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ELASTICITY MEASUREMENT OF FOOD DEMAND IN PAKISTAN: CROSS-PRICE AND OWN PRICE ELASTICITY ANALYSIS

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A B S T R A C T

The structural change is considered as the heart of development and each country is required to change its strategies due to the economic changes as well as the shift in external as well as domestic environments. In this connection, Pakistan has experienced different complexed phases during the past decades and thus introduced various reforms towards the different sectors of economies. In many developing countries like Pakistan, nutrient deficiencies tend to hinder the development of human potentials and social and economic development of the country, food biologically is a basic need, hence plays a very impotent role in lifestream of all the existence of human being. As all food items are less or more important but a yardstick which measures their need is called elasticity of food demand items. In Pakistan, starvation, in this regard, is solemn apprehension that is gloomily experienced in children and mothers and no further development is evident. The malnutrition leading causal influences are poor health status and insufficient food intake as subjective to a shortage of resources and deficiency to food access, family size and feeding practices. This study objective also estimates capacities spent and economical stake by projected price elasticity for prediction in the future towards total food demand in Pakistan.

Disciplinary: Cross-disciplinary (Economic and Management Sciences, Food System & Policy and Nutrition).

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1. INTRODUCTION

For the survival of human beings, food is playing an imperative role which allows the physique to make all kinds of profitable activities. The foods, in other words, maybe drunk/eaten which might be captivated by the body and become the energy source. For this purpose, it is essential to examine the food demand and elasticity. The elasticity denotes the capability of material as well as an entity to recommence its usual form when compressed/stretched (Ehtisham, 1987). In economics, elasticity is a dimension of proportional change of economic inconstant in reaction to variation in other variables. In this link, the changeable factor is the variable that returns proportionally more than the fluctuations

in other factors (Eatazaz, 2007). Conversely, the inelastic factor is also considered as an important variable in economics. The elasticity is thus the dominant economics concept applied in different circumstances. The rudimentary supply and demand study clarifies that economic factors like demand, income, and price are unconcernedly interconnected.

The provision of important information is the main concern of elasticity regarding the weakness and strength of such connections. The cross-price elasticity of demand measures the sensitivity of the demanded quantity for goods in exchange for the prices of other goods (Angus & Muellbaver, 1980). This demand for elasticity price is considered as a change percentage in the claimed quantity of the services and goods shared by price change percentage. In Pakistan, the pattern consumption agonizes the substantial variations in income increases over time with actual manners (Rui, 2000). Therefore, decisions of investments should be planned by considering food demand elasticities. Food is a simple requirement; it has a massive influence on households in the Pakistani context. In this connection, it is imperious to advantage over an acquaintance of causes of food elasticities and demand, so as to plan inclusive social policy and agricultural food to expand food access which made up the forte of the domestic objects towards the better food admittance (Huseyin, 2003).

2. LITERATURE REVIEW

The description of earlier studies explaining the phenomenon of food demand elasticities is as under. Thus, Siddiqui (1981) concluded that, with the growth of income, consumption pattern is expected to undergo major change overtime in Pakistan. In many studies, explanatory variables are considered. For each product they found income and household size to be the only significant variables but other variables to be insignificant. The conclusion of this study shows that spending control for certainly lower, lower household elasticities and expenditure elasticities for luxury objects are greater. Thus, Carthy & Desmond (1981) proposed a theory of consumer behavior that varies from approaches of conventional manners which explains that elastic values are presented for goods as a quality measure. The quality effects problem on the behavior of the consumer is measured in the demand model that is rather diverse from approaches traditional. The experiential outcomes on patterns for the consumption of food show that when the income increases, the individuals then spend the larger portion of their income on luxuries goods and varieties of goods increases with advanced prices.

The consequences of the said phenomena are argued for package meant at development in alimentary eminence. In this connection, the usual concerns get develops and conclude as when income upturns, individuals put away extra though ample upsurge drives to purchasing the priced higher variabilities. For example, as the size of the household rises, higher consumption varieties priced rises. The dwellers in urban are prone more to buying price higher goods. As levels of prices increases, consumed quantity cascades, however, the stronger even outcome is marked to those individuals who change to the varieties of priced lower. Tahir (1987) classified various food items into necessities and luxuries about their income elasticities has important policy implications especially the factors contributing to a household decision for the nutritional status of the family. Ahmad, (2007) showed that Chinese reforms in markets of foods have assumed consumers' better choices and freedom in decisions of the consumption. The model of LA/A is practical to market wholesale for vegetables to extend the sensitivity in the prices as compared to the open markets. The required data-set for 1988-1994 is shared in two stages to examine how consumption of vegetables is

returning to reforms.

The consumers in China are brought into being to be priced more receptive in period latter denoting that consumers are a pleasing benefit of competition increased in markets. The present study works on the approximation linear of virtually model system of Demand (Deaton & Muellbaur, 1980). The elasticities concerning expenditure and income are similar broadly in extents for both stages with no down or up trends. It infers that in China, growth in income will clue to consumption increased of vegetables. In China, vegetable production is hence expected to rise amid poor those who eat meat and beneath what circumstances to respond to this query, the Tobit exploration was assumed. The outcomes show that meat consumption probability by household poor is better (Jabrian, 2005). When households are led by individuals elderly and by secondly women, by household urban location is declined. When more or one household are farmers then automatically the change in prices might be experienced than the household of non-farming and there is a rise in equivalence adults.

This study empirical outcomes further recognized the significance of the income high demand elasticity to meet amid middle-class people. This paper results in social standing and relevance of factors of competition in feed-feed, therefore inspiring the extensions suggested of applications and analysis to other countries likewise Thailand/China wherein fast rising is happening in what are really agricultural cultures like Pakistan. In this drive, Tahir, (1987) since the establishment of the People's Republic of China, economic growth along with rising per capita income needs a comparative study. So year-wise comparison of the said growth has been given in the study. The results indicate Engel's law accuracy in a manner that as income increases the food proportion declined steadily. Abdullai, (2004) pointed out that malnutrition is caused usually by insufficient nutrition and causes that mark utilization nutrients in the body of a human. The confirmation for an individual on income and price elasticity food groups and food is actually squeaky. Thus present study backs the literature by means of the fresh survey data in Tanzania to observe how characteristics of socio-economic, expenditure and prices affect nutrient demand and food.

Ozear (2003) stated that estimation in demands for food does not provide only evidence feet to describe the structure of food demand, nonetheless provide also consistent and complete background to assess influence of changes in policies as both the human capital and price policies are linked to nutrition and health are interrelated to resolve of income (expenditure) elasticity. Wyatt (2004) treated Group expenditure as exogenous when demand estimating constraints for commodities group with an ideal almost system of demand (Rehana, 1981). Now, the method is measured in the case of Japanese wherein the demand meat with equation sample more to group estimate expenses. The addition of a simple relatively equation of expenditure extensively changes calculations for elasticity which results in an examination of how exclusion or inclusion of group-single equation of expenditure elasticity affects. Balcome et al. (2003) account for linear approximate estimation of demand almost system for Jordon demand for meat viva micro-data. A system of the censored regression equation for the method is rummage-sale to examine consumption meat designs. Model estimated was recycled to get estimates of expenditure demand and Hicksian, Marshallian elasticities for meats in Jordan.

3. RESEARCH METHODOLOGY

This study estimates the regression quantities for 9 commodities including Tea, Sugar, Pulses,

Milk, Meat, Fruit, Cereals, Ghee, and Vegetables. Working-Leser model is being used. Of course, other models are also available like Almost-Ideal Demand Systems (AIDS), linear Expenditure System (LES) Tobit model but due to data constraint and usefulness of the model, the Working-Leser model is used. It is important to recall that we will use the regression equation for 9 commodities separately for the overall country and for all 8 regions of the country (urban-rural regions of the 4 provinces). The study also estimates cross-price and own-price elasticities for all these 9 commodities for 4 provinces and 8 regions and overall country.

3.1 POPULATION OF STUDY

The population is the entire element of the research which is under consideration for a specific objective. The population of the said study is the entire country of Pakistan.

3.2 SAMPLE OF STUDY

The Statistics for Federal Bureau has led the sample survey approximately covering 76,520 households to offer indicators for district level in different sectors like Health, Education, Water Sanitation & Supply and Economic Situation Household & Gratification by services and facilities used.

4. DATA COLLECTION AND ANALYSIS

The database is taken from Pakistan National Bureau of statistics which is a national uniform survey called Pakistan living and social standards measurement 2004-05 conducted in every province in Pakistan. The survey basically follows the approach of the Core Welfare Indicators Questionnaire which was conducted.

5. RESULT OF STUDY

There has been growing interest in estimating the food demand elasticities in Pakistan because of their importance for assessing the future food demand in a country of 200 million people in Pakistan.

Own-Price Elasticity: Change in the demand for, e.g., tea with respect to change in the price of tea (Marshallian) it can be expressed in the form

$$\text{e}_{ij} = -\delta_{ij} + \left(\frac{\beta_{ij}}{w_i}\right) \qquad \forall j = 1,2,\ldots,n \tag{1},$$

where **e** for elasticity, i & j are food items. δ_{ij} is the Kronecker delta that is unity if i equals j and zero otherwise. β_{ij} is a parameter to be calculated, w_i is weight.

Cross-Price Elasticity: Change in the demand for tea w.r.t change in the price of other items (Hicksian). Price and elasticity estimates of the effect of household demographic variables on Pakistan food items are estimated using a household survey data 2004-05, in overall areas in Pakistan. However, look into the study more deeply, see Table 1 for the information about Pakistan, an agrarian, developing country facing food scarcity problems.

Table 1a: Own and Cross Price Elasticity of Food Items.

Item	Tea		Sugar		Pulse		Milk		Meat	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Tea	-0.551	<0.001*	0.060	<0.001*	0.052	<0.001*	-0.128	<0.001*	-0.012	0.004**
Sugar	-0.003	0.584	-0.860	<0.001*	<0.001	0.167	-0.026	0.006*	0.031	0.005**
Pulse	0.113	<0.001*	0.024	0.446	-0.740	<0.001*	0.146	<0.001*	-0.015	0.658
Milk	-0.013	0.011**	-0.030	0.001*	<0.001	0.360	-1.038	<0.001*	0.146	<0.001*
Meat	0.000	0.929	-0.067	<0.001*	<0.001	0.008*	-0.058	<0.001*	-0.697	<0.001*
Cereals	0.029	0.001*	-0.024	0.153	-0.104	<0.001*	-0.006	0.665	0.151	<0.001*
Ghee	0.018	0.020**	-0.037	0.009*	-0.052	0.030**	0.050	<0.001*	0.042	0.005*
Vegetable	-0.005	0.377	0.059	<0.001*	0.260	<0.001*	-0.272	<0.001*	0.087	<0.001*
Fruit	0.002	0.447	-0.020	<0.001*	<0.001	0.099	-0.025	<0.001*	0.045	<0.001*
Expenditure	0.229	<0.001*	0.780	<0.001*	0.375	<0.001*	1.570	<0.001*	-0.012	0.004**

Table 1b: Own and Cross Price Elasticity of Food Items.

	Cereals		Ghee		Vegetable		Fruit	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Tea	0.017	0.000*	0.004	0.263	-0.003	0.015**	-0.048	0.000*
Sugar	-0.042	0.000*	-0.064	0.000*	-0.013	0.000*	0.027	0.035**
Pulse	-0.201	0.000*	-0.044	0.077	0.003	0.750	0.080	0.038**
Milk	-0.065	0.000*	-0.050	0.000*	-0.013	0.000*	0.085	0.000*
Meat	-0.051	0.000*	-0.059	0.000*	-0.005	0.001*	0.013	0.067
Cereals	-1.260	0.000*	0.023	0.074	-0.013	0.003*	0.163	0.000*
Ghee	-0.143	0.000*	-1.018	0.101	-0.003	0.359	0.107	0.000*
Vegetable	-0.011	0.272	0.016	0.055	-0.035	0.000*	0.253	0.000*
Fruit	-0.067	0.000*	0.006	0.118	-0.008	0.000*	-0.835	0.000*
Expenditure	1.042	0.002*	0.900	0.000*	0.070	0.000*	0.696	0.000*

*Significant 1% **significant 5%   Source PSLM (2004-2005)

Cross price elasticity means a demand change for the product in line for the change in the price of other commodities. So in the above table, cross-price elasticity of Tea is significant for Sugar, Pulse, Milk, Meat in Table 1(a), Cereals, Vegetables and Fruit in Table 1(b), Similarly, cross-price elasticity of Sugar is significant for Milk, Meat in table (a), Cereals, Ghee, Vegetables and Fruit in table (b). Pulse cross-price effect is significant for Tea, Milk, Cereals, Fruit. For Milk, the cross-price effect is significant for Tea, Sugar and Meat, while Cereals, Ghee, Vegetables and Fruit. Meat, elasticity cross price is significant for Suger, Pulse, Milk, Cereals, Ghee, and Vegetables. Cereals elasticity cross price is significant for Tea, Pulse, Meat, Vegetable, Fruit. Ghee significant elasticity cross-price for Tea, Suger, Pulse, Milk and, Meat, Fruit.   Similarly, Vegetable, significant cross-price elasticity for all except Tea, while only Fruit.   Cross price elasticity of Fruit is significant for only Suger, Milk and Meat while for Ghee and vegetable.

6. CONCLUSION

When summarizing analysis, we come to know that cross-price and own-price elasticity are core determinants for policymakers to decide the production of those food commodities, which fewer respondents to the price change and change in other goods and services.   From Tables 1a and 1b, researchers can very easily come to categories these mentioned goods. For instance, the Marshallian Own-price elasticity generated from Working-Lesser model using OLS, provided significant information about different items. Results meant that Milk, Cereals and Ghee consumption was more own-price changes sensitive, while Vegetable ingesting was least sensitive to the change in its own prices. The Hicksian's cross-price elasticity generated from the Working-Lesser model were positive for Tea, indicating the substitution relationship with Sugar and Pulse. In particular, a one percent increase in Sugar price caused a 6% increase in Tea consumption while a 1% increase in Pulse price increased Tea consumption by 5%. A complimentary relationship was found for tea with milk and meat consumption, while sugar and pulse were found to have a substitution relationship.

7. AVAILABILITY OF DATA AND MATERIAL

Relevant information can be made available by contacting the corresponding author.

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