

Socio-Economics Factors Affecting B40 Households Food Expenditure in Malaysia

Shri-Dewi Applanaidu ^{1*}, Azira Abdul-Adzis ², Soon Jan Jan ³, Norhaslinda Zainal Abidin ⁴

^{1*}*School of Economics, Finance and Banking, College of Business,
Universiti Utara Malaysia, Sintok, Kedah, Malasiya.*

^{2,3,4}*Universiti Utara Malaysia.*

Email: ^{1} dewi@uum.edu.my*

Abstract

As Malaysia continues its stable economic growth, certain income groups remain vulnerable to economic shocks, particularly the B40 households especially during this Covid-19 pandemic. Almost 80 percent of B40 household income spent on routine essential expenses with the highest proportion on food and non-alcoholic beverages. Hence, any spike in the food prices will impact this income group the most. Therefore, the aim of this study is to explore the spending pattern of households on food and non-alcoholic beverages items of different income groups. This study also examines the effects of important socio-economics factors on the consumption pattern of food and non-alcoholic beverages among B40 households in Malaysia. Household Expenditure Survey (HES) 2016 dataset has been employed. A total of 14,551 households were used. Linear regression technique was developed to examine the effects of selected socio-economic factors including average price for food items, B40 income, household size, education, ethnicity, marital status, occupation, location, age, gender, and house ownership) on household food expenditure. Descriptive analysis indicates, average expenditure on food consumption by B40 households is RM563.13, while average monthly income is RM 2,540.81. While, for M40 and T20 average monthly food expenditure among households is estimated at RM766.59 and RM948.60 respectively. The average monthly income estimated at RM 5,723.34 and RM14,159.87 for M40 and T20 respectively. The B40 income group spend 29% of their income on food expenditure. Fresh fish, fresh meat, fresh vegetables, rice, and bread/kuih are the top five food expenditures respectively. The regression analysis indicates that, apart from semi-skilled occupation, all other factors in the linear model significantly affects the food expenditure. Thus, the results recommend the government to closely monitor the top food items mostly consumed by B40 and M40 income group. This may help to minimize the cost of living on food expenditure borne by these income groups.

Keywords: B40, Food expenditure pattern, Food items, Food price monitoring, Socio-economic factors

I. INTRODUCTION

Private consumption is one of the important components and the key driver of economic growth in any country. All the purchases made by consumers such as food, housing, energy, clothing, health, leisure, education, communication, transport as well as hotels and restaurant services are known as private consumption. In most countries, on average,

consumer spending accounts between half and two-thirds of Gross Domestic Product (GDP). Understanding consumer expenditure patterns is crucial as it will help the government to implement effective strategies to achieve the economic growth of the country and improve the well-being as well standard of living of the community.

According to the 2010 World Bank data, low-income households in the developing countries spend more on food and beverages compared to other consumption segments. Additionally, the share of food and beverages consumption of low-income households is higher than other income groups. This triggers an interesting question whether such a relationship exists in Malaysia? The household income brackets in Malaysia are categorized into three; the bottom 40 (B40) refers to households that are at the bottom 40 percent of income distribution with an average monthly income of RM2,848 in 2016 and the income range is between 0 to RM 4,359. It is estimated that 11.7 million or 40 percent of Malaysian, falls within this household income. The middle 40 (M40) is the 40 percent group earning an average income of RM 6,502 or income range between RM4,360 and RM9,619. The T20 or the highest 20% household income group refers to households with average monthly income of RM16,088 and the income range is RM 9620 and above (DOSM, 2017; World Bank, 2017). More recently, the 2019 Household Income and Expenditure Survey reported by the DOSM indicated that the average income for B40 currently stand at RM3,152 and the income range is between 0 to 4849, while for M40, the average income stand at 7,348 while the income range is between RM4,850 and RM10,959 and the T20 have average income of RM18,506 and the income range is RM 10,960 and more (DOSM, 2019).

Based on the Household Income and Expenditure Survey report (DOSM 2016), the B40 households spends on routine essential expenses almost 80 percent of household income whereas the T20 and M40 spend about 64 and 48 percent respectively. There is limited room for future savings since the gap between household income and expenditure of B40 shows the cost of living is high (DOSM, 2016). The spending patterns become more diversified as low-income households concentrate their spending on food ,while wealthier households consume a wider range of goods and services (Prais 1952, Jackson 1984 in Chai and Rohde

(2012). Engel's Law introduced by Ernst Engel in 1856 also states that the lower the household income, the more they will spend on food.

According to latest Consumer Price Index (CPI), food and non-alcoholic beverages accounted for 30.2% with the overall increase of 4.6%. Since B40 income group spends most of the income on food items, this group is vulnerable to any price changes. Any increase in food prices will result in a direct increase in the food expenditure of the households as price is one of the important determinants of food expenditure. This raised a concern on the food security issue especially in terms of the affordability dimension.

Most of the existing studies focused on total food consumption but do not consider the fact that food consumption may differ by type of food and income groups. There are some studies reported on how households distribute their resources across broad groups of goods and services (Nelson, 1996; Paulin & Lee, 2002). However, little research has focused on how these distributions differ across groups of income households, particularly in Malaysian context. Is there any major difference in terms of the food items spent by these income groups? Therefore, this study aims to identify the food items that are spent the most by these income groups (B40, M40 and T20). The next objective will enable us to answer how income affects the spending on food. We will analyse what are the factors affecting the food expenditure by the income groups. Therefore, this study aims to fill this research gap by using recent available cross-sectional household expenditures data to gain a better understanding of how the important factors influence the amount of income spent on food items in Malaysia by income group.

This study will give an insight into consumers' demand patterns of for specific food items by income groups in Malaysia. There are many possible factors (level of income, prices of goods and household size) affecting the changes in food composition and patterns of household use in Malaysia. This study will give a clear picture for the policy makers to recommend

policies specifically related to these income groups. Understanding how these factors affect household expenditure patterns on food items is also important for the policy makers to strategize food price determination strategy and income-based consumer insights. In addition, the findings will provide better picture of how all these factors to health and government authorities with useful information on the structure of the food expenditure and the nutritional intake of Malaysian households by income groups and to ensure food security level.

II. LITERATURE REVIEW

2.1. Theoretical Review

The economic theory to study household characteristics on food expenditure is based on the Engel's Law by Ernst Engel (1857). This theory describes the relationship between income and food expenditures. It states that as household income increases, the percentage of income spent on food decreases.

The sensitivity of the quantity of demand for a good to every percentage change in income is known as income elasticity of demand. According to Engel's Law, households with lower income spend a larger proportion of their income on food than the ones with a middle or higher-income level.

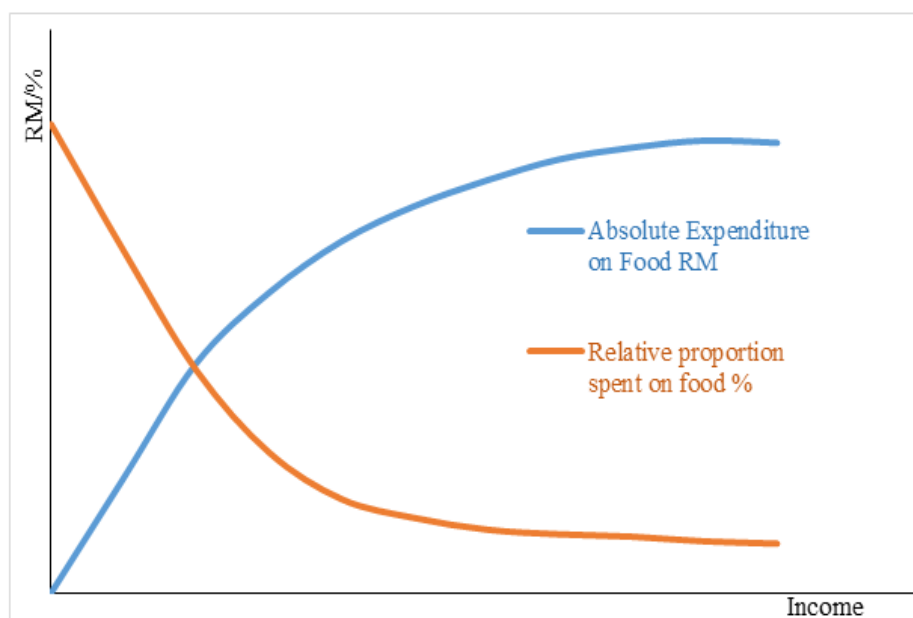


Figure 1. Engel's Theory

Figure 1 indicate the relationship between income and both the relative and absolute proportion of the income spent on food. The relative proportion of the income spent on food decreases as income increases while, the absolute expenditure on food increases as income increases. This implies that, while the absolute value of income spent on food by the high-income group is higher compared low-income groups, the percentage of the income spent on food is low for high income groups while it is high for low-income groups. Thus, low-income groups are left with smaller amount

of their income to use in meeting other needs or investment.

2.2. Empirical Review

In general, existing studies on food expenditures assess the relationship between demographic characteristics and food spending pattern of households. In this respect, demographic characteristics are defined as population characteristics such as age, race, gender, employment, education, income, marriage status, birth and death rates, whereas these characteristics are frequently examined in

household behavior studies and regarded as important for policy development and economic market research.

Income is one of the important demographic characteristics that influence household food expenditure which is commonly associated with Engel's Law theory. Differences in the allocation response of low-and high-income households to price and income changes have been showed in some studies (e.g., Park *et al.*, 1996; Zhen *et al.*, 2014 in Boonsaeng & Carpio (2020).

Empirical study by Wu (1997) emphasizes that China complies with Engel's Law, in which household expenditure on food as a proportion of total expenditure decreases as consumer income rises. In the United Kingdom, Chai *et al.*, (2015) suggest that lower income households concentrate highly on food spending but tend to diversify their spending quickly as their income rises. Moreover, another study in the U.S. by Schanzenbach *et al.*, (2016) revealed that low-income households spend a higher share of their budgets on basic needs which are housing and food. About one-third of spending is devoted to housing by a middle-income household while the high-income households spent only two thirds of their budgets on basic needs.

Boonsaeng and Carpio (2020) examines the budget allocation patterns of U.S. households during the period 2000–2015 and divides the household groups into four categories based on their income levels. Confirming Engel's Law, the findings indicate that a higher share of total expenditures on food and utilities has been spent by households in the lower-income groups. This income group also tend to spend less on durable goods.

Another strand of literature examines the pattern of food expenditures by focusing on types of food purchased. In Canada, Kirkpatrick and Tasaruk (2003) examined the relationship between lower and higher income households by examining the food spending pattern such as the types and cost of food purchased, locations where the foods are purchased. The results in general showed that households with lower

income would spend less money on food particularly at restaurants and at stores. As for the types of food spent, low-income households spend less on fruits and vegetables and milk products than high-income households, indicating a lack of nutritious food among lower income groups. However, this study, only used simple descriptive approach.

Another study by Ricciuto *et al.* (2006), indicate that households with children purchased greater quantities of milk products while those with older adults spent a greater share of their income on vegetables and fruits. Higher income households were associated with purchasing more of all food groups, but the associations were nonlinear, with the strongest effects at lower income levels. Households that purchased significantly more vegetables and fruit, and less meat and alternatives and 'other' foods is where the reference person had a university degree which is relative to households with the lowest education level. This study focused on household size, composition, income, and education on food spending pattern. It specifically raises concerns on food purchasing among lower income households but other relevant socio-economic factors like house ownership, location and occupation are relevant. In Turkey, Terin *et al.* (2019) suggest that lower income level households spend less on fresh and frozen fruits and vegetables compared to higher income households. This study is based on mainly on three food categories: fresh, frozen fruit and vegetable expenditures.

Baharumshah and Mohamed (1993) in Malaysia concluded that consumption of meat will increase in line with the rising income. Sheng *et al.* (2008) support the findings by suggesting that Malaysians will spend more on meat, fish, vegetables, and fruits when their income increases. A study by Yen *et al.* (2015) indicates that food and vegetable consumption is higher among high income groups in Malaysia. Recently, Cheah, *et al.* (2021) examined how sociodemographic and household characteristics of household head influences the oil and fat products expenditure

patterns Findings indicated a positive effect of age, educational level, employment, marital status, location and household size.

The existing studies on food consumption in Malaysia (e.g., Zubaidi and Mohamed 1993; and Zubaidi 1993; and Radam and Arshad 2001), examined the structural changes using either aggregated or time-series data. However, there is disaggregated cross-sectional micro-level data have been shown to provide much better insights on how different groups within the population behave, compared to studies assuming average effects from aggregated or time-series data (Yen and Huang, 2002).

A recent study by Hamid *et al.* (2021), explores the main determinants of the socio-economic characteristics in Malaysian households in terms of budget and income. Generally, the amount of expenditures depends on the changes in household budgets; thus, income and wealth are the primary determinants of household budgets and consequently consumption patterns.

2.3. Gaps of the study

Very few studies explored the differences in behaviours across the different income groups in Malaysia. In fact, we have only identified studies that evaluate budget allocation patterns for poor and nonpoor households, and these studies both focused on budget allocation with regards to food (Park *et al.*, 1996). Even though there is a study which was conducted in Canada by Kirkpatrick and Tasaruk (2003) that compared low-income group with other income group, they based their spending pattern on specific food types and the expenditures on the selected food types. Additionally, the methodological approach of the studies was mostly a descriptive approach. Therefore, the previous literature has some drawbacks such as the insufficient empirical studies to enable the generalization of findings.

The empirical assessment of factors influencing the food expenditure pattern are scanty. The literature also indicates that, in the context of the three income groups in Malaysia, there are scarcity of empirical studies to provides insight

on how the socio-economic conditions of these household groups influences their food expenditure. Especially since different income groups allocate their expenditure on specific food items differently. In fact, none of the studies examined the relationship between income categories (B40, M40 and T20) and the spending pattern on the specific food items in Malaysia. Therefore, the factors that influences the decision on the food expenditure by income groups are yet to be confirmed.

Hence, this study will contribute to the existing literature by identifying the major food items that consume the most proportion of the food expenditure by the B40, M40 and T20 income categories. It will further access how the socio-economic conditions of the income groups influence the expenditure on food and the spending pattern on the major food items. Additionally, other socio-economic factors such as price, the different occupation categories and then the ownership of residential building were omitted in the related study in Malaysia by Cheah *et al.* (2021). It is important to identify the spending patterns of Malaysian households across income groups and on food items such as fish, meat, vegetables, rice, and bread. In fulfilling the existing gaps, the current study's findings could guide the pro poor interventions by the government to achieve the food security level especially in terms of accessibility (affordability).

III. METHODOLOGY

3.1. Data and sample

The data used in this study is extracted from the Malaysian Household Expenditure Survey (HES) 2016, a nationally representative survey carried out by the Department of Statistics Malaysia (DOSM) once every five years. HES provides data on the expenditure pattern among households in Malaysia particularly on 12 main groups of goods and services, including food items. The dataset would allow this study to examine the spending pattern of three categories income groups on the food item and particular food sub-items. Overall, a total of 14,551 households' data were utilized,

representing 30% of total household data produced by the DOSM.

3.2. Variables

The dependent variable is expenditure on food and food sub-items and it is measured by monthly food expenditure (in RM). These food and sub-food items are classified based on the unique 4-digit code specified by DOSM, e.g. 0111 for rice, 0141 for fresh milk and 0121 for fresh meat, etc. The independent variables are the income levels (INC), household size (HHSIZE), education level (EDU), ethnic group (ETHNIC), marital status (MARITAL), occupation type (OCC), location (LOC), age of the household head (AGE), gender of the household head (GENDER), and house ownership (OWN).

The independent variable which is the income level is classified using the following criteria; monthly income below RM3,878 are classified as B40; households with monthly income in between RM3,878 and RM8,436 are classified as M40; households with monthly income RM8,436 and above are classified as T20. Since the dataset for this study is in year 2016, the income classification is based on year 2016. Following Engel's Law, it is expected that households with higher income will spend less on food. HHSIZE is the total number of persons in the house. It is expected that household size will have a positive effect on the food expenditure as the bigger the family size, the higher the food spending would be. Education level (EDU) is the highest qualification level obtained by the household head. EDU is measured by the dummy variable where 1 for tertiary education (degree or diploma or certificate holder) and 0 otherwise. ETHNIC is a type of ethnicity in Malaysia, where the DOSM data identify four types of ethnicities; Bumiputera, Chinese, Indian and Others. In this study, ETHNIC is measured by the dummy variable (1 for Bumiputera, 0 otherwise).

Marital status (MAR) is a dummy variable for the personal status of the household head (1 for married and 0 otherwise). Type of occupation is divided into three categories; high-skilled,

semi-skilled and low-skilled based on the data obtained from DOSM, 2016. Each of the type of occupation variable is assigned with the dummy variable. Location (LOC) is measured by the dummy variable, 1 for rural and 0 for urban. Empirical findings by Nsabimana *et al.* (2020) indicate that rural households spend proportionally more on food than urban households, especially on low-value staples, starches, and cereal products. In addition, it is expected that the B40 group will have higher spending on staple food (such as rice) compared to other income groups.

AGE is the age of the household head. Age is divided into 4 categories based on Mondal and Dubey (2020) classification; 15-29, 30-44, 45-59, and 60 and above. Each of the age range is assigned with a dummy variable. GENDER is the gender of the household head, where 1 for male and 0 otherwise. Being male is expected to have a greater impact on nutrient intake than being female because males generally consume more food than women (Frazao & Cleveland, 1994). Thus, it is expected that male household head will spend more on food compared to female household head. OWN is a dummy variable of the type of ownership of the household head, where 1 for own house and 0 otherwise. Those who own a house are expected to spend more on food because they have proper facilities to store and prepare food items.

3.3. Estimation techniques

The specific objectives of this study which are to; (i) analyze the socio-economics profile of the households; (ii) explore the food and nonfood items expenditure by income groups; (iii) identify the top 10 food items with highest expenditure by B40, M40 and T20 income groups. Finally, the objective (iv) involves the determination of the socio-economic factors that affect the food expenditure of these income groups.

The estimation techniques for achieving objectives (i), (ii) and (iii) was based on the descriptive approach. Thus, descriptive statistics such as the frequency distributions of the relevant variables, the mean values,

percentages and standard deviations were also estimated. Then the graphical representations such as bar charts and histogram were further used to illustrate the findings.

In determining the choice of estimation method for objective (iv), various considerations guided our choice. Heteroskedasticity problem may exist in the estimation of regression models using cross-sectional data. When heteroskedasticity is present, ordinary least squares (OLS) estimation places more weight on the observations which have large error variances than on those with small error variances. Due to this implicit weighting, OLS parameter estimates are unbiased and consistent, but they are not efficient. To detect the presence of heteroskedasticity, the Breusch-Pagan Godfrey (BPG) test is used in all the regressions.

This study utilizes Engel's law income-expenditure model as the underlying basis. The Engel curve reflects the income and consumption relationship of households and thus plays an important role in the countries' policies regarding income distribution.

Equation (1) is the general model, with households at the bottom 40% of the income bracket as our main explanatory variable of interest.

$$FE_i = f(B40_i, Z_i) \quad (1)$$

Where

FE = expenditure in Ringgit Malaysia for food and food sub-items by the i^{th} household

$B40_i$ = Dummy B40 income category of household i (1=B40, 0 for other categories)

Z_i = Socio-demographic variables

We extended the model by Cheah *et. al.* (2021), where they included age, gender, ethnicity, marital status, educational level, employment status, monthly household income, household size, and household location. In this current paper, in addition to these factors, we included average food prices, occupation categories (high skilled and semi-skilled occupations), and house ownership. The equation to explain these relationships is presented in Figure 2 and Equation (2).

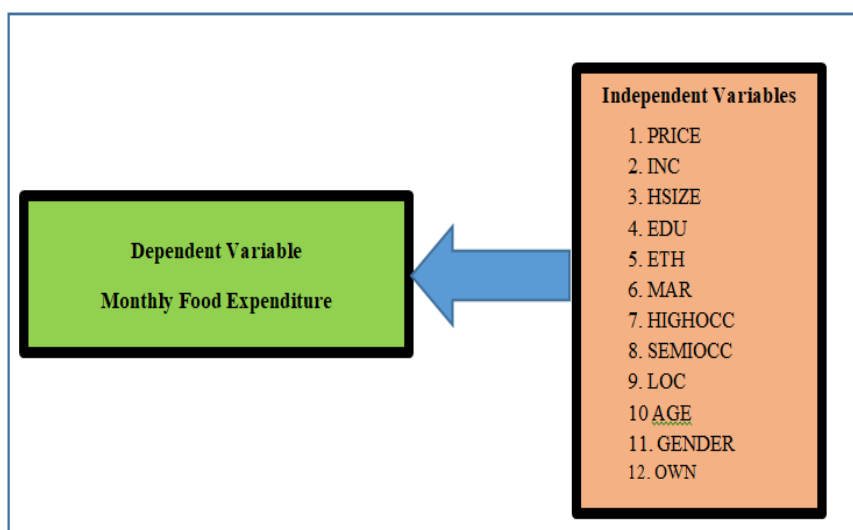


Figure 2 Conceptual Framework

Further breakdown of the socio-demographic characteristics is shown in Equation (2):

$$FE = \alpha_i + \beta_1 PRICE_i + \beta_2 INC_i + \beta_3 HSIZE_i + \beta_4 EDU_i + \beta_5 ETH_i + \beta_6 MAR_i + \beta_7 HIGHOCC_i + \beta_8 SEMIOCC_i + \beta_9 LOC_i + \beta_{10} AGE_i + \beta_{11} GENDER_i + \beta_{12} OWN_i + \mu_{i1} \quad (2)$$

Where:

FE = Food expenditure (in Ringgit Malaysia),
 $PRICE$ = the average price food items spent by the income groups.

INC = Income represented by a dummy variable of B40 income group (1 = B40, 0 = otherwise).

HSIZE = Household size, measured by the number total of people in the house.

EDU = Education level of the household head, the highest qualification level obtained by the head of household. EDU is measured by the dummy variable where 1 for tertiary education (degree or diploma or certificate holder) and 0 otherwise.

ETH = Ethnicity is the type of ethnicity of the household, where there are four types of ethnicity in Malaysia; Bumiputera, Chinese, India and Others. Ethnic is measured by the dummy variable, 1 for Bumiputera, 0 otherwise.

MAR = Marital status, a dummy variable for the personal status of the household (1 for married households and 0 otherwise).

HIGHOCC = High skilled occupation of the household head, and type of occupation is divided into three (3) categories; high-skilled, semi-skilled, and low-skilled. Each of the type of occupation variable is assigned with the dummy variable.

SEMIOCC = Semi skilled occupation of the household head, and type of occupation is divided into three (3) categories; high-skilled, semi-skilled, and low-skilled. Each of the type of occupation variable is assigned with the dummy variable.

LOC = Location, measured by the dummy variable, 1 for rural and 0 for urban. It is expected that rural households will spend more on food compared to urban households.

AGE = The age of the household head. Using the labour force classification by DOSM, the age of the household head is divided into 15-64 and more than 64 years (DOSM, 2021).

GENDER = Household head gender where 1 for male and 0 otherwise.

OWN = is a dummy variable of the type of ownership of the household head, where 1 for own house and 0 otherwise.

The linear regression model is employed to see the relationship between the monthly food expenditure and the socio-economics factors.

IV. RESULTS AND DISCUSSIONS

Based on the specific objectives of this study which are to; analyze the socio-economic

profile of the households; explore the food and nonfood items and expenditure by income groups; to identify the top 10 food items with highest expenditure by B40, M40 and T20 income groups and finally the study also will also analyse the socio-economic factors affecting the food expenditure. Table 1 exhibits the characteristics of the data used in this study.

Table 1: Demographic and Household Characteristics of the Study

Variable	Mean (SD) in Ringgit Malaysia
Total spending (Monthly)	3,720.6 (2842.22)
Gross income (Monthly)	6,256.07 (5963.48)
Food spending (Monthly)	725.01 (370.59)
Household size	4.15 (2.04)
Age	46.82 (13.49)

SD is standard deviation in ()

Table 2 shows the average monthly income by each income group, the percentage of the income spent monthly and the proportion of the monthly expenditure on food and non-food items. The result indicated that the low-income group which is the B40 spent the highest percentage (83%) of its income monthly. Then followed by the M40 groups which spent 65% of its income monthly while, on average the T20 only spent 51% of its income monthly. The results also revealed that B40 has the lowest average expenditure per month (RM 2,043.63). The M40 category has an average monthly expenditure of RM 3,653.73, that is the second top average expenditure among the three groups. The T20 has the highest average monthly expenditure of RM 6,964.56.

Table 2: Monthly Income, Food and Non-food Expenditures by Income Strata and their Relative Percentages

Income group	Obs	Mean income (RM)	Total Expenditure (RM)	Food expenditure (RM)	Non-food expenditure (RM)
B40	5,729	2,540.81	2043.63 (0.83)	563.13 (0.29)	1480.49 (0.71)
M40	5,742	5,723.34	3653.73 (0.65)	766.59 (0.22)	2887.15 (0.78)
T20	3,080	14,159.87	6964.56 (0.51)	948.60 (0.15)	6015.96 (0.85)

Note: values in parenthesis () are percentages of income on each the expenditure category

Further assessment on how the expenditure is distributed among food and non-food items is also shown in Table 2. The average monthly expenditure on food is RM563.13, RM766.59 and RM948.60 for B40, M40 and T20 respectively. Among the three income groups, the B40 group spends the highest proportion of its total expenditure on food items. That is 29% for B40, 22% and 15% for M40 and T20 income groups respectively. While, the average monthly expenses on non-food items are RM1,480.49, RM2,887.15, and RMR6,015.96

for B40, M40 and T20 respectively. The assessment of the proportion of the monthly expenditure on non-food items by income categories shows that the B40 spends the least on non-food item (71%), compared to 78% and 85% by the M40 and T20, respectively. Yeong-Sheng, (2008) and Cheah *et al.* (2021) indicated a positive relation between income level and total food expenditure. Similarly, Heng and Guan (2007) higher monthly household income is directly associated with food expenditure.

Table 3: Top 10 Food Items (with Four Digit Code) Monthly Expenditure by B40, Average Prices and their Proportion in Total Expenditure

Food category	B40 mean monthly expenses (RM)	Average price (RM)	Proportion of Total Expense (%)
Fresh fish (Code 0131)	78.00	18.68	13.85
Fresh meat (Code 0121)	65.77	17.94	11.68
Fresh vegetables (Code 0171)	62.80	6.22	11.15
Rice (Code 0111)	41.51	27.92	7.37
Bread and 'kuih' (Code 0114)	34.63	5.21	6.15
Fresh seafood (Code 0132)	26.85	20.42	4.77
Fresh fruits (Code 0161)	22.27	5.96	3.95
Processed fish and seafood (Code 0133)	19.64	12.21	3.49
Milk powder and other milk-based products (Code 0143)	17.76	14.04	3.15
Crackers (Code 0113)	15.27	3.62	2.71
Total	384.50	132.22	68.27%
N	5,729		

Table 3 shows the top 10 food items in terms of monthly average food expenditure for the B40 households. These are, fresh fish, fresh meat, fresh vegetables, rice, bread and *kuih*, fresh seafood, fresh fruits, processed fish and

seafood, milk powder and other milk-based products, and crackers (from the highest to the lowest expenditure). On average, the B40 households spend 68.27% of their food expenditure on these 10 items.

Table 4: Top 10 Food Items (with Four Digit Code) Monthly Expenditure by M40, Average Prices and their Proportion in Total Expenditure

Food category	M40 mean monthly expenses (RM)	Average price (RM)	Proportion of total expense (%)
Fresh fish (Code 0131)	98.08	18.68	12.79
Fresh meat (Code 0121)	85.06	17.94	11.10
Fresh vegetables (Code 0171)	76.55	6.22	9.99
Bread and 'kuih' (Code 0114)	50.67	5.21	6.61
Fresh seafood (Code 0132)	47.47	20.42	6.19
Rice (Code 0111)	44.90	27.92	5.86
Fresh fruits (Code 0161)	36.22	5.96	4.72
Milk powder and other milk-based products (Code 0143)	31.34	14.04	4.09
Crackers (Code 0113)	21.93	3.62	2.86
Processed fish and seafood (Code 0133)	21.84	12.21	2.85
Total	514.06	132.22	67.06%
N	5,742		

Similarly, Table 4 indicates the food categories in the top 10 average monthly food expenditure of the M40 income group. These includes fresh fish, fresh meat, fresh vegetables, bread and 'kuih', fresh seafood, rice, fresh fruits, milk powder and other milk-based products,

crackers, processed fish, and seafood, from highest to lowest. On average, the M40 households spend 67.06% of their food expenditure on these 10 items. It is very clear that for M40, the expenditure proportion on rice is lesser than B40.

Table 5: Top 10 Food Items (with Four Digit Code) Monthly Expenditure by T20, Average Prices and their Proportion in Total Expenditure

Food category	T20 mean monthly expenses (RM)	Average price (RM)	Proportion of total expense (%)
Fresh fish (Code 0131)	106.54	18.68	11.23
Fresh meat (Code 0121)	92.89	17.94	9.79
Fresh vegetables (Code 0171)	77.81	6.22	8.20
Bread and 'kuih' (Code 0114)	76.25	5.21	8.04
Fresh seafood (Code 0132)	69.45	20.42	7.32
Fresh fruits (Code 0161)	54.08	5.96	5.70
Rice (Code 0111)	52.27	27.92	5.51
Milk powder and other milk-based products (Code 0143)	48.28	14.04	5.09
Processed meat (Code 0123)	27.78	7.60	2.93
Mineral water, soft drink, fruit and vegetable juice (Code 0103)	27.32	3.53	2.88
Total	632.67	132.22	66.69%
N	3,080		

Table 5 shows the top 10 average monthly food expenditures on various food categories by T20 income category. Like other income groups, the T20 group spends more on fresh fish, followed by other food categories such as fresh meat, fresh vegetables, bread and 'kuih', fresh seafood, fresh fruits, rice, milk powder and other milk-based products, processed meat, and mineral water, soft drink, fruit, and vegetable juice. On average, the T20 households spend 66.69% of their food expenditure on these 10 items. It is very clear that for T20, the expenditure proportion on rice is lesser than M40 and B40. The higher the income category, the less expenditure on rice.

Regression Analysis

The monthly food expenditure model is first analyzed using the linear regression analysis. To control for the effect of heteroskedasticity which is common in cross sectional data, the model was then estimated using the white robust standard error technique and the outcome of the estimation is presented in Table 6.

Table 6: Food expenditure regression analysis

Independent Variables	Expected sign	Model 1 Baseline
Constant		-42.31
B40	-	-192.92***
PRICE	+	4.13***
HSIZE	+	53.35***
EDU	+	56.35***
ETH	+/-	-15.76**
MAR	+	83.43***
HIGHSKILL	+	25.04***
SEMISKILL	+	0.50
LOC	-	33.87***
AGE (15-64)	-	-49.37***
GENDER	+	-23.22***
OWN	+	52.52***
R-Squared		0.2649
F-Statistics		343.66***
No. of observation		14,278

Robust standard error t-statistics are given in parentheses. ***, **, and * represent significance at 1%, 5%, and 10% level, respectively. The highly significant of F-

statistic means that all explanatory variables have joint effect on monthly food expenditure.

Table 6 present the estimated coefficients from model specification 2. The dependent variable in the model is the household expenditure on food, while the independent variables constitute household demographic factors. Results indicate that specific demographic variables have important influence on household food expenditure decisions. Among the factors that indicated a positive and significant effect on household food expenditure are average price of food items, the household size, educational attainment of household head, the marital status of household head, type of occupation which is high skilled, the location of household and the ownership of the house.

As predicted, price variable indicates a positive and significant coefficient, implying that an increase of RM1 in the food prices will increase the food expenditure by RM4.13 monthly. This finding reveals that prices of food items positively affect the food expenditure, which implies that the higher the price of food items the more the food expenditure, that is, food expenditure increases with price. This also agrees with the expectation of this study and other prior studies (Cheah, *et al.*, 2021). The implication is that the B40 income groups will face a become worse off in terms of food accessibility as a result of income constraint considering that they have low disposable income compared to other income groups.

The household size has a significant positive relationship with food expenditure, implying that the larger households have higher amount of food expenses. This implies that an addition of one person in the household shows an increase of food expenditure by RM53.35 monthly. These findings are in-line with the finding by Ricciuto *et al.* (2006), where the study showed a positive effect of household size on the food items consumed.

In terms of educational level of household head, this is another important factor positively influencing food expenditure. Those households having from tertiary education and above have

been shown to spend RM50.73 more than those with less than tertiary education level. Similar findings were reported by earlier studies like Ricciuto *et al.*, 2006; Chai *et al.*, 2015; Schanzenbach *et al.*, 2016; Cheah, *et al.*, 2021. However, this contradicts findings by Ramdhanie *et al.* (2017) whom reported that when the household head has higher education, then their food expenditure decreases.

Households headed by married individuals spend RM83.43 more on food compared with households headed by single individuals. Contrastingly, Ramdhanie *et al.* (2017) reported a negative effect, then justified their findings based on the ability of the married household heads to benefit from an additional person to help with decision making, thus ensuring increased efficiency in food purchasing and consumption. High-skilled worker spends RM25.04 more on food compared with low-skilled categories. Similar findings were reported by earlier studies like Cheah, *et al.* (2021). Those who are living in rural areas spend RM33.87 lower than those who are living in the urban area. This can be as a result of their proximity to farms where food production occurs. Similar findings were reported by earlier studies by Schanzenbach *et al.* (2016) and Cheah, *et al.* (2021). Contrarily, there is only one variable found to have no significant effect which is the dummy of semi-skilled household head.

The monthly food expenditure of the B40 group on average is RM192.92 lower than the other groups (M40 and T20). This is attributable to the lower disposable income compared to the other groups, B40 income group spend less on the food expenditure. This finding is in tandem with the findings of previous studies that showed that income has a negatively significant effect on food expenditure (Ricciuto *et al.*, 2006; Chai *et al.*, 2015; Schanzenbach *et al.*, 2016; Farrell *et al.*, 2019).

Concerning ethnicity, this study showed that Bumiputera consumers appear to spend RM15.76 less on food items as compared to other ethnicities in Malaysia. This agrees with the findings of Ramdhanie, (2017) where they

reported that non-African households spend more on food than native Africans. Similar findings were reported by earlier studies like Chai *et al.*, 2015; Ramdhanie *et al.*, 2017. The age category of 15-64 shows that they spend less RM49.37 compared to the other age group. This also agrees with the earlier studies by (Ricciuto *et al.*, 2006; Cheah *et al.*, 2021).

However, this contradicts with the findings of extant studies such as Ramdhanie *et al.* (2017) whereby household head that are older were shown to have lower food expenditure compared to younger ones. Also, contradicting with the expected result, gender variable shows a negative and significant coefficient, indicating that households headed by male spend RM23.22 lower on food compared with female heads. While this is in tandem with the findings of Ramdhanie *et al.* (2017). Finally, those who own a house spend RM52.52 more on food compared with those who are not owning a house.

V. CONCLUSIONS AND POLICY RECOMMENDATIONS

This study identifies the top 10 food items consumed by different income groups in Malaysia. Further, estimates the relationship between socio-economics factors of Malaysian households and the food expenditure. The findings showed that the B40 group spends more percentage of their income on food than the M40 and T20 groups. The top three food items spent by all these three income groups are the same; fresh fish, fresh meat, and fresh vegetables. However, rice is the fourth food items in the B40 list whereas for this rice item stood at number sixth and seventh respectively for M40 and T20.

These findings offer some policy recommendations. The government should monitor the prices of fresh fish, meat, and vegetables as in these days particularly during this Covid-19 pandemic situation, these items have seen to experience significant price increase. Furthermore, these food items also have been the most spent items by B40 income categories and the price increase will burden this income group the most in which most

households are struggling to make ends meet due to this crisis. The policy makers may lessen the burdens of the B40 group in Malaysia by providing food vouchers or discount vouchers to buy essential food items such as fresh fish, meat, and vegetables.

Besides price monitoring, discount and vouchers, policies that can increase the income of this group would be a good place to start. In fact, in 2018, the Central Bank of Malaysia mooted the idea of living wage, that is, a wage level that not only shifts households above the absolute poverty line of RM2,208, but sufficient enough to be able to engage in other aspects of life rather than mere preoccupations for survival, i.e. food expenditure. However, for the living wage concept to take off, it cannot be solely financed from the fiscal coffers, it has to come from productivity-led wage growth, which in turn would need an expansion of the economy. Policy-makers therefore need to ensure a vibrant economic sector for this income group.

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