Examining Malaysian Household Expenditure Patterns on Food-Away-From-Home

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ABSTRACT

The censored Tobit model is applied on data from the Malaysian Household Expenditure Survey (1998/99) to examine household expenditure patterns on food-away-from-home (FAFH). Results indicate that the Chinese population, the urban residents, or those with higher monthly household income have significantly higher FAFH expenditures than their non-Chinese, rural, or lower household income cohorts, ceteris paribus. In addition, other socio-demographic characteristics such as age, gender, household size, or even education do not affect total monthly household expenditures on FAFH in a statistically significant manner. Based on these findings, several observations are noted to provide policymakers and food industry analysts with a better understanding of the habits and attitudes of Malaysian households vis-à-vis FAFH.

INTRODUCTION

Malaysians have traditionally apportioned the largest amount of household expenditures on food consumption. This item covers consumption of food-at-home (FAH) and food-away-from-home (FAFH)[1]. Statistics show that while expenditures on FAH declined steadily from a share of 33.7% to 22.2% between 1973 and 1999, FAFH expenditures rose from 4.6% to 10.9% during the same period (Figure 1) (Department of Statistics Malaysia 2000). This discernible shift in the mode of food consumption, whereby having a meal at home is becoming less often while eating out has become more frequent, reflects the changing lifestyle of the Malaysian population.

In general, the FAFH food service industry in Malaysia can be classified into five main categories, namely dine-in restaurants (including hotel coffee houses), fast-food outlets, coffee shops, food courts or hawker centers, and roadside hawkers. First, dine-in restaurants are normally air-conditioned establishments where uniformed staff provide a full range of services; these cater mostly to those in the upper income groups. Patrons in most of these establishments are also subjected to a service charge and government tax. Second, fast-food outlets consist mainly of franchise holders of Western-style menus. These outlets follow strict serving and preparation specifications, charge standardized prices, and are typically frequented by the upper and middle income groups. Third, coffee shops are, by and large, non-air-conditioned establishments operated by individual owners who sublet sections of their premises to others selling local gourmet food. Fourth, the bulk of food courts or hawker centers are located at major shopping complexes or at urban townships. These hawker

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[1] FAH refers to food prepared and consumed at home. FAFH is defined as various types of food consumed in restaurants, coffee shops, food courts houses, roadside stalls, etc. It also includes food bought in these eating places but consumed at home.
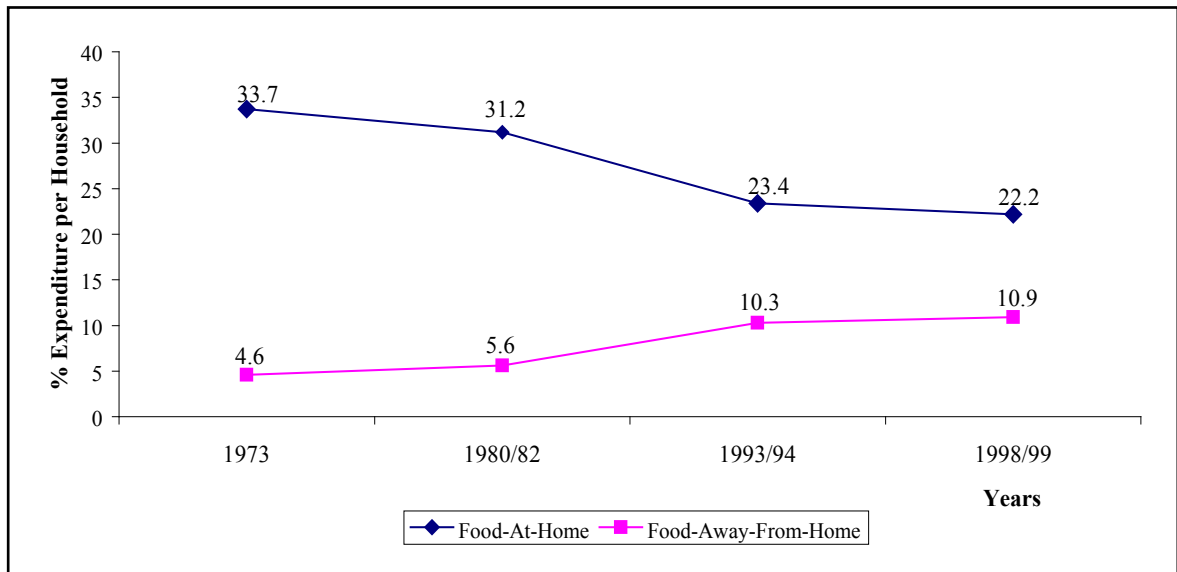
Fig. 1. Household Expenditures on Food-At-Home and Food-Away-From-Home as Percentage of Total Household Expenditure, Malaysia (Selected Years)
Source: Department of Statistics Malaysia, 2000.

centers generally serve local cuisine; the ambience in such establishments varies widely according to their location. Lastly, roadside hawkers are commonly sighted congregating along the streets, peddling their foodstuffs. These hawkers remain a favorite among Malaysians from all walks of life, owing to the informal settings and the cheap price ranges.

The growing popularity of eating out has paved the way for the development of the FAFH industry in Malaysia. From 1999 to 2003, the Malaysian consumer food service market increased by 16% to a total of 20,235 consumer food service units (Euromoniter International 2004). During the same period, consumer food service transactions and market worth grew by 22% and 39%, respectively, to 1,026 million and RM16,312 million (US$4,315 million)[2] in current value terms. In addition, the 60% growth (in unit terms) of the one-hundred percent home delivery or take-away food sector has been primarily attributed to the increasingly busy work schedules of Malaysians. With the continued global economic recovery, and the growing trend towards the independence of women and their participation in the labor market, the consumer food service market in Malaysia is projected to grow by 19% in unit terms, 30% in total transactions, and as much as 32% in current value, respectively, over the forecast period of 2003–2008 (Euromoniter International 2004).

Notwithstanding the increased popularity of eating out and the convenience it provides, there also exists negative health effects associated with substituting ready-to-eat foods prepared away-from-home for food prepared at home. Studies have shown that FAFH tend to be less nutritious; higher in calories, total fat, saturated fat, and cholesterol; and lower in dietary fiber, calcium, and iron on a per-calorie basis than FAH (Variyam 2005; Guthrie et al. 2002; Lin et al. 2001). In addition, the rise of FAFH consumption has also been linked to problems of overweight and obesity among adults and children (Nestle and Jacobson 2000). Others, such as Binkley et al. (2000) found that those who consumed a higher proportion of fast-food tended to have a higher Body-Mass-Index, while McCrory et al. (1999) reported a positive relationship between the frequency of consuming restaurant food and higher levels of body fat amongst adults.

Despite its upward growth trend, economic significance, and possible negative health effects, a careful scrutiny of certain aspects of the Malaysian FAFH industry has largely been neglected over the years. While an extensive literature review shows

[2] US$1.00 = RM3.78; RM1.00 = US$0.26 (approximate value as of 18 January 2006).

a number of micro-level demand studies of FAFH in Western cultures using disaggregated cross-sectional household consumption data (Stewart et al. 2004; Capps, Jr. and Park 1997; Byrne et al. 1996; McCracken and Brandt 1987), there is, in contrast, little research, with the exception of Ishida et al. (2003), on the FAFH expenditure patterns in Malaysia.

The existing studies on food consumption in Malaysia (e.g., Nik Mustapha et al. 2001; Radam and Arshad 2001; Nik Mustapha 1994; Zubaidi and Mohamed 1993; and Zubaidi 1993), have mostly examined the structural changes of food consumption in Malaysia using either aggregated or time-series data. However, Yen and Huang (2002) and Blaylock and Blissard (1992) have both noted that disaggregated cross-sectional micro-level type of 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. On the other hand, while Ong (1991) used household survey data to examine buying behavior and restaurant image, the study concentrated on the fast-food market and is limited geographically to the town of Petaling Jaya.

This study, therefore, aims to fill this research gap by using available cross-sectional household expenditures data to gain a better understanding of how socio-demographic factors influence the amount of money spent on FAFH in Malaysia. Understanding how these factors affect household expenditure patterns on FAFH is important to food service strategy and consumer insight analysts who are interested in knowing the characteristics that define their industry. In addition, a better understanding of these factors provides health and government authorities with useful information on the structure of the food distribution industry and the nutritional intake of Malaysian households.

THEORETICAL FRAMEWORK

The theory of household production (Becker 1965) is often used to model FAFH analysis. Based on classical demand theory, the theory of household production may help track how socio-demographic factors (e.g., age, gender, race, educational level, etc.), income, and the opportunity cost of time constraints can all affect a household's expenditure patterns (Stewart et al. 2004). In general, households choose the best combination of commodities subject to time, resources, and technology constraints to maximize utility.

Following the notations of Manrique and Jensen (1998), among others, a household maximizes its utility function based on:

$$U = U(Z1, Z2, ..., Zj, ..., Zn) \qquad (1)$$

where U represents the household utility function, and Zj refers to quantities of home-produced commodity j. This function is subject to some constraints such as total time available for the household, total expenditures on market-purchased good being equal to the sum of non-wage income and wage income of household members, and household characteristics (Manrique and Jensen 1998).

From the solution of equation (1) using cross-sectional data, Manrique and Jensen (1998) noted that the following FAFH expenditure function can be derived, namely:

$$FAFHi = fi (T, M, d) \quad i = 1, 2, ..., n \qquad (2)$$

where $FAFHi$ represents the total household FAFH expenditures for the ith household; T refers to the hours of participation in the workforce by the ith household; M is the wage and non-wage income for the ith household; and, d stands for a vector of socio-demographic variables (such as age, gender, race, household size etc) hypothesized to affect the household's expenditures on FAFH.

EMPIRICAL MODEL

In this study, the dependent variable (Yi) measures the total monthly household expenditures by the *ith* household on FAFH. Given the nature of disaggregated cross-sectional studies, it is conceivable that households not recording any expenditure on FAFH during the specified survey period, but otherwise having complete records of socio-demographic characteristics, are included in the sample. Total monthly household expenditures on FAFH containing zero as well as positive amounts of money spent are consequently distributed over a limited range; thus, the sample is censored at the limit value of zero. In this case,

the use of the censored regression or Tobit model (Tobin 1958) is appropriate.[3]

The Censored Tobit Model

The standard censored or Tobit model for the research study is written as follows:

$$X_i'\beta = Y_i^* + u_i, \qquad i = 1, 2, ..., n$$

$$Y_i = Y_i^* \qquad\qquad \text{if } 0 < Y_i^*, \qquad (3)$$

$$Y_i = 0 \qquad\qquad \text{if } 0 \geq Y_i^*,$$

where Yi = observed dependent variable (total monthly household expenditures on FAFH);

Y_i^* = latent variable (the optimal amount of expenditures of the respondent; it can also be construed as the solution to the utility maximization problem);

X_i' = k-dimensional vector of known regressors as listed in Table 1;

β = k-dimensional vector of unknown parameters;

$u_i,$ = stochastic disturbance term of the regression assumed to be N(0,σ2).

The maximum likelihood method (assuming normality of the disturbance term) is used to estimate the β coefficients. Since this method assures the consistency of large sample and the asymptotic normality of the estimated coefficients,

conventional tests of significance are thus applicable. The likelihood function for the Tobit model is given by:

$$L(\theta) = \prod_0 \left[1 - \Phi\left(\frac{X_i'\beta}{\sigma} \right) \right] \prod_1 \sigma^{-1}\phi\left[\frac{(Y_i - X_i'\beta)}{\sigma} \right] \quad (4)$$

where, $\prod_0$ denotes the product over values of i such that $Y_i^* \leq 0$; $\prod_1$ denotes the product over values of i such that $Y_i^* > 0$; $\theta = (\beta', \sigma^2)$; and Φ and ϕ are the cumulative distribution function and probability density function, respectively, of the standard normal variable (Greene 2003).

Model Regressors

Given the scanty research on the socio-demographic variables likely to affect Malaysian household expenditures on FAFH, this study sought guidance from the previous studies by Stewart et al. (2004), Manrique and Jensen (1998), Capps, Jr. and Park (1997), Byrne et al. (1996), McCracken and Brandt (1987), and Capps, Jr. et al. (1985). The following socio-demographic characteristics were eventually chosen for their possible influence on FAFH expenditure patterns: (1) age of household head, (2) ethnicity/race, (3) education, (4) gender, (5) household size, (6) total household monthly income, and (7) location (Table 1).

Age of the household head (in number of years) was chosen for the current study since the literature (e.g., Capps, Jr., and Park 1997; McCracken and Brandt 1987) shows that age is one of the important determinants of FAFH expenditures. In general, younger people are assumed to differ from the older ones in terms of tastes and preferences for food, eating habits, lifestyles, and opportunities to socialize. McCracken and Brandt (1987) and Capps, Jr., et al. (1985) found that age had a negative effect on expenditures on FAFH. Such an effect

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[3] Altering or disposing of such data would result in the loss of valuable information on users and non-users (Heckman 1979). The use of ordinary least squares regression, on the other hand, would result in biased, inconsistent, and inefficient parameter estimates (Greene 2003).

Table 1. Description of explanatory variables in the statistical model

Variable	Description
Age	Age of household head (in years)
Race1	1 if Malay household head; 0 if non-Malay
Race2	1 if Chinese household head; 0 if non-Chinese
Education	Formal education of the household head (in years)
Gender	1 if male household head; 0 if female
Household Size	Total number of family members in the household
Household Income	Total gross monthly household income (in Ringgit)
Location	1 if household resides in urban area; 0 if rural

might be expected as younger household heads are typically more active, able, and mobile than their older cohorts. On the other hand, older households may be more conscious about health and hygiene, compared to their younger counterparts. As such, they may be less likely to eat out and would have higher FAH expenditures if they perceive FAFH to be unhealthy or unhygienic (Blaylock and Blisard 1994; Nayga, Jr. and Capps, Jr. 1993). Therefore, total monthly household expenditures on FAFH are hypothesized to be inversely related to the age of the household head in the present study.

Previous studies by McCracken and Brandt (1990) suggest that a dummy variable based on race be included in household expenditure studies to allow for the possibility that cultural and ethnic differences may influence food expenditure patterns. In the case of Malaysia, Ong (1993) also noted that culture affects an individual's preferences as a consumer, including that of the type of food consumed. Following the multi-ethnic character of the Malaysian population — consisting of three distinct races, i.e., Malay, Chinese, Indian, and a small proportion consisting of various other races — the sample in this study is grouped into Malay (Race1), Chinese (Race2), and Indian/others (Race3) (base group). However, based on the observed trends of spreading westernization and growing partiality for convenience, one can expect that the expenditure patterns for FAFH in Malaysia will increase among all households in general, regardless of ethnic backgrounds.

The formal education of the household head (in number of years) is examined in this study due to its possible effect on lifestyles and knowledge of health-related issues. Furthermore, given the unavailability of information on the hours of participation in the workforce, as denoted in equation (2), this variable also serves as a proxy for the opportunity cost of time. This assumes that those with more years of education would presumably have a higher opportunity cost of time. In general, better-educated household managers may also have broader knowledge about diet and health, and may consequently choose healthier meals for consumption (Manrique and Jensen 1998; Wang et. al. 1995). This suggests a possible negative relationship between years of education and total expenditures, especially if FAFH is viewed as less healthy or unhygienic. However, the possibility that

the number of years of formal education may have a positive effect on FAFH expenditures cannot be entirely ruled out as well.

Through the use of print and electronic media sources, the better-educated households may be more aware of the availability of different varieties and facilities of FAFH. As a result, they may have higher FAFH expenditures, especially when purchasing meals that have higher nutritional quality. In addition, more educated households may face greater time constraints at work compared to less educated households. For example, those who have longer working hours would have less time to cook at home and, thus, may prefer to eat out more often. As such, the hypothesized effect of education on expenditures on FAFH may be either positive or negative in the current study.

Studies by Binkley (2005), Byrne et al. (1996), and Nayga, Jr. and Capps, Jr. (1993) suggest that a variable on gender be included in FAFH studies to account for differences in expenditure patterns among different genders of household heads. In general, male-headed households are hypothesized to have greater FAFH expenditures, primarily due to the lack of culinary skills (Byrne et al. 1996). On the other hand, if the household head is a female, and more specifically, a housewife, the food-at-home expenditures is expected to be higher compared to FAFH expenditures. Furthermore, given that the participation rates of women in the Malaysian workforce have been steadily increasing of late, from 44.2% in 1998 to 45.8% in 2005 (Figure 2), one is led to expect increases in FAFH expenditures, particularly among women-headed households and those who have less time to cook at home[4]. Interestingly, Ong (1993) found that gender does not play a significant role in fast food consumption in Malaysia. This is primarily attributed to the availability of domestic helpers who can prepare meals at home, and perhaps to the added responsibility imposed upon women to prepare meals at home after work. As such, the

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[4] Data from this study do not distinguish the marital nor working status of household heads. Hence, additional background information as to whether the household head is a single parent, full/part-time homemaker, and one/both working spouses was not available. However, it was assumed that the household head (whether male or female) is the one who makes food expenditure
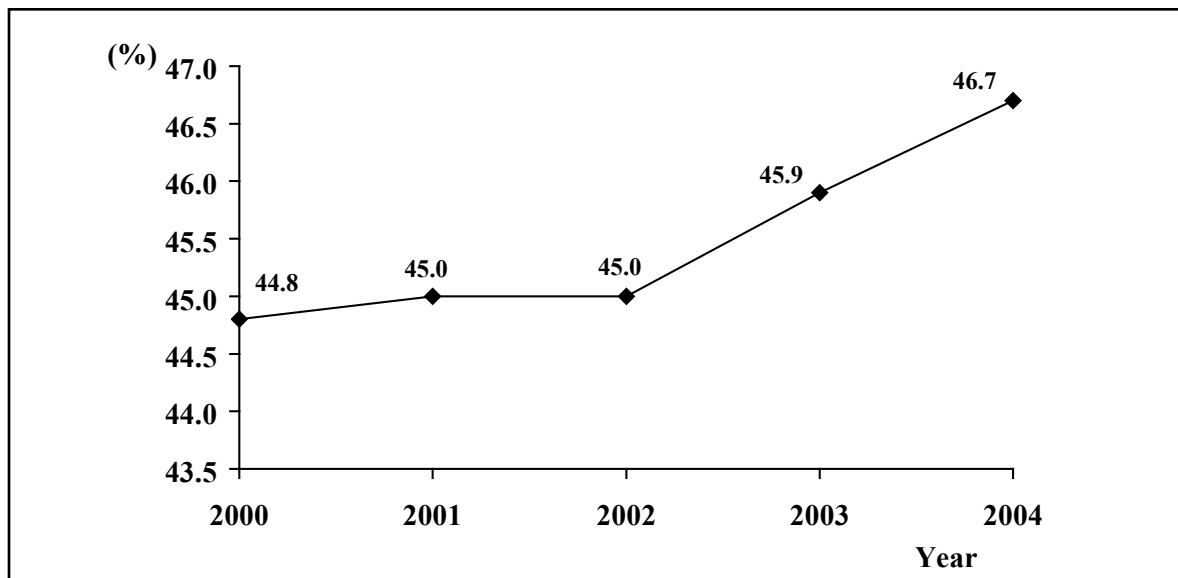
Fig. 2. Number of Economically Active Females as Percentage of Total Number of Females of Working Age, Malaysia, 2000-2004
Source: Ministry of Finance Malaysia, Economic Report 2004/2005.

relationship between the gender of the household head and expenditure patterns on FAFH would have to be ascertained in the present study.

The findings of Nayga, Jr. and Capps, Jr. (1993) indicate that household size, represented by the number of individuals living in the household, determines decision-making on FAFH expenditures. In general, FAH expenditures are expected to increase when family size increases, while the converse is true for FAFH expenditures. This is primarily due to scale economies in meal preparation at home for more individuals in the family (Stewart et al. 2004; Wang et al. 1995). In addition, larger size families with pre-school children may also have lesser FAFH expenditures due to the inherent difficulty of feeding children in public places, given their possibly unruly behaviour and smaller stomach capacities (Redman 1980; Rodgers and Green 1978). As such, the relationship between household size and FAFH expenditures is expected to be negative in the current study.

Total monthly household income (in Ringgit, RM) is included in the model to account for differences in the expenditure patterns of the household. As noted by Nik Mustapha et al. (2001), when Malaysian per capita income and level of affluence rises, there exists a concerted shift towards higher-value and superior foods. Stewart

et al. (2004) and Ishida et al. (2003) also found that wealthier households are more likely to spend on products and services, including leisure and other dining amenities such as full service and ambience. In this context, FAFH can be considered as a form of leisure, in which it is the time spent outside of household production (e.g. cooking, cleaning, shopping) and labor force activities (Stewart et al. 2004). From another point of view, low-income households will have tighter budget constraints compared to households with high incomes. Consequently, these households may have lower expenditures across a range of products such as clothes, entertainment, and other goods, including FAFH. As such, a positive correlation between income and FAFH expenditures is expected.

In this study, a dummy variable is assigned a value of 1 for urban households and 0 for rural households. The inclusion of a location variable is desirable as it reflects the possibility that a wider choice of eating establishments may affect household FAFH expenditure patterns (Manrique and Jensen 1998; Capps, Jr. et al. 1985). In general, urban households have greater availability and choice of eating establishments compared to rural households. Urban households also face greater time constraints in traveling back and forth from work due to traffic congestion, and thus have

less time to prepare or cook at home. In contrast, rural households have a more traditional lifestyle and may even produce their own foods for home consumption. However, Nik Mustapha et al. (2001) argue that since most areas in Malaysia are linked by a well developed transportation and communication systems, the food marketing system allows most Malaysians to gain access to the markets for these (food) products. Hence, the hypothesis that urban households have higher FAFH expenditures than their rural counterparts will have to be further examined.

DATA

Data used in this study are culled from the 1998/1999 Malaysian Household Expenditure Survey (MHES) which represents the latest national food consumption survey conducted by the Department of Statistics of Malaysia. The primary objective of the MHES is to collect information on the levels and patterns of consumption expenditure by households on a comprehensive range of goods and services.

Data collection for the entire MHES was carried out for 12 months, from July 1998 to June 1999. Different samples were canvassed every month to ensure that seasonal variations — on account of various festivals during the year and also the commencement of school terms — were taken into consideration. In the survey, households were asked to maintain a detailed record of household expenditures over a one-month period. In addition, the socio-demographic characteristics of the respondents were also recorded (Department of Statistics Malaysia 2000).

The sample was designed using a stratified, multi-stage, area probability sampling method, thus ensuring that socio-demographic and geographical considerations are taken into account to reflect the Malaysian population. While a total of 9198 households participated in this survey, several households in the sample have incomplete socio-demographic and other relevant information. As a result, only 9184 observations were retained after deleting those with missing or suspected spurious information.[5]

Characteristics of Survey Respondents[6]

Descriptive statistics of variables in the statistical model are presented in Table 2. To provide additional insights into the expenditure patterns of households, a breakdown of responses based on various socio-demographic characteristics and those who indicate positive (Ringgit) amounts and zero FAFH expenditures is also provided in Table 3[7].

While the average age for the entire Malaysian population is 26.3 years old, the average age of the household head in the current sample is much older at 44.8 years (Table 2). Ethnically, 49% of the sample household heads are Malay; 28% Chinese; 21% Indian/other races. In contrast, the total population of Malaysia consists of 54% Malay; 26% Chinese; and 20% Indian/other races (Department of Statistics Malaysia 2001). Within the entire sample, a household head averages about eight years of formal education (at least secondary/high school education).

While the general population of Malaysia consists of 50.4% males and 49.6% females, the current sample consists of about 83% male and 17% female household heads. The average household size of the current sample is approximately 4.0 persons compared to 4.6 persons for the national average. The sample households have an average monthly income of about RM2,333 (US$617) compared to the national average of RM2,472 (US$654). About 57% of the current sample resides in urban areas as opposed to 62% for the general

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6 In the interest of brevity, only a succinct discussion of the characteristics of the survey respondents is provided. A more comprehensive discussion can be obtained from the authors upon request.

7 Data on the age of the household head are classified into three categories, namely: between 16-35 years old (young), 36-56 (middle-age), and 57 years old and above (retirees). The education level is classified into: without any formal education, at least primary, at least secondary, and with formal tertiary education. The categories for household size are: singles, couples, 3-7 persons (medium), and more than 8 persons (large-sized families). Lastly, data on total monthly household income were classified into those earning below RM1,500 (US$396), between RM1,501-RM7,999 (US$397-US$2116), and above RM8,000 (US$2116) to reflect low-, medium-, and high-income households respectively. The aforementioned classifications were used as supporting discussion materials.

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5 The MHES does not report price or quantity data, and as a result, price is assumed constant across each cross-section.

Table 2. Descriptive statistics of variables in the statistical models

Variables	Those who purchased FAFH DID (n1 = 6608)			Those who NOT purchase FAFH (n2 = 2576)			Total Sample (N = 9184)			Population Average
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Max
Tot. Expenditure (RM)	197.63	30	5311.9	-	-	-	142.20	0	5311.9	1621.00
Age (years)	43.66	16	91	47.70	16	98	44.80	16	98	26.3
Race1 (dummy)	0.49	0	1	0.52	0	1	0.50	0	1	54%
Race2 (dummy)	0.35	0	1	0.12	0	1	0.29	0	1	26%
Race3 (dummy)*	0.16	0	1	0.36	0	1	0.21	0	1	20%
Education (years)	8.74	0	17	5.75	0	17	7.90	0	17	-n/a-
Gender (dummy)	0.85	0	1	0.79	0	1	0.83	0	1	50.4%
Household Size (no. occup)	4.43	1	23	4.26	1	17	4.40	1	23	4.6
Household Income (RM)	2776.14	1	56638	1197.56	64	55000	2333.36	1	56638	2472.00
Location (dummy)	0.65	0	1	0.36	0	1	0.57	0	1	62%

* Refers to the omitted category in the analysis.

Table 3. FAFH purchase according to age, ethnicity, gender, household size, education, income, and location

	Purchased	Did Not Purchase	Total
Age			
16-35 years old	1939 (74%)	665 (26%)	2604 (28%)
36-56 years old	3491 (75%)	1137 (25%)	4628 (50%)
$\geq$ 57 years old	1178 (60%)	774 (40%)	1952 (21%)
Ethnicity			
Malay	3232 (71%)	1348 (29%)	4580 (50%)
Chinese	2337 (89%)	298 (11%)	2635 (29%)
Indian/others	1039 (53%)	930 (47%)	1969 (21%)
Education Level			
No Education	498 (45%)	603 (55%)	1101 (12%)
Primary	2053 (65%)	1087 (35%)	3140 (34%)
Secondary	3257 (80%)	826 (20%)	4083 (44%)
Tertiary	800 (93%)	60 (7%)	860 (10%)
Gender			
Male	5615 (73%)	2040 (27%)	7655 (83%)
Female	993 (65%)	536 (35%)	1529 (17%)
Household Size			
1 person	757 (73%)	280 (27%)	1037 (11%)
2 persons	680 (63%)	408 (37%)	1088 (12%)
3–7 persons	4562 (73%)	1646 (27%)	6208 (68%)
$\geq$ 8 persons	609 (72%)	242 (28%)	851 (9%)
Household Income			
$\leq$ RM1500	2070 (51%)	1976 (49%)	4046 (44%)
RM1501 – RM7999	4290 (88%)	595 (12%)	4885 (53%)
$\geq$ RM8000	248 (98%)	5 (2%)	253 (3%)
Location			
Urban	4289 (82%)	937 (18%)	5226 (57%)
Rural	2319 (59%)	1639 (41%)	3958 (43%)
Total	**6608 (72%)**	**2576 (28%)**	**9184 (100%)**

Malaysian population. Lastly, while total monthly household expenditures for overall consumption average about RM1,621 (US$429), the average total monthly household expenditures on FAFH is RM142.20 (US$37) for the overall sample (Table 2).

From the sub-sample whereby respondents are categorized as either purchasers or non-purchasers of FAFH, 6608 (72%) respondents reported that their monthly expenditures on FAFH are above the limit value of zero (i.e. those who have expenditures worth a positive amount of RM during the survey period) while 2576 (28%) respondents reported that their monthly expenditures are at the limit value of zero (i.e. those who did not have any FAFH expenditures at all during the survey period)[8]. The average monthly FAFH expenditure for this sub-purchasing group is approximately RM197.63 (US$52) (Table 2).

[8] In this study, respondents reporting FAFH expenditures of RM30.00 (US$8) and below were also classified as non-purchasers. This amount was derived based on a nominal amount of RM1.00 (US$0.26) spent per day for food away from home.

ESTIMATION RESULTS

Summary statistics of the Tobit model are reported in Table 4 with the estimated coefficients (β)and the probability for z-statistic presented in the first and the second columns, respectively. Based on McDonald and Moffitt (1980), the marginal effect of each of the explanatory variables on the expected value of the dependent variable (amount of expenses evaluated at the means) for all observations (third column) and for observations above the limit (fourth column) are also presented. The fifth column depicts the marginal effect on changes in the probability for those who did not spend on FAFH, but might, referring to observations at the limit.

The Log Likelihood Ratio (LR) is 1924.852, with probability value of almost zero. In addition, the Wald statistic has a value of 246.518 and its probability value is also almost zero. Hence, the model is concluded as having a good fit.

Age

In contrast to the results of McCracken and Brandt (1987) and Capps, Jr. et al. (1985), age is not statistically significant in explaining total monthly household expenditures on FAFH (Table 4). This result is also supported by the breakdown into age groups, which indicates that the younger and middle-aged households are equally (and not equally) likely to have FAFH expenditures (Table 3). One possible explanation for this finding is that eating-out has become a regular feature of the Malaysian lifestyle such that everyone, regardless of age is likely to indulge in this activity on a daily basis. The finding that age appears not to affect total monthly household expenditures is not quite unexpected.

Race

Only Race2 (Chinese households) is statistically significant and has a positive effect on total monthly household expenditures on FAFH (Table 4). The validity of this finding is somehow further confirmed by the fact that while Chinese households constitute only 29% of the overall sample, almost 90% of these households indicate FAFH expenditures (Table 3). It is apparent that although recent trends of westernization and inclination for convenience may affect Malaysians in general, Chinese households, in particular, seem to have imbibed more of these influences as shown, for instance by their higher FAFH expenditures compared to the other non-Chinese ethnic groups.

Table 4. Summary statistics for Tobit analysis of household expenditures on FAFH

Explanatory Variables	1 Coefficients	2 Z-statistics	3 $\dfrac{\partial EY}{\partial X_i}$	4 $\dfrac{\partial E(Y\|Y>0)}{\partial X_i}$	5 $\dfrac{\partial P(Y>0)}{\partial X_i}$
Constant	-1.4387	-0.0384	-0.9161	-0.6398	-0.0014
Age	-0.5833	-1.0689	-0.3714	-0.2594	-0.0006
Race1	13.8761	0.8096	8.8363	6.1706	0.0134
Race2	122.9893	6.6376*	78.3196	54.6930	0.1186
Education	2.0601	1.1748	1.3119	0.9161	0.0020
Gender	19.8454	1.0392	12.6376	8.8252	0.0191
Household Size	-3.2764	-1.1026	-2.0864	-1.4570	-0.0032
Household Income	0.0357	36.3021*	0.0227	0.0159	0.00003
Location	36.9724	2.4913*	23.5440	16.4415	0.0356

Source: Columns 3-5 computed by authors.
Note: The unconditional expected value of y (at mean x) = 233.593; the conditional expected value of y (at mean x) = 366.82317; the standard error around the Tobit model index = 389.2126; the predicted probability that y > 0 (at the mean x) = 0.6368; z = 0.35; f(z) = 0.3752.
* at 5% level of significance.

Education

In contrast to the results of Manrique and Jensen (1998) and Wang et al. (1995), the number of years of formal education is not statistically significant in explaining FAFH expenditure patterns (Table 4). Given that neither nutritional awareness nor working lifestyles affect FAFH expenditure patterns, this result may further reflect the reality that the eating-out habit has become entrenched in the lifestyle of the Malaysian society. Therefore, one's educational attainment does not make any difference since Malaysians of all educational levels are generally not averse to spend on eating out.

Gender

From the breakdown of responses in Table 3, even though male household heads (83%) overwhelmingly outnumber their female counterparts (17%), the percentages for those who purchased FAFH do not differ greatly between genders (73% and 65%, respectively). Furthermore, following Bryne et al. (1996), the gender of the household manager does not significantly influence the total monthly household expenditures of FAFH (Table 4). These results also corroborate the findings of Ong (1991) that, similar to the trend in western cultures, Malaysian female household managers are as likely as their male counterparts to eat out. However, this outcome is not totally unexpected. This is because, in Malaysia, the whole household typically consumes FAFH as a group. Thus, the lack of gender's influence on total monthly expenditures on FAFH may simply mean that when dining out, the members of the household eat the same type of food together.

Household Size

The number of persons living in a household is statistically insignificant in explaining total monthly household expenditures on FAFH (Table 4). As such, contrary to the findings of Wang et al. (1995) and Nayga, Jr. and Capps, Jr. (1993), household size does not have any influence on FAFH expenditure patterns in Malaysia. A plausible reasoning is that while total expenditures to eat out may be higher for larger households compared to smaller households, this does not prevent them from consuming FAFH, given the wide variety of food establishments (i.e., coffee shops, hawker centers, roadside stalls, food courts, restaurants, hotels) and its varied price ranges.

Household Income

Following a priori expectations, the effect of monthly household income on FAFH expenditures is positive and statistically significant. In fact, the expected value of the expenditures is found to increase by about RM36.00 (US$9.52) as monthly household income increases by RM1000 (US$264) (Table 4, Column 1). When considering the total sample, a RM1000 increase in monthly household income leads to a rise of about RM23.00 in household expenditures on FAFH (Table 4, Column 3). Holding other things constant, household expenditures amongst those who have spent on FAFH during the survey period will increase by about RM16.00 given each additional RM1000 in monthly household income (Table 4, Column 4). For those who have not spent on FAFH, their probability of spending increases by 3% if monthly household income rises by RM1000 (Table 4, Column 5). Furthermore, while those in the lower income category comprise 44% of the overall sample, only 51% indicate FAFH expenditures. In comparison, while only 3% of the total respondents are from the high-income groups, 98% of this group indicates expenditures on FAFH (Table 3).

These findings are also consistent with those of Ishida et al. (2003), Nik Mustapha et al. (2001) and Lee (1991) who found that higher income households in Malaysia have higher FAFH expenditures compared to those with lower incomes. In general, wealthier households have more disposable income and, thus, they can afford higher expenditures on goods and services (including on the convenience of FAFH) compared to households with tighter budget constraints.

Location

Following Ishida et al. (2003) and Lee (1991), the location variable is statistically significant and positively related to total monthly household expenditures on FAFH (Table 4). This finding is supported by the wide disparity between the number of urban dwellers, i.e., 82%, that purchased FAFH

compared to only 59% from the rural areas (Table 3). These results suggest that urban households have significantly higher FAFH expenditures compared to their rural counterparts. This is possibly due to the fact that urban households are exposed to a wider availability of eating establishments, more marketing and promotional incentives, and differences in working lifestyles, compared to rural households. However, in contrast to the results of Nik Mustapha et al. (2001), the findings of this study suggest that although the current marketing system may be adequate in terms of transporting general food supplies to the rural areas, the traditional lifestyles of the rural communities still exhibit a stronger predilection for eating food prepared at home instead of eating out.

CONCLUSION

Results of this study may have important implications for the food industry in Malaysia as it indicates that household income, race, or location of residence of households significantly affect total monthly expenditures on FAFH, ceteris paribus. Specifically, as household income increases, total monthly expenditures on FAFH are expected to increase. At the same time, Chinese households or those from urban residences have significantly higher FAFH expenditures than their non-Chinese, or rural counterparts.

Several notable implications can be culled from these results. First, similar to the trend in other countries, it is expected that the shift in Malaysian food expenditure patterns toward FAFH will continue, occurring alongside the increase in income and urbanization arising from economic growth. As such, this would provide great business opportunities for the development of the food service industry in Malaysia. Second, when considering the viability of future business locations, the food service industry may target markets consisting of ethnic Chinese households, urban locales, or those with high disposable incomes. These socio-demographic characteristics are found to typically define those who are more willing and able to spend on FAFH to satisfy their lifestyle and nutritional needs. Third, since FAFH is typically high in fat, sodium, and caloric content, the government should direct public health policies aimed at ensuring optimal nutrient intake towards

Chinese households and those in the urban settings. On the other hand, advertising and promotional efforts focussing on age groups, gender, or even education may have limited effects on FAFH expenditure patterns.

Finally, in order to better understand the dynamics of consumer demand for FAFH, it is important to have an initial understanding of the factors that motivate the expenditure patterns for these products. In its attempt to act as a catalyst for undertaking further research on Malaysian household expenditure patterns, particularly on FAFH, this study had to contend with several limitations due to the secondary nature of the data. First, the only available information was the value of total monthly household expenditures. Therefore, the dependent variable was assumed to implicitly capture the interaction between prices and quantities (demand) in the FAFH market. Second, the data did not discriminate amongst FAFH acquired from fast-food restaurants, roadside hawkers, dine-in restaurants, or other types of food outlets. Therefore, the study failed to gain insights on cross-substitutions between these different sources of FAFH and also with FAH. Lastly, this study would have drawn up a more comprehensive picture of the socio-demographic effects if the following additional information were readily available, such as marital status, number of working adults, number of children and their ages, working hours, availability of domestic helpers, health status, and reasons for consumption or non-consumption.

ACKNOWLEDGEMENTS

REFERENCES

Becker, G. S. 1965. "A Theory of Allocation of Time". Economics Journal, 75: 493-508.

Binkley, J.K. 2005. "The Effect of Demographic, Economic, and Nutrition Factors on the Frequency of Food Away from Home". Selected paper presented at the American

Agricultural Economics Association Annual Meeting, held in Providence, Rhode Island, July 24-27, 2005.

Binkley, J.K., J. Eales, and M. Jekanowsi. 2000. "The Relation Between Dietary Change and Rising U.S. Obesity." International Journal of Obesity, 24: 1032-1039.

Blaylock, J.R. and W.N. Blisard. 1992. "U.S. Cigarette Consumption: The Case of Low-Income Women". American Journal of Agricultural Economics, 75: 698-705.

Byrne, P.J., O.Capps, Jr. and A. Saha. 1996. "Analysis of Food-Away-From-Home Expenditure Patterns for U.S. Households, 1982-89". American Journal of Agricultural Economics, 78: 614-627.

Capps, Jr.,O. and L.J. Park. 1997. "Demand for Prepared Meals by U.S. Households". American Journal of Agricultural Economics, 79: 814-824.

Capps, Jr., O., J.R. Tedford and J. Havlicek, Jr. 1985. "Household Demand for Convenience and Nonconvenience Foods". American Journal of Agricultural Economics, 67: 862-869.

Department of Statistics Malaysia. 2000. Report on Household Expenditure Survey, Malaysia (1998/99). Department of Statistics Malaysia, Putrajaya, Malaysia.

_____. 2001. Population Distribution and Basic Demographic Characteristics 2000. Department of Statistics Malaysia, Putrajaya, Malaysia.

Euromonitor International. 2004. Consumer Food Service in Malaysia: Executive Summary. <eo20864foodservicemalaysia.html> [Accessed 26 January 2006].

Greene, W.H. 2003. Econometric Analysis. 5th Edition. New Jersey: Prentice Hall..

Guthrie, J.F., B.H. Lin, and E. Frazao. 2002. "Role of Food Prepared Away from Home in the American Diet, 1977-78 versus 1994-96: Changes and Consequences." Journal of Nutrition Education and Behavior, 34:140-150.

Heckman, J.J. 1979. "Sample Selection Bias as a Specification Error". Econometrica, 47: 153-161.

Ishida, A., S.H. Law, and Y. Aita. 2003. "Changes in Food Consumption Expenditure in Malaysia". Agribusiness, 19: 61-76.

Lee, K.C. 1991. "The Fast Food Market: A Study of Buying Behavior and Restaurant Image." Malaysian Management Review, 26(2): 58-67.

Lin, B.H., J. Guthrie, and E. Frazao. 2001. "American Children's Diets Not Making the Grade." Food Review, 24(May-August): 8-17.

Manrique, J. and H.H. Jensen. 1998. "Working Women and Expenditures on Food-Away-From-Home and At-Home in Spain." Journal of Agricultural Economics, 49(3): 321-333.

McCracken, V.A. and J.A. Brandt. 1990. "Time Value and Its Impact of Household Food Expenditures Away From Home." Home Economics Research Journal, 8(4): 267-285.

_____. 1987. "Household Consumption of Food Away From Home: Total Expenditure and by Type of Food Facility." American Journal of Agricultural Economics, 69: 274-284.

McCrory, M.A., P.J. Fuss, N.R. Hays, A.G. Vinken, A.S. Greenberg, and S.B. Roberts. 1999. "Overeating in America: Association Between Restaurant Food Consumption and Body Fatness in Healthy Adult Men and Women Ages 19 to 80." Obesity Research, 7: 564-571.

McDonald, J.F. and R.A. Moffitt. 1980. "The Uses of Tobit Analysis." Review of Economics and Statistics, 60: 318-321.

Ministry of Finance Malaysia. 2004. Economic Report 2004/2005. Kuala Lumpur, Malaysia.

Nayga, Jr., R.M. and O. Capps, Jr. 1993. "Analysis of Socio-Economic and Demographic Factors Affecting Food Away from Home Consumption". Journal of Food Distribution Research, 24: 69-86.

Nestle, M. and M.F. Jacobsen. 2000. "Halting the Obesity Epidemic: A Public Health Policy Approach." Public Health Reports, 115(January/February): 12-23.

Nik Mustapha, R.A., A.A.A. Rahman, A. Zubaidi, and A. Radam. 2001. "Demand and Prospects for Food in Malaysia". In A.Radam and F.M. Arshad (eds.), Repositioning the Agriculture Industry in the Next Millenium, University Putra Malaysia Press, pp. 149-160.

Nik Mustapha, R.A. 1994. "Incorporating Habit in the Demand for Fish and Meat Products in Malaysia." Malaysian Journal of Economic Studies, 31(2): 25-35.

Ong, F.S. 1993. "Chinese Ethnicity: Its Relationship to Some Selected Aspects of Consumer Behaviour." Malaysian Management Review, 28(2): 29-43.

Radam, A. and F.M. Arshad. 2001. Readings on Malaysian Economy: Issues in Food and Agriculture. Serdang: Universiti Putra Malaysia, 226p.

Redman, B.J. 1980. "The Impact of Women's Time Allocation on Expenditure for Meals Away From Home and Prepared Foods". American Journal of Agricultural Economics, 62: 234-237.

Rogers, D.S. and H.L. Green. 1978. "Changes in Consumer Food Expenditure Patterns." Journal of Marketing, (April): 14-20.

Stewart, H., N. Blisard, S. Bhuyan, and R.M. Nayga, Jr. 2004. The Demand for Food Away From Home: Full-Service or Fast Food? <http://www.ers .usda. gov/ publications/AER829/> [Accessed 15 November 2004].

Tobin, J. 1958. "Estimation of Relationships for Limited Dependent Variables". Econometrica, 26: 24-36.

Variyan, J.N. 2005. "Nutrition Labeling in the Food-Away-From-Home Sector: An Economic Assessment." Economic Research Report number 4 (April). Economic Research Service. U.S. Department of Agriculture.

Wang, H., C.F.J. Mok, and J. Fox. 1995. "Food Expenditure Patterns of Elderly Consumers: A Question of Time Allocation". Journal of the Family Economics and Resource Management, 1: 185-191.

Yen, S.T. and C.L. Huang. 2002. "Cross-Sectional Estimation of U.S. Demand for Beef Products: A Censored System Approach." Journal of Agricultural and Resource Economics. 27(2): 320-334.

Zubaidi, B.A. 1993. "Applying the Almost Ideal Demand Systems to Meat Expenditure Data: Estimation and Specification Issues." Malaysian Journal of Agricultural Economics, 10: 23-37.

Zubaidi, B.A. and Z. Mohamed. 1993. "Demand for Meat in Malaysia: An Application of the Almost Ideal Demand System Analysis." Pertanika Journal of Social Sciences & Humanities, 1(1): 91-99.