly proxies for financial literacy. The additional proxies for financial literacy are *financial assets*, defined as the share of income spent on acquiring financial assets, and *insurance*, defined as the share of income spent on insurance premiums. The results of their inclusion are presented in Table A.2.

**Table A.2 Regression results including proxies for financial literacy**

**Dependent Variable: Household consumption**

Income bracket (RM '000)	0-1	1-2	2-3	3-4	4-5	5-10	>10	Pooled
Income	0.86*** (0.01)	0.75*** (0.01)	0.58*** (0.03)	0.52*** (0.04)	0.41*** (0.08)	0.39*** (0.02)	0.25*** (0.02)	0.37*** (0.02)
Age < 30	91*** (15)	244*** (24)	700*** (73)	757*** (172)	1,473*** (466)	1,348*** (266)	1,890 (1,591)	817*** (41)
Age 30-50	91*** (14)	280*** (21)	756*** (71)	887*** (167)	1,612*** (497)	1,585*** (264)	2,214 (1,620)	939*** (45)
Age > 50	100*** (12)	278*** (21)	740*** (70)	912*** (169)	1,653*** (466)	1,695*** (259)	2,899* (1,600)	985*** (51)
Credit	162** (69)	376*** (49)	748*** (88)	800*** (108)	1,258*** (330)	1,285*** (229)	3,708*** (1,189)	1,749*** (175)
Wealth	21 (19)	285*** (30)	508*** (77)	1,122*** (138)	1,623*** (340)	2,135*** (300)	3,827*** (1,292)	212** (91)
Employment	-16** (6.7)	-50*** (15)	-100** (45)	-53 (79)	-332 (263)	-159 (222)	1,185 (1,524)	131*** (34)
Financial assets	-737*** (22)	-1,294*** (25)	-1,956*** (41)	-2,292*** (77)	-2,590*** (150)	-2,957*** (203)	-5,937*** (509)	-1,919*** (84)
Insurance	7,422*** (800)	2912 (2308)	3998** (1595)	1931 (2666)	4517*** (1339)	6,226** (3,090)	13,013* (6,869)	8,230*** (2210)
R-squared	0.721	0.503	0.295	0.237	0.047	0.210	0.425	0.581
Sample size	1,665	5,654	4,594	2,958	1,979	3,759	994	21,601

Note: \*\*\*, \*\* and \* denote statistical significance at the 1, 5 and 10 per cent level. Heteroscedasticity robust standard errors are reported in the parentheses.

Source: BNM Estimates based on HES 2009/2010, DOSM

The negative coefficient on *financial assets* supports the conjecture that households with more financial assets tend to be more financially literate and more likely to save for the future. The positive effect of *insurance* on consumption is suggestive of lower precautionary savings by households that possess insurance, enabling higher consumption. Most importantly, the MPC estimates are not sensitive to the inclusion of these control variables and remain similar to the baseline MPC estimates in Table 4.1.