The Food-Away-from-Home Consumption Expenditure Pattern in Egypt

Jacinto F. Fabiosa

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Center for Agricultural and Rural Development
Iowa State University
Ames, Iowa 50011-1070
www.card.iastate.edu

Jacinto Fabiosa is a scientist in the Center for Agricultural and Rural Development and co-director of the Food and Agricultural Policy Research Institute at Iowa State University. *This project was conducted during the author's 2007 Fulbright research grant in Egypt, from March to August of 2008, Cairo, Egypt. Dr. Gamal Siam of Cairo University provided the data and suggested model specification improvements to an earlier draft of the paper. Any remaining errors are the sole responsibility of the author.*

Questions or comments about the contents of this paper should be directed to Jacinto Fabiosa, 579 Heady Hall, Iowa State University, Ames, Iowa 50011-1070; Ph: (515) 294-6183; Fax: (515) 294-6336; E-mail: jfabiosa@iastate.edu.

Abstract

This study characterizes the household food-away-from-home (FAFH) expenditure pattern in Egypt. Specifically, a standard Tobit model was estimated to quantify the responsiveness of Egyptian household FAFH expenditures to changes in their income and selected household demographic characteristics.

We found that the proportion of households with a positive FAFH expenditure is small, at 36% to 38% of the total number of households. These households spent 5% to 8% of their total expenditure on FAFH. Households that are located in urban areas, with more family members, and whose household head is young and male had generally higher levels of FAFH expenditure. The estimated conditional income elasticity is only 0.02, and the unconditional income elasticity is 0.52, suggesting that most of the growth in this sector will be driven by new households participating for the first time in FAFH expenditures. These elasticity estimates are relatively low when compared to those of other countries. However, preliminary estimates from more recent data seem to suggest a higher income elasticity, which is consistent with the expansion of the sector of hotels, restaurants, and other institutions in Egypt.

Keywords: conditional and unconditional elasticity, demand, Egypt, food away from home, HRI (hotels, restaurants, and other institutions).

The Food-Away-from-Home Consumption Expenditure Pattern in Egypt

1. Introduction

One common consumption pattern that is shared by many countries as their economies develop is the increasing significance of expenditure on food away from home (FAFH) in consumers' food basket. This emerging consumption pattern can be of significant interest to policymakers for a number of reasons. Among others, although FAFH is generally taken as a result of economic growth, it can also serve as a dynamic stimulant in the development of industries such as those related to hotels, restaurants, and other institutions (HRI) in the food sector (Ma et al., 2006). Also, as the FAFH expenditure share becomes more important in household budgets, possible differential nutritional content in food at home and food away from home may have important implications for the dietary status of population groups (Lin, Guthrie, and Frazao, 1999).

The emergence and growth of FAFH expenditure can be driven by many factors, including the greater proportion of women participating in the labor market, which raises the opportunity cost of home production of food (Nayga and Capps, 1992). This is particularly true in societies in which food preparation is performed by the female members of the family. Another contributing factor is the demand for greater variety by consumers. In both cases, the growth in demand for FAFH is driven by increases in household income. It is for this reason that FAFH demand is usually associated with high responsiveness to income and, as a result, the rapid rise in the proportion of income that is spent on FAFH reported in many countries such as the United States (Lin, Guthrie, and

Frazao, 1999), China (Ma et al., 2006, Bai et al., 2008), Malaysia (Lee and Tan, 2006), and Spain (Angulo, Gil, and Mur, 2002).

The objectives of this study are to (a) characterize the FAFH consumption expenditure pattern in Egypt; (b) identify factors that affect FAFH; and (c) estimate the responsiveness of FAFH to changes in consumer income and selected household demographic characteristics.

2. Model

Household production theory (Becker, 1965; Lancaster, 1971) has been used in many studies as the underlying theoretical basis for analyzing the demand for FAFH (Stewart et al., 2004). In this case, households are maximizing utility in the consumption of home-produced goods subject to a household production function, time constraint, and income constraint. The solution to this optimization problem gives the standard demand functions for market goods that are used as inputs in household production. When multiplied by their respective prices, these demand functions can be expressed in terms of expenditures. We follow this approach in deriving the demand for FAFH in this study.

Since in the survey data used in the study, many respondents may report zero FAFH expenditure, we use a standard univariate Tobit model to specify the estimating equation for the demand model for the FAFH consumption expenditure. That is,

[1] $$y_i^* = x_i\beta + \varepsilon_i ,$$

where y^* is a latent variable representing household FAFH consumption expenditure; and x is a set of explanatory variables, which in this particular case includes total expenditure as a proxy for household income and demographic characteristics including household size and household location (i.e., urban or rural). β is a vector of parameters to be

estimated, and ε is the independently identically distributed error with mean of zero and variance of sigma. Observations of the FAFH consumption is treated as censored since many respondents in consumption surveys report zero FAFH. This can be represented in the Tobit model as,

$$[2] \qquad y_i = \begin{cases} y_i & if \quad y_i^* > 0 \\ 0 & if \quad y_i^* \le 0 \end{cases}.$$

The log-likelihood function (LLF) of this model specification is

$$[3] \qquad \ell = \sum_{i \in \{y_i = 0\}} \ln\left\{1 - \Phi\left(\frac{x_i'\beta}{\sigma}\right)\right\} + \sum_{i \in \{y_i > 0\}} \ln\left\{\frac{\left(\frac{\phi(y_i - x_i'\beta)}{\sigma}\right)}{\sigma}\right\},$$

where the first term of the LLF represents the limit observations, that is, a zero dependent variable (FAFH), while the second term represents the positive FAFH observations. Optimization of the LLF with respect to the parameters will give the set of equations that can be used to estimate the unknown parameter values. The conditional value of *y* given that the latent variable *y*>0* is

$$[4] \qquad E(y_i \mid y_i^* > 0) = x_i'\beta + \sigma \frac{\phi(x_i'\beta/\sigma)}{\Phi(x_i'\beta/\sigma)},$$

where φ and Φ are the standard normal probability density and cumulative density functions, respectively. It is the presence of the second term in equation [4] that will result in biased estimates if the households with zero FAFH observations in the sample are not properly accounted for. The conditional elasticity based on [4] is

$$[5] \qquad \varepsilon^c = \frac{\partial E(y_i \mid y_i^* > 0)}{\partial x_i} \frac{\overline{x}_i}{E(y_i \mid y_i^* > 0)},$$

which is equal to

[6] $$\varepsilon^c = \beta\left(\frac{\Phi^2 - (x_i'\beta/\sigma)\phi\Phi - \phi^2}{\Phi^2}\right)\frac{\overline{x}_i}{E(y_i \mid y_i^* > 0)}.$$

The unconditional mean is

[7] $$E(y_i) = P(y_i^* > 0)(E(y_i \mid y_i^* > 0) + P(y_i^* \le 0)(E(y_i \mid y_i^* \le 0),$$

which when simplified is equal to

[8] $$E(y_i) = \Phi(x_i'\beta/\sigma)x_i'\beta + \sigma\phi(x_i'\beta/\sigma).$$

The unconditional elasticity is computed from [8] and is given in [9],

[9] $$\varepsilon^u = \frac{\partial E(y_i)}{\partial x_i}\frac{\overline{x}_i}{E(y_i)} = \Phi x_i'\beta\frac{\overline{x}_i}{E(y_i)}.$$

The difference between the unconditional [9] and conditional [6] elasticity can be interpreted as an elasticity of participation (Fabiosa, 2005 and 2006), that is, the responsiveness of households who currently do not have any spending on FAFH to begin participating in this sector, or

[10] $$\varepsilon^p = \varepsilon^u - \varepsilon^c.$$

3. Data and Results

This study uses the Egypt Integrated Household Survey (EIHS). The EIHS is a multi-topic, nationally representative household survey carried out by the International Food Policy Research Institute (IFPRI) in coordination with the Ministry of Agriculture and Land Reclamation and the Ministry of Trade and Supply of the Government of Egypt. The sample consists of 2,500 households in 20 governorates, and the survey data collection was conducted in 1997.

Sample households were asked in the survey if anyone from the household consumed away from home during the past seven days of the survey period. If the answer was yes,

they were asked further how much the household members spent in total for regular meals including breakfast, lunch, dinner, school meal, and other light meal (e.g., biscuits, sandwiches, etc.). The household FAFH expenditure is defined as the sum of all expenditures associated with all these events. For the purpose of this study, we used total expenditure to proxy household income. This is the sum of food expenditures and non-food expenditures. Food expenditures covered all food items included in the survey such as grains and cereals, pulses, eggs and milk products, cooking oils, green leafy vegetables, fruits and nuts, fish and meat, spices and condiments, sweet and confectionary, and beverages. Non-food expenditure included housing, utilities, fuel, clothing, services, and health. We also included other demographic variables such as household size and location of households, whether urban or rural.

Of the 2,500 households included in the survey, only 2,492 were used in this study. Estimation was done using SAS version 9.1 for Windows. Of the total number of respondents, 46% of the household observations used were located in urban areas and the other 54% were located in rural areas. Food expenditure of households in rural areas represented 58% of total expenditure and 46% for households in urban areas. A significant proportion of households in both urban and rural areas did not report any FAFH expenditure: 64%, of rural households and 62% of urban households (see table 1). Households that did not have any FAFH expenditure had incomes that were only 84% to 85% of the income of households that reported positive FAFH expenditure.

Urban households that reported positive FAFH consumption spent 1.7 times on FAFH compared to rural households. This expenditure accounted for 7.9% of urban household total expenditure, which is much higher compared to the 5.2% for rural

households.[1] The average household income of urban households that reported positive FAFH expenditure was 1.14 times higher than the income of rural households with positive FAFH expenditure.

Table 2 shows that lunch is the most reported FAFH consumption event, at 13%, in terms of the proportion of households that reported positive FAFH expenditure. This is followed by breakfast, at 12%, and then dinner, at only 4%. In terms of the amount spent per week, lunch FAFH consumption also reported the highest amount spent, followed by dinner and then breakfast. Households also reported school meal and others as events for FAFH expenditure.

The urban and rural household FAFH consumption expenditure pattern is shown in table 2. Rural households had 8 to 9 percentage points more reporting zero FAFH expenditure compared to urban households. For those reporting a positive FAFH expenditure, urban households spent LE 31 per week more for dinner and lunch FAFH expenditure compared to rural households, and LE19 per week more for school meals and other FAFH expenditures.

Table 3 reports the standard Tobit model estimates for the FAFH expenditure model. With the exception of household size and marital status of the head of household, the rest of the explanatory variables are significant at the 1% level. The signs are also consistent with expectations. That is, income has a significant positive influence on FAFH expenditure. The size of the household also shows a positive influence on FAFH expenditure, although not significant. That is, households with more family members

[1] The proportion of FAFH to total household expenditure is smaller in more recent 2004-2005 household expenditure survey data (3 to 4 percent for rural and urban households, respectively), which may suggest that the FAFH pattern has not changed significantly with what is reflected in the EIHS dataset.

spent more on FAFH compared to households with fewer members.[2] Moreover, urban location of households has a positive influence on FAFH expenditure. This household location effect can be explained from both the demand and supply sides. That is, urban location is highly associated with higher income, which has a positive influence on FAFH expenditure on the demand side. On the supply side, there are more institutional food suppliers in urban locations, so this sector is larger in urban compared to rural areas. When households are headed by males who are younger, this shows a positive influence on FAFH expenditure. The marital status of the head of household is not significant.

The estimated conditional elasticity of FAFH expenditure to income for households that are already spending on FAFH is only 0.02, which suggests that for every 1% increase in household income, FAFH expenditure of households who are already spending on FAFH increases by only 0.02%. The estimated unconditional elasticity is 0.52. That is, for every 1% increase in household income, FAFH expenditure of households increases by 0.52%. The difference between the unconditional elasticity and conditional elasticity can be interpreted as the elasticity of participation. In this case, it is equal to 0.50. That is, for every 1% increase in household income, FAFH expenditure of households increases by 0.52%, 0.50% of which accounts for households who are spending on FAFH for the first time. This represents households who previously had no spending in the FAFH category who are now participating in this sector. These estimates show that the growth in this sector is driven more by new households that are participating for the first time than by the increase in FAFH expenditure for households that are already spending on FAFH. The share of the new participating households in the

[2] Other studies (Stewart et al., 2004) found an inverse relationship with household size because of some economies of scale gained in home production with larger household size.

total response is 96%, while the share of the households that are already participating is only 4%.

The elasticity of FAFH expenditure in Egypt is relatively small compared to estimates in other countries (see table 4).[3] For example, Ma et al. (2006) reported an FAFH consumption expenditure elasticity with respect to income for urban China of 0.21 to 0.77 for the conditional elasticity and 1.02 to 2.54 for the unconditional elasticity. Bai et al. (2008) reported a conditional elasticity of 1.38 and an unconditional elasticity of 2.33. Angulo, Gil, and Mur (2002) reported an unconditional elasticity of 0.80 for Spain. Stewart et al. (2004) reported a conditional elasticity of 0.64 for the United States.

4. Summary and Conclusions

This study characterized the household FAFH expenditure pattern in Egypt. We found that based on the 1997 IFPRI survey data, only 36% to 38% of households interviewed reported positive FAFH expenditures. On average, household FAFH expenditure accounted for 5% to 8% of total food expenditure. In general, larger households and those located in urban areas spent more on FAFH.

Lunch is the most important event associated with FAFH both in terms of the proportion of households reporting positive FAFH consumption expenditure as well as the amount spent per month. This is followed by breakfast in terms of the proportion of households with positive FAFH expenditure, and then dinner in terms of the amount spent.

[3] A more recent household and expenditure survey for the year 2004/05 has been conducted, but only highly aggregated numbers are available to the public. Official publications report an average HRI expenditure and total household expenditure for 20 income classes for urban and rural households. Using these numbers in a double-log function gives an FAFH income elasticity of 0.93. The estimated function has highly significant explanatory variables and very good fit. Although validity of the recent data is not guaranteed, new estimates suggest that the responsiveness of household FAFH to changes in income may have increased. This is consistent with the obvious expansion of the HRI sector in Egypt over time.

The estimated conditional income elasticity of FAFH expenditure in Egypt is only 0.02 and the unconditional income elasticity of FAFH is 0.52, suggesting an income elasticity of participation of 0.50. This implies that the growth in the FAFH sector will largely be driven by new households entering into the sector, spending on FAFH for the first time.

These elasticity estimates are relatively low when compared to elasticities reported for other countries. However, estimates from more recent data seem to suggest that these elasticity estimates may have increased.

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Table 1. Data statistics

	Household Location	
Data	Urban	Rural
Number of observations	1138.00	1357.00
Limit (zero) Observations		
Number	702.00	873.00
Percent	61.69	64.33
Total expenditure (LE/month)	836.71	727.18
Means (for FAFH>0)		
Food away from home expenditure (LE/month)	77.53	44.94
Total expenditure (LE/month)	980.04	862.05
Percent	7.91	5.21

Table 2. Food-away-from-home consumption expenditure by type of meal

	Limit Observations		Positive Observations	
	Number	Percent	Number	Expenditure
Breakfast				
Urban	988	39.60	150	53.52
Rural	1,204	48.26	153	29.47
Lunch				
Urban	988	39.60	150	78.87
Rural	1,179	47.25	178	46.37
Dinner				
Urban	1,102	44.17	36	70.47
Rural	1,292	51.78	65	35.06
School meal				
Urban	1,105	44.29	33	45.23
Rural	1,317	52.79	40	22.59
Others				
Urban	888	35.59	250	39.51
Rural	1,076	43.13	281	20.59

Table 3. Tobit estimation results for food-away-from-home consumption expenditure

Explanatory Variables	Coefficient	Std Error	t-ratio	Probability
Intercept	-98.078	14.453	-6.790	<.0001
Total Expenditure	0.042	0.005	8.780	<.0001
Household Size	1.490	1.029	1.450	0.148
Urban – Rural Location	24.754	5.930	4.170	<.0001
Head of Household				
Gender (Male)	36.980	10.967	3.370	0.001
Marital Status (Married)	-3.309	10.600	-0.310	0.755
Age	-0.689	0.211	-3.260	0.001
Standard Error	113.109	2.904	38.950	<.0001

Table 4. Comparison of income elasticity of food away from home

Country / Study	Participation	Conditional	Unconditional
Egypt - Fabiosa	0.50	0.02	0.52
China (Urban) – Ma et al.		0.77	2.54
China – Bai et al.	0.95	1.38	2.33
Spain – Angulo, Gil, and Mur			0.80
U.S. (Full service) – Stewart et al.		0.64	