

Household Expenditure on Food Away from Home by Type of Meal in Malaysia

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ABSTRACT

This paper analyses the household food-away-from-home (FAFH) expenditure pattern in Malaysia. For this purpose, the Tobit model was used to quantify the responsiveness of households' expenditure on FAFH to changes in their income and the household characteristics. The results show that households' FAFH expenditure has increased due to rise in income and changing lifestyle. Meanwhile, the household income has statistically significant influence on the FAFH expenditure for all types of meals, except for breakfast, although the FAFH expenditure for breakfast is positive. The positive effect of the total household income shows Malaysian households spent more by eating out as they have to spend more time at work and less time to prepare food at home. Breakfasts and lunches away from home have positive and inelastic income. The results indicate that household members have less choice but to consume breakfast and lunch away from home as their workplaces are usually far away from their homes and thus consume these meals at home are not cost-effective. They have greater flexibility in making decisions whether to consume at home or away from home for dinner and other meal. The estimated conditional and unconditional income elasticity for the households' FAFH expenditure for all types of meals shows that the FAFH expenditures by Malaysian households are income inelastic. This implies that the growth in the FAFH sector will largely be driven by household demographics, ethnic characteristics and region in Malaysia. The government should take appropriate measures to ensure that the meals are of high nutritious values, safe, and reasonably priced.

Keywords: Conditional and unconditional elasticity, food away from home, Malaysia, type of meal

INTRODUCTION

Eating away from home for Malaysian households has increased over the years, and this has drawn a significant interest by policy makers for many reasons. This country has achieved high income growth and experienced rapid structural transformation and urbanization in the recent years. The changes in socio-

economic and demographic structure have also occurred – the average household size has been falling (from 5.2 in 1980 to 4.3 persons in 2005), while the percentage of the population in the 65 years and above age category is increasing (Department of Statistics Malaysia, 2006). Women working outside home also showed an increasing trend from 44.5% to 46.7% between 2000 and 2005 (Ministry of Finance, 2004).

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Malaysia is a multi-ethnic country consisting of three dominant ethnic groups, namely the Malays (65%), Chinese (26%), and Indians (8%). Each ethnic group has their own food habits and the choice of the consumers may vary widely among these heterogeneous ethnic groups. In Malaysia, the expenditure on food at home (FAH) was found to have declined from a share of 36.2% of the total household food budget in 1973 to 20.1% in 2004, while spending on food away from home (FAFH) rose from 8.9% in 1973 to 10.5% in 2004. These findings indicate that Malaysians have changed their preference for food away from home at the expense of having meals at home. The market worth of consumer food service transactions was RM16,312 million (US\$4,315 million in the current value in 2003) which grew from 22% to 39% from 1999 to 2003 (Lee and Tan, 2007).

The increasing trend of home delivery and take-away food sector clearly demonstrates that the Malaysian households are spending less time in preparing FAH, a reflection of busy work schedules outside the home. There is a rapid growth of food service facilities, such as fast food restaurants and street food stalls, available throughout the country. At the same time, a variety of food items and the service facilities are now available in the FAFH sector. This will likely to have continuous impacts on the distribution, marketing, food service system, and the nutritional intake. With growing urbanization, it is expected that there will be significant changes in future food consumption in terms of dietary habits and food preferences in Malaysia. The important concerns for FAFH are related to the nutritional value, food safety and the ambient environment of the eateries. The literature reviewed reveals that very little research has been conducted to examine the FAFH consumption pattern in this region.

Most studies on the FAFH expenditure have identified income, race, household size, and residence of the households (Hanna and Carter, 1986; Lee and Brown, 1986; McCracken and Brandt, 1987; Soberon-Ferrer and Dardis, 1991; Yen, 1993), seasonal effects, age, and

status of parents (Hiemstra and Kim, 1995; Yen, 1993; Nayga and Capps, 1992) as important determinants of the FAFH expenditure. Meanwhile, Ries, Kline and Weaver (1987) found that the nutrient density of FAFH was lower than FAH. McCracken and Brandt (1990) asserted that both the socio-economic and demographic variables have differential impacts on the FAFH expenditure facilities (different types of eating places) and have important implications in analyzing household food demand. Reynolds and Goddard (1993) examined the determinants of FAFH based on the type of facilities and the types of meal in Canada. They found that the household choices on FAFH differ by the type of meal.

In Malaysia, studies on FAFH have mostly been done at the total expenditure levels. Three studies (Ishida *et al.*, 2003; Lee and Tan, 2007; Alias *et al.*, 2006) looked at the FAFH in Malaysia using the Household Expenditure Survey data. Among other, Ishida *et al.* (2003) estimated the Engel's demand elasticity while Lee and Tan (2007) and Alias *et al.* (2006) found that gender (male), age of household head, household size and education are the significant variables. Meanwhile, individuals from urban areas appeared to have high FAFH demand as compared to those from the rural areas.

This paper investigates the household expenditure on the FAFH based on the type of meals (breakfast, lunch, dinner, and other meal) for the households in the urban and rural areas of Malaysia. The objectives of the study were to: (a) determine the consumption trends and spending patterns of Malaysian households on food away from home, and (b) estimate the responsiveness of FAFH meals to changes in income and selected household demographic characteristics. This paper is organized as follows; Section 2 describes the Model used in the study; the data and their sources are described in Section 3; the results are discussed in Section 4; and the conclusions are presented in the final section.

MODEL

The household production theory (Becker, 1965; Lancaster, 1971) has been used in many studies as the underlying theoretical basis for analyzing the demand for food away from home (Stewart *et al.*, 2004). The theory posits that households are maximizing utility in the consumption of home-produced goods subject to a household production function, time, and income constraints. The production theory mainly accounts for time constraints in the household's decision making process, and thus, the value of the homemaker's time is an important determinant of FAFH expenditure (Prochaska and Schrimper, 1973). As the opportunity cost of time rises, households can be expected to purchase food items that require less time to process at home. In this case, food bought outside home and not cooked at home would be considered as FAFH consumption.

At the same time, the respondents may report zero FAFH expenditure. The estimation of coefficient will be inconsistent when only observed positive purchase data are used to estimate consumption behaviour by the OLS regression. The censored Tobit model is appropriate because it allows the presence of zero observations attributable to corner solutions. Zero shares are censored by an unobservable latent variable. The Tobit model is used to handle the censored sample, i.e. a sample in which information on the dependent variable is available only for some observations. This model is often used to investigate the determinants of household expenditure (Soberon-Ferrer and Dardis, 1991).

In order to purchase an item, it is assumed that households make two decisions. These decisions are, first, whether to spend - a participation effect and, second, how much to spend - a quantity effect. The researchers used the standard Tobit model to specify the estimating equation for the demand model for the FAFH consumption expenditure. In their work, Deaton and Irish (1984) assumed a linear equation, while the Tobit formulas for both latent demand and observed demand are:

$$Y^* = \beta' X + \varepsilon, \text{ (latent demand)} \quad [1]$$

$$Y^{**} = \max(Y^*, 0) \text{ (observed demand)} \quad [2]$$

The maximum likelihood method was used to estimate the β coefficients. This method assures large sample consistency, asymptotic normality of the estimated coefficients and conventional tests of significance. The log likelihood function for the Tobit model is expressed as:

$$\text{Log } L = \sum_0 \log \Phi (\beta' x / \sigma) + \sum_+ \{ \log \varphi [(y - \beta' x) / \sigma] - \log \sigma \} \quad [3]$$

Where Φ and φ are the cumulative probability distribution function, the density function of the standard normal variable and σ is the standard deviation of μ (Greene, 2003). The subscripts 0 and + mean that summation is performed over the sub-sample in which dependent variable is zero and positive.

The marginal effects of the Tobit model, with censoring at zero and normally distributed disturbances, can be written as follows (Greene, 2003:766):

$$\frac{\partial E[y_i | x_i]}{\partial x_i} = \beta \Phi \left(\frac{\beta' x_i}{\sigma} \right) \quad [4]$$

Where β is the estimated coefficient of the Tobit model corresponding to x_i , $\Phi \left(\frac{\beta' x_i}{\sigma} \right)$ is the cumulative distribution function and σ is the standard deviation of the distribution. A useful decomposition of $\partial E(y_i / x_i) / \partial x_i$ was suggested by McDonald and Moffitt (1980):

$$\frac{\partial E[y_i | x_i]}{\partial x_i} = \beta \times [\Phi_i(1 - \lambda_i(\alpha_i + \lambda_i)) + \varphi_i(\alpha_i + \lambda_i)] \quad [5]$$

where

$$\Phi_i = \Phi(\beta' x_i / \sigma) = \Phi(\alpha_i) \text{ and } \lambda_i = \varphi_i / \Phi_i$$

Taking the two parts separately, this leads to the decomposition of the slope vector into:

$$\frac{\partial E[y_i | x_i]}{\partial x_i} = Prob((y_i > 0)) \frac{\partial E[y_i | x_i, y_i > 0]}{\partial x_i} + E[y_i | x_i, y_i > 0] \frac{\partial Prob[y_i > 0]}{\partial x_i} \quad [6]$$

Thus, a change in x_i has two effects, namely, its effects on the conditional mean of y_i^* in the positive part of the distribution, and its effects on the probability that the observation will fall in that part of the distribution.

From the estimated marginal effect, the conditional elasticity of y_i with respect to any x_i such as income, can be computed as follows:

$$\text{Conditional Elasticity } \epsilon^c = \frac{\partial E[y_i|x_i]}{\partial x_i} \frac{E(x_i)}{E[y_i|x_i]} \quad [7]$$

The unconditional elasticity of y_i , with respect to any x_i can be computed as:

$$\text{Unconditional Elasticity } \epsilon^u = \frac{\partial E(y_i)}{\partial x_i} \frac{E(x_i)}{E y_i} \quad [8]$$

DATA SOURCE

A combination of the stratified and cluster sampling design was adopted. A detailed list of household census and locations (Enumeration Blocks and living quarters) throughout Malaysia was obtained from the Department of Statistics Malaysia. At the same time, the stratification by states was done at the first stage and nine states were randomly selected from the list. Each selected state was further divided into urban and rural clusters which were randomly selected. Within each selected cluster, Living

Quarters (households) were randomly selected. The selected sample included 31 Enumeration Blocks in 9 states, with a total sample size of 283 Living Quarters consisting of 176 households from the urban areas and 107 households from the rural (Table 1).

The survey used structured questionnaire at the household level. The questionnaire was divided into sections for its convenience to record household socio-demographic characteristics and to record food expenditure away from home. The expenditure of all the members of households on FAFH was recorded by types of meals. The household members in Malaysia consume three main meals a day. In addition, light foods such as snacks, tea, biscuits, etc. in-between meals are also being consumed. The expenditures on meals away from home made by household members were recorded at the end of the each day during the survey week. In many of the sampled households, record keeping work was performed by housewives, but in some, this task was done by the school or college-going members of the households. The sampled households kept records on their food expenditures for 7 consecutive days, and the duration of survey was spread over one month to overcome logistical problems of having to cover all the respondents in the same week. The survey period lasted from May 15 to June 15, 2008.

TABLE 1
The sampled households by urban and rural areas for FAFH survey

State	Urban		Rural		All	
	No.	Percent	No.	Percent	All	Percent
WP	53	30.1	0	0.0	53	18.7
Selangor	40	22.7	32	29.9	72	25.4
Kedah	16	9.1	16	15.0	32	11.3
P. Pinang	24	13.6	0	0.0	24	8.5
Sabah	16	9.1	0	0.0	16	5.7
Sarawak	16	9.1	0	0.0	16	5.7
Terengganu	0	0.0	22	20.6	22	7.8
Johor	3	1.7	29	27.1	32	11.3
N. Sembilan	8	4.5	8	7.5	16	5.7
All	176	100	107	100	283	100

The sample statistics of the FAFH expenditure according to the type of meal are presented in Table 2. Of the total sample, 241 households (82%) reported expenditure on breakfast, 224 households (79%) on lunch, 197 households (70%) on dinner, and 118 households (42%) on other meals away from home during the one-week period (Table 2).

Average weekly FAFH expenditure by households on breakfast, lunch, dinner, and other light meal were RM34, RM 47, RM43 and RM11, respectively (Table 2). Meanwhile, the weekly average FAFH expenditures for consuming households were RM40, RM60, RM61, and RM26 for breakfast, lunch, dinner and other meal, respectively. The expenditure also varied between the urban and rural areas, while the overall expenditure for all types of meals in urban areas was higher than that of the rural areas (Table 3).

This study used household expenditure as proxy for the demand of FAFH by the households. The household expenditures on breakfast, lunch, dinner, and other meals away

from home during a one-week period were used as the dependent variables. The important explanatory variables are household income, which is an average monthly income of earning members of the households. Other explanatory variables used include education, household size, ethnic, and region (urban and rural).

The household income was hypothesized to have a positive effect on the FAFH expenditure. In other words, as income increases, households may allocate more of their income to FAFH expenditure. Several socio-demographic variables were also included in the estimated equations to capture the taste and preferences of the household FAFH consumption. Meanwhile, household size (measured as the number of persons residing in the household during the survey week) was expected to have a negative effect on FAFH expenditure. The effects of age of household head (in years), education attainment of household head (in years) and the number of children below 12 years were ambiguous. The studies by Capps Jr. and Park (1997) as well as McCracken and Brandt

TABLE 2
Sample statistics of FAFH by meal type

Meal type	Full sample		Consuming households		
	Mean	Std. dev.	Mean	Std. dev.	N ^a
Breakfast	34.55	38.13	40.38	38.26	241
Lunch	47.66	47.45	59.95	45.76	224
Dinner	42.86	68.20	61.45	74.28	197
Others	10.83	53.99	25.80	81.09	118

^aSize of consuming households

TABLE 3
Sample statistics of FAFH by meal type by region

Meal type	Urban			Rural		
	Mean	Std. dev.	N	Mean	Std. dev.	N
Breakfast	44.59	43.47	149	33.64	26.85	93
Lunch	67.21	47.28	144	47.05	40.06	81
Dinner	71.14	84.71	131	42.50	42.25	67
Others	30.23	99.32	78	17.39	17.32	41

(1987) used the variables for ethnicity to capture cultural and ethnic differences that influence purchase decisions. They found that there were differences between younger and older people in tastes, eating habits, and lifestyles. Several dummy variables were also used in an attempt to capture the regional (urban or rural) and racial (Malay, Chinese, Indian, or East Malaysian Bumiputra) differences in the FAFH expenditure by households in this study. The sample statistics of all the explanatory variables are presented in Table 4 below.

RESULTS

The standard Tobit model for each meal and for the overall FAFH expenditure was estimated by the maximum likelihood technique. Five equations were independently estimated in one for each type of meal, namely breakfast,

lunch, dinner and others, and another for the overall FAFH expenditure. The dependent variable for each of these equations consists of per week expenditure (RM) on FAFH by household members. Table 5 presents the results of the estimated equations. The total household income is statistically significant and has positive effect for the total FAFH expenditure and the FAFH expenditure on all types of meals except breakfast. The range of increase in the FAFH expenditure is between RM0.02 to RM0.04 for every RM increase in the income per week. The positive effect of total household income shows that as income rises, households spend more by eating out as expected probably because they have to spend more time at work and less time to prepare food at home.

The results show that a few socio-demographic variables were found to be statistically significant in the overall FAFH

TABLE 4
Sample statistics of explanatory variables

Variables	Mean	Std. dev.	Min	Max
Continuous				
Total FAFH Expenditure (RM/per week)	136	142	0	1174
FAFH Expenditure on Breakfast (RM)	34.5	38.1	0	342
FAFH Expenditure on Lunch (RM)	47.7	47.4	0	267
FAFH Expenditure on Dinner (RM)	42.9	67.9	0	760
FAFH Expenditure on Others (RM)	10.8	53.9	0	876
Total Food At Home (FAH) Expenditure (RM)	157	113	0	1216
Household Income (RM)	718	461	125	1375
Household size (No.)	5.4	2.2	1	13
Household head Age (year)	47	10	21	82
Education of household head (year)	10.8	4.0	0	16
No. of Children (below 12 years)	1.3	1.4	0	7
Dummy (yes=1, no=0)				
Urban households	0.62	0.48	0	1
Malay household	0.59	0.49	0	1
Chinese household	0.24	0.43	0	1
Indian household	0.11	0.31	0	1

expenditure, breakfast and lunch equations and more of these variables are statistically significant in the FAFH expenditure equations for dinner and other meals. The household members' work places tend to be away from home. As a result, they prefer eating breakfast and lunch at or close to their working places rather than at home in order to save time and costs. However, for dinner and other meals, they may not be constrained by having to return to their work place after meal and thus, they have more flexibility in making decisions whether to consume these meals at home or away from home.

The effects of the household income (per week) on FAFH expenditure on dinner and other meals are statistically significant. For every RM increase in household income, the FAFH expenditure on dinner and other meal increases by RM0.03 and RM0.01 per week. The FAH expenditure has significant effect on the total FAFH expenditure and FAFH expenditure on all types of meals except lunch. The effects of the FAH expenditure on the FAFH expenditure are positive in all the equations. For every RM increase in the FAH expenditure, the FAFH expenditure increase between RM0.03 and RM0.2 per week. Similarly, the increase in the

TABLE 5
Maximum likelihood estimates of Tobit model: Food away from home expenditures by meal type

Variables	Total FAFH expenditure	Breakfast	Lunch	Dinner	Other meal
Constant	20.847 (77.569)	5.916 (23.397)	12.1263 (25.6639)	-27.7680 (32.8355)	45.968 (28.962)
Household Income (RM/month)	0.0482** (0.0194)	0.00537 (0.00555)	0.02572*** (0.00801)	0.02555** (0.01017)	0.01404** (0.0058)
Age of household head (Year)	0.0016 (0.0501)	0.01099 (0.02910)	-0.00995 (0.03917)	0.044767 (0.03790)	-0.0215*** (0.0075)
Household size (number of household member)	-0.1173 (5.5847)	0.34539 (1.55789)	0.02214 (2.2714)	-0.6692 (2.1198)	-2.0764** (1.8753)
Number of children (below 12 years)	-7.7826 (7.4815)	-2.4975 (2.2814)	-3.867 (3.297)	-3.95852 (3.7728)	7.2974*** (2.44204)
Education of household head (level of education)	-2.1631 (2.6064)	-0.5014 (0.7586)	-0.2907 (0.96142)	-0.76084 (1.3553)	-0.24250 (0.44981)
Expenditure at home (RM/per month)	0.2192*** (0.05577)	0.0364** (0.0174)	0.0525 (0.03274)	0.07585** (0.0301)	0.086877*** (0.023134)
Ethnic (dummy)					
Malay	45.179 (52.8835)	18.677 (16.764)	-0.16235 (18.6496)	28.9959 (20.9846)	19.540 (27.253)
Chinese	86.504 (53.307)	27.858* (16.606)	15.9141 (19.0844)	38.7279* (21.0112)	16.3842 (28.6184)
Indian	65.099 (50.713)	22.2711 (16.2758)	7.900 (19.5295)	46.0998** (20.7656)	5.5932 (26.3567)
Region	30.01 (18.67)	2.8593 (5.007)	8.880 (7.8126)	14.9126* (8.3948)	15.6328** (7.1757)

Standard errors in parentheses.

* (**) (***) Significant at the 0.10, 0.05 and 0.01 level.

FAH expenditure by households will increase FAFH expenditure simultaneously, and this is probably because of the households' preference changes for better quality and more nutritious food that cost more.

Age of the household head was found to have significant and negative effect only on the FAFH expenditure for other meals. In other words, as the age of household head increases by one year, the households spent less eating out for other meals, but the reduction is very small, i.e. at RM0.02 per week. The household size also has a significant and negative effect only on the FAFH expenditure for other meals. Once again, as household size increases, the tendency for households to spend more on main meals such as breakfast, lunch, and dinner but they spend about RM2 less eating out for other meal. Greater number of children below 12 years in the households has significant and positive effect on FAFH expenditure for other meal. For an additional child, households spent more than RM7 per week on other meals, and this is probably due to the fact that school going children spend more on food at school canteens. This increases their tendency to eat out between meals at fast food restaurants.

The regional dummy variable has significant and positive effects on the FAFH expenditure on dinner and other meals. These results indicate that the urban households spent on average RM15 per week on dinner and RM15 on other meals away from home. For the racial dummies, Chinese households spent on average RM28 per week on breakfast and RM38 per week on dinner away from home more than the Bumiputra households in East Malaysia. Meanwhile, the Indian households spent significantly more (RM46 per week on dinner away from home) as compared to East Malaysian Bumiputra households.

The elasticity of the FAFH expenditure was computed based on the Tobit equations estimates. Table 6 presents the conditional and unconditional income elasticities. The estimates for all types of meals are all less than one, except for the unconditional elasticity of

other meals (2.042) which indicates that the FAFH expenditure by Malaysian households are income inelastic. The implication is that a one percent increase in income will increase the FAFH expenditure by less than one percent. Meanwhile, the conditional income elasticity for the overall FAFH expenditure, breakfast, lunch, dinner, and other meals are 0.22, 0.09, 0.31, 0.29 and 0.51, respectively. As for the unconditional income elasticity, their values for all types of meals are higher than the corresponding conditional values. The unconditional income elasticity ranged from 0.11 for breakfast to 2.04 for other meals. These values are consistent with those estimated in other studies. For instance, Byrne *et al.* (1996, p. 615) estimated the income elasticity values between 0.11 and 0.36, while Ma *et al.* (2006) estimated the elasticity of meat for FAFH in China to be 0.35.

CONCLUSIONS

In this study, the household FAFH expenditure in Malaysia was analyzed using the econometric model that accommodates zero observations in the sample. The results of the study show that there are potentials for the FAFH industry to expand and prosper in Malaysia. As the Malaysian economy continues to grow in the long run and in turns causing household income to rise, the household FAFH expenditure will also be increased as indicated by the positive, albeit inelastic expenditure with respect to income. In other words, income increases imply that household members need to spend more time at work and less time to prepare food at home.

Urbanization will also raise household expenditure on FAFH. In particular, the urban households were found to spend more on FAFH than the rural households, particularly on dinners and other meals. There are differences in the FAFH expenditure among the households of various ethnicities. Meanwhile, the Chinese and Indian households' expenditures on FAFH are relatively higher as compared to the Malay and East Malaysian Bumiputra households. Although FAFH providers need

TABLE 6
Conditional and unconditional income elasticity of demand for FAFH

Meal type	Conditional elasticity ^a	Unconditional elasticity	Total elasticity
Breakfast	0.088	0.111	0.199
Lunch	0.309	0.393	0.702
Dinner	0.294	0.440	0.734
Others	0.511	2.042	2.552
All meals	0.217	0.251	0.468

^aThe conditional elasticity or quantity elasticity is the elasticity of expected consumption of consuming individual with respect to the independent variable (FAFH expenditure).

to take cognizance of the ethnic differences and cater their services accordingly, it will be more sensible and appropriate to provide FAFH that is acceptable to all the ethnic and religious groups. At the same time, greater number of children in the households has caused them to spend more on other meals. This is probably due to the fact that school going children spend on food at school canteens and they have greater tendency for eating out between meals at fast food restaurants.

Households make choices more frequently when deciding on the expenditures for dinners and other meals as compared to breakfast and lunch. Increasing the variety of food and improving the menu may help to spur the growth of the industry. The household members have not much choice but to spend on breakfasts and lunches near to or at their work places in order to save on traveling time and cost of eating at home. As such, steps need to be taken to ensure that these meals are of high nutritional values, safe to consume and reasonably priced. As for dinners and other meals, increase the variety of food and improving the menu may help to spur the growth of the industry.

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