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HOUSEHOLD EXPENDITURE ON FOOD AT HOME IN MALAYSIA

by

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ABSTRACT

"Engel's law" explains that the share of household expenditure on food typically falls as income and expenditure increase. The objectives of this study are to investigate the food expenditure patterns of different income groups and the relationships between household characteristics and expenditure patterns. Household Expenditure Survey 2004/2005 data from Department of Statistics was used to analyze the food expenditure pattern of households. An expenditure model was developed and the coefficients are estimated by Working-Leser model. The estimated results are clearly a reflection of "Engel's law", resulting in higher income elasticity for lower income groups than higher income groups. The share of food expenditure increases with increase in income. The results also indicate that household size, races, age of household head, level of income, and gender are the main variables related to household food expenditure pattern.

Keywords: *Food expenditure pattern, Working-Leser, Engel's Law, income, income elasticity*

JEL code: D12

1.0   INTRODUCTION

Globalization has seen healthy growth in Malaysian economics. As Malaysia develops, there is general change of food consumption patterns which are mainly attributed by structural changes. The transformation of diets with economic development and increasing per capita incomes has been well documented (Blandford, 1984; Garnaut and Ma, 1992; Mitchell, *et al.*, 1997; Wu and Wu, 1997). With rising income, it is expected that the Malaysian population diversified their consumption patterns, namely a substitute of staple food (rice) by higher value grain based foods like wheat and wheat based products. Such change is projected to be extended to higher demand for healthy foods. Thus, Malaysia is more likely to experience the history of changes in food consumption patterns like those in the developed Asian countries such as Japan and Taiwan.

The affluence of Malaysian is reflected by higher household expenditure on consumer goods over the years. The Malaysian average monthly household expenditure on consumer goods, which include both food and non-food, is clearly stated in Household Expenditure Survey 1973, 1980/82, 1993/94, 1998/99, and 2004/05. According to The Malaysian Institute of Economic Research (2007), the increase started from RM412 in 1973 to RM732 in 1980/82. It then recorded higher expenditure of RM1,631 in 1993/94, followed by an average positive rate of 7.0 per cent between 1993/94 and 1998/99. More rapidly development in Malaysian

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economic after economic crisis in 1997 observed the Malaysians average monthly household expenditure on consumer items surged even further from RM1,161 in 1998/99 to RM1,937 in 2004/2005. One similarity among all household expenditure surveys is a significant difference between households in urban areas and rural areas, where household expenditure in urban areas is generally higher than those in rural areas

Complying the "Engel's law", food's share of Malaysian household expenditure typically falls as income and total expenditures increase. Expenditure on food at home has declined steadily from a share of 33.7 per cent in 1973 to 20.4 per cent in 2004/2005. Meanwhile, expenditure on food away from home has rise from only 4.6 per cent in 1973 to 10.8 per cent in 2004/2005. Such phenomenon is due to the impact of economic and structural changes on lifestyle. Within the same period, total expenditure on food, comprising both food at home and food away from home has decreased from 38.3 per cent in 1973 to 31.2 per cent in 2004/2005. Generally, lower income households spend bigger portion of their incomes on foods. Similarly, it can be expected that lower income households are more likely to spend more on foods when income increases.

Though the food expenditure system has been studied extensively, there are many generalizations that changes in food consumption pattern in Malaysia are due to increase in per capita income and population (Tee and Thiam, 1975; Hussein, *et al.*, 1986; Baharumshah and Mohamad, 1993). In fact, there are other demographic factors change through time as well, such as migration from rural to urban regions, changes in the country's and household's demographic structures, and improvements in education, transportation, communications and marketing infrastructure. The other changes are referred to as structural variables, could play a role in influencing dietary patterns (Haley, 2001). Because most of the previous demand studies in Malaysia have ignored these structural shifts, the effects of income on food demand have been overestimated (Huang and Bouis, 1996). This is further supported by Haley (2001) with findings that show structural shifts are strongly correlated with increasing per capita income. Thus, it is difficult to separate the effects of income and structural changes empirically.

Consequently, a clear understanding of what may happen to food demand, and its composition, is necessary to gain insight of the potential changes in the domestic food economy. The objectives of this study are to investigate the food expenditure patterns of different income groups and the relationships between household characteristics and expenditure patterns.

2.0   FOOD EXPENDITURE BUDGET IN OTHER COUNTRIES

"Engel's law" explains that share of household expenditure on food typically falls as income increases. Table 1 depicts the food budget share of transition countries, developing countries and developed countries in 1996. It shows significant difference in food budget share among these countries, with transition countries allocated biggest share of their income for foods. Noteworthy those households from Vietnam, Yemen, Sri Lanka, Mongolia, and Bangladesh in Asia spent more than half of their income on food. To be more specific, expenditure on staple foods such as cereals, rice, and breads accounted the largest share of their total expenditure on foods, followed by expenditure on fruits and vegetables, and meats. Such picture shows a tendency where as per capita income rises, consumers in these countries will be likely to increase their consumption on higher value livestock, vegetable and fruit products.

While global food demand is expected to increase with income, especially in developing countries. Complying with "Engel's law", the food share of total budget in these countries is expected to decline as income increases. It is observed that Thailand and Korea allocated almost one third of their income for food. It is worth mentioning that households in these countries experienced dietary change, with more consumption of meats, vegetables and fruits seeing decline in consumption of staple foods.

Further to "Engel's law", high income households in developed countries spent the least on food. For example, households in Japan and Hong Kong allocated 15% and 10% of their incomes for foods respectively. Meats, vegetables, fruits and dairy accounted the biggest portion of their food budget shares. A comparison shows that Hong Kong households spent 23% of their food budgets on meat products while Bangladeshi households allocated just 4 percent of food expenditures on meats. In contrast, Hong Kong households just spent 9% of their food budgets on staple foods while Bangladeshi consumers allocated more than half of their food expenditures to staple foods.

Table 1: Food budget share in various countries, 1996.

	Country	Beverages & tobacco	Breads & cereals	Dairy	Fats & oils	Fish	Fruits & vegetables	Meat	Other foods	Total food expenditure
Transition Countries	Tanzania	4.7	39.5	3.6	3.3	6.4	24.2	9.6	8.6	73.2
	Albania	5.1	20.6	17.4	9.5	0.3	22.6	19.0	5.4	69.3
	Madagascar	5.9	44.5	2.1	2.3	3.8	26.2	9.6	5.6	65.9
	Vietnam	7.8	35.7	2.8	1.5	10.3	9.4	21.9	10.5	64.8
	Sri Lanka	14.9	21.8	6.7	1.4	12.4	26.4	1.8	14.5	63.6
	Yemen	22.9	26.1	5.7	5.5	6.1	10.8	11.8	11.1	61.1
	Mongolia	6.1	30.4	18.1	3.5	0.0	3.8	31.2	6.9	58.7
	Bangladesh	4.1	50.2	3.2	3.9	9.2	9.6	4.4	15.5	56.1
	Philippines	11.9	29.7	6.7	1.8	14.5	11.1	14.5	9.8	48.4
	Kenya	15.5	32.5	15.1	2.6	0.4	17.6	5.1	11.2	45.8
	Cameroon	19.1	16.1	1.2	3.8	4.7	31.2	16.2	7.6	43.8
Developing Countries	Turkey	9.5	20.3	12.8	8.4	1.0	23.2	13.6	11.1	32.6
	Korea	17.8	20.7	5.0	0.9	11.7	21.2	12.7	10.0	31.6
	Bulgaria	12.3	17.1	13.9	3.5	0.8	24.8	19.7	7.9	30.7
	Poland	26.5	10.3	8.4	3.4	1.5	14.5	21.2	14.1	30.7
	Thailand	28.6	16.1	5.2	2.8	3.3	16.4	18.6	9.0	28.6
	Mexico	18.9	21.7	10.9	2.3	3.1	13.0	17.3	12.8	26.6
	Czech Republic	28.1	10.3	11.6	4.0	1.8	12.4	21.3	10.6	25.0
	Chile	13.4	21.5	11.2	4.6	2.1	17.3	21.8	8.1	23.0
	Brazil	12.3	16.8	14.0	3.6	2.3	14.8	24.5	11.5	22.7
	Hungary	23.6	10.9	12.8	4.7	0.8	12.7	20.5	14.1	22.5
	Greece	24.6	7.3	13.6	5.4	4.5	17.3	16.0	11.4	21.2
Developed Countries	United Kingdom	47.5	8.3	6.9	1.3	2.3	12.0	12.6	9.2	16.4
	Australia	25.2	13.5	9.7	1.7	3.1	18.3	16.9	11.6	15.1
	Japan	23.1	22.3	4.8	0.7	17.0	12.8	7.8	11.5	14.9
	Switzerland	26.2	10.7	15.2	2.0	1.8	17.0	16.5	10.6	14.6

Denmark	28.8	8.9	11.1	2.2	2.0	11.9	20.4	14.7	14.0
Netherlands	24.0	12.4	12.6	2.2	2.2	15.7	18.7	12.3	13.3
Germany	28.2	14.9	7.1	2.3	1.9	8.3	20.3	17.1	13.1
Singapore	25.2	10.3	5.0	1.8	15.0	18.1	13.3	11.3	13.0
Canada	29.5	11.4	11.2	2.1	2.7	18.1	16.5	8.6	11.7
Hong Kong	17.9	9.0	3.4	3.3	19.7	11.8	22.7	12.2	10.3
United States	28.7	11.4	8.6	1.8	1.2	14.7	19.6	14.1	9.7

Source: United States Department of Agriculture, 2007.

3.0   PREVIOUS STUDIES

This study should fill some gaps in the current literature in Malaysia context. Household expenditure on food has been studied extensively in other developing countries. By extending the Engel function, Rimmer and Powell (1996) developed a model called Direcly Addictive Demand System (AIDADS). Cranfield, *at al.* (1998) used the AIDADS model and estimated income elasticity for demand of food in Ethiopia, Pakista, Senegal, Korea, France, and USA was 0.97, 0.77, 0.76, 0.55, 0.26, and 0.15 respectively. It shows that poorer countries are more likely to spend more of their income on food, which is effectively the overcoming of the under-nutrition associated with poverty. While Yuen (1994) estimated food income elasticity for 24 countries from 1961 to 1994 via Working-Leser single equation. The results comply with "Engel's law", with decreasing food income elasticity from year to year as the countries developed.

Previous studies in Brazil (Simões and Brant, 1981; Alves, *et al.*, 1982; and Thomas, *et al.*, 1989; Asano and Fiusa, 2003) calculated the elasticities using cross-sections data. Recently, Menezes, *et al.* (2005) used a two-stage budgeting system via Linear Approximate Almost Ideal Demand System (LA/AIDS) to estimate income and price elasticities for groups of products, such as food, housing, clothing, personal expenditure, transportation & communication, and health. It was found that income elasticity for demand of food in Brazil was 0.301. More specifically, it was 0.109 and 0.454 among the diciles of 50% richest population and the diciles of 50% poorest population in Brazil. Such findings imply that poorer households are expected to increase their expenditure on food in response to increase in income more rapidly than richer households.

Similarly, Elsner (1999) analyzed Russian food expenditure pattern by using a two-stage budgeting system. Total expenditure allocation on food and non-food was analyzed using Working's Engel model in the first stage. The Working's Engel model estimated income elasticity for demand of food was 0.81 in Russia. Also, income elasticity for demand of food was estimated to be 0.98 and 0.78 among Russian households in rural areas and urban areas respectively. Another study by Brosig (2000) estimated a two stage model of Hungarian households' food demand. Demand for food was estimated by a Working-Leser single equation model in the first stage. The study found that income elasticity for demand of food was 0.60 in Hungary. It also showed that differences existed between food demand behaviors across specific socio-demographic groups. It was estimated that income elasticity for demand of food was 0.65 and 0.58 among Hungarian households in rural areas and urban areas respectively. Both of these studies indicate that households in rural areas are expected to increase their expenditure on food in response to increase in income more than those households in urban areas.

On another hand, numerous studies (Thomas, 1987; Blundell, *et al.*, 1993; Fan, *et al.*, 1995; Gao, *et al*., 1996; Tiffin & Tiffin 1999; Dey, 2000) estimated food income elasticity in the first stage of multi-stage budgeting system via Working-Leser model. Most recent study by Dey (2000) found that lower income groups are expected to increase their share of expenditure on food more than higher income groups. Further to the Working-Leser model specification, Huang and Bouis (1996) and Haley (2001) argued exclusion of demographic and socio-economic factors may have the effects of income on food demand have been overestimated. Kang and Chern (2001) compared the performance of Working-Leser model with and without incorporation of the demographic variables. The study indicates that the treatment of translating demographic effects is important in improving the performance of the model.

4.0 METHOD AND DATA

This study used the household data of the Household Expenditure Survey 2004/2005 obtained from the Department of Statistics, Malaysia. The household expenditure data is useful in analyzing the consumption pattern in relation to the demographic and socio-economic background of the households. The large number of households, consisting 14,084 respondents in the Household Expenditure Survey 2004/2005 provides higher degrees of freedom in econometric estimation. This is particularly important for estimating income elasticities of different income groups, which is distributed in term of quartile.

This study utilized the first stage of multi-stage budgeting framework (Thomas, 1987; Blundell, *et al*., 1993; Fan, *et al*., 1995; Gao, *et al*., 1996; Tiffin & Tiffin 1999; Dey, 2000) to estimate food demand system in Malaysia, incorporating socio-economic factors. The food demand system describes the household makes decisions on how much of their total income (expenditure) to be allocated for food consumption, conditional on household characteristics and the consumption of the non-food goods. Following Blundell, *et al.* (1993), Working-Leser functional form of food demand system in Malaysia can be expressed as:

$$\ln(M^h) = \alpha + \beta_1 \ln(P^h) + \beta_2 \ln(NF^h) + \beta_3 \ln(Y^h) + \beta_4 (\ln Y^h)^2 + \beta_5 \ln(FAFH) + \Sigma \beta_i Z \quad (1)$$

where M^h is food expenditure at home,
P^h is stone price index for food,
NF^h is non-food expenditure,
Y^h is per capita income,
$FAFH$ is expenditure on food away form home, and
Z is a vector of demographic and socio-economic variables.

The demographic and socio-economic variables in the model are household size, dummy variable for age of household head below 24 years old, dummy variable for age of household head between 25 and 55 years old, dummy variable for Malay, dummy variable for Chinese, dummy variable for Indian, dummy variable for employment status, dummy variable for urbanization, and dummy variable for gender of household head. This model can be estimated by the Ordinary Least Squares (OLS).

As equation 1 is an outcome of utility maximization problem, it must observe homogeneity of degree zero in prices and income. The restriction is evaluated at the sample mean and can be stated as:

$$\beta_1 + \beta_2 + \beta_3 + 2\beta_4 \ln y^h + \beta_5 = 0 \tag{2}$$

Income elasticity, η_y, can be computed upon estimation of (1). From Blundell, *at al.* (1993), income elasticity of demand for food can be expressed as:

$$\eta_y = \beta_3 + 2\beta_4 \ln y^h \tag{3}$$

5.0   RESULTS

The analysis compared expenditure allocation by Malaysian households at different income levels. There are variations in terms of allocation of the food budget across expenditure quartiles in 2004/2005. Lower income groups, Quartile 1 and Quartile 2 allocated 33.03% and 25.92% of total income for food budget respectively. On another hand, higher income groups, Quartile 3 and Quartile 4 recorded lower expenditure share of income on food with 21.2% and 14.63% respectively. Such results are a reflection of "Engel's law", mirroring the effect of income and expenditure on food budget. It can then be generalized that higher income groups allocated smaller budget share for food than lower income groups.

Patterns of food expenditure are particularly important since they determine the growth in market demand for food. The results of income elasticity of demand for food at different income levels are reported in Table 2. Generally, demand of food will be increased in line with income growth. The estimated income elasticities from Equation 3 are as expected, where lower income groups are more likely to increase their food budget in response to increase in income mainly due to healthy economic development at that time. For example, if per capita income increases by 10%, the demand for food by Quartile 1 is likely to increase at 20.06% which is higher than 9.02% of Quartile 4.

Table 2: Expenditure elasticities of various income group in Malaysia.

Income Group	Expenditure Elasticity
Quartile 1	0.200553
Quartile 2	0.143014
Quartile 3	0.129151
Quartile 4	0.090214

Table 3 shows the estimated parameter of food expenditure function. The derived estimate of the square term of the per capita income variable is different from zero, entailing that the response of food expenditure to income changes is non-linear. The coefficient of household size is positive and significant. It implies a higher level of food consumption by bigger household size compared to smaller household size, other things remaining the same. Noteworthy is a higher proportion of younger household head is expected to decrease average per capita consumption of food. The other significant parameter estimates are races and gender in most cases. Race has positive effects on food consumption. Surprisingly, urbanization is not one of the significant parameters. The result of this study contradicts with previous studies (Huang and David, 1993; Huang and Bouis, 1996; Rae, 1998; Argenti, 2000). Urban households generally spend more of their income on food than rural households. The phenomenon here is probably because of there is no big difference in total expenditure on food between Malaysian households in rural and urban areas.

Table 3: Estimated food expenditure function, Malaysia, 2004/2005.

	Income Group			
	Quartile 1	**Quartile 2**	**Quartile 3**	**Quartile 4**
Intercept	2.2299	3.1136	3.6410	4.6268
	(56.34)***	(42.17)***	(42.83)***	(85.65)***
Ln (Stone price index)	0.4836	0.6673	0.7528	0.8409
	(56.40)***	(79.19)***	(108.58)***	(115.49)***
Ln (Non-food expenditure)	-0.7157	-0.6789	-0.4633	-0.5706
	(-39.98)***	(-27.99)***	(-17.15)***	(-15.44)***
Ln (Per capita total income)	0.1483	-0.0338	-0.3262	-0.2886
	(5.89)***	(-1.08)	(-10.08)***	(-6.68)***
Ln (Expenditure on food away from home)	-0.0331	-0.0522	-0.0557	-0.0536
	(-13.31)***	(-15.13)***	(-13.50)***	(-10.58)***
Ln (Per capita total income) x Ln (Per capita total income)	0.0227 [a]	0.0170 [a]	0.0149 [a]	0.0104 [a]
Household Size	0.0057	0.0100	0.0141	0.0243
	(4.38)***	(5.36)***	(5.76)***	(6.81)***
Age of household head, below 24 years old	-0.0690	-0.1146	-0.2285	-0.1259
	(-3.47)***	(-5.99)***	(-12.06)***	(-6.03)***
Age of household head, between 25 and 55 years old	-0.0070	0.0147	-0.0129	-0.0001
	(-1.07)	(1.72)*	(-1.25)	(-0.01)
Race - Malay	0.0537	0.0551	0.0358	0.0018
	(8.32)***	(6.05)***	(3.14)***	(0.11)
Race - Chinese	0.0847	0.1230	0.1050	0.0871
	(6.79)***	(10.54)***	(8.34)***	(5.44)***
Race - Indian	0.0613	0.0922	0.0800	0.0721
	(4.45)***	(6.12)***	(4.48)***	(3.26)***
Employment	0.0020	-0.0081	0.0034	-0.0083
	(0.25)	(-0.88)	(0.31)	(-0.62)
Urban	-0.0052	0.0000	0.0125	0.0122
	(-1.01)	(0.00)	(1.43)	(0.94)
Male	0.0142	0.0191	-0.0244	-0.0084
	(1.80)*	(1.98)**	(-2.37)**	(-0.71)
Adjusted R-squared	0.86	0.84	0.87	0.88

[a] Derived from imposed homogeneity restriction.
[b] Figures in parentheses are values of t-ratio.
*** Statistically significant at 1% level of significance.
** Statistically significant at 5% level of significance.
* Statistically significant at 10% level of significance.

6.0   SUMMARY

This study is to investigate the food expenditure patterns of different income groups and the relationships between household characteristics and expenditure patterns. The empirical results show that household size, races, age of household head, income, and gender are the main variables related to household food expenditure pattern. The share of food expenditure will increase with an increase in income among the Malaysian population. The estimated results are clearly a reflection of "Engel's law", resulting in bigger expenditure elasticity for lower income groups than higher income groups. Such results confirm that lower income households in Malaysia tend to spend bigger portion amount of their incremental income on foods.

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