

Analysis of Food Demand Patterns of Sindh Province, Pakistan

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Abstract

The study estimates, compare and analyse the food demand patterns of households in the rural and urban Sindh. Estimates of the study are based on data of Household Integrated Economic Survey (HIES) 2010-11, using Linear Expenditure System (LES). The results show that substantial quantities of milk, eggs, vegetables, salt, sugar, wheat, and pulses are taken by households in both the urban and rural Sindh; whereas formers add vegetable oil and later, fruits to this list. There is a visible difference in the marginal budget share and luxuries, necessities, substitutes and complements for both types of households. The difference in results of both the rural and urban recommends that, separate policies should be chalked out for the two areas.

Key words: Demand Elasticities, Demand Analysis, LES, SUR Model, Food, Sindh.

JEL Classification: D10, D12, C31, R22.

I. Introduction

Consumption patterns of people living in different geographies vary from time to time, due to change in income, price, taste, weather, products range, customs, tradition and other factors. Food items are at top of the list of necessities of life, caused by any factor. Change in demand for certain food items do not only affects the overall health standards of people but also cause further change in the labour productivity, efficiency and the overall output of economy. It transmits signals that help farmers, food processing firms and businessmen to revise their investment and output decisions. The analysis of food demand patterns also help the government and policy makers to make public investment decisions and formulate better socio-economic policies to uplift living standards of people and access to accomplish healthy food. Thus, studying food demand patterns of households is quite wider in scope as it is linked to microeconomics, health economics and labour economics. This study aims to study the food demand patterns of people, living in rural and the urban Sindh, with an objective to make microeconomic analysis of demand pat-

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terms and suggest suitable policies to households, business firms and to government; in helping them to achieve their goals.

Microeconomic theory of demand legitimates income, income distribution, household size, number of bread winners in a household, own and relative price of commodities, geographical, climate and cultural differences are important factors that could affect the demand and consumption patterns significantly. The studies of Massell (1969), Hay and Sinha (1972), Ray (1982), Yen and Jensen (1996), Ekholm, et al. (2010) and Ahmad, et al. (2007) confirm that out of all these factors income and size of house-holder the most influential factors in consumption and demand decisions. Looking at such statistics for Sindh, it is found that average household size is 6.22 and 6.9 for urban and rural Sindh, respectively. Similarly, in urban Sindh, the major source of income is wages and salaries, non-agriculture activities, owners and occupied houses, while in rural Sindh, the major income is the wages and salaries, followed by income from crop-production and the livestock farming. Likewise, the distribution of income and consumption among quintiles is quite skewed in urban Sindh and quite smooth and even in rural Sindh. On the basis of these and other traits presented in Appendix Table A-1, separate estimates for rural and urban households are made and it is expected that households in rural and urban Sindh will follow somewhat different demand patterns.

Sindh is the second largest province of Pakistan. The population of Sindh is 42.4 million and its urban rural ratio is 52:48.¹ In the 18th constitutional amendment, different departments with complete authority on policy making and powers was transferred from the central government to the provincial governments; amongst which, the policy on agriculture, health and food was also include. Hence, a provincial level analysis for food patterns and food policies is now more crucial and significant for provinces, rather than the national concern. Unfortunately, in the past, no study has been focused on Sindh and therefore, this study aims to fill this gap.

The dataset is taken from the (HIES) 2010-11 and the selected sample include 15 basic, most used food items consumed by 309 households in urban and 150 households in rural Sindh. The LES is used to calculate income, price and cross elasticity. The results show the geographical classification of urban and rural has significant impact on consumption patterns of different goods. There are significant differences in the consumption of subsistence quantities of goods, and that of the goods classified as necessities, luxuries, substitutes and/or complements.

The rest of the paper is structured as follows: Review of literature is presented in section II, methodology is discussed in section III which includes discussion on economic model, econometric technique and description of data. Section IV presents the results and a thorough discussion on findings of the study. Finally, Section V conclude the study and presents the policy implication.

¹ <http://www.pwdsindh.gov.pk/about-us/welcome-note.htm>.

II. Review of Literature

Demand is a very basic concept of economics and attracts the attention of researchers to study this concept. In Pakistan, renowned economists like Siddiqui (1982), Ahmad, et al (1988), Malik and Aziz (2006), Ahmad, et al (2007), Khalil and Yousaf (2012) analysed the consumption and demand patterns of Pakistan using different demand systems, econometric technique and the data sets. Mudassar, et al. (2012) used the Linear Approximation version of Almost Ideal Demand System, to examine the demand of major food items in Pakistan which was based on the data set of HIES (2007–08). It was concluded that mutton in urban and, mutton and Fish in rural areas were considered the luxury food items where uncompensated price elasticity was negative and less than one in absolute terms, for rest of the items. Overall, income and price elasticity were higher in case of rural areas as compared to the urban areas. The results were consistent with the economic theory.

Based on the income levels Safdar, et al. (2012) studied the household consumption patterns of different food commodities consumed by people of different groups in urban and rural areas of Pakistan. The results showed positive and significant elasticity of income and household size for all coefficients which also confirmed the existence of Engel's Law demand elasticity. Consumption patterns for food products for households in rural and urban parts of Baluchistan were also studied by Khalil and Yousaf (2012). AIDS model was applied to the data taken from Household Income and Expenditure Survey (2005-06) and the adult equivalent scale was taken into account. Their findings showed that other than vegetable oil, all food items were being treated as necessities in both the rural and urban areas of the province. Bashir, et al. (2012) investigated the demand for soap in Multan, by collecting cross sectional data from 370 respondents. The study showed that price, income, advertisement and family size had increasing relation with demand. Results of income elasticity indicated that soap is a normal commodity.

Haq, et al. (2011) studied the food demand patterns in Punjab, by taking data from the Household Income and Expenditure Survey (HIES 2004-05), and using the Linear Approximate Almost Ideal Demand System (LAAIDS). Their findings confirmed the role of socio-economic factors, education and profession of household head in consumption behaviour. The estimates of demand elasticities showed that rural consumers were more vibrant to change of price, as compared to urban consumers. Results of compensated and uncompensated cross elasticities were also in accordance to those suggested by the theory. The number of goods considered as complements were higher in urban, than in rural areas. The study of Koksai and Wohlgenant (2013) concluded that cigarettes and alcohol are considered to be substitutes to each other in the current consumption but not in lag. In long-run, increase in relative price resulted to substitute an addictive good with another, while permanent increase resulted to switch from more harmful addictive substance to less addictive ones. It was also found that an increase in education level decreases the consumption of cigarette and alcohol.

Estrada (2012) studied the demand for social services of city government units using the data of Philippines for the year 2008 under LES. His research concluded that local governments of cities with relatively rich inhabitants were less dependent on the share of Internal Revenue Allotment (IRA) as compared to the opposites. Analysing expenditure, the findings stated that in higher income cities, the education; and in middle income cities, the health and nutrition, were at the top of all other expenditures; and that the government was spending more than just the substantial level especially in case of education, health and nutrition. Income elasticity measures indicated that the demand for Local Tax Revenue, Social Welfare Services, Health and Nutrition and Education was less elastic.

A brief review of literature confirms the importance of studying demand patterns, and because of the dynamic nature of demand these studies are conducted repeatedly from time to time as they figure out changes in consumers demand patterns. The overview also confirms absence of any study on analysis of consumption and demand elasticities of food items for Sindh. This study aims to fill this gap by studying food consumption patterns for rural and urban Sindh, using the Household Integrated Economic Survey (2010-11) data. After the devolution of powers from central to provincial government through 18th constitutional amendment, provincial level studies are more important for making effective policies in the areas including poverty, livestock, agribusiness and health. This study could be helpful for consumer, producers and provincial governments including Sindh; in policy perspective as the elasticities provide ease in taking consumption, production, investment, healthcare, livestock farming and poverty eradication related decisions.

III. Methodology

1. Linear Expenditure System

Different demand systems are used to estimate the demand of households for goods. Linear Expenditure System is one of the methodologies which is also known as Stone-Geary System and is quite popular for demand analysis using household data. This system assumes that consumers first buy the substantial and committed quantity of each commodity and then distribute the remaining income among goods in fixed proportion.

The generalized form of LES is:

$$p_i x_i = p_i \beta_i + \alpha_i \left(M - \sum_{j=1}^n P_j \beta_j \right) \quad (1)$$

where, $p_i x_i$ is the total amount of money spent to purchase x_i quantity of i th commodity, β_i is the substantial quantity of this commodity, $p_i \beta_i$ is the expenditure on purchasing

the substantial quantity, α_i is the income share allocated to consumption after substantial quantity, $\sum_{j=1}^n P_j \beta_j$ is the expenditure made to purchase the commodities after buying their substantial quantity, p_i is the price vector of $1 \times n$ order, and x_i is the quantity vector of $n \times 1$.

The formulas² for measurement of different kinds of elasticities are:

$$\text{Income Elasticity} = \alpha_i M / p_i x_i,$$

$$\text{Own Price Elasticity (Compensated)} = -(1 - \alpha_i) \left(1 - \beta_i / X_i \right),$$

$$\text{Own Price Elasticity (Uncompensated)} = -1 + (1 - \alpha_i) \beta_i / X_i,$$

$$\text{Cross Price Elasticity (Compensated)} = \alpha_j \left(1 - \beta_i / X_i \right),$$

$$\text{Cross Price Elasticity (Uncompensated)} = -\alpha_i P_j \beta_j / P_i X_i$$

Linear Expenditure System has some notable properties such as the sum of price, income and cross elasticities of a commodity which is zero. All goods have positive cross and income elasticities which mean that these are substitutes to each other and are normal goods. Hence, it rules out any possibility for existence of inferior and complementary goods. It satisfies the adding up and homogeneity properties as well. Despite its limitations, LES is still used in comparative type of analysis because it allows to compare different sets of consumers not only on the basis of difference in income, own price and cross price elasticities but also on two additional parameters: the difference in consuming substantial quantity, and the difference in marginal budget share. Since this study also aims to compare the food demand patterns of urban consumers with those living in rural areas, the use of LES will widen the scope of the study.

2. *Seemingly Unrelated Regression Model*

To estimate the linear expenditure system, the Seemingly Unrelated Regression Model (SUR) is used. SUR describes the change, not only in one endogenous variable in regression analysis but also in a set of M endogenous variables with reference to change in endogenous variables and random error particular to every single equation. Since the change in demand for one item (no matter what factors were responsible for that change) effects the quantities demanded of other items as well, therefore this methodology of Econometrics is used to gauge the parameters of demand systems. SUR is one of the most widely used econometric model after linear regressions

² Fujii, et al. (1987), Silberberg and Suen, (2001), Stone, (1954).

as it provides useful systems representation of demand equations that arise in neo-classical static theories of consumer and producer behaviour [Geweke (1997), Zellner (1962)].

3. Data Description

The data used in this study has been taken from the Household Integrated Economic Survey (2010-11) published by the Pakistan Bureau of Statistics, Islamabad. Two key concerns were considered while drawing sample from HIES data set:

- a) how many and which items should be included in the selected basket? and,
- b) how many households should be selected?

The objectives of this study demand to consider as many goods as possible, in the basket; and while addressing the concern of selecting items and households, the items consumed by most numbers of the households were given a priority. Starting from the basket of a large number of items, it can be looked as to how many households consume that basket? If the numbers of households are smalls, the items used by the least number of households would drop and again the number of households consuming all these items would be checked. Iterating this process, we end up with the current selection of food items and the households. The sample contains a good number of items being consumed by a good number of households, regularly. This process is consistent with literature on similar studies like Siddiqui (1982), and Ahmad, et al. (1988).

Proceeding in this way, selected sample of urban and rural Sindh, finally include the milk, yogurt, beef, chicken, eggs, fruits, vegetables, salt, spices, sugar, wheat, rice, pulses, vegetable oil and tea. Urban samples including 309 households whereas, 150 households have been taken from the rural Sindh. The issue of such a big difference in the number of households arises because in HIES data-set sampling ratio was 61.2:38.8. The category of milk includes the consumption data of both the fresh milk and packed milk. In HIES data tapes, information on both of them are given separately but here in this work, both are summed up in a single class. The case of classes of fruits, vegetables, pulses and salt is similar as in rural areas, consuming own produced wheat, rice, fruits and vegetables, etc., is quite common. To take this into account, it is considered that quantity and price of food items, fall under either of:

- a) Paid and consumed.
- b) Wages and salaries in kind and consumed.
- c) Own produced and consumed.

For demand estimation with LES, budget of the household is required and so the budget consists of all expenditures made by the households on all these commodities. LES also require data of the prices of food commodities but unfortunately the price data is not available. Therefore, the unit values obtained by dividing expenditures to quantity were used as a proxy of prices.

IV. Results and Interpretations

Results of the linear expenditure system were estimated by using the seemingly unrelated regression model and are presented in the following sections along with brief interpretations of the results.

1. Substantial Quantities and Marginal Budget Shares

According to the theory of LES, consumers' buy the substantial quantity of each commodity first, and then distribute the remaining income for goods in fixed proportion. This substantial quantity, (is the quantity of any good that a consumer thinks he must buy whatever the conditions are,) is represented by positive value while the negative value has no economic interpretation.

Referring to Appendix Table A-2, households of urban Sindh buy substantial quantity of milk, eggs, vegetables, salt, sugar, wheat, pulses and vegetable oil while, households of rural Sindh buy goods like milk, eggs, fruits, vegetables, salt, sugar, wheat and pulses in subsistence quantity as shown by their positive values. The remaining income is spent on additional quantity of these and other goods. In case of rural households exclusion of vegetable oil from this group seems quite natural as they have alternatives like '*desi ghee*', etc., which are produced domestically in most of the cases. Similarly, for some households, fruits are their own produce and so they are easily consumed. Except for vegetables and pulses, the substantial quantities of all products are higher for rural households. Similarly, the marginal share is also different for all commodities across the rural and urban households. For urban households, the share of milk in the whole budget is 25.816 per cent while for rural households it is 22 per cent. Similarly, for tea, urban household spend 11.67 per cent of their budget, while households in rural areas spend only 6.22 per cent. This is because of the fact that rural households have a variety of domestically produced (*lassi*) drinks to consume, especially in summer.

Comparing the urban-rural consumption patterns for Sindh makes it clear that subsistence quantities of commodities consumed by households are almost the same, except fruit which is included in case of rural households only. Vegetable oil consumer is there in case of urban households only. Marginal budget share for commodities like yogurt, eggs and tea are clearly different but for other commodities, results are more or less the same when it comes to geographical classification.

2. *Income and Own Price Elasticities*

Income elasticity of demand, measures the proportionate change in demand of a good to the proportionate change in income of the consumer, i.e.,

$$e_{x,M} = \frac{\Delta x/x}{\Delta M/M} = \frac{\partial x}{\partial M} \cdot \frac{M}{x} \quad (2)$$

For normal goods, income elasticity is positive and, for inferior goods it is negative. A value less than one (but positive) for income elasticity shows that the good is a necessity while the (greater than one) value of income elasticity shows that the good is luxury. [Nicholson and Snyder (2007), Shastri (2000), Varian (2010)]. Price elasticity measures the proportionate change in quantity demand of a good due to a proportionate change in the price of that good, keeping all other variables constant, i.e.,

$$e_{x,p_x} = \frac{\Delta x/x}{\Delta p_x/p_x} = \frac{\partial x}{\partial p_x} \cdot \frac{p_x}{x} \quad (3)$$

Normally, the price elasticity of a good is negative, which confirms that the good is normal; but if it is positive, it indicates that the good is Giffen. In absolute terms, necessities have a lower value of elasticity of demand while luxuries have higher value of elasticity of demand. [Shastri (2000), Varian (2010)]. The compensated price elasticity shows responsiveness of the compensated quantity demand of good, due to a change in the price of that good.

$$e_{x^c,p_x} = \frac{\Delta x^c/x^c}{\Delta p_x/p_x} = \frac{\partial x^c}{\partial p_x} \cdot \frac{p_x}{x^c} \quad (4)$$

Both the compensated and uncompensated price elasticities give the same value, if the good has a small share in consumers' budget or if income elasticity of that good is low. [Jehle and Reny (2011), Mas-Colell, et al. (1995), Nicholson and Snyder (2007) Varian (1992)]. Referring to Appendix Table A-3, positive values of income elasticities of all goods consumed by households in urban Sindh shows that all goods are normal, i.e., an increase in income of a household will result in an increase in demand for all commodities. A value of 1.2358 for income-elasticity for beef shows that if household income is doubled, the demand for beef will increase by 123.58 per cent. Less than one income elasticity for eggs, fruits, salt and vegetables, etc., show that these goods are taken as necessities.

All negative values of price elasticities confirm that for all goods, quantity demanded has negative relation with price which further implies that none of the goods are Giffen. The value (-0.5474) of own price elasticity for salt indicate that by change of 100 per cent in price, the quantity demand for salt will show a reaction of 54.74

per cent in the opposite direction. Values of compensated demand elasticities measures the change of quantity demand due to a change in price of that good when consumers are compensated in income to stay on the same level of satisfaction, that is, these values indicate as to how much the change is purely, because of prices. Therefore, for beef, a 100 per cent change in price will cause 125.85 per cent change in its quantity demand in the opposite direction, out of which 116.079 per cent is purely due to price effect (i.e., the substitution effect).

In case of households located in rural parts of Sindh (Appendix Table A-4) less than one value of income elasticities of pulses, wheat, sugar, spices, salt, vegetables fruits, eggs and milk shows that these commodities are considered necessity by the households. Uncompensated price elasticities shows that demanded quantities of wheat, pulses, salt, vegetables and eggs give little response to a change in their respective prices when compared to chicken, beef and yogurt; but at the same time, all responses are in opposite direction reiterating the negative relation between prices and quantity demand for all goods. Compensated price elasticity value of -1.5413 for rice exhibits that a 10 per cent increase in price of rice will result in reduction in demanded quantity by 15.413 per cent, even if the household is compensated in income to be on the same level of utility, which is the pure price effect.

3. *Uncompensated Own and Cross Price Elasticities*

Cross elasticity measures the reaction of demand of a good (say x) due to a change in price of any other good (say y), i.e.,

$$e_{x,p_y} = \frac{\Delta x/x}{\Delta p_y/p_y} = \frac{\partial x}{\partial p_y} \cdot \frac{p_y}{x} \quad (5)$$

A positive value of cross elasticity indicates that goods are substitutes while a negative value infers that these goods are complements [Nicholson and Snyder (2007), Varian (2010)].

4. *Compensated Own and Cross Price Elasticities*

Compensated cross price elasticity measures the responsiveness of compensated quantity demanded of a good (say x) to a change in price of any other good (say y), i.e.,

$$e_{x^c,p_y} = \frac{\Delta x^c/x^c}{\Delta p_y/p_y} = \frac{\partial x^c}{\partial p_y} \cdot \frac{p_y}{x^c} \quad (6)$$

as explained by [Mas-Colell, et al. (1995), Shastri (2000), Varian (1992)].

In case of goods like, salt and yogurt, vegetables and eggs, salt and wheat, etc., calculate values of cross elasticities based on dataset of urban households and represented in Appendix Table A-5 which indicate that there is no significant effect of increase in price of one good on the quantity demanded of the other good. The value of cross elasticity between chicken and beef is 0.0285 which shows that if price of chicken increases by 100 per cent, the quantity demand of beef will go up by 2.85 per cent only. Therefore, these goods are weak substitutes to each other. Similarly, if price of milk goes up by 10 per cent, the quantity demand of tea will increase by 0.992 per cent only. All compensated cross price elasticities (Appendix Table A-6) are positive which means that all these goods are substitutes to each other. Absolute value is also more than that in case of uncompensated one. Here, if the price of chicken goes up by 100 per cent, the quantity demand of beef will increase by 12.42 per cent and a change of similar ratio in the prices of rice will cause a change of 15.40 per cent. In the same way, keeping in view the real income of the household the quantity demand of wheat would remain unchanged. Households located in rural areas of Sindh the cross price elasticities between some commodities (Appendix Table A-7) like vegetables and eggs, vegetables and yogurt, wheat and salt, etc., are close to zero showing that there exists no significant cross relation between these commodities. A value of cross elasticity (for example 0.0276) between pulses and chicken shows that a change of 100 per cent in price of pulses will affect the quantity demand of chicken by 2.76 per cent. Similarly, a 10 per cent increase in the price of wheat will result in 0.2774 per cent increase in the quantity demand of rice. Hence, in both cases the goods are linked to weak substitute relation.

Referring to Appendix Table A-8, all compensated cross price elasticities which assume no change in purchasing power of the household, are positive. This means that all goods in this case are substitutes. Moreover, the value is also higher (in absolute terms) in this case. Here too, the cross elasticities of all goods with salt are nearly zero, showing that none of the good have a significant cross relation with salt. The value of 0.12467, for cross elasticity between beef and chicken shows that an increase of 1 per cent in the price of beef will increase the quantity demanded of chicken by 0.1247 per cent. Comparing the cross elasticities calculated for households in urban and rural Sindh, some difference in absolute values can be observed. As in case of cross elasticity between chicken and beef the value remain 0.0285 for urban and 0.0171 for rural households. Therefore, the rural households are not as keen in response to change in price as the urban households. This is quite justified because for most of the rural households, chicken is a domestically produced food item, but in the case of cross elasticities between wheat and rice, the value for urban households is 0.0037 and 0.0277 in the case of rural households. Here, rural households show more response as compare to the urban households. In case of cross elasticity between milk and tea, the value is 0.099 for urban households and 0.018347 for rural households. Here again, the fact that milk is a domestically produced item

for most of the rural households, but not for the urban households. Similarly, analysing each value separately, it is obvious that this geographical classification of urban and rural have significant effect on consumption pattern of different goods. A similar kind of observation comes when compensated cross elasticities are compared, where clear magnitude of response can be noticed.

While comparing findings of the current study with previous studies, one should keep in mind that all previous studies were conducted on the country level and not on the province level. Thus, indicating similarities and differences by comparing this study, the past studies were not fully applicable. However, keeping this limitation in mind, the findings of Khalil and Yousaf, (2012), Siddiqui (1982) and Ehtisham, et al. (1988), it is seen that those studies also pointed out difference in the consumption patterns, as difference in the commodities was considered necessity, inferior, normal, substitute and complements in rural and urban areas.

V. Conclusion and Policy Recommendations

This study analyse the food consumption patterns of urban and rural Sindh, Pakistan. Its main objective is to examine the food demand patterns of the province using Linear Expenditure System on the latest available data set and suggest some useful policies to government to increase the welfare of people. The data used in this study is taken from HIES 2010-11. The final sample of the rural and urban Sindh includes fifteen items. Unrelated Regression (SUR) model has been used to estimate the parameters of LES model. Using these parameters, income, uncompensated price, compensated price, uncompensated cross price and compensated cross price elasticities have been calculated.

Information of 309 households from urban and 150 from rural Sindh has been analysed. The results reveal that milk, eggs, vegetables, salt, sugar, wheat, pulses and vegetable oil are among those commodities for which households in urban Sindh take some subsistence quantities before spending their budget on additional quantities of other goods. The households in rural Sindh, slightly differ from the urban households as they take subsistence quantities of fruit, but not of vegetable oil. Looking at the magnitude of response to change in income, it is found that demand for commodities like milk, yogurt, beef, chicken and vegetable oil, etc., is highly income elastic in the case of urban Sindh; while in the case of consumers of rural Sindh, high income elasticity can be seen for items like yogurt, beef, rice and tea, etc. Commodities like tea, beef, chicken, fruits, rice and vegetable oil, etc., are more price elastic in urban parts and commodities like yogurt, spices, chicken, beef and tea, etc., are of same kind in rural parts of Sindh. Therefore, difference in urban and rural consumption patterns can be traced out through this.

On the basis of this analysis, it is recommended that policy making for food support programs should be decentralized and instead of making a single policy for both

the urban and rural areas, separate policies should be chalked out, as geographical differences affect the consumption behaviour. This would increase both the profit of firms and efficiency of government programs. It is advised that policy makers in government sector should support the households in monetary terms so that they would be able to consume food items which fall in the category of necessities and are also healthier. Firms should not increase the price of commodities which indicate more elasticity as increasing price may cost in terms of reduction in the sale of such commodities; ultimately it would reduce the profit of firms.

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APPENDIX

TABLE A-1
 Characteristics of Rural and Urban Households

Characteristics	Urban	Rural
Members per HH.	6.22	6.90
Average No. of Adults per HH	3.90	3.48
Employed Persons per HH	1.77	2.39
Share of Largest Source of Income	62.85%	44.01%
	(Wages and Salaries)	(Wages and Salaries)
	i) 2.08%	i) 18.91%
	ii) 5.16%	ii) 22.36%
Distribution of monthly income by quintiles	iii) 10.74%	iii) 20.89%
	iv) 19.11%	iv) 19.22%
	v) 62.91%	v) 18.62%
	i) 2.27%	i) 21.05%
	ii) 5.92%	ii) 23.93%
Distribution of monthly consumption expenditures by quintiles	iii) 12.09%	iii) 21.08%
	iv) 20.46%	iv) 18.16%
	v) 59.25%	v) 15.77%
Average Monthly Expenditure on Selected Food Basket	Rs. 4424.69	Rs. 4356.88

Source: HIES, 2010 -11.

TABLE A-2
Substantial Quantity and Marginal Budget
Shares for Households in Rural and Urban Sindh

Commodity	Substantial Quantity		Marginal Budget Share	
	Urban Sindh	Rural Sindh	Urban Sindh	Rural Sindh
Milk	1.242929	2.182953	0.268159	0.220087
Yogurt	-0.277948	-4.41266	0.031281	0.104438
Beef	-0.39116	-0.256936	0.09775	0.068537
Chicken	-0.419694	-0.647242	0.098786	0.102711
Eggs	2.337272	4.559148	0.018654	0.009261
Fruits	-0.08624	0.227172	0.042518	0.018306
Vegetables	4.020561	3.77509	0.055398	0.049068
Salt	0.351045	0.373451	0.00124	0.001034
Spices	-0.24408	-0.023804	0.054663	0.028368
Sugar	0.580311	0.636735	0.070166	0.097325
Wheat	0.57256	4.098487	0.143755	0.13169
Rice	-0.230556	-2.868295	0.051805	0.082096
Pulses	0.258957	0.214804	0.026555	0.025747
Vegetable Oil	0.016089	-0.098481	0.03874	0.072288
Tea	-0.942402	-0.183862	0.116753	0.062242

TABLE A-3
Elasticities Calculated for the Households in Urban Sindh

Commodities	Income Elasticity	Price Elasticity (Uncompensated)	Price Elasticity (Compensated)
Milk	1.02787	-0.95514	-0.68698
Yogurt	1.222721	-1.14724	-1.11596
Beef	1.235811	-1.25854	-1.16079
Chicken	1.262273	-1.24412	-1.14534
Eggs	0.90268	-0.84437	-0.82571
Fruits	0.976924	-1.01521	-0.97269
Vegetables	0.670798	-0.65629	-0.6009
Salt	0.564369	-0.54741	-0.54617
Spices	1.127151	-1.27603	-1.22137
Sugar	0.971366	-0.87807	-0.80791
Wheat	1.088248	-0.97299	-0.82924
Rice	1.066076	-1.0679	-1.01609
Pulses	0.824583	-0.80889	-0.78233
Vegetable Oil	1.029737	-0.98672	-0.94798
Tea	3.24742	-3.36089	-3.24414

TABLE A-4
Elasticities Calculated for the Households in Rural Sindh

Commodities	Income Elasticity	Price Elasticity (Uncompensated)	Price Elasticity (Compensated)
Milk	0.963156	-0.9236	-0.70351
Yogurt	2.78677	-1.91442	-1.80998
Beef	1.177784	-1.19916	-1.13063
Chicken	1.348431	-1.38376	-1.28105
Eggs	0.573955	-0.5728	-0.56354
Fruits	0.814457	-0.95594	-0.93763
Vegetables	0.642854	-0.67065	-0.62158
Salt	0.635105	-0.64838	-0.64735
Spices	0.973299	-1.04217	-1.0138
Sugar	0.888959	-0.90968	-0.81235
Wheat	0.848745	-0.8377	-0.70601
Rice	1.769439	-1.6234	-1.5413
Pulses	0.845331	-0.83493	-0.80918
Vegetable Oil	1.066238	-1.04429	-0.97201
Tea	1.394042	-1.40269	-1.34045

TABLE A-5
Uncompensated Own and Cross Price Elasticities for Urban Sindh

	Milk	Yogurt	Beef	Chicken	Eggs	Fruits	Vegeta- bles	Salt	Spices	Sugar	Wheat	Rice	Pulses	Veg. Oil	Tea
Tea	0.099176	0.117977	0.11924	0.121793	0.087097	0.094261	-0.00802	-0.00675	0.108756	0.093724	0.105002	0.102863	0.079562	0.099356	-3.36089
Veg. Oil	-0.00054	-0.00064	-0.00065	-0.00066	-0.00047	-0.00051	-0.00085	-0.00071	-0.00059	-0.00051	-0.00057	-0.00056	-0.00043	-0.98672	-0.0017
Pulses	-0.00649	-0.00771	-0.0078	-0.00796	-0.0057	-0.00616	-0.00043	-0.00037	-0.00711	-0.00613	-0.00687	-0.00673	-0.80889	-0.0065	-0.02049
Rice	0.003572	0.004249	0.004295	0.004387	0.003137	0.003395	-0.00052	-0.00044	0.003917	0.003376	0.003782	-1.0679	0.002866	0.003578	0.011285
Wheat	-0.00434	-0.00517	-0.00522	-0.00533	-0.00382	-0.00413	-0.00071	-0.0006	-0.00476	-0.00411	-0.97299	-0.00451	-0.00349	-0.00435	-0.01373
Sugar	-0.00959	-0.01141	-0.01153	-0.01178	-0.00842	-0.00912	-0.00076	-0.00064	-0.01052	-0.87807	-0.01016	-0.00995	-0.0077	-0.00961	-0.03031
Spices	0.014036	0.016696	0.016875	0.017236	0.012326	0.01334	-0.00205	-0.00173	-1.27603	0.013264	0.01486	0.014557	0.01126	0.014061	0.044344
Salt	-0.00109	-0.0013	-0.00131	-0.00134	-0.00096	-0.00104	-2.50E-06	-0.54741	-0.0012	-0.00103	-0.00115	-0.00113	-0.00088	-0.00109	-0.00345
Vegetables	-0.03133	-0.03727	-0.03767	-0.03847	-0.02751	-0.02978	-0.65629	-0.00024	-0.03435	-0.02961	-0.03317	-0.03249	-0.02513	-0.03138	-0.09898
Fruits	0.001016	0.001208	0.001221	0.001248	0.000892	-1.01521	-0.00033	-0.00027	0.001114	0.00096	0.001076	0.001054	0.000815	0.001018	0.00321
Eggs	-0.0033	-0.00393	-0.00397	-0.00405	-0.84437	-0.00314	-1.70E-05	-1.40E-05	-0.00362	-0.00312	-0.0035	-0.00342	-0.00265	-0.00331	-0.01043
Chicken	0.021731	0.025851	0.026128	-1.24412	0.019085	0.020654	-0.00334	-0.00281	0.02383	0.020537	0.023008	0.022539	0.017433	0.021771	0.068657
Beef	0.02323	0.027633	-1.25854	0.028527	0.020401	0.022078	-0.00379	-0.00319	0.025474	0.021953	0.024594	0.024093	0.018636	0.023272	0.073392
Yogurt	0.004357	-1.14724	0.005239	0.005351	0.003827	0.004141	-0.00032	-0.00027	0.004778	0.004118	0.004613	0.004519	0.003496	0.004365	0.013766
Milk	-0.95514	-0.01966	-0.01987	-0.02029	-0.01451	-0.0157	-0.00233	-0.00196	-0.01812	-0.01562	-0.01749	-0.01714	-0.01326	-0.01655	-0.0522

TABLE A-6
Compensated Own and Cross Price Elasticities of Urban Sindh

	Milk	Yogurt	Beef	Chicken	Eggs	Fruits	Vegeta- bles	Salt	Spices	Sugar	Wheat	Rice	Pulses	Veg. Oil	Tea
Tea	0.110	0.134	0.150	0.148	0.098	0.119	0.074	0.064	0.151	0.101	0.113	0.125	0.094	0.115	-3.244
Veg. Oil	0.036	0.045	0.050	0.049	0.033	0.039	0.025	0.021	0.050	0.034	0.038	0.042	0.031	-0.948	0.142
Pulses	0.025	0.031	0.034	0.034	0.022	0.027	0.017	0.015	0.034	0.023	0.026	0.028	-0.782	0.026	0.098
Rice	0.049	0.060	0.067	0.066	0.044	0.053	0.033	0.028	0.067	0.045	0.050	-1.016	0.042	0.051	0.190
Wheat	0.135	0.166	0.185	0.183	0.121	0.146	0.091	0.079	0.186	0.125	-0.829	0.154	0.116	0.142	0.528
Sugar	0.066	0.081	0.090	0.089	0.059	0.071	0.045	0.038	0.091	-0.808	0.068	0.075	0.056	0.069	0.258
Spices	0.051	0.063	0.070	0.069	0.046	0.056	0.035	0.030	-1.221	0.047	0.053	0.059	0.044	0.054	0.201
Salt	0.001	0.001	0.002	0.002	0.001	0.001	0.001	-0.546	0.002	0.001	0.001	0.001	0.001	0.001	0.005
Vegetables	0.052	0.064	0.071	0.070	0.047	0.056	-0.601	0.030	0.072	0.048	0.054	0.059	0.045	0.055	0.203
Fruits	0.040	0.049	0.055	0.054	0.036	-0.973	0.027	0.023	0.055	0.037	0.041	0.046	0.034	0.042	0.156
Eggs	0.018	0.021	0.024	0.024	-0.826	0.019	0.012	0.010	0.024	0.016	0.018	0.020	0.015	0.018	0.069
Chicken	0.093	0.114	0.127	-1.145	0.083	0.100	0.063	0.054	0.128	0.086	0.096	0.106	0.079	0.097	0.363
Beef	0.092	0.113	-1.161	0.124	0.082	0.099	0.062	0.053	0.126	0.085	0.095	0.105	0.079	0.096	0.359
Yogurt	0.029	-1.116	0.040	0.040	0.026	0.032	0.020	0.017	0.040	0.027	0.030	0.034	0.025	0.031	0.115
Milk	-0.687	0.309	0.345	0.341	0.226	0.272	0.171	0.147	0.346	0.233	0.260	0.287	0.216	0.264	0.985

TABLE A-7
Uncompensated Own and Cross Price Elasticities for Rural Sindh

	Milk	Yogurt	Beef	Chicken	Eggs	Fruits	Vegeta- bles	Salt	Spices	Sugar	Wheat	Rice	Pulses	Veg. Oil	Tea
Tea	0.018	0.053	0.022	0.026	0.011	0.016	-0.004	-0.004	0.019	0.017	0.016	0.034	0.016	0.020	-1.403
Veg. Oil	0.003	0.009	0.004	0.004	0.002	0.003	-0.002	-0.002	0.003	0.003	0.003	0.006	0.003	-1.044	0.005
Pulses	-0.005	-0.014	-0.006	-0.007	-0.003	-0.004	0.000	0.000	-0.005	-0.005	-0.004	-0.009	-0.835	-0.006	-0.007
Rice	0.031	0.091	0.039	0.044	0.019	0.027	-0.001	-0.001	0.032	0.029	0.028	-1.623	0.028	0.035	0.046
Wheat	-0.028	-0.082	-0.035	-0.040	-0.017	-0.024	-0.001	-0.001	-0.029	-0.026	-0.838	-0.052	-0.025	-0.031	-0.041
Sugar	-0.010	-0.030	-0.013	-0.015	-0.006	-0.009	-0.001	-0.001	-0.011	-0.910	-0.009	-0.019	-0.009	-0.012	-0.015
Spices	0.001	0.004	0.001	0.002	0.001	0.001	-0.001	-0.001	-1.042	0.001	0.001	0.002	0.001	0.001	0.002
Salt	-0.001	-0.002	-0.001	-0.001	0.000	-0.001	0.000	-0.648	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
Vegetables	-0.026	-0.075	-0.032	-0.036	-0.016	-0.022	-0.671	0.000	-0.026	-0.024	-0.023	-0.048	-0.023	-0.029	-0.038
Fruits	-0.002	-0.006	-0.003	-0.003	-0.001	-0.956	0.000	0.000	-0.002	-0.002	-0.002	-0.004	-0.002	-0.002	-0.003
Eggs	-0.007	-0.019	-0.008	-0.009	-0.573	-0.006	0.000	0.000	-0.007	-0.006	-0.006	-0.012	-0.006	-0.007	-0.010
Chicken	0.031	0.091	0.039	-1.384	0.019	0.027	-0.003	-0.003	0.032	0.029	0.028	0.058	0.028	0.035	0.046
Beef	0.012	0.035	-1.199	0.017	0.007	0.010	-0.002	-0.002	0.012	0.011	0.011	0.022	0.011	0.014	0.018
Yogurt	0.054	-1.914	0.066	0.075	0.032	0.045	-0.001	-0.001	0.054	0.050	0.047	0.099	0.047	0.059	0.078
Milk	-0.924	-0.062	-0.026	-0.030	-0.013	-0.018	-0.001	-0.001	-0.022	-0.020	-0.019	-0.039	-0.019	-0.024	-0.031

TABLE A-8
Compensated Own and Cross Price Elasticities for Rural Sindh

	Milk	Yogurt	Beef	Chicken	Eggs	Fruits	Vegeta- bles	Salt	Spices	Sugar	Wheat	Rice	Pulses	Veg. Oil	Tea
Tea	0.056	0.126	0.076	0.089	0.035	0.059	0.041	0.040	0.065	0.056	0.051	0.105	0.052	0.065	-1.340
Veg. Oil	0.065	0.146	0.088	0.103	0.041	0.069	0.047	0.047	0.075	0.065	0.059	0.121	0.060	-0.972	0.103
Pulses	0.023	0.052	0.031	0.037	0.015	0.025	0.017	0.017	0.027	0.023	0.021	0.043	-0.809	0.027	0.037
Rice	0.074	0.166	0.100	0.117	0.047	0.078	0.054	0.053	0.086	0.074	0.067	-1.541	0.068	0.086	0.117
Wheat	0.119	0.266	0.160	0.188	0.075	0.126	0.086	0.085	0.137	0.119	-0.706	0.221	0.109	0.138	0.188
Sugar	0.088	0.197	0.118	0.139	0.055	0.093	0.064	0.063	0.102	-0.812	0.079	0.163	0.081	0.102	0.139
Spices	0.026	0.057	0.034	0.041	0.016	0.027	0.019	0.018	-1.014	0.026	0.023	0.048	0.024	0.030	0.041
Salt	0.001	0.002	0.001	0.001	0.001	0.001	0.001	-0.647	0.001	0.001	0.001	0.002	0.001	0.001	0.001
Vegetables	0.044	0.099	0.060	0.070	0.028	0.047	-0.622	0.032	0.051	0.044	0.040	0.082	0.041	0.051	0.070
Fruits	0.017	0.037	0.022	0.026	0.010	-0.938	0.012	0.012	0.019	0.016	0.015	0.031	0.015	0.019	0.026
Eggs	0.008	0.019	0.011	0.013	-0.564	0.009	0.006	0.006	0.010	0.008	0.008	0.016	0.008	0.010	0.013
Chicken	0.093	0.208	0.125	-1.281	0.058	0.098	0.067	0.067	0.107	0.092	0.084	0.172	0.085	0.108	0.147
Beef	0.062	0.139	-1.131	0.098	0.039	0.065	0.045	0.044	0.072	0.062	0.056	0.115	0.057	0.072	0.098
Yogurt	0.094	-1.810	0.127	0.149	0.059	0.100	0.068	0.068	0.109	0.094	0.085	0.175	0.087	0.109	0.149
Milk	-0.704	0.445	0.267	0.314	0.125	0.210	0.144	0.143	0.230	0.198	0.179	0.370	0.183	0.231	0.315