ESTIMATION OF URBAN-RURAL EXPENDITURE AND HOUSEHOLD SIZE ELASTICITIES OF FOOD ITEMS IN PAKISTAN:- EVIDENCE FROM PSLM SURVEY

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ABSTRACT

This study evaluates the household food demand patterns among different income sorts in urban and rural areas of Pakistan and estimation of food expenditure and household size elasticities. The different income sorts are the Lower Income Group(≤ 8000), Lower-middle Income Group(8001-12000), Middle Income Group(12001-18000),Upper-middle Income Group (18001-35000) and Upper Income Group (35000+) Pakistani rupees respectively. For the analysis purpose the cross sectional data were taken from Pakistan Social and Living Standard Measurement Survey (PSLM) 2010-11 by Federal Bureau of Statistics (FBS), Government of Pakistan, Islamabad. Engel Expenditure elasticities are a powerful research tool in the household analysis. If expenditure on a certain item is proportional to income or total expenditure then the income elasticity of demand is better known as Engel elasticity is unity. The food expenditures are the sum of expenditures by each household on the following commodity groups: cereals, pulses, fruits, vegetables, dairy products, chicken, meat, fish, condiments, sugar, edible oils, drinks and miscellaneous food products. The household size and income elasticities are estimated to explain the food consumption trends in Pakistan. The results of the study indicate that all the income and household size elasticities are positive and significant at one percent level of significance. Results of the study also indicate that the urban food consumption is higher in the upper income group (IG) while households belonging to other classes of rural areas are more food responsive. Urban households depict higher size elasticities in overall, lower IG, lower middle IG and middle IG whereas households belonging to upper-middle IG and upper IG of rural area are also more food responsive.

Key Words: Urban-rural households, Income groups, PSLM data, Income elasticities and household size elasticities.

1. INTRODUCTION

Pakistan is a developing country and falls in the low Human Development Index (HDI) because Pakistan is ranked 145th out of 187 countries (United Nations Development Programme, 2011). It is world's sixth most populous country (Official Pakistani Population Clock, 2010) and about 22.6 percent of the total population lives below the international poverty line of US $1.25 a day (Indicators, 2011). Household consumption pattern is rapidly changing in Pakistan like other developing countries due to the well modified and modernized system of the availability of goods and services. Despite the ease of lifestyles the conditions of most of the people are still miserable and they are in worry to fulfill even their basic consumption needs. The standard of living in Pakistan is highly differentiated and varies among different social classes. Though over more than 35 million families are regarded as growing middle class but a large portion of the country's population is still poor.

Household demand is a combination of two important words household and demand. Household refers to a single person or a group of persons who normally live and eat together and share kitchen, While the demand is the quantities of goods and services that the consumers are willing and able to buy from the market at various prices. Consumption of various goods and services is the reflection of household expenditure pattern which are largely influenced by household composition, needs, taste and financial means. Economists use the concept of utility to define the level of satisfaction or welfare that comes from a specific allocation of income among different products. Engel (Expenditure) elasticities are a powerful research tool in the household analysis. In economics the variation from proportionality of one variable with respect to another variable is measured by elasticity. Thus, if expenditure on a certain item is proportional to income or total expenditure then the income elasticity of demand, better known as Engel elasticity is unity. On the other hand, if expenditure on a certain item rises more proportionately relative to income, the Engel elasticity is greater than one. Similarly, if expenditure on an item rises less than proportionately relative to income, the Engel elasticity will be less than one. This concept is helpful in categorizing the commodities into different groups. The commodity is considered to be a necessity, normal and luxury if it has Engel elasticity less than one; equal to one and greater than unity, respectively. The elasticities of different commodities with respect to total expenditures are calculated and results are compared across the commodity and income groups (IG). These results provide the guidelines for future policy implication in respect of the management of the demand and consumption of food commodities in the country. The progress and development of any economy is related with the consumption in a way that it measures the welfare of the people who are making expenditure on the purchase of various consumption heads. Then again, it is helpful in the extension of business activities because the entire investment set up is dependent upon the consumption pattern in the country. Due to the importance of consumption in the economic theory,

a number of researcher have carried out research on household deeds in Pakistan and in other countries ranging from its simplest form to very complicated by using different types of data and variety of econometrics techniques. Functional description of Engel's Law is known as Engel curve which describes that how household expenditure on a particular good or a service varies with change in total income or expenditure. Budget share Engel curves depict how the share of household expenditures on a specific good or service changes with variation in income (Chai and Moneta, 2010a). Engel curve of a commodity reflects its income elasticity and indicates whether a particular good is an inferior, normal or a luxury good (Chai and Moneta, 2010b). No established theory subsists that could explain the pragmatic shape of Engel curves and their associated income elasticity values. Ernst Engel himself argues that households have a hierarchy of wants that determines the shape of Engel curves. As household income rises, some incentives become more prominent as far as household expenditures are concerned that dominates consumption patterns such as starvation, ultimately become satisfied at higher income levels (Witt, 2001). **The specific objectives of the present study are:** (1) To determine the household consumption pattern of various commodity groups of food items among different income groups in urban and rural areas of Pakistan; (2) To measure the economies of scale effect in household consumption by including the household size as an independent variable in Engel curve equation. (3) To estimate expenditure and household size elasticities of demand system, and finally to suggest some policies.

2. METHODOLOGY

Data:-The data for this study is taken from the Government of Pakistan (2011)Pakistan Social and Living Standards Measurement (PSLM) Survey 2010-11, conducted by the Federal Bureau of Statistics (FBS), Government of Pakistan Islamabad. It is based upon two-stage stratified sampling design. This survey, based on a national sample, covers the universe consisting of all urban and rural areas of the four provinces of Pakistan, namely Punjab, Sind, Khyber Pakhtunkhawa and Baluchistan apart from forces restricted military areas of these provinces. This study uses a sample of 6580 households from urban area and 9740 households from rural area out of total 16341 households covered by the PSLM 2010-11 due to unreported and missing values for 21 households. The expenditures in the form of only paid consumption are used for computation because the goal of study is to compare consumption patterns within various income sorts. The food consumption groups are as: cereals, pulses, fruits, vegetables, dairy products, chicken, meat, fish, condiments, sugar, edible oils, drinks and miscellaneous food products. Frequency of food items data in PSLM 2010-11 is of two types i.e. fortnightly and monthly. The 14 days data is first converted into monthly information and then both of these groups are joined to make the household total food consumption during the month. Thus the dependent variable is the natural log of the monthly expenditures on food items (Government of Pakistan, 2011). The total household expenditures are used as a proxy for income as an independent variable because of the fact that income data generally suffers from measurement errors and may also include a transitory component of income (Burney and Khan, 1991). The use of total expenditures instead of income is a common practice in

Engel curves estimation because the expenditures mostly reflect the permanent income of the households. Household total expenditures and household size are calculated in the form of natural log and then are used as an in dependant variable in this regression analysis. Household size indicates the numbers of persons living in the single house. This variable is computed in the natural log form of total family size of the household. Having certain advantages, the family size is used as a separate independent variable. The same is valuable to directly determine the economies of scale effect, avoids the loss of information problem and gives more efficient results regarding the household members (Malik and Sarwar, 1993). In order to determine the food demand pattern and to make the consumption comparison; households are divided into five income sorts. Table 1 shows the household distribution with respect to different income sorts in both urban and rural region at the national level, measured in Pakistani Rupee. Income groups include: The Lower Income Group (≤8000), Lower-middle Income Group(8001-12000), Middle Income Group(12001-18000), Upper-middle Income Group (18001-35000) and Upper Income Group (35000+), respectively.

Table- 1. Households Distribution among Different Income Groups by regions

Monthly Income group	Regions	Number of households	Percentage of Household
Lowe Income Group	Urban	744	4.56
	Rural	3030	18.57
Lower Middle Income Group	Urban	2401	14.71
	Rural	4018	24.62
Middle Income Group	Urban	1469	9.00
	Rural	1357	8.31
Upper Middle Income Group	Urban	682	4.18
	Rural	597	3.66
Upper Income Group	Urban	1285	7.88
	Rural	737	4.51
Overall	Urban	6580	40.31
	Rural	9740	59.69

Source: Calculations using PSLM 2010-11 data.

A functional form that is termed as the constant elasticity, log-log or double log specification which is undertaken in this study has been widely used for demand analysis by Houthakker (1957), Burney and Khan (1991). Though such a system is not consistent with the budget constraint and the theoretical restrictions on systems of demand equations but this is a frequently used specification of a system of demand equations and at best can be treated as a local approximation to the true system of demand equations (Griliches and Intriligator, 1983). A double-log specification has proven the most appropriate way of estimating the expenditure elasticity of demand and it generates more realistic expenditure elasticities (Babar and Shahnawaz, 2010).Consider a complete system of demand equations for n goods consists of the n demand equations:

$$X_j = Xj\,(P_1, P_2, ..., P_n, I, \mu_j)\, \text{J} = 1, 2, ...n \tag{1}$$

Where Xj is the demand for good j by a single household or a group of households, Pj is the price of good j, I is income which is the same as the expenditure on the n goods and μj is the stochastic term in the jth demand equation. In order to estimate the system (5) it is necessary to specify a particular functional form for the estimation of general relationship. Thus the n demand functions in (1) are specified as:

$$X_J = A_j\, P_1{}^{\eta_{j1}}\, P_2{}^{\eta_{j2}} .... P_n{}^{\eta_{jn}}\, I^{\eta_{j1}}\, e^{\mu_j} \tag{2}$$

The linearization of (2) by taking logarithms leads to the log-log specification of the form.

$$LnX_j = \alpha_j + \eta_{j1}\, LnP_1 + \eta_{j2}\, LnP_2 + ... + \eta_{jn}\, LnP_n + \eta_j\, LnI + \mu_j \tag{3}$$

Where $\alpha_j = LnA_j$ considering the price effect constant, the η_j are the income elasticities of demand that can be computed as:

$$\eta_j = \Delta L_n\, X_j\, /\, \Delta L_n\, I = \Delta X_j\, /\, \Delta I * I/X_j \tag{4}$$

Present study uses a double logarithmic functional form to estimate demand pattern because of its certain advantages. It is simple as its estimation and interpretation is quite easy. It is most appropriate to estimate the demand pattern of grouped commodities (Islam and Siwar, 2005). The income or expenditure coefficient is also the coefficient of elasticity so there is no need of further calculation. It is an easy technique to determine the most efficient effect of household size (Houthakker, 1957). Thus by incorporating total expenditure and household size as an independent variables in Engel curve equation and taking the natural log gives:

$$\ln E_{ij} = \alpha_{ij} + \beta_{ij} \ln E_j + \gamma_{ijLnHS_j} + \mu_{ij} \tag{5}$$

3. RESULTS AND DISCUSSION

Present study uses double logarithmic regression analysis to compute the household food demand pattern by computing its relationship with household total expenditures and household size. This systematic investigation is deployed for both urban and rural areas of Pakistan separately by dividing the households into five income sorts. Ordinary Least Square (OLS) technique is employed. Estimation of double log regression (Equation 5) gives estimates of food expenditure and household size elasticities. Results of the food expenditure elasticities for urban and rural areas are shown in Table 2 & 3. All the food expenditure and household size elasticities for both the urban and rural regions are significant at one percent level. Most of the elasticity coefficients exhibit quite little cyclical fluctuations among numerous income sorts.

Table 2. Food Expenditure Elasticities by Income Groups for Urban Area of Pakistan

Monthly Income Group	Food Expenditure Elasticities
Lower IG	0.865
Lower-Middle IG	0.877
Middle IG	0.735
Upper-Middle IG	0.730
Upper IG	0.684
Overall	0.741

Source: Calculations using PSLM 2010-11 data.

Table 3. Food Expenditure Elasticities by Income Groups for Rural Area of Pakistan

Monthly Income Groups	Food Expenditures Elasticities
Lower IG	0.882
Lower-Middle IG	0.890
Middle IG	0.874
Upper-Middle IG	0.787
Upper IG	0.584
Overall	0.779

Source: Calculations using PSLM 2010-11 data.

All the food expenditure elasticities are less than one showing that all the included commodities are necessities in nature. The urban and rural food consumption is initially increasing with increase in income but it declines gradually as income of the households tends to increase. The urban food consumption is higher in the Upper IG. Households belonging to other income sorts of rural area are relatively more food responsive. The validity of Engel's Law is verified for food consumption because its elasticity estimate is less than unity and its value decreases with increase in income of households.

Table.4. Household Size Elasticities by Income Groups for Urban Area of Pakistan

Monthly Income Groups	Household Size Elasticities
Lower IG	0.102
Lower-Middle IG	0.108
Middle IG	0.180
Upper-Middle IG	0.158
Upper IG	0.191
Overall	0.168

Source: Calculations using PSLM 2010-11 data.

The household size is used as an independant variable in order to investigate the economies of scale effect. Results of the household size elasticities for urban and rural areas are shown in Table 4 & 5). Economies of scale effect may occur because some food items can be shared within the household. Larger households may receive discounts as their quantity demanded is relatively high as compared to smaller households. Urban households depict higher size elasticities in overall,

lower IG, lower middle IG and middle IG whereas households belonging to upper-middle IG and upper IG in rural area are more responsive.

Table 5. Household Size Elasticities by Income Groups for Rural Area of Pakistan

Monthly Income Groups	Household Size Elasticities
Lower IG	0.049
Lower-Middle IG	0.073
Middle IG	0.143
Upper-Middle IG	0.206
Upper IG	0.281
Overall	0.121

Source: Calculations using PSLM 2010-11 data.

4. CONCLUSIONS

The study evaluates the double logarithmic analysis to determine the household food demand pattern in urban and rural regions of Pakistan. The data for this purpose is taken from Government of Pakistan (2011).The households are divided into five income groups. All the coefficients of income and household size elasticities are positive and significant at one percent level of significance. The legitimacy of Engel's law is verified because the proportion of food consumption is lower as compared to income. The household size analysis confirms the existence of economies of scale for food consumption among numerous income sorts. The urban food consumption is higher in the Upper IG while households belonging to other classes of rural people are more food responsive. Urban households depict higher size elasticities in overall, lower IG, lower middle IG and middle IG whereas rural households belonging to upper-middle IG and upper IG are more responsive.

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