

## FOOD DEMAND PATTERNS IN PAKISTANI PUNJAB

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### ABSTRACT

*Flexible LA-AIDS model is used to examine food demand patterns in Pakistani Punjab. The model is also estimated for rural and urban households using the Household Integrated Economic Survey of Pakistan consisting of 5972 households of Pakistani Punjab. Food products are categorized into eight groups including wheat, rice, fruits, vegetables, milk, cooking oil, meat, and other food products. Results show that households in both rural and urban areas with head of family having agriculture as profession consume less of all foods with the exception of wheat. Households in both rural and urban areas with literate head of family consume more of all food products with the exception of vegetables and wheat. Both compensated and uncompensated own price and expenditure elasticities are significant and have the expected signs for both rural and urban consumers. The demand for all eight food groups is price inelastic with wheat having the most price inelastic demand. All of the expenditure elasticities are positive suggesting that all goods are normal with the largest expenditure elasticities found for milk followed by fruits, other food products, meat, rice, vegetables, wheat and cooking oil. The study recommends further investigation to study the price and income responsiveness of poor and rich across rural and urban areas in the four provinces of Pakistan to understand food demand in the country.*

**Key Words:** Food demand, elasticities, rural and urban areas, Pakistani Punjab

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### INTRODUCTION

Over the past two decades Pakistan has made substantial progress in improving its per capita availability of major food items, such as, cereals, meat, milk, sugar, and eggs. As a result, the aggregate intake of calories and protein in Pakistan paint a generally positive picture with respect to food security. Unfortunately, disaggregated data shows that a large proportion of Pakistan's population still suffers from low incomes and inadequate diets. A large fraction of total household expenditure is spent on food, and inequalities continue to persist in consumption across income groups and between urban and rural areas. The international price increased for essential food items in 2008 has increased the risk of food insecurity and poverty in many developing countries, including Pakistan (FAO, 2008; von Braun, 2008; ADB, 2008).

Empirical research on food consumption patterns can provide evidence on consumers responsiveness to price and expenditure changes that are useful in designing a country's food policies. Estimates of price and income elasticities of different foods can help in setting administered prices and in designing subsidy and tax policies as well as in estimating the impacts of these policies on poverty. To formulate a long term policy for food security and poverty reduction in a developing country, there is a need to understand how different groups of households respond to changes in the prices of different foods. In view of the importance of the issues related to food security and food policy, several studies have examined food demand patterns in Pakistan over last four decades. However, most of these studies are old, published in Pakistan and are difficult to be accessed internationally. Further, these studies with the exception of Haq *et al.* (2008) did not use the national Household Integrated Economic Survey, and are therefore limited in scope. Also, to our knowledge, none of these studies provide estimates of compensated and uncompensated own and cross price elasticities for fairly disaggregated food items for the country. According to economic theory, any change in the price of a commodity changes the level of utility. As a result, a consumer moves from one indifference curve to another. This movement is captured by the uncompensated price elasticities since any change in prices affects the consumer's real income. If the original level of utility is held constant, when prices change, the consumer moves along the same indifference curve and this effect is captured by the compensated price elasticities. From a policy point of view, it is important to evaluate the effects of price changes by calculating and understanding both the uncompensated and compensated effects of changes as shown by Haq, *et al.* (2008).

In this paper we analyze the structure of food demand in Pakistani Punjab for disaggregate food items based on household consumption data using the Linear Approximate Almost Ideal Demand System (LA-AIDS) developed by Deaton and Muellbauer (1980a, 1980b). The parameter estimates from the LA-AIDS are used to calculate compensated, uncompensated, and expenditure elasticities. The analysis is based on the nationwide Household Integrated Economic Survey data collected in 2004-05.

The remainder of this paper is organized in five sections. The methods and data used to estimate price and expenditure elasticities are discussed in section three. Section three contains the empirical results and the last section presents the conclusions and policy implications.

### Theoretical Model and Data

We estimate compensated and uncompensated own-price and cross-price elasticities by using the estimated coefficients from the Linear Approximate Almost Ideal Demand System (LA-AIDS). The LA-AIDS provides a first order approximation to the expenditure function; satisfies the axioms of consumer choice and allows for investigating interdependence among products (Byrne *et al.* 1996).

### Specification and Estimation of LA-AIDS

Deaton and Muellbauer (1980a, b) derive the Almost Ideal Demand System from an expenditure function with Price Independent Generalized Logarithmic preferences to derive. The system of LA-AIDS demand equation in budget share form is given as follows:

$$w_i = \alpha_i + \sum_{j=1}^n \gamma_{ij} + \ln(p_j) + \beta_i \ln\left(\frac{x}{P}\right) + \varepsilon_i \quad (1)$$

where  $w_i$  is the budget share of good  $i$ ,  $p_j$  is the price of good  $j$ ,  $x$  is expenditure,  $P$  is a price index approximated by the Stone price index  $\ln(P) = \sum_j w_j \ln(p_j)$ ,  $n$  is the number of goods,  $\ln$  represents natural logarithm and  $\gamma_{ij}$ , and  $\beta_i$  are parameters. Separability is imposed at the food level, implying that consumers modify their optimal food consumption bundle when relative prices of individual foods change, given an optimal allocation expenditure to food. Due to separability, the marginal rate of substitution between any food items is dependent of the changes in the non-food items. Hence, the individual food price changes influence non-food assumption expenditures only through their influence on the allocation of total expenditures to food and non-food. The advantage of separability lies in the fact that at each stage of budgeting, information appropriate to the stage is required.

To account for the household characteristics, Equation (1) is augmented with household specific socio-economic and demographic (briefly socio-economic) characteristics using the following relationship proposed by Pollack and Wales (1978).

$$\alpha_i = \alpha_i^* + \sum_j \delta_{ij} z_j \quad (2)$$

where  $z_j$  is a matrix of socio-economic variables and  $\delta_{ij}$  is the vector of parameters. The socio-economic variables include household size measured as the number of household members; a binary variable for literacy of the household head, illiterate being the omitted category and binary variables representing employment of the household head (farming, self-employed, public/private sector employee). Binary variables are equal to one when the phenomenon exists and zero otherwise, e.g. literacy equals one when the household head is literate, otherwise zero. A hypothesis, that the combined effect of the socio-economic factors is zero, is tested to explore the importance of socio-economic variables. Substituting Equation (2) in the Equation (1) yields:

$$w_i = \alpha_i^* + \sum_{j=1}^n \gamma_{ij} + \ln(p_j) + \beta_i \ln\left(\frac{x}{P}\right) + \sum_{j=1}^n \delta_{ij} z_j + \varepsilon_i \quad (3)$$

Equation (3) is the socio-economic flexible LA-AIDS (Agbola, 2003). Stávková *et al.*, (2007) identified many other factors like brand, quality, product attributes, habits, price reductions, advertisement, innovation and word-of-mouth that could potentially affect demand for food. However, we did not include these factors in our analysis because HIES data do not include any information on these variables.

Equation (3) is estimated for rural and urban areas and the entire Punjab Province. The budget shares and prices included in equation (3) are for eight food commodities: wheat mainly consisting of wheat flour; rice including all kinds of rice consumed; fruits; vegetables; milk; cooking oil; meat consists of beef, mutton and poultry meat; and other food consists of pulses, tea, readymade food, condiments and spices, sugar, etc. The fruit, vegetable and milk categories consist mainly of fresh products.

The theoretical restrictions on the demand function are imposed during estimation. These restrictions include the following:

**Adding-up:**

$$\sum_i \alpha_i^* = 1, \quad \sum_i \gamma_{ij} = 0, \quad \sum_i \beta_i = 0 \quad \forall \text{ all } i \quad (4)$$

**Homogeneity:**

$$\sum_i \gamma_{ij} = 0, \quad \forall j \quad (5)$$

**Symmetry:**

$$\gamma_{ij} = \gamma_{ji} \quad (6)$$

Using equation (3), uncompensated (Marshallian), compensated (Hicksian) and expenditure elasticities can be derived. The uncompensated price elasticity for good  $i$  with respect to good  $j$  is:

$$e_{ij} = \frac{\gamma_{ij} - \beta_i}{w_i} - \delta_{ij} \quad (7)$$

Compensated price elasticity for good  $i$  with respect to good  $j$  is:

$$e_{ij} = \frac{\gamma_{ij}}{w_i} + w_j - \delta_{ij} \quad (8)$$

Where  $\delta_{ij}$  is the Kronecker delta and it equals one for own price and zero for cross-price elasticities. The expenditure elasticity ( $E_i$ ) is:

$$E_i = 1 + \frac{\beta_i}{w_i} \quad (9)$$

The seemingly unrelated regression estimation method of Zellner (1963) is employed to estimate the system of equations using STATA 10.0. The statistical significance of the estimated elasticities are derived using the delta method (STATA, 2005). If a surveyed household does not consume a commodity then the price of that commodity is missing; in order to keep these (missing) observations in the analysis, missing prices are replaced by average prices (Cox and Wohlgemant, 1986). Imposing the property of additivity of the expenditure function makes the variance and covariance matrix singular and one of the equations needs to be omitted to estimate the LA-AIDS. The expenditure equation for "other food" is omitted and the coefficients for the omitted equation are derived using the theoretical conditions imposed on the estimation process. However, the coefficients estimated using LA-AIDS are invariant to the omitted equation.

## Data

Household Income and Expenditure survey 2004-05 is used in the analysis. The data is collected as part of the Pakistan Social and Living Standards Measurement (PSLM) project. PSLM collected data from 77,000 households in the country while a sample of 14,708 households taken from PSLM is used for HIES. The main objective of the current HIES is to derive poverty indicators. A two-stage stratified random sample design was adopted to select the household's. In the first stage, 1,045 primary sampling units (enumeration blocks) were selected in the urban and rural areas of all four Pakistan provinces. In the second stage, the sample of 14,708 households was randomly selected from these primary sampling units. Using a random systematic sampling scheme with a random start, either 16 or 12 households were selected from each primary sampling unit (GoP, 2006). The HIES collects data on household characteristics, consumption patterns, household income by source, and social indicators. With this data it is possible to estimate income distribution, as well as income and non-income measures of poverty across various sections of the society. For this study a sample of 5972 respondents (both from rural and urban areas) pertaining to the Punjab Province of Pakistan is used.

## RESULTS AND DISCUSSION

The estimated coefficients are reported in (Table I). Most of the coefficients are significant at the 90 percent level of significance. The  $R^2$  ranges from 0.129 for cooking oil to 0.315 for other food products which are not uncommonly low when using cross-sectional data (Table I). The analysis failed to accept the hypothesis that the combined effect of the socio-economic factors is statistically zero for rural, urban and the entire Punjab (Tables I - III). Hence, socio-economic factors are important determinants of food demand in Punjab as well as in both urban and rural areas of Punjab. (Table I) shows that households with a literate head consume more rice, fruits, milk, edible oil and meat and less of wheat and vegetables. Household size has a positive and significant effect on the consumption of wheat, rice, vegetables and cooking oil but has a negative effect on the consumption of fruits, milk, meat, and other food items (Table I). Households with head of a family having agriculture as profession consume more of wheat and milk and less of fruits, vegetables, cooking oil and meat. This is not surprising since wheat is the main staple produced by almost all the farmers in the country. However, households heads who work in public and private firms consume more of wheat, cooking oil and other food products while less of rice, fruits,

**Table-I** *Parameter estimates of the LA-AIDS model for Pakistani Punjab*

Tables IV to VI report the estimates of compensated and uncompensated own and cross price and expenditure elasticities. All of the estimated compensated and uncompensated direct price and expenditure elasticities are statistically significant and have the expected signs. The demand for most of the commodities is price inelastic with six of the eight estimates ranging from -0.40 (wheat) to -0.96 (milk) and other food products -0.97 for Punjab as a whole (Table III). Tables IV and V show that the demand for most of the food items is more price inelastic in urban areas than in rural areas (except milk which is price elastic in rural areas). This means that rural consumers are more responsive to food product price changes than their urban neighbors. The demand for wheat, cooking oil and vegetables in urban areas is highly inelastic (-1.00, -0.408 and -0.476 respectively), as compared to rural areas (-0.466, -0.613 and -0.579). Similarly demand for meat is price inelastic (Bielik and Šajbidorová, 2009). The compensated own-price elasticities are generally lower, but similar to the uncompensated own-price elasticities except milk which is slightly price inelastic (-0.758) in rural areas (Table V).

Cross price elasticities indicate the effect of a price change in one commodity on the demand for another commodity. (Tables IV) indicates that out of 56 uncompensated cross-price elasticities, 16 are positive (gross substitutes) and 40 are negative (gross complements). The number of net substitutes equals 40 and net complements 16 based on the compensated cross price elasticities. Contrary to the findings of Umar *et al.* (1999), we find that most of the cross price elasticities are significant at the 99 percent level of significance and that urban households consider more goods substitutes than do rural households. The negative cross-price elasticities for wheat-rice in urban and rural areas indicate that these food items are complements in consumption. Umar *et al.* (1999) found similar findings but their wheat-rice cross price elasticities are larger



than ours. (Table III) shows that wheat-rice cross price elasticity is  $-0.02$  and non significant for urban areas and  $-0.123$  and significant for rural areas. This suggests that the consumption of wheat and rice are largely independent of price changes. Rice can be substituted for fruits, milk and meat. The direction and level of significance is the same for both compensated and uncompensated elasticities.

**Table-III** *Parameter estimates of the LA-AIDS model for rural Punjab*

Explanatory Variable	Wheat	Rice	Fruits	Vegetables	Milk	Cooking Oil	Meat	Other Food
Log of Price of Wheat	0.109*	-0.039*	-0.006**	-0.019*	-0.041*	-0.007	-0.008	0.011*
Log of Price of Rice	-0.039*	0.016*	0.003**	-0.005*	0.022*	-0.007*	0.011*	0.000
Log of Price of Milk	-0.041*	0.022*	0.001	0.016*	0.007	0.011*	-0.022*	0.006**
Log of Price of Fruits	-0.006**	0.003*	0.016*	-0.005*	0.001	-0.002	0.005**	-0.012*
Log of Price of Vegetables	-0.019*	-0.005*	-0.005*	0.046*	0.016*	-0.018*	-0.011*	-0.004*
Log of Price of Cooking Oil	-0.007	-0.007*	-0.002	-0.018*	0.011*	0.035*	-0.011*	-0.001
Log of Price of Meat	-0.008	0.011*	0.005*	-0.011*	-0.022*	-0.011*	0.046*	-0.010*
Log of Price of Other Food	0.011*	0.000*	-0.012*	-0.004*	0.006**	-0.001	-0.010*	0.010*
Log of Food Expenditure	-0.051*	-0.004*	0.011*	-0.018*	0.078*	-0.034*	0.002	0.016*
Household Size	0.008*	0.001**	-0.001*	0.000***	-0.008*	0.003*	0.000	-0.003*
Dummy for Literacy	-0.029*	0.006*	0.005*	-0.003**	0.001	0.005*	0.013*	0.002
Agriculture as Profession	0.010**	0.001	-0.004*	-0.006*	0.026*	-0.009*	-0.007**	-0.012*
Public/Private Employment	0.022*	-0.004*	-0.005*	-0.001	-0.003	0.004**	-0.016*	0.003
Self-employment	0.009***	0.002	0.002	0.004***	-0.008	0.000	-0.004	-0.005***
Constant	0.524*	0.018**	-0.027*	0.247*	-0.142*	0.223*	-0.009	0.166*
R-Squared	0.180	0.160	0.130	0.320	0.12	0.140	0.150	0.263
Chi	813.56	301.56	489.28	575.36	687.63	632.89	201.57	735.3

Source: Own estimation with survey data.

\* indicates significant at 99% , \*\* at 95% and \*\*\* at 90% level of significance. Number of observations is 3,531.

Test of hypothesis:

Combined effect of the socio-economic factors is zero;  $\chi^2 = 863.88$  (critical value at 95% level of significance with 35 df=55.75)

**Table-IV** *Estimated uncompensated (Marshallian) own price and cross price elasticities for Pakistani Punjab and urban and rural areas in Pakistani Punjab*

	Wheat	Rice	Fruits	Vegetables	Milk	Cooking Oil	Meat	Other Food
<b>Punjab</b>								
Wheat	-0.402*	-0.098*	-0.008	-0.009	-0.149*	-0.001	-0.041**	0.101*
Rice	-0.098*	-0.537*	0.082**	-0.174*	0.634*	-0.194*	0.090	0.069*
Fruits	-0.008	0.082	-0.607*	-0.105	-0.048	0.025	0.041***	-0.301*
Vegetables	-0.009	-0.174*	-0.105	-0.554*	0.110*	-0.148*	-0.127*	-0.004
Milk	-0.149*	0.634*	-0.048	0.110*	-0.958*	-0.038*	-0.150*	-0.038*
Cooking Oil	-0.001	-0.194*	0.025	-0.148*	-0.038*	-0.502*	-0.118*	-0.183*
Meat	-0.041**	0.087	0.041***	-0.127*	-0.147*	-0.118*	-0.783*	0.022**
Other Food	0.101	0.067*	-0.301	-0.004	-0.038*	-0.183*	0.022**	-0.970*
<b>Urban</b>								
Wheat	-0.300*	-0.025	-0.010*	0.064*	-0.187*	-0.033	-0.188*	0.112*
Rice	-0.024	-0.545*	0.087	-0.272*	0.502*	-0.226*	-0.317*	0.142*
Fruits	-0.010*	0.087	-0.581*	-0.110*	-0.102	0.155*	0.032	-0.285*
Vegetables	0.064*	-0.272	-0.110*	-0.476*	-0.049	-0.134*	-0.206*	0.018
Milk	-0.187*	0.502	-0.102	-0.049	-0.756*	-0.081*	-0.062**	-0.011
Cooking Oil	-0.033	-0.226*	0.155*	-0.134*	-0.081*	-0.408*	-0.130*	-0.254*
Meat	-0.188*	-0.317	0.032	-0.206*	-0.062**	-0.130*	-0.669	0.017
Other Food	0.111*	0.142	-0.285*	0.018	-0.011	-0.254*	0.017	-0.976*
<b>Rural</b>								
Wheat	-0.466*	-0.123	0.024***	-0.034**	-0.128*	0.022	0.015	0.099*
Rice	-0.123*	-0.508	0.091**	-0.148*	0.685*	-0.220*	0.346*	0.016
Fruits	0.024***	0.091**	-0.598*	-0.130*	0.016	-0.057	0.060***	-0.321*
Vegetables	-0.034**	-0.148*	-0.130*	-0.579*	0.162*	-0.144*	-0.075*	-0.018
Milk	-0.128*	0.685	0.016	0.162*	-0.998*	-0.027***	-0.186*	-0.050*
Cooking Oil	0.023	-0.220*	-0.057	-0.144*	-0.027***	-0.613*	-0.132*	0.024***
Meat	0.015	0.346	0.060***	-0.075*	-0.186*	-0.132*	-0.853*	-0.119*
Other Food	0.099*	0.016	-0.321*	-0.018	-0.050*	0.024***	-0.119*	-0.966*

Source: Own estimation with survey data.

\* indicates significant at 99% , \*\* at 95% and \*\*\* at 90% level of significance

(Table VI) reports expenditure elasticities. All of these elasticities are positive and significant at the 99 percent level of significance suggesting that all goods are normal. The elasticities are greater than one for fruits, milk, meat and other food products suggesting these food items are the most responsive to expenditure changes. The expenditure elasticities for Punjab as a whole are tightly grouped around one ranging from 0.762 (wheat) to 1.295 (milk) with the exception of cooking oil (0.69) which is the most expenditure inelastic of the eight goods. Expenditure elasticities are similar in rural and urban areas except for rice where the expenditure elasticity in urban areas is 1.011 compared to 0.862 in rural areas. In rural areas the highest expenditure elasticities are for milk (1.379), fruit (1.270), other food products (1.081) and meat (1.028) whereas in urban areas the most expenditure elastic products are: fruit (1.333), meat (1.138) other foods (1.128) and rice (1.011). These results indicate that in both urban and rural Punjab, the growth in demand for fruits, milk, meat and other food will

outpace growth in income. Sheng *et al.* (2008) also while using LA-AIDS also found similar results for Malaysia. Their estimated expenditure elasticities show that demands for meat (1.4064), fish (1.2440), vegetables (1.1729), and fruits (1.0905) are likely to grow faster than other traditional main calorie sources-rice (0.9091) and bread and other cereals (0.3177) in corresponding to positive income effect in future.

**Table-V** Estimated compensated (Hicksian) own price and cross price elasticities for Pakistani Punjab and urban and rural areas in Pakistani Punjab

Food Products	Wheat	Rice	Fruits	Vegetables	Milk	Cooking Oil	Meat	Other Food
<b>Punjab</b>								
Wheat	<b>-0.246*</b>	-0.115*	-0.011	0.055*	0.006	0.050*	0.007	0.253*
Rice	-0.115*	<b>-0.508*</b>	0.125*	-0.065	0.836*	-0.097***	0.184*	0.266*
Fruits	-0.011	0.125*	<b>-0.548*</b>	0.021	0.170*	0.139*	0.087*	-0.087*
Vegetables	0.055*	-0.065	0.021	<b>-0.458*</b>	0.298*	-0.064*	-0.046**	0.180*
Milk	0.006	0.836*	0.170*	0.298*	<b>-0.693*</b>	0.123*	0.008	0.223*
Cooking Oil	0.050*	-0.097***	0.139*	-0.064*	0.123*	<b>-0.733*</b>	0.090*	-0.076*
Meat	0.007	0.184*	0.087*	-0.046**	0.008	0.090*	<b>-0.879*</b>	0.191*
Other Food	0.253*	0.266*	-0.087*	0.180*	0.223*	-0.076*	0.191*	<b>-0.750*</b>
<b>Urban</b>								
Wheat	<b>-0.166*</b>	-0.036***	-0.086*	0.133*	-0.028	0.027	-0.113*	0.269*
Rice	-0.036***	<b>-0.513*</b>	0.143**	-0.160**	0.704*	-0.122	-0.198**	0.343*
Fruits	-0.086*	0.143**	<b>-0.507*</b>	0.020	0.120***	0.276*	0.082**	-0.066*
Vegetables	0.133*	-0.160**	0.020	<b>-0.378*</b>	0.140*	-0.044***	-0.101*	0.206*
Milk	-0.028	0.704*	0.119***	0.140*	<b>-0.531*</b>	0.044**	0.079***	0.212*
Cooking Oil	0.027	-0.122	0.276*	-0.044***	0.044**	<b>-0.233*</b>	-0.135*	0.087*
Meat	-0.113*	-0.198**	0.082**	-0.101*	0.079***	-0.135*	<b>0.065</b>	0.078
Other Food	0.269*	0.343*	-0.066*	0.206*	0.212*	0.087*	0.078	<b>-0.749*</b>
<b>Rural</b>								
Wheat	<b>-0.291*</b>	-0.142*	0.012	0.028***	0.027	0.070*	0.047**	0.248*
Rice	-0.142*	<b>-0.480*</b>	0.126*	-0.040	0.887*	-0.126***	0.424*	0.212*
Fruits	0.012	0.126*	<b>-0.548*</b>	-0.007	0.233*	0.052	0.103*	-0.110*
Vegetables	0.028***	-0.040	-0.007	<b>-0.484*</b>	0.350*	-0.063*	-0.010	0.165*
Milk	0.027	0.887*	0.233*	0.350*	<b>-0.758*</b>	0.150*	-0.024	0.228*
Cooking Oil	0.070*	-0.126***	0.052	-0.063*	0.150*	<b>-0.848*</b>	-0.031	0.190*
Meat	0.047**	0.424*	0.103*	-0.010	-0.024	-0.0304	<b>-0.943*</b>	0.083*
Other Food	0.248*	0.212*	-0.110*	0.165*	0.228*	0.190*	0.083*	<b>-0.750*</b>

Source: Own estimation with survey data.

\* indicates significant at 99% , \*\* at 95% and \*\*\* at 90% level of significance

**Table-VI** Expenditure Elasticities for Pakistani Punjab and for Urban and Rural Areas in Pakistani Punjab

Food Products	Punjab	Urban	Rural
Wheat	0.762*	0.758*	0.774*
Rice	0.905*	1.011*	0.862*
Fruits	1.292*	1.333*	1.270*
Vegetables	0.854*	0.885*	0.840*
Milk	1.295*	1.108*	1.379*
Cooking Oil	0.686*	0.735*	0.658*
Meat	1.073*	1.138*	1.028*
Other Food	1.095*	1.128*	1.081*

Source: Own estimation with survey data.

\* indicates significant at 99% level of significance

## CONCLUSION AND RECOMMENDATIONS

This paper uses the LA-AIDS model to examine food demand patterns in Pakistani Punjab. In general we obtain compensated and uncompensated own price and expenditure elasticities that are statistically significant and have the expected signs. The demand for all eight food goods is price inelastic. The demand for wheat and vegetables both by urban and rural consumers is very price inelastic. All of the expenditure elasticities are positive suggesting that all goods are normal with the largest expenditure elasticities found for milk, fruits, other food products and meat. Socioeconomic variables have important influences on household food demand.

These findings have policy implications. For example, the highly inelastic own price elasticity of wheat in both urban and rural areas and limited substitution between wheat and rice indicates the importance of wheat, particularly for urban consumers. An increase in the price of wheat will have a limited impact on wheat consumption in urban areas, and increase the total household expenditure on wheat while reducing expenditures on other foods. An increase in the wheat price may be helpful for wheat growers who are net sellers of wheat but not for the largely urban net buyers of wheat who will suffer real income losses.

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