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# DEMAND ANALYSES OF FOOD IN MALAYSIA: EFFECTS OF MODEL SPECIFICATION AND DEMOGRAPHIC VARIABLES

by

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## ABSTRACT

Demand analyses of food are deemed important to provide up-to-date indications of the demand behavior in future. This study is to determine which the model specification, as well as analyze the effects of demographic and socio-economic factors on of food demand in Malaysia. Household Expenditure Survey 2004/2005 data is analyzed by using Working Leser, Linear Engel model (LEM), Quadratic Engel model (QEM), and Linear Approximate Demand System (LA/AIDS). The empirical shows that LEM and QEM provide better results, in term of adjusted  $R^2$  and rationality of expenditure elasticities. Also, demographic variables improve the performance of all the selected models.

**Key words:** demand analyses, food, Malaysia, expenditure elasticity

**JEL code:** Q11, D12

## 1.0 INTRODUCTION

There has been a massive concern in forecasting future food demand in Malaysia, a typical developing Asian country that experiencing changes in food consumption pattern. The changes in food consumption can be briefly described by the decreasing trend of per capita rice consumption while observing higher per capita consumption of wheat based products and meats. It means that the food demand changes over time. Thus, demand analyses of food are deemed important to provide up-to-date indications of the demand behavior in future.

The main motivation of this study is in regards which food demand model specification is preferable in Malaysia. By using Household Expenditure Survey 2004/2005, the estimated expenditure elasticities for 11 food items via LA/AIDS in Tey *et al.* (2007a) and Working-Leser in Tey *et al.* (2007b) are different. In Tey *et al.* (2007a), the sequence of expenditure elasticities is vegetable (1.341), fruit (1.341), meat (1.110), wheat (0.878), and dairy (0.732) while Tey *et al.* (2007b) estimated expenditure elasticities of meat

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(1.260), dairy (1.190), fruit (1.160), vegetable (1.160), and wheat (0.77). Also, there has been a concern of the appropriateness in estimating expenditure elasticities of demand for wheat as an aggregate of rice and wheat based products in the both studies.

Previous studies by Tee and Thiam (1975), Hussein *et al.* (1986), Baharumshah and Mohamed (1993), Baharumshah (1993), Mustapha (1994), Ishida *et al.* (2003), and Tey *et al.* (2007a) did not incorporate the demographic factors. The same goes for Mustapha *et al.* (1999, 2000 and 2001) and Tey *et al.* (2007b), which did not fully utilize demographic factors. Underlying consumption economics theory, food consumption is not only affected by changes in income and prices but also demographic factors. Incorporation of demographic factors in a food demand model is to improve estimated parameters that yield better estimates of demand elasticities.

The objectives of this study are two folds. First, this study is to determine which model specification is preferable in analyzing food demand in Malaysia. Second, this study is to determine the effects of non-incorporation and incorporation of demographic and socio-economic factors on the performance of food demand models. It is expected that the food demand models will produce vastly different coefficient estimates. In order to make further comparison between the food demand models, demand elasticities, namely expenditure elasticities and own-price elasticities are to be estimated in this study.

## 2.0 DATA

Household Expenditure Survey 2004/2005 data of Malaysia, which was collected by the Department of Statistics, is utilized in this study. The database consists of 14084 households that recorded expenditures on comprehensive range of food products and demographic variables. The comprehensive range of food products in the data are originally grouped into eight major groups, namely cereal, meat, fish, dairy & fats, fruit, vegetable, sugar & beverage, and other foods. In order to obtain more plausible estimates, the eight major groups mentioned were restructured into eleven food groups. The twelve food groups comprise of rice, wheat, meat, fish, milk & dairy, egg, oils & fats, fruit, vegetable, sugar, beverage, and other foods.

The other variables included in the selected models are defined in table 1.

**Table 1:** Definitions of variables used in the models

<b>Variable</b>	<b>Definition</b>
$i, j$	The 12 food items
$w_i$	The expenditure share of food $i$ among the 12 food items
$p_j$	The price of food $j$
$x$	The total expenditure of all food items included in the model
$\varepsilon$	Random disturbances assumed with zero mean and constant variance.
$\delta_{ij}$	The Kronecker delta that is unity if $i = j$ and zero otherwise.
$H_k$	includes dummy variable where $k \in 8$

<i>AGE</i>	Logarithm of age of household head of the $h^{th}$ household
<i>HHSIZE</i>	Logarithm of household size of the $h^{th}$ household
<i>URBAN</i>	The $h^{th}$ household resides in urban area (0, 1). Base = rural area
<i>EMPLOYED</i>	The $h^{th}$ household head is employed (0, 1). Base = unemployed
<i>PENINSUL</i>	The $h^{th}$ household resides in Peninsular Malaysia (0, 1). Base = Sabah
<i>SARAWAK</i>	The $h^{th}$ household resides in Sarawak (0, 1). Base = Sabah
<i>MALE</i>	The $h^{th}$ household head is male (0, 1). Base = female
<i>MALAY</i>	The $h^{th}$ household head is Malay (0, 1). Base = other race/ethnic
<i>CHINESE</i>	The $h^{th}$ household head is Chinese (0, 1). Base = other race/ethnic
<i>INDIAN</i>	The $h^{th}$ household head is Indian (0, 1). Base = other race/ethnic

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### 3.0 MODEL SPECIFICATIONS

#### Working-Leser Model

The first empirical model applied in this study is the Working-Leser model. Original form of Working-Leser was discussed by Working (1943) and Leser (1963). This model can be estimated for each food item by the ordinary least squares (OLS). The Working-Leser food demand function can be expressed as:

$$w_i = \alpha_0 + \alpha_i \log x + \sum_j \beta_{ij} \log p_j + \sum_k \gamma_{ik} H_k + \varepsilon_i \quad (1)$$

The expenditure elasticity ( $e_i^{Working-Leser}$ ) can be expressed as:

$$e_i^{Working-Leser} = 1 + \left( \frac{\alpha_i}{w_i} \right) \quad (2)$$

Taking a derivative of equation (1) with respect to  $\log(p_j)$  yields uncompensated own ( $j=i$ ) and cross ( $j \neq i$ ) price elasticities, ( $e_{ij}^{Working-Leser}$ ), as follows:

$$e_{ij}^{Working-Leser} = -\delta_{ij} + \left( \frac{\beta_{ij}}{w_i} \right) \quad \forall i, j = 1, \dots, n \quad (3)$$

#### Linear Engel Model (LEM)

Like Tee and Thiam (1975) and Hussein *et al.* (1986), a set of single equation, LEM is estimated. The LEM can be expressed as:

$$\log(EXP_i) = \alpha_0 + \alpha_i \log x + \sum_j \beta_{ij} \log p_j + \sum_k \gamma_{ik} H_k + \varepsilon_i \quad (4)$$

The expenditure elasticity ( $e_i^{LES}$ ) can be obtained from  $\alpha_i$  in the parameter of equation (4). Uncompensated own ( $j=i$ ) and cross ( $j \neq i$ ) price elasticities ( $e_{ij}^{LES}$ ) can be estimated are as follows:

$$e_{ij}^{LES} = -\delta_{ij} + \left( \frac{\beta_{ij}}{\log(EXP_i)} \right) \quad \forall i, j = 1, \dots, n \quad (5)$$

### Quadratic Engel Model (QEM)

Previous studies by Hausman *et al.* (1991), Hausman *et al.* (1995), Lewbel (1991), Bryne *et al.* (1996), Blundell *et al.* (1998), and Blundell *et al.* (1993) suggested that quadratic terms are needed in the models of food demand system. Followed Blundell *et al.* (1993) and Blundell *et al.* (1998), this model can be estimated via the ordinary least squares (OLS). The QEM can be expressed as:

$$\log(EXP_i) = \alpha_0 + \alpha_i \log x + \gamma_i (\log x)^2 + \sum_j \beta_{ij} \log p_j + \sum_k \gamma_{ik} H_k + \varepsilon_i \quad (6)$$

According to Blundell *et al.* (1993), the expenditure elasticity ( $e_i^{QES}$ ) can be estimated as:

$$e_i^{QES} = \alpha_i + 2\gamma_i \log(EXP_i) \quad (7)$$

Uncompensated own ( $j=i$ ) and cross ( $j \neq i$ ) price elasticities, ( $e_{ij}^{QES}$ ), are as follows:

$$e_{ij}^{QES} = \frac{\beta_{ij}}{\log(EXP_i)} - [\alpha_i + 2 * \gamma_i \log(x)] \frac{\log(EXP_j)}{\log(EXP_i)} - \delta_{ij} \quad \forall i, j = 1, \dots, n \quad (8)$$

### Linear Approximate Almost Ideal Demand System (LA/AIDS)

Almost Ideal Demand System (AIDS), a flexible demand system is originally developed by Deaton and Muellbauer (1980a, 1980b). Moschini (1998) pointed out that the AIDS model automatically satisfies the adding-up restriction, and with simple parametric restrictions, homogeneity and symmetry can be imposed. The original model is difficult to be estimated, thus, this study applied the LA/AIDS model.

LA/AIDS has been popular among the previous studies in Malaysia. Baharumshah and Mohamed (1993), Baharumshah (1994), Mustapha (1994), Mustapha *et al.* (1999, 2000 and 2001), and Tey *et al.* (2007a) applied Stone Price index in the LA/AIDS model. Alston *et al.* (1994), Asche and Wessells (1997), and Moschini (1995) commented that prices will never be perfectly collinear. By applying the Stone index will introduce the units of measurement error. Thus, Moschini (1995) suggested to use a Laspeyres price index in order to overcome this measurement error. The Laspeyres price index can be expressed as:

$$\ln(P) = \sum_i \bar{w}_i \ln(P_i) \quad (9)$$

The LA/AIDS can be estimated as follows:

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log(p_j) + \beta 1_i \log(x/P) + \sum_k \gamma_k H_k + \varepsilon_i \quad (10)$$

Following the formulae and procedures of Green and Alston (1990), the demand elasticities of LA/AIDS can be computed at sample means as follows:

Expenditure elasticities

$$e_i^{LA/AIDS} = \frac{\beta 1_i}{w_i} + 1 \quad (11)$$

Marshallian measures of price elasticities

$$e_{ij}^{LA/AIDS} = -\delta_{ij} + \left( \frac{\gamma_{ij}}{w_i} \right) - \left( \frac{\beta 1_i}{w_i} \right) w_j \quad \forall i, j = 1, \dots, n \quad (12)$$

## 4.0 RESULTS

Appendix tables 1 and 2 present the parameter estimates of the Working-Leser form with and without demographic effects. In both estimations, most of the parameters are statistically significant. It is reported that income is not a significant factor to milk & dairy and oils & fats equations while it is reasonable to obtain insignificant estimates of urban variable in homogeneous foods-eggs, oils & fats, and sugar equations.

The results of the LEM with and without demographic effects are presented in appendix tables 3 and 4. Overall, most of the estimates are statistically significant. All the estimations show that income, household size, and urban variables are statistically significant in determining expenditures on food items. It is interesting to know that households that reside in urban areas spent lesser on rice, fish, oils & fats, vegetables, sugar, and beverage than those reside in rural areas.

As an extension to LEM model, the results of QEM are similar like LEM due to nesting. Appendix tables 5 and 6 show the results of the QEM with and without demographic factors. The purpose of estimating QEM is also to determine whether or not the demand system is quadratic in log income, more attention is paid to the coefficients  $\gamma_i$ . Specifically, it is to test the hypothesis of  $\gamma_i = 0$  against  $\gamma_i \neq 0$ . In the QEM with demographic factors, the results show that expenditure functions of eight out of twelve food items are non-linear with statistically significant  $\gamma_i$  estimates. Only the  $\gamma_i$  coefficients for rice, milk & dairy, eggs, oils & fats are not statistically significant. On another hand, in the QEM without demographic factors, only the  $\gamma_i$  coefficients for milk & dairy and oils & fats are not statistically significant while the other equations are non-linear.

LA/AIDS allows household utility maximization framework with regularity conditions of adding-up, homogeneity, and symmetry. Appendix tables 7 and 8 present the results of the LA/AIDS with and without demographic factors. It is surprising to find that income is

not significant factor in both meat equations, with and without demographic variables respectively. The urban variable shows similar results like LEM and QEM models.

Table 2 represents the adjusted  $R^2$  in the selected models. The larger the adjusted  $R^2$  indicates that the performance of a model is better. Clearly, the performance of all the selected models with incorporation of demographic variables is much better than those without incorporation of demographic variables, especially of rice equation in all the selected models, showing improvements range from 11.83% in LEM to 9.83% in LA/AIDS. By comparing general performance among the selected models, LEM and QEM produce similar adjusted  $R^2$ s that are higher than Working-Leser and LA/AIDS.

**Table 2:** Comparison of Adjusted  $R^2$  in the selected models

	<b>Working-Leser With Demographic Variables</b>				<b>Working-Leser Without Demographic Variables</b>			
	<b>LEM</b>	<b>QEM</b>	<b>LA/AIDS</b>		<b>LEM</b>	<b>QEM</b>	<b>LA/AIDS</b>	
Rice	0.3161	0.3754	0.3753	0.2957	0.2106	0.2565	0.257	0.1974
Bread & other cereals	0.344	0.3802	0.3806	0.2395	0.278	0.342	0.344	0.1493
Meat	0.1709	0.4852	0.4853	0.1197	0.085	0.4517	0.4519	0.0243
Fish	0.2433	0.5192	0.5198	0.1786	0.1638	0.478	0.4791	0.0809
Milk & dairy	0.1959	0.4774	0.4774	0.1757	0.1657	0.4567	0.4566	0.1603
Eggs	0.0711	0.2934	0.2934	0.0305	0.0375	0.2187	0.22	0.0007
Oils & fats	0.1628	0.3694	0.3693	0.1143	0.1572	0.3388	0.3388	0.1143
Fruits	0.1261	0.3884	0.3891	0.0789	0.1005	0.3615	0.3626	0.0449
Vegetables	0.1757	0.5512	0.5515	0.179	0.1011	0.5101	0.5102	0.1097
Sugar	0.0548	0.2497	0.2501	0.0442	0.0357	0.2126	0.2134	0.0196
Others	0.0868	0.3348	0.335	0.0396	0.0536	0.3082	0.3084	0.0298
Beverage	0.209	0.3473	0.3475	NA	0.1744	0.3127	0.3139	NA

In order to probe further, Chern (2000) suggested that it is more appropriate to compare the estimated expenditure elasticities from food demand models. The centre of the comparisons is rice-meat and rice-bread & other cereals in all the selected models, with and without incorporating the demographic variables. This is to determine whether the estimated expenditure elasticities for these food items follow the expectation that builds on the ground of observations about decreasing trend of per capita rice consumption but higher per capita consumption of wheat based products and meats. Table 3 compares the estimated expenditure elasticities from the selected models. In the case of rice and meat, LA/AIDS models produce higher estimated expenditure elasticity for rice than meat. The estimated expenditure elasticities of rice are also the highest among all the food items. The other selected models yield higher expenditure elasticities for meats than rice. In regards to the comparison between rice and bread & other cereals, the estimated expenditure elasticities for rice are higher than bread & other cereals in the Working-Leser and LA/AIDS respectively. Surprisingly, simple equation models like the LEM and

QEM models reverse the order. Noteworthy to mention that estimated expenditure elasticity for the main staple food, rice is the lowest in the LEM models.

**Table 3:** Comparison of expenditure elasticities of food items, Malaysia, 2004/2005

	<b>Working- Leser</b>				<b>Working- Leser</b>			
	<b>LEM</b>	<b>QEM</b>	<b>LA/AIDS</b>	<b>LEM</b>	<b>QEM</b>	<b>LA/AIDS</b>		
	<b>With Demographic Variables</b>				<b>Without Demographic Variables</b>			
Rice	0.7238	0.4991	0.4876	1.2821	0.7639	0.6278	0.4574	1.3113
Bread & other cereals	0.5713	0.7159	0.6273	0.7576	0.6473	0.7539	0.5561	0.8054
Meat	1.2709	1.1180	1.2129	1.0140	1.2659	1.1241	1.2424	1.0036
Fish	1.1048	1.0509	1.1869	0.9681	1.0645	1.0109	1.2034	0.9330
Milk & dairy	1.1557	0.7250	0.8337	0.6814	1.0148	0.7628	0.7870	0.6077
Eggs	0.7998	0.5457	0.4381	1.1170	0.8208	0.6839	0.2323	1.1404
Oils & fats	0.9445	0.7125	0.7486	1.1241	0.9829	0.8714	0.7641	1.1123
Fruits	1.0541	0.9787	0.6426	1.0434	1.1173	1.0816	0.6637	1.0576
Vegetables	1.0516	0.9650	1.1026	1.1805	1.0962	1.0353	1.1359	1.1880
Sugar	0.8340	0.6703	0.4513	0.9631	0.7958	0.6792	0.3706	0.9537
Others	1.6538	1.1614	0.9008	0.8731	1.4455	1.0497	0.7997	0.8465
Beverage	0.8383	0.8652	0.6797	1.1225	0.9010	0.9228	0.5461	1.1899

It is hard to make comparisons by referring to estimated own-price elasticities. Table 4 presents the estimated own-price elasticities from the selected models, with and without incorporating demographic variables. All the estimated own-price elasticities comply with the law of demand by getting negative magnitude in all the estimates. All the selected models show that the estimated own-price elasticities for rice are elastic, except LEM model that did not incorporate demographic variables. Both of the LEM models produce inelastic estimated own-price elasticities for meat while other selected models produce more than unity estimated own-price elasticities for meat.

**Table 4:** Comparison of own-price elasticities of food items, Malaysia, 2004/2005

	<b>Working- -Leser</b>				<b>Working- -Leser</b>			
	<b>LEM</b>	<b>QEM</b>	<b>LA/AIDS</b>	<b>LEM</b>	<b>QEM</b>	<b>LA/AIDS</b>		
	<b>With Demographic Variables</b>				<b>Without Demographic Variables</b>			
Rice	-2.5047	-1.0429	-1.5306	-2.0108	-2.3729	-0.9889	-1.4476	-1.9180
Bread & other cereals	-0.9182	-0.9536	-1.4898	-0.9410	-0.9194	-0.9579	-1.3764	-0.9345
Meat	-1.2370	-0.8827	-2.1736	-1.0749	-1.3150	-0.8612	-2.1656	-1.0610
Fish	-1.0464	-1.0465	-2.2245	-0.8545	-1.1641	-1.0848	-2.2767	-0.7973
Milk & dairy	-0.1642	-0.2558	-1.7432	-0.5568	-0.1340	-0.2681	-1.6946	-0.5400
Eggs	-1.6610	-1.2720	-1.3440	-1.4534	-1.5758	-1.1537	-0.8157	-1.4070
Oils & fats	-1.4927	-1.0620	-1.7354	-1.2182	-1.4821	-1.0633	-1.6574	-1.2260



Fruits	-1.5417	-1.3042	-1.3288	-1.0691	-1.5053	-1.2755	-1.3172	-1.0634
Vegetables	-1.2368	-1.0754	-2.1568	-1.1286	-1.2782	-1.0886	-2.1633	-1.1490
Sugar	-1.0633	-0.8542	-1.4764	-1.0507	-1.0706	-0.8701	-1.3182	-1.0656
Others	-0.5954	-0.6667	-1.6912	-0.9681	-0.6376	-0.6853	-1.6698	-0.9750
Beverage	-1.3298	-1.0790	-1.4831	-1.3369	-1.3408	-1.0952	-1.2327	-1.3244

## 5.0 CONCLUSIONS

By utilizing Household Expenditure Survey 2004/2005 data, this study intends to determine which model specification is preferred in analyzing food demand in Malaysia, where at the same time, to find out the effects of non-incorporation and incorporation of demographic factors on the performance of food demand models. The selected food demand models are the Working-Leser, LEM, QEM, and LA/AIDS.

Generally, the effects of each demographic factor are different in the selected models. The catchiest demographic variables are household size and dummy variable of urban. The effect of the household size variable varies across the selected models. However, the results of the dummy variable of urban are consistent in the selected models. The most significant observation is that the households reside in urban areas spent lesser on rice and subsequently devoted lower share for rice than those reside in rural areas.

The incorporation of demographic variables obviously improved the performance of all the selected models. As the LEM is nested in the QEM, the results of both of the models are not very much different. Similarly, both of the models performed better than Working-Leser and LA/AIDS as indicated by the adjusted  $R^2$ . However, single equation functional forms of the LEM and QEM were not imposed with the regularity conditions. Thus, the assumption of utility maximization was made before hand by including major factors (income, own-price, and price of substitutes) in the equations. Further efforts on estimating expenditure elasticities have seen that the LEM and QEM produce more plausible results than the Working-Leser and LA/AIDS models.

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**Appendix 1:** The parameter estimates of the Working-Leser model with demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.3686	(0.0131)***	0.3330	(0.0200)***	-0.0556	(0.0175)***	0.0263	(0.0201)	-0.0253	(0.0144)*	0.1000	(0.0047)***
LOG(TOTFD)	-0.0267	(0.0010)***	-0.0587	(0.0015)***	0.0339	(0.0013)***	0.0210	(0.0015)***	0.0089	(0.0011)***	-0.0043	(0.0004)***
LOG(P1)	-0.1455	(0.0032)***	0.0877	(0.0049)***	0.0005	(0.0043)	-0.0358	(0.0049)***	-0.0008	(0.0035)	-0.0039	(0.0011)***
LOG(P2)	-0.0056	(0.0010)***	0.0112	(0.0016)***	-0.0024	(0.0014)*	-0.0006	(0.0016)	0.0037	(0.0011)***	-0.0023	(0.0004)***
LOG(P3)	0.0048	(0.0021)**	0.0291	(0.0032)***	-0.0297	(0.0028)***	-0.0205	(0.0032)***	-0.0014	(0.0023)	-0.0030	(0.0008)***
LOG(P4)	-0.0126	(0.0031)***	0.0186	(0.0047)***	0.0005	(0.0041)	-0.0093	(0.0047)**	0.0017	(0.0034)	0.0015	(0.0011)
LOG(P5)	-0.0030	(0.0009)***	-0.0027	(0.0013)**	-0.0074	(0.0012)***	-0.0138	(0.0013)***	0.0475	(0.0010)***	-0.0023	(0.0003)***
LOG(P6)	-0.0022	(0.0023)	0.0057	(0.0036)	-0.0007	(0.0031)	0.0171	(0.0036)***	-0.0079	(0.0026)***	-0.0143	(0.0008)***
LOG(P7)	-0.0016	(0.0008)**	0.0053	(0.0012)***	0.0027	(0.0011)***	-0.0053	(0.0012)***	0.0017	(0.0009)**	-0.0012	(0.0003)***
LOG(P8)	0.0058	(0.0013)***	-0.0073	(0.0019)***	0.0084	(0.0017)***	0.0081	(0.0019)***	0.0054	(0.0014)***	-0.0004	(0.0005)
LOG(P9)	-0.0011	(0.0023)	0.0386	(0.0035)***	-0.0096	(0.0030)***	-0.0461	(0.0035)***	0.0063	(0.0025)***	-0.0020	(0.0008)**
LOG(P10)	-0.0082	(0.0007)***	0.0104	(0.0011)***	0.0010	(0.0010)	-0.0054	(0.0011)***	0.0000	(0.0008)	-0.0008	(0.0003)***
LOG(P11)	-0.0051	(0.0008)***	0.0126	(0.0013)***	-0.0049	(0.0011)***	-0.0168	(0.0013)***	0.0009	(0.0009)	-0.0014	(0.0003)***
LOG(P12)	0.0033	(0.0006)***	-0.0079	(0.0010)***	0.0044	(0.0009)***	0.0155	(0.0010)***	0.0014	(0.0007)*	0.0001	(0.0002)
LOG(AGE)	0.0171	(0.0021)***	-0.0277	(0.0032)***	0.0085	(0.0028)***	0.0408	(0.0032)***	-0.0296	(0.0023)***	-0.0040	(0.0007)***
LOG(HHSIZE)	-0.0154	(0.0011)***	-0.0489	(0.0017)***	0.0290	(0.0015)***	0.0251	(0.0017)***	0.0179	(0.0012)***	-0.0027	(0.0004)***
URBAN	-0.0131	(0.0012)***	0.0124	(0.0019)***	0.0058	(0.0016)***	-0.0093	(0.0019)***	0.0072	(0.0013)***	0.0002	(0.0004)
EMPLOYED	0.0062	(0.0015)***	-0.0094	(0.0023)***	0.0039	(0.0020)*	-0.0024	(0.0024)	-0.0040	(0.0017)**	-0.0005	(0.0005)
MALE	0.0003	(0.0016)	0.0018	(0.0024)	0.0014	(0.0021)	0.0019	(0.0024)	0.0018	(0.0017)	-0.0006	(0.0006)
MALAY	-0.0208	(0.0020)***	0.0222	(0.0031)***	-0.0069	(0.0027)***	0.0176	(0.0031)***	0.0069	(0.0022)***	-0.0039	(0.0007)***
CHINESE	-0.0253	(0.0022)***	0.0065	(0.0033)**	0.0301	(0.0029)***	-0.0064	(0.0033)*	0.0000	(0.0024)	-0.0042	(0.0008)***
INDIAN	-0.0154	(0.0030)***	-0.0108	(0.0046)**	-0.0129	(0.0040)***	-0.0044	(0.0046)	0.0174	(0.0033)***	-0.0062	(0.0011)***
PENINSUL	-0.0514	(0.0021)***	0.0013	(0.0032)	0.0118	(0.0028)***	0.0419	(0.0032)***	0.0104	(0.0023)***	-0.0066	(0.0007)***
SARAWAK	-0.0135	(0.0023)***	-0.0165	(0.0035)***	0.0520	(0.0030)***	-0.0065	(0.0035)*	-0.0002	(0.0025)	-0.0006	(0.0008)

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 1: Continued**

	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.0629	(0.0051)***	-0.0417	(0.0139)***	0.1613	(0.0117)***	0.0760	(0.0068)***	-0.1740	(0.0173)***	0.1684	(0.0139)***
LOG(TOTFD)	-0.0016	(0.0004)***	0.0037	(0.0010)***	0.0055	(0.0009)***	-0.0058	(0.0005)***	0.0351	(0.0013)***	-0.0110	(0.0010)***
LOG(P1)	-0.0048	(0.0013)***	0.0407	(0.0034)***	-0.0182	(0.0029)***	0.0020	(0.0017)	0.0414	(0.0042)***	0.0367	(0.0034)***
LOG(P2)	-0.0017	(0.0004)***	0.0025	(0.0011)**	-0.0019	(0.0009)**	-0.0019	(0.0005)***	-0.0026	(0.0014)*	0.0017	(0.0011)
LOG(P3)	-0.0001	(0.0008)	0.0118	(0.0022)***	-0.0140	(0.0019)***	0.0051	(0.0011)***	0.0021	(0.0028)	0.0158	(0.0022)***
LOG(P4)	0.0026	(0.0012)**	0.0077	(0.0033)**	-0.0142	(0.0027)***	0.0002	(0.0016)	-0.0044	(0.0041)	0.0077	(0.0033)**
LOG(P5)	-0.0010	(0.0003)***	-0.0025	(0.0009)***	-0.0026	(0.0008)***	-0.0016	(0.0005)***	-0.0042	(0.0011)***	-0.0063	(0.0009)***
LOG(P6)	-0.0024	(0.0009)***	0.0045	(0.0025)*	-0.0051	(0.0021)**	-0.0006	(0.0012)	0.0048	(0.0031)	0.0010	(0.0025)
LOG(P7)	-0.0141	(0.0003)***	0.0053	(0.0008)***	-0.0019	(0.0007)***	0.0002	(0.0004)	0.0080	(0.0011)***	0.0008	(0.0008)
LOG(P8)	0.0006	(0.0005)	-0.0371	(0.0013)***	-0.0002	(0.0011)	0.0006	(0.0007)	0.0108	(0.0017)***	0.0051	(0.0013)***
LOG(P9)	0.0013	(0.0009)	0.0056	(0.0024)**	-0.0254	(0.0020)***	0.0065	(0.0012)***	-0.0049	(0.0030)	0.0307	(0.0024)***
LOG(P10)	-0.0011	(0.0003)***	0.0057	(0.0008)***	-0.0016	(0.0007)**	-0.0022	(0.0004)***	0.0019	(0.0010)**	0.0002	(0.0008)
LOG(P11)	-0.0017	(0.0003)***	0.0010	(0.0009)	-0.0123	(0.0008)***	0.0015	(0.0004)***	0.0217	(0.0011)***	0.0046	(0.0009)***
LOG(P12)	0.0001	(0.0003)	-0.0042	(0.0007)***	0.0064	(0.0006)***	-0.0030	(0.0003)***	0.0065	(0.0008)***	-0.0225	(0.0007)***
LOG(AGE)	0.0009	(0.0008)	0.0134	(0.0022)***	0.0146	(0.0019)***	-0.0042	(0.0011)***	-0.0081	(0.0028)***	-0.0217	(0.0022)***
LOG(HHSIZE)	-0.0025	(0.0004)***	-0.0090	(0.0012)***	0.0030	(0.0010)***	-0.0012	(0.0006)**	0.0241	(0.0014)***	-0.0195	(0.0012)***
URBAN	0.0006	(0.0005)	0.0022	(0.0013)*	-0.0089	(0.0011)***	0.0001	(0.0006)	-0.0034	(0.0016)**	0.0060	(0.0013)***
EMPLOYED	0.0002	(0.0006)	0.0105	(0.0016)***	0.0009	(0.0014)	0.0022	(0.0008)***	-0.0037	(0.0020)*	-0.0038	(0.0016)**
MALE	-0.0007	(0.0006)	0.0001	(0.0017)	-0.0061	(0.0014)***	-0.0034	(0.0008)***	-0.0022	(0.0021)	0.0058	(0.0017)***
MALAY	0.0022	(0.0008)***	0.0057	(0.0021)***	-0.0249	(0.0018)***	0.0048	(0.0010)***	0.0005	(0.0026)	-0.0033	(0.0021)
CHINESE	0.0038	(0.0008)***	0.0145	(0.0023)***	0.0083	(0.0019)***	-0.0055	(0.0011)***	-0.0188	(0.0028)***	-0.0031	(0.0023)
INDIAN	0.0084	(0.0012)***	0.0006	(0.0032)	0.0193	(0.0027)***	-0.0014	(0.0016)	0.0132	(0.0040)***	-0.0076	(0.0032)**
PENINSUL	-0.0027	(0.0008)***	0.0194	(0.0022)***	0.0009	(0.0019)	-0.0055	(0.0011)***	-0.0093	(0.0028)	-0.0101	(0.0022)***
SARAWAK	-0.0010	(0.0009)	0.0014	(0.0024)	0.0130	(0.0020)***	-0.0032	(0.0012)***	-0.0281	(0.0030)	0.0032	(0.0024)

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 2:** The parameter estimates of the Working-Leser model without demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.3299	(0.0093)***	0.0464	(0.0139)***	0.0252	(0.0121)**	0.4005	(0.0139)***	-0.0342	(0.0097)***	0.0636	(0.0031)***
LOG(TOTFD)	-0.0228	(0.0010)***	-0.0483	(0.0014)***	0.0333	(0.0013)***	0.0130	(0.0014)***	0.0008	(0.0010)	-0.0039	(0.0003)***
LOG(P1)	-0.1327	(0.0033)***	0.1147	(0.0050)***	-0.0032	(0.0044)	-0.0641	(0.0050)***	-0.0124	(0.0035)***	-0.0007	(0.0011)
LOG(P2)	-0.0021	(0.0011)*	0.0110	(0.0016)***	0.0016	(0.0014)	-0.0088	(0.0016)***	0.0021	(0.0011)*	-0.0015	(0.0004)***
LOG(P3)	0.0116	(0.0022)***	0.0486	(0.0033)***	-0.0394	(0.0029)***	-0.0322	(0.0033)***	-0.0093	(0.0023)***	-0.0014	(0.0007)*
LOG(P4)	-0.0166	(0.0032)***	0.0130	(0.0047)***	0.0245	(0.0041)***	-0.0329	(0.0048)***	0.0022	(0.0033)	0.0019	(0.0011)*
LOG(P5)	-0.0035	(0.0009)***	-0.0069	(0.0014)***	-0.0035	(0.0012)***	-0.0154	(0.0014)***	0.0492	(0.0010)***	-0.0022	(0.0003)***
LOG(P6)	0.0092	(0.0025)***	0.0081	(0.0037)**	0.0030	(0.0032)	0.0047	(0.0037)	-0.0138	(0.0026)***	-0.0125	(0.0008)***
LOG(P7)	-0.0020	(0.0008)**	0.0123	(0.0013)***	-0.0015	(0.0011)	-0.0066	(0.0013)***	0.0002	(0.0009)	-0.0011	(0.0003)***
LOG(P8)	0.0026	(0.0013)*	0.0012	(0.0020)	0.0007	(0.0017)	0.0082	(0.0020)***	0.0057	(0.0014)***	-0.0007	(0.0005)
LOG(P9)	-0.0134	(0.0024)***	0.0556	(0.0036)***	-0.0242	(0.0031)***	-0.0407	(0.0036)***	0.0092	(0.0025)***	-0.0036	(0.0008)***
LOG(P10)	-0.0108	(0.0008)***	0.0150	(0.0011)***	-0.0004	(0.0010)	-0.0076	(0.0012)***	0.0007	(0.0008)	-0.0008	(0.0003)***
LOG(P11)	-0.0075	(0.0009)***	0.0140	(0.0013)***	-0.0023	(0.0012)**	-0.0191	(0.0013)***	0.0016	(0.0009)*	-0.0014	(0.0003)***
LOG(P12)	0.0035	(0.0007)***	-0.0066	(0.0010)***	0.0035	(0.0009)***	0.0182	(0.0010)***	-0.0014	(0.0007)**	-0.0003	(0.0002)
	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.0489	(0.0034)***	-0.0154	(0.0093)*	0.1364	(0.0081)***	0.0734	(0.0046)***	-0.0600	(0.0117)***	-0.0147	(0.0094)
LOG(TOTFD)	-0.0005	(0.0004)	0.0080	(0.0010)***	0.0103	(0.0008)***	-0.0071	(0.0005)***	0.0239	(0.0012)***	-0.0068	(0.0010)***
LOG(P1)	-0.0034	(0.0012)***	0.0425	(0.0034)***	-0.0163	(0.0029)***	0.0024	(0.0016)	0.0206	(0.0042)***	0.0526	(0.0034)***
LOG(P2)	-0.0015	(0.0004)***	0.0019	(0.0011)*	0.0016	(0.0010)	-0.0026	(0.0005)***	-0.0061	(0.0014)***	0.0043	(0.0011)***
LOG(P3)	0.0005	(0.0008)	0.0148	(0.0022)***	-0.0145	(0.0019)***	0.0052	(0.0011)***	-0.0077	(0.0028)***	0.0237	(0.0022)***
LOG(P4)	0.0045	(0.0012)***	0.0099	(0.0032)***	0.0025	(0.0028)	-0.0047	(0.0016)***	-0.0166	(0.0040)***	0.0123	(0.0032)***
LOG(P5)	-0.0011	(0.0003)***	-0.0039	(0.0009)***	-0.0011	(0.0008)	-0.0019	(0.0005)***	-0.0029	(0.0012)**	-0.0068	(0.0009)***
LOG(P6)	-0.0020	(0.0009)**	0.0019	(0.0025)	-0.0026	(0.0022)	-0.0002	(0.0012)	-0.0016	(0.0031)	0.0058	(0.0025)**
LOG(P7)	-0.0138	(0.0003)***	0.0071	(0.0008)***	-0.0029	(0.0007)***	0.0003	(0.0004)	0.0053	(0.0011)***	0.0027	(0.0009)***
LOG(P8)	0.0010	(0.0005)**	-0.0346	(0.0013)***	-0.0013	(0.0012)	0.0008	(0.0007)	0.0096	(0.0017)***	0.0068	(0.0014)***
LOG(P9)	0.0022	(0.0009)**	0.0121	(0.0024)***	-0.0298	(0.0021)***	0.0065	(0.0012)***	-0.0061	(0.0030)**	0.0322	(0.0024)***
LOG(P10)	-0.0009	(0.0003)***	0.0072	(0.0008)***	-0.0022	(0.0007)***	-0.0024	(0.0004)***	0.0006	(0.0010)	0.0017	(0.0008)**
LOG(P11)	-0.0016	(0.0003)***	0.0017	(0.0009)*	-0.0119	(0.0008)***	0.0012	(0.0004)***	0.0194	(0.0011)***	0.0058	(0.0009)***
LOG(P12)	0.0003	(0.0002)	-0.0024	(0.0007)***	0.0078	(0.0006)***	-0.0036	(0.0003)***	0.0043	(0.0008)***	-0.0233	(0.0007)***

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 3:** The parameter estimates of the Linear Expenditure System with demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.6397	(0.1248)***	-0.6805	(0.1411)***	-3.8137	(0.1531)***	-2.4497	(0.1250)***	-3.1960	(0.2044)***	-0.4091	(0.1660)**
LOG(TOTFD)	0.4991	(0.0108)***	0.7159	(0.0107)***	1.1180	(0.0136)***	1.0509	(0.0107)***	0.7250	(0.0174)***	0.5457	(0.0140)***
LOG(P1)	-0.0889	(0.0477)*	0.3109	(0.0345)***	0.0875	(0.0382)**	-0.1138	(0.0314)***	0.1132	(0.0512)**	0.0593	(0.0419)
LOG(P2)	-0.0525	(0.0097)***	0.1018	(0.0111)***	-0.0369	(0.0120)***	-0.0047	(0.0099)	0.0077	(0.0162)	-0.0720	(0.0132)***
LOG(P3)	-0.0031	(0.0195)	0.1232	(0.0226)***	0.2744	(0.0263)***	-0.0911	(0.0198)***	0.0320	(0.0326)	-0.0492	(0.0264)*
LOG(P4)	-0.1059	(0.0290)***	0.0077	(0.0331)	0.0236	(0.0356)	-0.1294	(0.0282)***	0.1523	(0.0479)***	0.1409	(0.0391)***
LOG(P5)	-0.0297	(0.0079)***	-0.0316	(0.0093)***	-0.0668	(0.0098)***	-0.0689	(0.0081)***	0.9650	(0.0123)***	-0.0810	(0.0106)***
LOG(P6)	0.0007	(0.0216)	-0.0006	(0.0252)	0.0100	(0.0261)	0.0980	(0.0219)***	-0.1282	(0.0349)***	-0.1599	(0.0269)***
LOG(P7)	-0.0234	(0.0073)***	0.0211	(0.0086)**	0.0238	(0.0090)***	-0.0339	(0.0074)***	0.0407	(0.0122)***	-0.0147	(0.0099)
LOG(P8)	0.0455	(0.0117)***	-0.1073	(0.0136)***	0.0646	(0.0146)***	0.0420	(0.0119)***	0.0791	(0.0194)***	0.0205	(0.0158)
LOG(P9)	0.0451	(0.0230)*	0.1466	(0.0245)***	-0.0245	(0.0284)	-0.2360	(0.0228)***	0.2132	(0.0363)***	-0.0003	(0.0304)
LOG(P10)	-0.0756	(0.0070)***	0.0644	(0.0079)***	0.0171	(0.0086)**	-0.0337	(0.0070)***	0.0572	(0.0116)***	-0.0141	(0.0095)
LOG(P11)	-0.0451	(0.0078)***	0.0625	(0.0090)***	-0.0360	(0.0097)***	-0.0825	(0.0079)***	-0.0083	(0.0130)	-0.0469	(0.0107)***
LOG(P12)	0.0310	(0.0061)***	-0.1046	(0.0069)***	0.0293	(0.0075)***	0.0851	(0.0061)***	0.0303	(0.0103)***	0.0066	(0.0082)
LOG(AGE)	0.1451	(0.0200)***	-0.1647	(0.0225)***	0.0487	(0.0250)*	0.2534	(0.0202)***	-0.3469	(0.0328)***	-0.1182	(0.0265)***
LOG(HHSIZE)	-0.3267	(0.0109)***	-0.2217	(0.0118)***	0.1093	(0.0140)***	0.0936	(0.0109)***	-0.1832	(0.0185)***	-0.3510	(0.0145)***
URBAN	-0.1146	(0.0111)***	0.0866	(0.0131)***	0.0743	(0.0139)***	-0.0357	(0.0113)***	0.1118	(0.0184)***	0.0334	(0.0148)**
EMPLOYED	0.0318	(0.0143)**	-0.0146	(0.0165)	0.0173	(0.0179)	-0.0141	(0.0146)	-0.0720	(0.0237)***	-0.0318	(0.0191)*
MALE	0.0330	(0.0147)**	-0.0413	(0.0169)**	0.0195	(0.0184)	0.0394	(0.0150)***	0.0278	(0.0244)	0.0037	(0.0195)
MALAY	-0.1158	(0.0183)***	0.1776	(0.0215)***	-0.0742	(0.0230)***	0.1295	(0.0187)***	0.0182	(0.0307)	-0.0583	(0.0243)**
CHINESE	-0.1741	(0.0200)***	0.0415	(0.0232)*	0.2354	(0.0246)***	0.0167	(0.0203)	-0.1028	(0.0333)***	-0.0273	(0.0265)
INDIAN	-0.0859	(0.0275)***	-0.0937	(0.0323)***	-0.0562	(0.0343)	0.0326	(0.0282)	0.1564	(0.0445)***	-0.1137	(0.0366)***
PENINSUL	-0.4294	(0.0190)***	-0.0132	(0.0225)	0.0668	(0.0241)***	0.1990	(0.0195)***	0.0999	(0.0318)***	-0.3457	(0.0257)***
SARAWAK	-0.1125	(0.0208)***	-0.1341	(0.0247)***	0.3442	(0.0259)***	-0.0695	(0.0213)***	-0.1082	(0.0351)***	-0.0673	(0.0278)**

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 3: Continued**

	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	-2.2274	(0.1583)***	-3.8906	(0.1964)**	-1.5728	(0.1189)***	-1.4904	(0.1681)***	-3.9537	(0.2049)***	-1.9939	(0.1846)***
LOG(TOTFD)	0.7125	(0.0140)***	0.9787	(0.0162)***	0.9650	(0.0101)***	0.6703	(0.0138)***	1.1614	(0.0177)***	0.8652	(0.0149)***
LOG(P1)	0.0119	(0.0422)	0.4935	(0.0481)***	-0.1233	(0.0296)***	-0.0130	(0.0421)	0.2490	(0.0516)***	0.3048	(0.0458)***
LOG(P2)	-0.0620	(0.0125)***	0.0167	(0.0155)	-0.0297	(0.0094)***	-0.0779	(0.0133)***	-0.0800	(0.0161)***	0.0199	(0.0147)
LOG(P3)	0.0477	(0.0250)*	0.1450	(0.0313)***	-0.1232	(0.0188)***	0.1291	(0.0266)***	0.0005	(0.0322)	0.1282	(0.0298)***
LOG(P4)	0.1341	(0.0374)***	0.1107	(0.0456)**	-0.1366	(0.0275)***	-0.1063	(0.0395)***	-0.0901	(0.0477)*	0.2424	(0.0437)***
LOG(P5)	-0.0280	(0.0100)***	-0.0382	(0.0127)***	-0.0274	(0.0077)***	-0.0483	(0.0109)***	-0.0959	(0.0132)***	-0.0799	(0.0121)***
LOG(P6)	-0.0672	(0.0281)**	0.0406	(0.0341)	-0.0413	(0.0207)**	-0.0032	(0.0297)	0.0207	(0.0353)	-0.0324	(0.0329)
LOG(P7)	-0.0597	(0.0112)***	0.0528	(0.0117)***	-0.0268	(0.0070)***	-0.0176	(0.0100)*	0.0216	(0.0121)*	0.0017	(0.0113)
LOG(P8)	0.0567	(0.0150)***	-0.4609	(0.0191)***	0.0025	(0.0113)	-0.0200	(0.0160)	0.0669	(0.0194)***	0.0335	(0.0179)*
LOG(P9)	0.1257	(0.0295)***	0.1205	(0.0343)***	-0.1626	(0.0202)***	0.1467	(0.0294)***	0.0727	(0.0370)**	0.2476	(0.0318)***
LOG(P10)	-0.0192	(0.0094)**	0.0957	(0.0111)***	-0.0184	(0.0067)***	0.1305	(0.0103)***	-0.0191	(0.0117)	0.0346	(0.0107)***
LOG(P11)	-0.0411	(0.0102)***	0.0172	(0.0125)	-0.1370	(0.0075)***	0.0097	(0.0106)	0.3856	(0.0127)***	0.0637	(0.0119)***
LOG(P12)	-0.0014	(0.0079)	-0.0896	(0.0096)***	0.0555	(0.0058)***	-0.0512	(0.0084)***	0.0382	(0.0101)***	-0.1184	(0.0099)***
LOG(AGE)	0.0490	(0.0255)*	0.1238	(0.0317)***	0.1650	(0.0191)***	-0.0405	(0.0268)	-0.1139	(0.0329)***	-0.2629	(0.0296)***
LOG(HHSIZE)	-0.2909	(0.0143)***	-0.1986	(0.0170)***	-0.0265	(0.0104)**	-0.1671	(0.0144)***	0.0846	(0.0183)***	-0.2179	(0.0157)***
URBAN	0.0513	(0.0140)***	0.0534	(0.0180)***	-0.0756	(0.0108)***	-0.0469	(0.0153)***	-0.0651	(0.0184)***	0.1380	(0.0171)***
EMPLOYED	-0.0073	(0.0182)	0.1170	(0.0228)***	0.0025	(0.0138)	0.0895	(0.0195)***	-0.0424	(0.0237)*	-0.0433	(0.0217)**
MALE	-0.0132	(0.0188)	0.0355	(0.0235)	-0.0263	(0.0142)*	-0.0636	(0.0199)***	-0.0585	(0.0243)**	0.0580	(0.0222)***
MALAY	0.0453	(0.0233)*	0.1602	(0.0298)***	-0.2142	(0.0177)***	0.1381	(0.0250)***	0.1126	(0.0303)***	-0.0351	(0.0277)
CHINESE	0.1492	(0.0254)***	0.3072	(0.0320)***	0.1277	(0.0192)***	-0.2031	(0.0273)***	-0.2785	(0.0330)***	-0.0595	(0.0300)**
INDIAN	0.2061	(0.0348)***	0.0662	(0.0445)	0.2116	(0.0267)***	-0.0445	(0.0379)	0.2858	(0.0456)***	-0.1124	(0.0418)***
PENINSUL	-0.1376	(0.0243)***	0.2852	(0.0313)***	0.0118	(0.0185)	-0.1847	(0.0262)***	-0.3125	(0.0317)***	-0.2364	(0.0290)***
SARAWAK	-0.0347	(0.0264)	0.0668	(0.0341)*	0.1448	(0.0202)***	-0.0387	(0.0286)	-0.3322	(0.0345)***	0.0133	(0.0316)

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.



**Appendix 4:** The parameter estimates of the Linear Expenditure System without demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	-0.3828	(0.0905)***	-1.9676	(0.0960)***	-4.0441	(0.1035)***	-0.5334	(0.0849)***	-4.9978	(0.1351)***	-2.8049	(0.1148)***
LOG(TOTFD)	0.6278	(0.0101)***	0.7539	(0.0100)***	1.1241	(0.0120)***	1.0109	(0.0096)***	0.7628	(0.0152)***	0.6839	(0.0128)***
LOG(P1)	0.0231	(0.0503)	0.4243	(0.0346)***	0.1738	(0.0389)***	-0.2188	(0.0322)***	0.1187	(0.0512)**	0.2640	(0.0432)***
LOG(P2)	-0.0177	(0.0104)*	0.0925	(0.0113)***	0.0041	(0.0122)	-0.0503	(0.0101)***	0.0049	(0.0162)	-0.0236	(0.0137)*
LOG(P3)	0.0890	(0.0210)***	0.2144	(0.0228)***	0.3246	(0.0269)***	-0.1283	(0.0203)***	0.0584	(0.0327)*	0.0621	(0.0274)**
LOG(P4)	-0.1761	(0.0303)***	-0.0538	(0.0327)	0.2639	(0.0352)***	-0.2360	(0.0283)***	0.1156	(0.0469)**	0.1818	(0.0394)***
LOG(P5)	-0.0481	(0.0085)***	-0.0544	(0.0095)***	-0.0454	(0.0100)***	-0.0816	(0.0083)***	0.9490	(0.0122)***	-0.0965	(0.0110)***
LOG(P6)	0.1107	(0.0232)***	0.0017	(0.0257)	0.0545	(0.0266)**	0.0367	(0.0225)	-0.1634	(0.0352)***	-0.0904	(0.0279)***
LOG(P7)	-0.0075	(0.0078)	0.0558	(0.0087)***	0.0098	(0.0092)	-0.0319	(0.0076)***	0.0669	(0.0123)***	0.0069	(0.0103)
LOG(P8)	0.0366	(0.0126)***	-0.0659	(0.0138)***	0.0254	(0.0149)*	0.0528	(0.0122)***	0.1332	(0.0195)***	0.0208	(0.0164)
LOG(P9)	-0.0634	(0.0246)**	0.2337	(0.0246)***	-0.1020	(0.0287)***	-0.1674	(0.0233)***	0.3263	(0.0363)***	-0.0538	(0.0313)*
LOG(P10)	-0.0984	(0.0076)***	0.0888	(0.0080)***	0.0215	(0.0087)**	-0.0395	(0.0072)***	0.0813	(0.0117)***	-0.0084	(0.0098)
LOG(P11)	-0.0670	(0.0084)***	0.0673	(0.0092)***	-0.0072	(0.0099)	-0.0908	(0.0081)***	-0.0029	(0.0131)	-0.0491	(0.0111)***
LOG(P12)	0.0455	(0.0064)***	-0.1031	(0.0069)***	0.0275	(0.0076)***	0.1034	(0.0062)***	0.0261	(0.0103)**	0.0070	(0.0084)
	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	-3.6525	(0.1064)***	-4.1122	(0.1304)***	-2.0136	(0.0814)***	-1.7029	(0.1128)***	-3.4525	(0.1367)***	-4.2019	(0.1257)***
LOG(TOTFD)	0.8714	(0.0121)***	1.0816	(0.0145)***	1.0353	(0.0092)***	0.6792	(0.0124)***	1.0497	(0.0155)***	0.9228	(0.0136)***
LOG(P1)	0.1053	(0.0425)**	0.5518	(0.0480)***	-0.0644	(0.0304)**	0.0635	(0.0421)	0.1574	(0.0518)***	0.4967	(0.0457)***
LOG(P2)	-0.0355	(0.0126)***	0.0121	(0.0156)	0.0076	(0.0096)	-0.0925	(0.0134)***	-0.1179	(0.0162)***	0.0598	(0.0149)***
LOG(P3)	0.1058	(0.0253)***	0.2079	(0.0314)***	-0.1065	(0.0193)***	0.1606	(0.0267)***	-0.0417	(0.0324)	0.2201	(0.0299)***
LOG(P4)	0.2098	(0.0367)***	0.1595	(0.0447)***	0.0492	(0.0276)*	-0.2905	(0.0387)***	-0.2796	(0.0468)***	0.2989	(0.0431)***
LOG(P5)	-0.0422	(0.0101)***	-0.0608	(0.0128)***	-0.0169	(0.0079)**	-0.0698	(0.0110)***	-0.0946	(0.0133)***	-0.0840	(0.0123)***
LOG(P6)	-0.0299	(0.0284)	0.0079	(0.0344)	-0.0101	(0.0214)	0.0360	(0.0301)	0.0062	(0.0356)	0.0449	(0.0333)
LOG(P7)	-0.0610	(0.0114)***	0.0862	(0.0118)***	-0.0299	(0.0072)***	-0.0034	(0.0101)	0.0133	(0.0122)	0.0179	(0.0114)
LOG(P8)	0.0752	(0.0151)***	-0.4174	(0.0193)***	-0.0031	(0.0116)	-0.0090	(0.0162)	0.0763	(0.0195)***	0.0367	(0.0181)**
LOG(P9)	0.1454	(0.0296)***	0.2296	(0.0343)***	-0.1911	(0.0208)***	0.1458	(0.0295)***	0.0860	(0.0370)**	0.2367	(0.0319)***
LOG(P10)	-0.0107	(0.0094)	0.1233	(0.0111)***	-0.0195	(0.0068)***	0.1162	(0.0104)***	-0.0332	(0.0117)***	0.0479	(0.0108)***
LOG(P11)	-0.0430	(0.0103)***	0.0323	(0.0126)**	-0.1280	(0.0077)***	0.0005	(0.0107)	0.3642	(0.0127)***	0.0758	(0.0120)***
LOG(P12)	0.0176	(0.0079)**	-0.0627	(0.0096)***	0.0726	(0.0059)***	-0.0551	(0.0084)***	0.0207	(0.0100)**	-0.1427	(0.0100)***

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 5:** The parameter estimates of the Quadratic Expenditure System with demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error
	t		t		t		t		t		t	
C	0.6883	(0.2377)**	-0.2662	(0.1942)	-4.2607	(0.3091)**	-3.2681	(0.2383)**	-3.5459	(0.3836)**	-0.1241	(0.3049)
LOG(TOTFD)	0.4779	(0.0892)**	0.5316	(0.0603)**	1.3134	(0.1181)**	1.4090	(0.0894)**	0.8776	(0.1426)**	0.4219	(0.1120)**
(LOG(TOTFD)) <sup>2</sup>	0.0024	(0.0098)	0.0218	(0.0070)**	-0.0215	(0.0129)*	-0.0399	(0.0099)**	-0.0169	(0.0157)	0.0138	(0.0124)
LOG(P1)	-0.0891	(0.0477)*	0.3018	(0.0346)**	0.0917	(0.0383)**	-0.1046	(0.0314)**	0.1173	(0.0514)**	0.0554	(0.0420)
LOG(P2)	-0.0525	(0.0097)**	0.1014	(0.0111)**	-0.0368	(0.0120)**	-0.0044	(0.0098)	0.0078	(0.0162)	-0.0723	(0.0132)**
LOG(P3)	-0.0035	(0.0196)	0.1190	(0.0227)**	0.2754	(0.0263)**	-0.0850	(0.0198)**	0.0346	(0.0327)	-0.0515	(0.0265)*
LOG(P4)	-0.1060	(0.0290)**	0.0030	(0.0331)	0.0237	(0.0356)	-0.1269	(0.0282)**	0.1528	(0.0479)**	0.1402	(0.0391)**
LOG(P5)	-0.0297	(0.0079)**	-0.0318	(0.0093)**	-0.0670	(0.0098)**	-0.0694	(0.0081)**	0.9646	(0.0123)**	-0.0809	(0.0106)**
LOG(P6)	0.0007	(0.0216)	-0.0006	(0.0252)	0.0099	(0.0261)	0.0978	(0.0218)**	-0.1283	(0.0349)**	-0.0809	(0.0269)**
LOG(P7)	-0.0234	(0.0073)**	0.0211	(0.0086)**	0.0243	(0.0090)**	-0.0331	(0.0074)**	0.0412	(0.0122)**	-0.1593	(0.0099)
LOG(P8)	0.0454	(0.0117)**	-0.1078	(0.0136)**	0.0653	(0.0146)**	0.0431	(0.0119)**	0.0796	(0.0194)**	-0.0149	(0.0099)
LOG(P9)	0.0449	(0.0231)*	0.1427	(0.0245)**	-0.0228	(0.0284)	-0.2332	(0.0228)**	0.0796	(0.0363)**	0.0202	(0.0159)
LOG(P10)	-0.0756	(0.0070)**	0.0632	(0.0079)**	0.0172	(0.0086)**	-0.0333	(0.0070)**	0.2144	(0.0116)**	-0.0016	(0.0304)
LOG(P11)	-0.0452	(0.0078)**	0.0618	(0.0090)**	-0.0353	(0.0097)**	-0.0811	(0.0079)**	0.0573	(0.0116)**	-0.0143	(0.0095)
LOG(P12)	0.0310	(0.0061)**	-0.1057	(0.0069)**	0.0296	(0.0075)**	0.0859	(0.0061)**	-0.0077	(0.0130)	-0.0474	(0.0107)**
LOG(AGE)	0.1450	(0.0200)**	-0.1670	(0.0225)**	0.0495	(0.0250)**	0.2541	(0.0202)**	0.0306	(0.0103)**	0.0064	(0.0082)
LOG(HHSIZE)	-0.3266	(0.0110)**	-0.2140	(0.0120)**	0.1080	(0.0140)**	0.0898	(0.0110)**	-0.3462	(0.0328)**	-0.1189	(0.0265)**
									-0.1849	(0.0185)**	-0.3493	(0.0146)**

		*		*		*		*		*		*
		(0.0111)**		(0.0131)**		(0.0139)**		(0.0113)**		(0.0184)**		(0.0148)**
URBAN	-0.1146	*	0.0857	*	0.0747	*	-0.0348	*	0.1122	*	0.0330	(0.0148)**
EMPLOYED	0.0318	(0.0143)**	-0.0133	(0.0165)	0.0174	(0.0179)	-0.0146	(0.0146)	-0.0720	*	-0.0318	(0.0191)*
MALE	0.0331	(0.0147)**	-0.0431	(0.0169)**	0.0186	(0.0184)	0.0380	(0.0150)**	0.0270	(0.0244)	0.0040	(0.0195)
		(0.0183)**		(0.0215)**		(0.0230)**		(0.0187)**				
MALAY	-0.1157	*	0.1772	*	-0.0749	*	0.1287	*	0.0174	(0.0307)	-0.0583	(0.0243)**
		(0.0200)**				(0.0246)**				(0.0333)**		
CHINESE	-0.1740	*	0.0401	(0.0232)*	0.2349	*	0.0157	(0.0203)	-0.1030	*	-0.0272	(0.0265)
		(0.0275)**		(0.0322)**						(0.0445)**		(0.0366)**
INDIAN	-0.0858	*	-0.0939	*	-0.0573	(0.0343)*	0.0316	(0.0281)	0.1561	*	-0.1134	*
		(0.0191)**				(0.0241)**		(0.0195)**		(0.0318)**		(0.0257)**
PENINSUL	-0.4293	*	-0.0122	(0.0225)	0.0659	*	0.1974	*	0.0994	*	-0.3448	*
		(0.0209)**		(0.0247)**		(0.0259)**		(0.0213)**		(0.0351)**		
SARAWAK	-0.1124	*	-0.1348	*	0.3433	*	-0.0709	*	-0.1088	*	-0.0666	(0.0278)**

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 5: Continued**

	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error	Coefficien	Std Error
	t		t		t		t		t		t	
C	-2.3323	(0.3211)** *	-2.7316	(0.3553)** *	-2.1761	(0.2313)** *	-0.8590	(0.2879)** *	-3.1547	(0.4068)** *	-1.3585	(0.3154)** *
LOG(TOTFD)	0.7584	(0.1229)** *	0.4697	(0.1311)** *	1.2295	(0.0876)** *	0.3959	(0.1025)** *	0.8113	(0.1550)** *	0.5844	(0.1140)** *
(LOG(TOTFD)) <sup>2</sup>	-0.0050	(0.0134)	0.0570	(0.0146)** *	-0.0294	(0.0097)** *	0.0310	(0.0115)** *	0.0387	(0.0170)** *	0.0318	(0.0128)** *
LOG(P1)	0.0127	(0.0423) (0.0125)**	0.4755	(0.0483)** *	-0.1168	(0.0296)** *	-0.0224	(0.0423) (0.0133)**	0.2426	(0.0517)** *	0.2947	(0.0460)** *
LOG(P2)	-0.0620	(0.0125)** *	0.0160	(0.0155) (0.0314)**	-0.0296	(0.0094)** *	-0.0780	(0.0133)** *	-0.0801	(0.0267)** *	0.0196	(0.0147) (0.0299)**
LOG(P3)	0.0483	(0.0251)* (0.0374)**	0.1358	(0.0188)** *	-0.1191	(0.0275)** *	0.1234	(0.0395)** *	-0.0044	(0.0323) *	0.1222	(0.0437)** *
LOG(P4)	0.1341	(0.0100)** *	0.1068	(0.0456)** (0.0127)**	-0.1358	(0.0077)** *	-0.1095	(0.0109)** *	-0.0913	(0.0477)* (0.0132)**	0.2399	(0.0121)** *
LOG(P5)	-0.0281	(0.0281)** *	-0.0374	(0.0340) (0.0117)**	-0.0277	(0.0207)** (0.0070)**	-0.0481	(0.0297) *	-0.0955	(0.0353) *	-0.0798	(0.0329) *
LOG(P6)	-0.0673	(0.0112)** *	0.0404	(0.0117)** *	-0.0415	(0.0070)** *	-0.0034	(0.0297) *	0.0213	(0.0353) *	-0.0329	(0.0329) *
LOG(P7)	-0.0596	(0.0150)** *	0.0515	(0.0191)** *	-0.0262	(0.0113) (0.0202)**	-0.0185	(0.0100)* (0.0294)**	0.0208	(0.0121)* (0.0194)**	0.0009	(0.0113) *
LOG(P8)	0.0569	(0.0295)** *	-0.4598	(0.0343)** *	0.0032	(0.0066)** *	-0.0208	(0.0160) (0.0103)**	0.0659	(0.0370)* *	0.0326	(0.0179)* (0.0318)**
LOG(P9)	0.1259	(0.0094)** (0.0102)**	0.1150	(0.0110)** *	-0.1617	(0.0075)** *	0.1431	(0.0106) (0.0084)**	0.0705	(0.0117)* (0.0127)**	0.2441	(0.0107)** *
LOG(P10)	-0.0192	(0.0102)** *	0.0946	(0.0125) (0.0096)**	-0.0181	(0.0075)** *	0.1298	(0.0106) (0.0084)**	-0.0193	(0.0117)* (0.0127)**	0.0336	(0.0119)** *
LOG(P11)	-0.0410	(0.0079) *	0.0153	(0.0125) *	-0.1361	(0.0058)** *	0.0085	(0.0106) *	0.3846	(0.0101)** *	0.0629	(0.0099)** *
LOG(P12)	-0.0013	(0.0079) *	-0.0907	(0.0317)** *	0.0559	(0.0191)** *	-0.0520	(0.0268) (0.0145)**	0.0378	(0.0329)** *	-0.1182	(0.0295)** *
LOG(AGE)	0.0492	(0.0255)* (0.0143)**	0.1224	(0.0171)** *	0.1660	(0.0105)** *	-0.0425	(0.0268) (0.0145)**	-0.1146	(0.0183)** *	-0.2637	(0.0159)** *
LOG(HHSIZE)	-0.2911	(0.0143)** *	-0.1911	(0.0171)** *	-0.0290	(0.0105)** *	-0.1625	(0.0145)** *	0.0870	(0.0183)** *	-0.2123	(0.0159)** *

URBAN	0.0513	(0.0140)** *	0.0521	(0.0180)** *	-0.0749	(0.0108)** *	-0.0481	(0.0153)** *	-0.0658	(0.0184)** *	0.1373	(0.0171)** *
EMPLOYED	-0.0073	(0.0182)	0.1182	(0.0228)** *	0.0022	(0.0138)	0.0899	(0.0195)** *	-0.0418	(0.0237)*	-0.0422	(0.0217)* (0.0222)**
MALE	-0.0135	(0.0188)	0.0357	(0.0235) (0.0298)**	-0.0271	(0.0142)* (0.0177)**	-0.0636	(0.0199)** *	-0.0575	(0.0243)** (0.0303)**	0.0576	*
MALAY	0.0451	(0.0233)* (0.0254)**	0.1614	* (0.0320)**	-0.2152	* (0.0192)**	0.1389	* (0.0273)**	0.1137	* (0.0330)**	-0.0345	(0.0277)
CHINESE	0.1491	* (0.0348)**	0.3072	* (0.0313)**	0.1270	* (0.0267)**	-0.2030	* (0.0262)**	-0.2780	* (0.0456)**	-0.0598	(0.0300)** (0.0418)**
INDIAN	0.2059	* (0.0243)**	0.0667	(0.0444) (0.0313)**	0.2106	* (0.0185) (0.0202)**	-0.0435	(0.0379) *	0.2870	* (0.0317)**	-0.1123	* (0.0290)**
PENINSUL	-0.1378	* (0.0264)	0.2871	* (0.0340)**	0.0109	(0.0185) (0.0202)**	-0.1834	* (0.0286)	-0.3108	* (0.0345)**	-0.2353	* (0.0316)
SARAWAK	-0.0349	(0.0264)	0.0686	(0.0340)**	0.1438	*	-0.0379	(0.0286)	-0.3305	*	0.0138	(0.0316)

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 6:** The parameter estimates of the Quadratic Expenditure System without demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.3417	(0.2407)	-1.0067	(0.1726)**	-4.6024	(0.2972)**	-1.7021	(0.2307)***	-5.0767	(0.3622)***	-1.5928	(0.2954)***
LOG(TOTFD)	0.3140	(0.0971)***	0.3491	(0.0613)***	1.3669	(0.1217)***	1.5138	(0.0928)***	0.7966	(0.1450)***	0.1648	(0.1173)
(LOG(TOTFD)) <sup>2</sup>	0.0346	(0.0107)***	0.0472	(0.0070)***	-0.0266	(0.0133)**	-0.0557	(0.0102)***	-0.0037	(0.0159)	0.0574	(0.0129)***
LOG(P1)	0.0203	(0.0503)	0.3944	(0.0348)***	0.1796	(0.0390)***	-0.2042	(0.0323)***	0.1197	(0.0514)**	0.2450	(0.0433)***
LOG(P2)	-0.0182	(0.0104)*	0.0907	(0.0113)***	0.0044	(0.0122)	-0.0496	(0.0101)***	0.0050	(0.0162)	-0.0249	(0.0137)*
LOG(P3)	0.0831	(0.0210)***	0.1993	(0.0229)***	0.3259	(0.0270)***	-0.1182	(0.0204)***	0.0591	(0.0328)*	0.0503	(0.0275)*
LOG(P4)	-0.1773	(0.0303)***	-0.0664	(0.0327)**	0.2639	(0.0352)***	-0.2326	(0.0282)***	0.1158	(0.0469)**	0.1789	(0.0394)***
LOG(P5)	-0.0477	(0.0085)***	-0.0537	(0.0095)***	-0.0457	(0.0100)***	-0.0826	(0.0083)***	0.9488	(0.0122)***	-0.0956	(0.0110)***
LOG(P6)	0.1105	(0.0232)***	-0.0011	(0.0257)	0.0546	(0.0266)**	0.0373	(0.0225)*	-0.1633	(0.0352)***	-0.0882	(0.0279)***
LOG(P7)	-0.0087	(0.0078)	0.0538	(0.0087)***	0.0106	(0.0092)	-0.0302	(0.0076)***	0.0670	(0.0123)***	0.0054	(0.0103)
LOG(P8)	0.0353	(0.0126)***	-0.0685	(0.0138)***	0.0263	(0.0149)*	0.0547	(0.0122)***	0.1333	(0.0195)***	0.0190	(0.0164)
LOG(P9)	-0.0661	(0.0247)***	0.2223	(0.0247)***	-0.1000	(0.0287)***	-0.1634	(0.0233)***	0.3266	(0.0363)***	-0.0600	(0.0313)*
LOG(P10)	-0.0985	(0.0076)***	0.0854	(0.0080)***	0.0217	(0.0087)**	-0.0388	(0.0072)***	0.0813	(0.0117)***	-0.0096	(0.0098)
LOG(P11)	-0.0680	(0.0084)***	0.0654	(0.0092)***	-0.0064	(0.0099)	-0.0890	(0.0081)***	-0.0028	(0.0131)	-0.0507	(0.0111)***
LOG(P12)	0.0450	(0.0064)***	-0.1068	(0.0069)***	0.0280	(0.0076)***	0.1048	(0.0062)***	0.0262	(0.0103)**	0.0058	(0.0084)
	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	-3.3386	(0.3072)***	-2.6416	(0.3355)***	-2.4581	(0.2252)***	-0.7969	(0.2686)***	-2.6770	(0.3878)***	-2.8724	(0.2979)***
LOG(TOTFD)	0.7353	(0.1256)***	0.4507	(0.1334)***	1.2278	(0.0913)***	0.2931	(0.1046)***	0.7142	(0.1578)***	0.3547	(0.1162)***
(LOG(TOTFD)) <sup>2</sup>	0.0149	(0.0137)	0.0703	(0.0148)***	-0.0213	(0.0101)**	0.0433	(0.0117)***	0.0370	(0.0173)**	0.0638	(0.0130)***
LOG(P1)	0.1026	(0.0425)**	0.5250	(0.0483)***	-0.0590	(0.0305)*	0.0469	(0.0423)	0.1504	(0.0519)***	0.4699	(0.0460)***
LOG(P2)	-0.0357	(0.0126)***	0.0107	(0.0156)	0.0078	(0.0096)	-0.0931	(0.0134)***	-0.1182	(0.0162)***	0.0583	(0.0149)***
LOG(P3)	0.1037	(0.0253)***	0.1934	(0.0315)***	-0.1030	(0.0194)***	0.1504	(0.0268)***	-0.0472	(0.0325)	0.2038	(0.0300)***
LOG(P4)	0.2097	(0.0367)***	0.1537	(0.0447)***	0.0499	(0.0276)*	-0.2957	(0.0388)***	-0.2810	(0.0468)***	0.2929	(0.0431)***
LOG(P5)	-0.0419	(0.0101)***	-0.0592	(0.0128)***	-0.0173	(0.0079)**	-0.0691	(0.0110)***	-0.0940	(0.0133)***	-0.0829	(0.0123)***
LOG(P6)	-0.0297	(0.0284)	0.0064	(0.0344)	-0.0100	(0.0214)	0.0346	(0.0301)	0.0063	(0.0356)	0.0421	(0.0333)
LOG(P7)	-0.0610	(0.0114)***	0.0836	(0.0118)***	-0.0292	(0.0072)***	-0.0053	(0.0101)	0.0123	(0.0122)	0.0151	(0.0114)
LOG(P8)	0.0748	(0.0151)***	-0.4160	(0.0193)***	-0.0025	(0.0116)	-0.0106	(0.0162)	0.0752	(0.0195)***	0.0337	(0.0180)*
LOG(P9)	0.1448	(0.0297)***	0.2215	(0.0343)***	-0.1905	(0.0208)***	0.1400	(0.0295)***	0.0840	(0.0370)**	0.2277	(0.0319)***
LOG(P10)	-0.0108	(0.0094)	0.1215	(0.0111)***	-0.0192	(0.0068)***	0.1155	(0.0104)***	-0.0334	(0.0117)***	0.0456	(0.0108)***
LOG(P11)	-0.0433	(0.0103)***	0.0301	(0.0126)**	-0.1274	(0.0077)***	-0.0012	(0.0107)	0.3634	(0.0127)***	0.0740	(0.0120)***
LOG(P12)	0.0173	(0.0079)**	-0.0645	(0.0096)**	0.0731	(0.0059)***	-0.0565	(0.0084)***	0.0201	(0.0100)**	-0.1426	(0.0099)***

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 7:** The parameter estimates of the LA/AIDS with demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	-0.0255	(0.0097)***	0.6146	(0.0155)***	-0.0483	(0.0128)***	-0.1185	(0.0148)***	0.1601	(0.0105)***	0.0402	(0.0035)***
LOG(P1)	-0.0951	(0.0029)***	0.0737	(0.0046)***	-0.0085	(0.0038)**	-0.0262	(0.0044)***	-0.0110	(0.0032)***	0.0075	(0.0010)***
LOG(P2)	0.0035	(0.0009)***	0.0035	-	-0.0017	(0.0014)	-0.0033	(0.0016)**	-0.0011	(0.0012)	-0.0008	(0.0004)**
LOG(P3)	0.0244	(0.0021)***	-0.0092	(0.0019)***	-0.0092	-	-0.0096	(0.0031)***	-0.0058	(0.0023)**	0.0010	(0.0007)
LOG(P4)	0.0094	(0.0027)***	-0.0535	(0.0043)***	0.0279	(0.0027)***	0.0279	-	0.0037	(0.0030)	0.0068	(0.0010)***
LOG(P5)	0.0002	(0.0009)	-0.0202	(0.0014)***	-0.0053	(0.0012)***	0.0242	(0.0007)***	0.0242	-	-0.0016	(0.0003)***
LOG(P6)	0.0202	(0.0021)***	-0.0247	(0.0034)***	0.0069	(0.0028)**	0.0383	(0.0032)***	-0.0098	(0.0007)***	-0.0098	-
LOG(P7)	0.0041	(0.0008)***	0.0091	(0.0013)***	-0.0019	(0.0011)*	-0.0108	(0.0013)***	0.0001	(0.0009)	-0.0061	(0.0002)***
LOG(P8)	0.0139	(0.0012)***	-0.0128	(0.0020)***	0.0019	(0.0017)	0.0040	(0.0019)**	-0.0003	(0.0014)	0.0010	(0.0005)**
LOG(P9)	0.0159	(0.0022)***	0.0196	(0.0035)***	-0.0061	(0.0029)**	-0.0307	(0.0033)***	0.0027	(0.0024)	0.0014	(0.0008)*
LOG(P10)	-0.0061	(0.0007)***	0.0133	(0.0011)***	-0.0013	(0.0010)	-0.0102	(0.0011)***	-0.0004	(0.0008)	0.0000	(0.0003)
LOG(P11)	-0.0017	(0.0009)**	0.0123	(0.0014)***	-0.0060	(0.0012)***	-0.0191	(0.0013)***	-0.0006	(0.0010)	-0.0004	(0.0003)
LOG(P12)	0.0113	-	-0.0112	-	0.0032	-	0.0156	-	-0.0017	-	0.0012	-
Expenditure	0.0273	(0.0009)***	-0.0332	(0.0014)***	0.0018	(0.0012)	-0.0064	(0.0014)***	-0.0181	(0.0010)***	0.0025	(0.0003)***
LOG(AGE)	0.0047	(0.0021)**	-0.0534	(0.0034)***	0.0235	(0.0028)***	0.0621	(0.0032)***	-0.0274	(0.0023)***	-0.0055	(0.0008)***
LOG(HHSIZE)	0.0091	(0.0010)***	-0.0503	(0.0017)***	0.0219	(0.0014)***	0.0172	(0.0016)***	0.0107	(0.0011)***	0.0000	(0.0004)
URBAN	-0.0159	(0.0012)***	0.0098	(0.0020)***	0.0073	(0.0017)***	-0.0090	(0.0019)***	0.0065	(0.0014)***	-0.0001	(0.0004)
EMPLOYED	0.0037	(0.0016)**	-0.0157	(0.0025)***	0.0074	(0.0021)***	0.0045	(0.0024)*	-0.0043	(0.0017)**	-0.0007	(0.0006)
MALE	-0.0005	(0.0016)	0.0041	(0.0026)	0.0005	(0.0022)	0.0003	(0.0025)	0.0019	(0.0018)	-0.0008	(0.0006)
MALAY	-0.0179	(0.0020)***	0.0192	(0.0033)***	-0.0068	(0.0027)**	0.0164	(0.0032)***	0.0041	(0.0023)*	-0.0035	(0.0007)***
CHINESE	-0.0370	(0.0021)***	0.0048	(0.0035)	0.0342	(0.0029)***	-0.0122	(0.0033)***	0.0043	(0.0024)*	-0.0063	(0.0008)***
INDIAN	-0.0187	(0.0030)***	-0.0118	(0.0049)**	-0.0101	(0.0041)**	-0.0100	(0.0047)**	0.0188	(0.0034)***	-0.0069	(0.0011)***
PENINSUL	-0.0477	(0.0021)***	-0.0061	(0.0034)*	0.0135	(0.0029)***	0.0417	(0.0033)***	0.0067	(0.0024)***	-0.0062	(0.0008)***
SARAWAK	-0.0223	(0.0023)***	-0.0235	(0.0037)***	0.0575	(0.0031)***	-0.0080	(0.0036)**	0.0022	(0.0026)	-0.0027	(0.0008)***

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**Appendix 7: Continued**

	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.0166	(0.0040)***	0.0006	(0.0102)	-0.0175	(0.0085)**	0.0780	(0.0050)***	0.0577	(0.0130)***	0.2419	-
LOG(P1)	-0.0011	(0.0012)	0.0248	(0.0030)***	-0.0021	(0.0025)	0.0033	(0.0015)**	0.0102	(0.0039)***	0.0245	-
LOG(P2)	-0.0004	(0.0004)	0.0014	(0.0011)	0.0046	(0.0009)***	-0.0023	(0.0006)***	-0.0062	(0.0014)***	0.0028	-
LOG(P3)	0.0020	(0.0009)**	0.0055	(0.0022)**	-0.0040	(0.0018)**	0.0043	(0.0011)***	-0.0085	(0.0028)***	0.0091	-
LOG(P4)	0.0074	(0.0011)***	-0.0080	(0.0028)***	0.0047	(0.0024)**	-0.0040	(0.0014)***	-0.0011	(0.0037)	-0.0212	-
LOG(P5)	-0.0010	(0.0004)***	-0.0053	(0.0009)***	0.0059	(0.0008)***	-0.0034	(0.0005)***	-0.0061	(0.0012)***	-0.0116	-
LOG(P6)	0.0015	(0.0009)*	-0.0076	(0.0023)***	0.0061	(0.0019)***	-0.0018	(0.0011)	-0.0037	(0.0029)	-0.0157	-
LOG(P7)	-0.0061	-	0.0041	(0.0008)***	-0.0013	(0.0007)*	0.0011	(0.0004)***	0.0037	(0.0011)***	0.0041	-
LOG(P8)	-0.0045	(0.0005)***	-0.0045	-	0.0005	(0.0011)	0.0004	(0.0006)	-0.0007	(0.0017)	0.0011	-
LOG(P9)	0.0049	(0.0009)***	-0.0117	(0.0014)***	-0.0117	-	0.0058	(0.0011)***	-0.0110	(0.0030)***	0.0210	-
LOG(P10)	-0.0018	(0.0003)***	0.0066	(0.0008)***	-0.0018	(0.0003)***	-0.0018	-	0.0198	(0.0011)***	-0.0162	-
LOG(P11)	-0.0022	(0.0004)***	0.0014	(0.0009)	-0.0108	(0.0007)***	0.0013	(0.0004)***	0.0013	-	0.0245	-
LOG(P12)	0.0013	-	-0.0066	-	0.0098	-	-0.0029	-	0.0023	-	-0.0224	-
Expenditure	0.0035	(0.0004)***	0.0030	(0.0009)***	0.0193	(0.0008)***	-0.0013	(0.0005)***	-0.0068	(0.0012)***	0.0084	-
LOG(AGE)	-0.0004	(0.0009)	0.0152	(0.0022)***	0.0159	(0.0018)***	-0.0069	(0.0011)***	0.0050	(0.0028)*	-0.0328	-
LOG(HHSIZE)	0.0014	(0.0004)***	-0.0112	(0.0011)***	0.0106	(0.0009)***	0.0000	(0.0005)	0.0078	(0.0014)***	-0.0171	-
URBAN	-0.0003	(0.0005)	0.0047	(0.0013)***	-0.0089	(0.0011)***	-0.0003	(0.0006)	-0.0009	(0.0016)	0.0070	-
EMPLOYED	0.0000	(0.0006)	0.0102	(0.0016)***	0.0014	(0.0014)	0.0015	(0.0008)*	-0.0011	(0.0021)	-0.0069	-
MALE	-0.0010	(0.0007)	0.0011	(0.0017)	-0.0068	(0.0014)***	-0.0032	(0.0008)***	-0.0022	(0.0021)	0.0068	-
MALAY	0.0023	(0.0008)***	0.0062	(0.0021)***	-0.0227	(0.0018)***	0.0047	(0.0010)***	-0.0006	(0.0027)	-0.0016	-
CHINESE	0.0023	(0.0009)**	0.0191	(0.0023)***	0.0058	(0.0019)***	-0.0062	(0.0011)***	-0.0092	(0.0029)***	0.0004	-
INDIAN	0.0084	(0.0013)***	0.0000	(0.0032)	0.0186	(0.0027)***	-0.0015	(0.0016)	0.0168	(0.0041)***	-0.0036	-
PENINSUL	-0.0021	(0.0009)**	0.0187	(0.0022)***	0.0045	(0.0019)**	-0.0059	(0.0011)***	-0.0090	(0.0028)***	-0.0079	-
SARAWAK	-0.0019	(0.0010)**	0.0066	(0.0024)***	0.0118	(0.0020)***	-0.0040	(0.0012)***	-0.0202	(0.0031)***	0.0043	-

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.



**Appendix 8:** The parameter estimates of the LA/AIDS without demographic variables, Malaysia, 2004/2005.

	Rice		Bread & other cereals		Meat		Fish		Milk & dairy		Eggs	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	-0.0542	(0.0054)***	0.3498	(0.0083)***	0.0891	(0.0064)***	0.1853	(0.0074)***	0.0965	(0.0054)***	0.0104	(0.0018)***
LOG(P1)	-0.0858	(0.0031)***	0.0843	(0.0048)***	-0.0095	(0.0040)**	-0.0391	(0.0046)***	-0.0132	(0.0032)***	0.0095	(0.0010)***
LOG(P2)	0.0053	(0.0009)***	0.0053	-	0.0030	(0.0015)**	-0.0138	(0.0017)***	-0.0025	(0.0012)**	-0.0003	(0.0004)
LOG(P3)	0.0271	(0.0022)***	-0.0076	(0.0019)***	-0.0076	-	-0.0112	(0.0032)***	-0.0096	(0.0023)***	0.0017	(0.0007)**
LOG(P4)	0.0021	(0.0028)	-0.0763	(0.0044)***	0.0380	(0.0027)***	0.0380	-	0.0063	(0.0029)**	0.0051	(0.0010)***
LOG(P5)	0.0023	(0.0009)**	-0.0260	(0.0015)***	-0.0023	(0.0012)*	0.0249	(0.0007)***	0.0249	-	-0.0015	(0.0003)***
LOG(P6)	0.0345	(0.0022)***	-0.0395	(0.0035)***	0.0113	(0.0029)***	0.0410	(0.0033)***	-0.0088	(0.0007)***	-0.0088	-
LOG(P7)	0.0005	(0.0008)	0.0170	(0.0014)***	-0.0056	(0.0011)***	-0.0116	(0.0013)***	-0.0008	(0.0009)	-0.0064	(0.0002)***
LOG(P8)	0.0105	(0.0013)***	-0.0063	(0.0021)***	-0.0061	(0.0017)***	0.0079	(0.0020)***	0.0008	(0.0014)	0.0005	(0.0005)
LOG(P9)	0.0078	(0.0023)***	0.0267	(0.0036)***	-0.0187	(0.0030)***	-0.0180	(0.0034)***	0.0061	(0.0024)**	0.0002	(0.0008)
LOG(P10)	-0.0102	(0.0008)***	0.0200	(0.0012)***	-0.0027	(0.0010)***	-0.0149	(0.0012)***	0.0004	(0.0008)	-0.0001	(0.0003)
LOG(P11)	-0.0050	(0.0009)***	0.0154	(0.0014)***	-0.0029	(0.0012)***	-0.0241	(0.0014)***	0.0002	(0.0010)	-0.0006	(0.0003)*
LOG(P12)	0.0109	-	-0.0131	-	0.0031	-	0.0211	-	-0.0040	-	0.0007	-
Expenditure	0.0301	(0.0009)***	-0.0266	(0.0014)***	0.0005	(0.0012)	-0.0134	(0.0014)***	-0.0223	(0.0010)***	0.0030	(0.0003)***
	Oils & fats		Fruits		Vegetables		Sugar		Others		Beverage	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
C	0.0168	(0.0021)***	0.0647	(0.0054)***	0.0194	(0.0046)***	0.0552	(0.0027)***	0.0798	(0.0068)***	1.9128	-
LOG(P1)	-0.0018	(0.0012)	0.0223	(0.0030)***	-0.0099	(0.0026)***	0.0064	(0.0015)***	0.0075	(0.0038)*	0.0232	-
LOG(P2)	-0.0006	(0.0004)	0.0018	(0.0011)	0.0068	(0.0009)***	-0.0030	(0.0006)***	-0.0081	(0.0014)***	0.0091	-
LOG(P3)	0.0014	(0.0008)	0.0065	(0.0022)***	-0.0063	(0.0018)***	0.0044	(0.0011)***	-0.0092	(0.0027)***	0.0059	-
LOG(P4)	0.0081	(0.0011)***	-0.0044	(0.0028)	0.0182	(0.0024)***	-0.0081	(0.0014)***	-0.0015	(0.0036)	-0.0174	-
LOG(P5)	-0.0008	(0.0004)**	-0.0067	(0.0009)***	0.0075	(0.0008)***	-0.0035	(0.0005)***	-0.0053	(0.0012)***	-0.0099	-
LOG(P6)	0.0015	(0.0009)*	-0.0139	(0.0022)***	0.0048	(0.0019)**	0.0002	(0.0011)	-0.0014	(0.0028)	-0.0212	-
LOG(P7)	-0.0064	-	0.0066	(0.0009)***	-0.0031	(0.0007)***	0.0010	(0.0004)**	0.0027	(0.0011)***	0.0050	-
LOG(P8)	-0.0041	(0.0005)***	-0.0041	-	-0.0020	(0.0011)*	0.0010	(0.0006)	0.0006	(0.0017)	0.0002	-
LOG(P9)	0.0056	(0.0009)***	-0.0138	(0.0014)***	-0.0138	-	0.0066	(0.0011)***	-0.0069	(0.0029)**	0.0116	-
LOG(P10)	-0.0018	(0.0003)***	0.0083	(0.0008)***	-0.0023	(0.0003)***	-0.0023	-	0.0179	(0.0011)***	-0.0097	-
LOG(P11)	-0.0023	(0.0004)***	0.0028	(0.0009)***	-0.0108	(0.0008)***	0.0009	(0.0004)**	0.0009	-	0.0245	-
LOG(P12)	0.0012	-	-0.0053	-	0.0108	-	-0.0035	-	0.0027	-	-0.0213	-
Expenditure	0.0032	(0.0004)***	0.0039	(0.0009)***	0.0201	(0.0008)***	-0.0016	(0.0004)***	-0.0082	(0.0011)***	0.0130	-

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.