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Household Consumption Patterns in Pakistan: A Rural-Urban Analysis

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Abstract

This paper attempts to analyze various elasticities; expenditure (income), own-price and household size in relation to a variety of Aggregate Food Commodity (AFC) groups. The outcome of this research reflects that most of the estimated elasticities are significant and reasonable in magnitude. It is observed that cereal's group has a fixed position in the menu of the Pakistani consumers; in both rural and an urban region. The expenditures on vegetables and meats increase with higher income in rural areas weigh against the urban areas. However, the expenditures on fruits, and milk and milk products are more likely to increase with higher income both in urban areas than in rural areas. Besides, household size has a significant impact on household food expenditures. The expenditures on most food groups increase at a decreasing rate as household size increases.

I. Introduction

Food is a basic need and it has an enormous economic impact on Pakistani households. For this reason, it is imperative to gain thorough knowledge of the determinants of food demand in order to design comprehensive agricultural, food and social policy options that improve access to food. Expenditure (income) and price elasticities of food demand are exemplified as the key information for this purpose, and econometric analyses are needed to estimate them empirically. In addition to the described elasticities, some other features like the possible effects of income changes on patterns of per capita expenditure in both rural and urban areas; the existence and the effects of economies of scale on household food expenditure among several scales of household sizes; and no doubt, the simultaneous effect of total expenditure, location, and household size on food expenditure patterns of

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a country are also mandatory in order to design wide-ranging agricultural, food and social policy options that build up the strength of the households towards the healthier food access. Therefore, this study illuminates the partial food demand systems as a basis for future choice of Pakistani food policies.

For the sake of analysis, a double-log specification of the Engel curve is estimated. The use of Engel functions is appropriate as the data used is cross-sectional and price effects are absent. Expenditure elasticities are calculated using the slope of the Engel curve. Some of the popular functions used are linear, quadratic, semi-log, double-log, log-inverse, and inverse. Each functional form possesses some desirable characteristics, thus no single form has found general acceptance[2] but studies by Prais and Houthakker (1955) indicate that the semi-log and double-log specifications are the most appropriate forms. However, for all practical purposes and when elasticities are estimated at the sample means, estimates obtained using a double-log specification are generally sufficient[3]. So, on the basis of Mergers (1991) views, here a double-log specification of the Engel curve is opted for the static demand analysis. Expenditure on food products was aggregated into various sub groups: e.g. cereals (CR), pulses (PL), fruits (FR), edible oils and fats (EOF), sugar and gur (SG), meats (MT), vegetables (VG), tea, coffee and soft drinks (TCS), and milk and milk products (MMP). The decision to break down the commodities into these groups is based on the pattern of the Pakistani diet and the available data.

In static framework this study focuses: (i) to estimate the expenditure elasticities for Aggregate Food Commodity (AFC) groups across rural-urban regions; (ii) to explore household size economies by estimating expenditure elasticities with respect to the household size in rural and urban regions; and finally, (iii) to analyze the simultaneous effects between the total expenditure, location and household size.

Expenditure elasticity is one of the key determinants of future food demand, and it is important to have an accurate estimate of expenditure elasticity in order to forecast the medium to long-term demand for food stuffs. Keeping aligned with the international research about the fact several empirical studies have been conducted on consumption patterns in Pakistan. These include Rehman (1963), Bussink (1970), Khan (1970), Ali (1981, 1985), Siddiqui (1982), Malik (1982), Cheema and Malik (1984, 1985), Malik

[2] See, Salathe (1979) for further details.
[3] See, for instance Mergers (1991).

and Ahmad (1985), Malik *et al.* (1987), Burney and Khan (1990, 1991), Malik (1992), Burki (1997), Aziz (1997, 2004), Chaudhary *et al.* (1999), Malik and Siddique (2002), Ahmad (2004), and Malik and Babar (2005, 2006).

The studies mentioned here are almost meticulous in the area of consumption analysis. These studies have addressed different issues relating to household consumption patterns in rural and urban households. Most of the studies used HIES data to highlight the rural urban differences in consumption patterns in Pakistan. In addition to it the researchers have also explored the expenditure elasticities while making use of Engel curve methodology in its various functional forms (*i.e.* linear, semi-log, log-log, log-log inverse and semi-log inverse). Siddiqui (1982) and Cheema and Malik (1985) also explored the household size effect on the consumption patterns of the inhabitants. The present study is a step ahead in the sense that in addition to expenditure elasticities, the effects of household size, location and simultaneous effects on the consumption patterns of the people are also explored. Rest of the paper is organized as; part-II consists of data sources and model specification, part-III deals with the food expenditure elasticities by region, part-IV discusses on food expenditure elasticities by household size, part-V provides the simultaneous effect of total expenditure, location and household size and last part is specified for summery and conclusions.

II. Data Sources and Model Specification

The data used is based on micro level data set of Pakistan Integrated Household Survey data (PIHS) 2004-05 conducted by Federal Bureau Statistics, Government of Pakistan.[4] Total per capita expenditure and per capita expenditure on nine major food groups[5] are calculated and used separately for both rural and urban areas and for each household size (one person, 2-4 persons, 5-7 persons, and 8 or more persons). It is hypothesized that the relative importance of economies of scale increases with household size.

This provides a basis for estimating Engel curves that are based on the relationships between expenditure on an individual good and the income level as measured by total expenditures. In cross-sectional budget studies, provided

[4] See, appendix B (table B1 to B3), for further details about the households (i.e. number of households in sample, household size, sex, etc.).

[5] The food groups are cereals (CR), pulses (PL), fruits (FR), edible oils and fats (EOF), sugar and gur (SG), meats (MT), vegetables (VG), tea, coffee and soft drinks (TCS), and milk and milk products (MMP).

the surveys are completed in a short time-span, prices faced by all households can be regarded as constant, apart from minor variations due to social and regional factors. This allows focusing on responses of household demand to variation in income or total expenditure[6]. After statistically estimating the Engel curves, the nature of these responses can be summarized by computing expenditure elasticities.

2.1. The Model

A double-log specification of the Engel function has been chosen in order to estimate expenditure elasticities for rural and urban areas and for each household size. A double-log specification has proven the most appropriate way of estimating the expenditure elasticity of demand; it generates more realistic expenditure elasticities (Malik, 1992). The general model can be written as follow:

$$\ln w_j = \alpha_j + \beta_j \ln y + \eta_j \qquad (1)$$

Where w_j is the average per capita expenditure share for food group j, α_j and β_j are the estimated coefficients, y is the average total per capita income calculated as the average total per capita expenditure, and (η_j) is the disturbance term. As pointed out before, the derivation of the Engel function assumes constant prices.

Equation (1) is estimated for each of the nine Aggregate Food Commodity (AFC) groups for rural and urban areas, and for each household size in both rural and urban Pakistan. Three hypotheses are to be tested:

- First, it is unstipulated that the income (or expenditure) variable is an imperative determinant of food expenditures.
- Second, there exists dissimilarity in the expenditure elasticity for each food group between rural and urban areas. More specifically this hypothesis refers to the existence of location effect among the inhabitants of different localities.

[6] In the literature, there is a tendency to use total expenditure instead of income as explanatory variable. The central theme behind this adoption is that people declare total expenditures more truly than income. Therefore, in this study the total expenditure elasticities are estimated instead of income elasticities.

- The third hypothesis suggests that there is a demarcation in the elasticity for each food group among several scales of household size[7].

Dummy variables are included for the verification and confirmation of second and third hypotheses. There are four categories of household size as described in the data set. Therefore, three dummies are introduced, in order to testify the second and third hypothesis after following the methodology as described by Gujarati (1995). Assuming that the four types household size have a common slope but different intercepts in the regression of per capita expenditure share for a food group on average total expenditures[8]. The equation estimated for this is of the form:

$$\ln w_j = \alpha_j + \beta_j \ln y + \gamma_0 D_{0j} + \gamma_1 D_{1j} + \gamma_2 D_{2j} + \gamma_3 D_{3j} + \eta_j \qquad (2)$$

Where:

D_0 = 1, if rural
0 otherwise

D_1 = 1, if household size 2-4 persons
0 otherwise

D_2 = 1, if household size 5-7 persons
0 otherwise

D_3 = 1, if household size 8 and more persons
0 otherwise

All other variables have been as defined above. The two equations (1) and (2) are estimated using (OLS) regression. Expenditure elasticities are calculated as ($\varepsilon_j = \beta_j$), where β_j is the coefficient of regression. The coming section illustrate the results of expenditure elasticities for rural as well as urban areas of Pakistan.

III. Food Expenditure Elasticities by Region

There are variations in elasticities for chosen AFC groups that tend to indicate a difference in household's attitudes toward these groups as their

[7] Debate about household size economies of scale are well documented in Deaton and Paxon (1998); Gibson (2002); and Abdulai (2003).

[8] The first household type (one person) is treated as the base category and the intercept α_j reflects the intercept of this category.

income augmented. The corresponding expenditure elasticities are reported for both rural and urban regions of Pakistan.

3.1. Rural Pakistan

On an economic basis, the estimated elasticities in table 1(see appendix A) seem to be plausible. All expenditure elasticities have positive signs and for all of the AFC groups is less than one. This means that all selected food groups are necessities for Pakistani households in rural regions, *i.e.*, as income increases their expenditure will increase at a lower rate.

Table 1 reveals that expenditure elasticities of demand for all food groups are significant at one percent level of significance. The elasticities of cereals and pulses are relatively similar at low numbers, which means that the consumption of these commodities is relatively little affected by income changes. The smaller elasticities, the less the consumption is affected by a change in income. The cereals group has an expenditure elasticity of 0.43, which means that as total expenditure rises by one percent the expenditure on cereals would tend to rise by only 0.43 %.

The elasticity of pulses is 0.40, the lowest, indicating that as total expenditure raises by one percent the quantity consumed from pulses group would tend to rise by 0.40 %. This result is consistent with the fact that consumption of pulses is important for the poor and is likely to decrease with higher income.

The vegetables group has a fixed position in the Pakistani menu. It has an expenditure elasticity of 0.53 compared to fruits group, which has a relatively high expenditure elasticity of 0.92. An increase in total expenditure by one percent would tend to generate a 0.92 % increase in fruits expenditure in rural Pakistan. Fruits such as citrus, banana, and grapes are consumed extensively during religious fasting, especially in rural areas. The meats group has a relatively high expenditure elasticity of 0.98, indicating that an increase in total expenditure by one percent would tend to cause a 0.98 % increase in meat expenditure.

Milk and milk products are used for breakfast and dinner in Pakistan. Not only are they protein sources, but also their prices, compared to prices of other animal products, were for a long time relatively low. Increased total expenditure has a clear impact on the expenditure on milk and milk products; its expenditure elasticity is 0.84. This means that a one percent increase in total expenditure would tend to cause an increase in expenditure on milk and

milk products by 0.84 %. For sugar and gur, the expenditure elasticity is 0.75, which means that an increase in total expenditure by one percent would tend to generate 0.75 % increase in sugar and gur expenditure in rural Pakistan.

The estimated expenditure elasticity for the edible oils and fats group is 0.63, which means that a one percent increase in total expenditure would tend to cause an increase in the expenditure on the edible oils and fats group by 0.63 %. With higher income perhaps the quantity of edible oils and fats consumed will not increase but the quality of edible oils and fats group consumed will improve.

3.2. Urban Pakistan

It is found that all AFC groups have positive expenditure elasticities in urban regions and all are less than one (table 2, see appendix A). This means that all selected food groups are necessities for urban Pakistan. It is found that the change in the consumption of food groups will be significant at one percent probability level as income increases.

The estimated expenditure elasticity for cereals group is 0.44, which might be a symptom of that a one percent increase in total expenditure is associated with an increase of about 0.44 % in cereals expenditure. The cereals group has a momentous place in the menu of the Pakistani consumer. The elasticity of cereal's group for urban regions is very close to that of rural regions and low in magnitude. The low expenditure elasticity thus reveals the constant behaviors of the consumers towards the cereal consumption and the consumption of cereals is effected minutely as income of consumers' changes.

For the pulses group, the expenditure elasticity is only 0.26, the lowest, compared to the elasticities for other food commodities. Like cereals the low magnitude of expenditure elasticity for pulses illustrates that the consumption of pulses increases at decreasing rate as income of the consumer increases. The expenditure elasticity for the vegetables group is 0.50, where an increase in total expenditure by one percent would tend to cause 0.50 % increase in vegetables expenditure in urban Pakistan.

Increased total expenditure has a clear stimulus for the consumption of fruits in urban Pakistan. Its consumption is likely to escalate more with higher income than any other commodity. The expenditure elasticity of fruits is 0.95, which means that a one percent increase in total expenditure is associated with an addition of about 0.95 % in expenditure on fruits.

The expenditure elasticity for the meats group is 0.71, which indicates that an increase in total expenditure by one percent would tend to cause a 0.71% increase in meats group expenditure in urban Pakistan. The expenditure elasticity of milk and milk products group is somewhat high, 0.90, indicating a one percent increase in total expenditure is associated with an increase of about 0.90 % in expenditure milk and milk products group.

The estimated expenditure elasticity of the sugar and gur group is 0.72, which means that an increase in total expenditure by one percent would tend to cause a 0.72 % increase in expenditure on the sugar and gur and its products group. The high expenditure elasticity of sugar and gur is also an indicator of increasing sweets consumption with higher income. The expenditure elasticity for edible oils and fats is 0.56, indicating a one percent increase in total expenditure would tend to generate an increase in the share of edible oils and fats group by 0.56 %, as improvement of the quality of edible oils and fats consumed.

As it is clear from the aforementioned results that the cereals group has a fixed position in the menu of the Pakistani consumer in both rural and urban areas, so that's why, its consumption is relatively affected diminutively by income changes. The expenditures on vegetables and meats increase with higher income in rural areas weigh against the urban areas. However, the expenditures on fruits, and milk and milk products are more likely to increase with higher income in urban areas than in rural areas.

IV. Food Expenditure Elasticities by Household Size

This section examines the existence of economies of scale in household food expenditure in Pakistan. Engel relationship is estimated for nine AFC groups using the same survey data set as mentioned before. The survey includes data on food expenditure by household size. This data were divided into four brackets as follows: one person, 2-4 persons, 5-7 persons, and 8 and more persons[9].

Economies of scale in consumption are present if expenditures increase at a decreasing rate as household membership increases. Some studies examine the interactions between household size, economies of scale,

[9] The details about household size are presented in appendix B: tables B1 to B3.

and the consumption of private goods such as food[10]. Economies of scale in consumption may occur for mainly three reasons:

- First, the public goods within the household can be shared and serve their function without needing to be replicated in relation to the number of individuals within the household.
- Second, larger households may process food more efficiently and with less waste than smaller households (for example, food portions and leftovers that may be discarded by smaller households may be used by larger ones).
- Third, larger households may receive quantity discounts because they buy larger quantities.

It is found that household size has a significant influence on household food expenditures. The expenditures on most food groups increase at a decreasing rate as household size increases (table 3 to 6 for rural Pakistan and table 7 to 10 for urban Pakistan, see appendix A). There are differences in elasticity estimates for selected food groups that tend to indicate a difference in economies of scale in consumption of these foods.

Table 3 to 6 (see appendix A) present the expenditure elasticities for selected AFC groups for the four household sizes at rural level. All of the coefficients appear to be significant at the one percent significance level and expenditure elasticities have the expected positive signs.

Expenditure elasticity for cereals group is 0.35 for the smallest household size (one person). It increased to reach 0.43 for the biggest household size (8 persons and more), but it is the lowest, 0.31, for the household size 5-7 persons. It is observed that the expenditure elasticities for most food groups decrease for the household size 2-4 persons and 5-7 persons, and then increase for the largest household size (8 persons and more), as shown in table 3 to 6 (see appendix A).

The expenditure elasticity for vegetables and fruits has each achieved the lowest for the household size 2-4 persons, indicating high economies of scales in consumption of these food groups for this household size as compared to other household sizes. For other food groups, the expenditure elasticities are the lowest for the household size of 5-7 persons.

[10] Some studies offer a detailed discussion about the economies of scale in consumption, see: e.g. Deaton and Paxon (1998); Gibson (2002); and Abdulai (2003).

For urban Pakistan, the corresponding expenditure elasticities are reported in table 7 to 10 (see appendix A) for each household size for nine AFC groups. The expenditure elasticity for the cereals group increases at a decreasing rate as household membership increases. It is 0.36, 0.41, 0.43, and 0.48 for the household sizes: one person, 2-4 persons, 5-7 persons and 8 and more persons, respectively. The same pattern of elasticity estimates is observed for fruits, meats, tea, coffee and soft drinks, and milk and milk products with differences in economies of scale in consumption of these food groups as household size increases.

V. Simultaneous Effect of Total Expenditure, Location and Household Size

Important determinants of food expenditure patterns are income (or expenditure) level of the household, the household size, and the local food habits. These determinants are analyzed simultaneously by using dummy variables for each food group, as mentioned in equation (2). The major results are shown in table 11 to 19 (see appendix A).

As can be expected, total expenditure (income) variable is an important determinant of food expenditure. There is a marked difference between rural and urban areas in the expenditure on most food groups. Most of the coefficients appear to be significant at the one significance level and expenditure elasticities have the expected positive signs. For most food groups, the household sizes; 5-7 persons and 8 and more persons, have significant influences on household food expenditures.

VI. Summery and Conclusions

A double log Engel curve specification is used in a static framework in order to estimate the expenditure elasticities and to explore the household size economies of scale in consumption. All the estimated expenditure elasticities are as expressed in magnitude (less then one) with positive signs. This means that all selected food groups are necessities, *i.e.*, as income increases their expenditure will increase at a lower rate. There are differences in elasticity estimates for selected food groups that tend to indicate a difference in economies of scale in consumption of these foods. It is further explored that household size has a significant influence on household food expenditures. The expenditures on most food groups increase at a decreasing rate as household size increases. For most food groups, the household sizes; 5-7 persons and 8 and more persons, have significant influences on household

food expenditures. The main findings of the Engel curve's analysis are as under.

- The analysis reveals that expenditure elasticities in urban regions are low in magnitude as compared to the same for rural regions.
- The consumption towards cereals' group is relatively affected diminutively by income changes because it has a fixed position in the menu of the Pakistani consumers in both rural and urban areas. The expenditures on vegetables and meats increase with higher income in rural areas weigh against the urban areas. However, the expenditures on fruits, and milk and milk products are more likely to increase with higher income in urban areas than in rural areas. Moreover, fruits; meats; and milk's group reflect high magnitudes of expenditure elasticities as compared to the other included groups.
- Regarding household specific elasticity estimates, households residing in urban and rural areas, and households of different sizes show that the expenditures on vegetables and meats increase with higher income in urban areas compared to rural areas. However, the expenditures on fruits, fish, and milk and its products are more likely to increase with higher income in rural areas than in urban areas. Also, the expenditure of most food groups has increased at decreasing rates as household size increased.
- It is explored that household size has a significant influence on household food expenditures. The expenditures on most food groups increase at a decreasing rate as household size increases. There are differences in elasticity estimates for selected food groups that tend to indicate a difference in economies of scale in consumption of these foods. In this context it is also observed that for most food groups, the household sizes; 5-7 persons and 8 and more persons, have significant influences on household food expenditures.

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Appendix A: Tables of Empirical Results

Table: 1. Expenditure Elasticities for Selected AFC Groups in Rural Pakistan

Food Groups[11]	α_j	β_j	Std. error	R^2	T-Statistics
CR	1.90	0.43	0.05	0.75	7.94***
PL	0.08	0.40	0.06	0.64	6.14***
VG	0.55	0.53	0.06	0.75	8.02***
FR	-3.08	0.92	0.07	0.87	11.77***
MT	-0.60	0.98	0.05	0.91	15.09***
TCS	-1.93	0.67	0.05	0.87	12.11***
MMP	-2.35	0.84	0.04	0.94	17.95***
EOF	-0.49	0.63	0.06	0.84	10.37***
SG	-1.89	0.75	0.03	0.96	24.94***

Note: *** Indicates significant at one percent level of significance.

Table: 2. Expenditure Elasticities for Selected AFC Groups in Urban Pakistan

Food Groups	α_j	β_j	Std. error	R^2	T-Statistics
CR	1.57	0.44	0.01	0.99	79.87***
PL	0.69	0.26	0.01	0.93	15.58***
VG	0.57	0.50	0.02	0.95	20.00***
FR	-3.26	0.95	0.03	0.97	25.01***
MT	-0.07	0.71	0.02	0.97	24.87***
TCS	-0.86	0.49	0.04	0.86	10.20***
MMP	-2.55	0.90	0.05	0.93	15.71***
EOF	-0.18	0.56	0.02	0.96	22.12***
SG	-1.80	0.72	0.01	0.99	69.49***

Note: *** Indicates significant at one percent level of significance.

[11] Cereals (CR), pulses (PL), vegetables (VG), fruits (FR), meats (MT), tea, coffee and soft drinks (TCS), milk and milk products (MMP), edible oils and fats (EOF), and sugar and gur (SG).

Table: 3. Expenditure Elasticities for Selected AFC Groups in Rural Pakistan if Household Size is One Person

Food Group	α_j	β_j	R^2	T
CR	2.53	0.35	0.52	4.28***
PL	0.74	0.36	0.62	4.06***
VG	2.03	0.37	0.43	2.73***
FR	-3.52	0.96	0.86	7.81***
MT	0.17	0.72	0.88	8.69***
TCS	-0.27	0.52	0.86	7.73***
MMP	-2.27	0.85	0.88	8.71***
EOF	0.37	0.56	0.44	2.78***
SG	-2.09	0.82	0.83	8.97***

Note: *** Indicates significant at one percent level of significance.

Table: 4. Expenditure Elasticities for Selected AFC Groups in Rural Pakistan if Household Size is 2-4 Persons

Food Group	α_j	β_j	R^2	T
CR	2.01	0.41	0.96	18.51***
PL	1.43	0.23	0.48	3.58***
VG	2.69	0.28	0.45	3.36***
FR	-1.28	0.71	0.75	6.44***
MT	1.17	0.58	0.94	14.38***
TCS	0.03	0.44	0.94	15.04***
MMP	-1.52	0.75	0.95	15.73***
EOF	1.41	0.41	0.74	6.37***
SG	-0.32	0.57	0.95	16.65***

Note: *** Indicates significant at one percent level of significance.

Table: 5. Expenditure Elasticities for Selected AFC Groups in Rural Pakistan if Household Size is 5-7 Persons

Food Group	α_j	β_j	R^2	T
CR	2.66	0.31	0.81	8.41***
PL	1.38	0.21	0.52	4.14***
VG	1.60	0.38	0.82	8.64***
FR	-2.56	0.84	0.86	10.06***
MT	1.61	0.49	0.70	6.16***
TCS	-0.21	0.42	0.56	4.55***
MMP	-1.02	0.64	0.72	6.41***
EOF	0.99	0.41	0.74	6.83***
SG	0.86	0.38	0.70	6.09***

Note: *** Indicates significant at one percent level of significance.

Table: 6. Expenditure Elasticities for Selected AFC Groups in Rural Pakistan if Household Size is 8 and more Persons

Food Group	α_j	β_j	R^2	T
CR	1.76	0.43	0.95	19.04***
PL	0.03	0.37	0.32	2.77***
VG	0.29	0.53	0.91	13.01***
FR	-3.81	0.99	0.84	9.20***
MT	-1.10	0.87	0.94	16.29***
TCS	-1.77	0.62	0.89	11.23***
MMP	-2.27	0.81	0.91	12.45***
EOF	-1.38	0.73	0.92	13.95***
SG	-1.45	0.68	0.96	12.04***

Note: *** Indicates significant at one percent level of significance.

Table: 7. Expenditure Elasticities for Selected AFC Groups in Urban Pakistan if Household Size is one Person

Food Group	α_j	β_j	R^2	T
CR	2.38	0.36	0.72	6.62***
PL	0.18	0.37	0.49	30.40***
VG	2.02	0.39	0.84	9.26***
FR	-1.27	0.76	0.74	6.94***
MT	2.31	0.48	0.68	6.06***
TCS	2.30	0.20	0.41	3.44***
MMP	0.79	0.55	0.73	6.71***
EOF	1.90	0.37	0.88	11.06***
SG	-0.11	0.57	0.72	6.57***

Note: *** Indicates significant at one percent level of significance.

Table: 8. Expenditure Elasticities for Selected AFC Groups in Urban Pakistan if Household Size is 2-4 Persons

Food Group	α_j	β_j	R^2	T
CR	1.82	0.41	0.97	28.16***
PL	1.60	0.17	0.63	5.41***
VG	1.84	0.37	0.91	13.59***
FR	-1.70	0.78	0.96	20.76***
MT	1.41	0.55	0.87	10.99***
TCS	1.44	0.23	0.58	4.85***
MMP	0.09	0.62	0.91	13.01***
EOF	0.90	0.45	0.93	15.50***
SG	-0.93	0.62	0.94	15.93***

Note: *** Indicates significant at one percent level of significance.

Table: 9. Expenditure Elasticities for Selected AFC Groups in Urban Pakistan if Household Size is 5-7 Persons

Food Group	α_j	β_j	R^2	T
CR	1.57	0.43	0.99	72.29***
PL	1.35	0.17	0.85	9.47***
VG	1.49	0.38	0.95	17.31***
FR	-2.39	0.85	0.95	18.20***
MT	0.46	0.64	0.94	16.67***
TCS	0.15	0.36	0.74	6.82***
MMP	-1.48	0.76	0.91	13.17***
EOF	0.93	0.41	0.94	15.78***
SG	-1.28	0.65	0.98	34.67***

Note: *** Indicates significant at one percent level of significance.

Table: 10. Expenditure Elasticities for Selected AFC Groups in Urban Pakistan if Household Size is 8 and more Persons

Food Group	α_j	β_j	R^2	T
CR	1.20	0.48	0.94	15.59***
PL	-0.15	0.38	0.67	5.67***
VG	0.94	0.44	0.90	11.93***
FR	-3.02	0.91	0.95	17.46***
MT	-0.34	0.74	0.97	22.39***
TCS	-1.51	0.57	0.84	9.34***
MMP	-2.55	0.89	0.92	13.29***
EOF	0.20	0.48	0.80	8.02***
SG	-1.29	0.63	0.97	25.30***

Note: *** Indicates significant at one percent level of significance.

Table: 11. Double-Logarithmic Curves: Estimated Results for Cereals

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	1.99	15.39***	0.90
Ln total expenditure	0.40	28.74***	
Location	0.15	5.06***	
Household size (2 – 4 persons)	-0.10	-2.48***	
5 – 7 persons	-0.20	-4.64***	
8 and more persons	-0.17	-3.73***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 12. Double-Logarithmic Curves: Estimated Results for Pulses

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	1.63	4.46***	0.41
Ln total expenditure	0.20	5.06***	
Location	0.29	3.57***	
Household size (2 – 4 persons)	-0.24	-2.05**	
5 – 7 persons	-0.48	-4.01***	
8 and more persons	-0.54	-4.27***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 13. Double-Logarithmic Curves: Estimated Results for Vegetables

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	1.96	11.64***	0.89
Ln total expenditure	0.39	21.81***	
Location	0.04	0.96	
Household size (2 – 4 persons)	-0.30	-5.65***	
5 – 7 persons	-0.53	-9.58***	
8 and more persons	-0.69	-11.85***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 14. Double-Logarithmic Curves: Estimated Results for Fruits

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	-1.99	-5.96***	0.88
Ln total expenditure	0.86	23.86***	
Location	-0.06	-0.75	
Household size (2 – 4 persons)	-0.38	-3.54***	
5 – 7 persons	-0.55	-4.96***	
8 and more persons	-0.69	-5.98***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 15. Double-Logarithmic Curves: Estimated Results for Meats

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	1.06	4.91***	0.89
Ln total expenditure	0.62	26.49***	
Location	0.02	0.32	
Household size (2 – 4 persons)	-0.21	-3.08***	
5 – 7 persons	-0.42	-5.94***	
8 and more persons	-0.36	-4.80***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 16. Double-Logarithmic Curves: Estimated Results for TCS Group

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	0.55	2.41**	0.82
Ln total expenditure	0.39	15.78***	
Location	0.20	4.01***	
Household size (2 – 4 persons)	-0.37	-5.12***	
5 – 7 persons	-0.64	-8.42***	
8 and more persons	-0.76	-9.56***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 17. Double-Logarithmic Curves: Estimated Results for Milk Group

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	-0.72	-2.93***	0.91
Ln total expenditure	0.72	26.91***	
Location	-0.40	-7.33***	
Household size (2 – 4 persons)	-0.15	-1.93	
5 – 7 persons	-0.39	-4.75***	
8 and more persons	-0.48	-5.61***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 18. Double-Logarithmic Curves: Estimated Results for Oils and Fats

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	1.04	4.92***	0.86
Ln total expenditure	0.46	20.30***	
Location	0.17	3.54***	
Household size (2 – 4 persons)	-0.27	-3.96***	
5 – 7 persons	-0.55	-7.88***	
8 and more persons	-0.63	-8.49***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Table: 19. Double-Logarithmic Curves: Estimated Results for Sugar and Gur

Explanatory variables	Parameter	T- Statistics	R^2
(Constant)	-0.40	-2.02***	0.92
Ln total expenditure	0.60	28.30***	
Location	0.12	2.69***	
Household size 2 – 4 persons	-0.32	-5.05***	
5 – 7 persons	-0.54	-8.27***	
8 and more persons	-0.64	-9.27***	

Note: *** & ** Indicate significant at one & five percent level of significance, respectively.

Appendix B

Table: B1. Size of an Average HH and its Composition by Sex and Quintiles (Pakistan)

Average HH Size	Total	Quintiles				
		1st	2nd	3rd	4th	5th
No. of sample Households	14708	2277	2598	2832	3156	3845
Percentage of Households	100.00	16.16	17.19	18.71	21.25	26.68
Average number of: Members per HH	6.75	8.66	7.62	6.98	6.31	5.20
Male	3.44	4.33	3.89	3.55	3.25	2.67
Female	3.31	4.33	3.73	3.43	3.06	2.54
Average number of adults Male (age 18 & above)	1.71	1.77	1.68	1.72	1.74	1.66
Female(age 16 & above)	1.84	2.00	1.87	1.86	1.84	1.72
Children	3.19	4.89	4.07	3.40	2.73	1.83
Percentage of HH by number of members: Total	100.00	100.00	100.00	100.00	100.00	100.00
One	0.85	0.09	0.00	0.16	0.33	2.74
Two	4.35	0.33	0.74	1.34	4.35	11.22
Three	6.95	1.27	2.53	5.76	7.78	13.41
Four	10.57	3.07	6.02	9.44	12.94	16.96
Five	13.68	7.04	12.15	13.49	16.77	16.34
Six	14.93	11.41	15.57	16.56	16.89	13.93
Seven	13.88	15.42	16.39	16.75	13.16	9.90
Eight	11.90	17.79	15.99	12.98	10.84	5.77
Nine	8.04	12.80	11.74	9.03	5.98	3.71
Ten & over	14.86	30.79	18.86	14.47	10.95	6.02

Source: HIES 2004-05 electronic data copy.

Table: B2. Size of an Average HH and its Composition by Sex and Quintiles (Urban Pakistan)

Average HH Size	Quintiles					
	Total	**1st**	**2nd**	**3rd**	**4th**	**5th**
No. of sample Households	5809	540	726	959	1267	2317
Percentage of Households	100.00	7.99	10.68	15.42	21.58	44.33
Average number of: Members per HH	6.63	9.30	7.91	7.46	6.90	5.43
Male	3.39	4.61	4.00	3.80	3.57	2.79
Female	3.24	4.69	3.92	3.65	3.33	2.64
Average number of adults Male (age 18 & above)	1.83	1.89	1.82	1.86	1.96	1.75
Female(age 16 & above)	1.93	2.21	1.99	2.02	2.04	1.79
Children	2.87	5.21	4.10	3.58	2.90	1.89
Percentage of HH by number of members: Total	100.00	100.00	100.00	100.00	100.00	100.00
One	1.20	0.00	0.00	0.00	0.31	2.56
Two	3.65	0.44	0.58	0.71	2.10	6.74
Three	6.94	1.49	2.50	3.10	4.86	11.33
Four	11.18	0.90	4.03	6.27	9.03	17.51
Five	15.69	4.04	8.84	13.47	17.50	19.34
Six	14.80	8.69	13.05	15.94	15.90	15.38
Seven	13.59	15.69	17.94	17.72	14.78	10.14
Eight	11.51	19.94	17.99	15.89	12.15	6.59
Nine	7.70	16.06	14.22	7.90	8.27	4.28
Ten & over	13.74	32.75	20.84	18.99	15.08	6.12

Source: HIES 2004-05 electronic data copy.

Table: B3. Size of an Average HH and its Composition by Sex and Quintiles (Rural Pakistan)

Average HH Size	Total	Quintiles				
		1st	2nd	3rd	4th	5th
No. of sample Households	8899	1737	1872	1873	1889	1528
Percentage of Households	100.00	20.05	20.30	20.28	21.10	18.28
Average number of: Members per HH	6.80	8.53	7.55	6.81	6.03	4.94
Male	3.46	4.27	3.87	3.46	3.10	2.52
Female	3.34	4.26	3.68	3.35	2.93	2.42
Average number of adults Male (age 18 & above)	1.65	1.75	1.65	1.68	1.64	1.55
Female(age 16 & above)	1.80	1.96	1.84	1.80	1.74	1.63
Children	3.35	4.83	4.06	3.34	2.64	1.76
Percentage of HH by number of members: Total	100.00	100.00	100.00	100.00	100.00	100.00
One	0.68	0.10	0.00	0.22	0.34	2.95
Two	4.68	0.31	0.78	1.57	5.45	16.38
Three	6.96	1.22	2.53	6.72	9.21	15.81
Four	10.28	3.48	6.52	10.59	14.85	16.31
Five	12.72	7.61	12.98	13.50	16.42	12.88
Six	14.99	11.92	16.21	16.78	17.37	12.26
Seven	14.02	15.37	16.01	16.41	12.36	9.61
Eight	12.08	17.38	15.49	11.93	10.20	4.83
Nine	8.20	12.19	11.12	9.44	4.87	3.05
Ten & over	15.39	30.41	18.37	12.83	8.94	5.91

Source: HIES 2004-05 electronic data copy.