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An Analysis of Consumption Pattern in Pakistan

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The paper aims at testing the validity of Engel's law with data on Pakistan. Consumption functions for urban and rural areas have been estimated separately. These functions are shown to be determined by total expenditure and household size. Engel's law is confirmed for some commodity groups but not for all. Following tests of urban-rural homogeneity and of stability of urban and rural consumption functions, demand growth rates for different food and non-food items have been calculated, assuming different growth rates of total expenditure and household size.

INTRODUCTION

In a developing country like Pakistan, consumption pattern undergoes significant changes over time as real income increases. Hence, capacity investment should be planned by taking into consideration, besides other factors, changes in consumption patterns. The need for exploring determinants of consumption patterns and estimating various parameters in the consumption functions for various commodities is, therefore, quite obvious.

More than one hundred years ago, Engel propounded an empirical law that with an increase in income the share of expenditure on food in total household expenditure tends to decrease, that on clothing, fuel and lighting remains constant, and that on luxury goods increases [25]. Since then a number of studies conducted for the developing and developed countries have corroborated Engel's Law.[1]

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[1]For example, see Aziz-ur-Rehman [2], Bussink [4], Ranis [21], Islam [11], Khan [13, 14], Crammer [5], Houthakkar [8], Humphrey and Oxley [10], Stigler [25], Sinha and Hay [24], Ranjan [22] and Prais and Houthakkar [20].

The most important factor determining the pattern of consumption is level of income. However, certain other variables, such as distribution of income, level and distribution of assets, size and composition of households, number of earners in a household, prices, structural, geographical and climatic differences, etc., may also significantly affect the pattern of consumption. However, in most of the studies the focus is on the relationship of expenditure on different products to income and household size. Crockett [6], Massell [16], Ranjan [22] and Sinha & Hay [24] have analysed the effects of some of the other variables (mentioned above) on consumption patterns but they, too, conclude that income and household size are the major determinants of consumption. For example, Sinha and Hay, in their study of the Indian industrial workers [24] conclude that where all the expenditure categories are concerned the only significant variables were income and household size.[2]

For Pakistan, we are constrained to analyse consumption patterns in terms of income, household size and number of earners because data on other variables are not available. The omission of other explanatory variables will, hopefully, not affect our results significantly. Nevertheless, we shall account for the effect of urbanization on consumption patterns, because the consumption pattern in rural areas is expected to be quite different from that in urban areas. Therefore, in our study, we shall estimate separate consumption functions for the urban and rural areas.

Aziz-ur-Rehman [2], Bussink [4], Ranis [21] and Khan [13] have studied the consumption pattern of Pakistan. However these studies, besides being now out of date as they pertain to the early Sixties, ignore completely the effect of household size and use only per capita income (or expenditure) as the explanatory variable. In the present study, variations in consumption of different items have been explained in terms of total expenditure, household size and the number of earners. The last-mentioned variable was dropped later because of high multi-collinearity between the number of earners and household size.

The present study is divided into four main sections. The first section discusses the methodology and data problems. The second section presents the results of our analysis and compares them with the results pertaining to other developed and developing countries. In the third section, demand projections are made and policy prescriptions are also discussed. The last section concludes the discussion.

I. METHODOLOGY

The main objective of this study is to test the validity of Engel's law on the basis of data relating to Pakistan. For this purpose, we have analysed consumption

[2]The study by Sinha and Hay [24] considers the effect of fourteen explanatory variables (including income, household size, number of earners per family, permanence of employment, urban residence, sex, and religion) on consumption pattern.

patterns by estimating the relationship of expenditure on a product per household to total expenditure per household, household size and number of earners in a household. We have used total expenditure instead of income as an explanatory variable because, firstly, income data generally suffer from measurement errors, and, secondly, total expenditure better reflects the changes in permanent income. The simultaneous inclusion of both variables, viz. household size and number of earners, in the relationship affects the significance of the estimated parameters, as these two variables are highly collinear. Consequently, we have retained household size and dropped the number of earners from the relationship as the former has greater and direct influence on consumption patterns.

The data drawn from various issues of the *Household Income and Expenditure Survey* [18] have been classified by income groups. Since the number of households is not the same in various income groups, the OLS estimates are likely to be biased [12, pp. 236–238]. Therefore, we have used weighted least squares (WLS). Both linear and log-linear relations were estimated, but on the basis of Box-Cox test[3] we have preferred the log-linear relationship.

Data Problems

This study is primarily based on the data given in the *Household Income and Expenditure Survey 1971-72,* which remains the last issue of the publication to date. In order to test the stability of consumption behaviour over time, consumption functions have been estimated on the basis of pooled data for the years 1968-69 to 1971-72. However, for these data relating to different periods to be comparable, they should be at constant prices. To obtain total expenditure and expenditure on different items at constant prices of 1971-72, general consumer price index (CPI) and CPI for different expenditure groups have been used to deflate total expenditure and expenditure on different consumption groups respectively. It may be noted that prior to 1970-71, published sources reported CPIs corresponding to three occupational groups, viz. industrial workers, clerical workers, and government employees, separately and not for all occupational groups combined, which are required for the present study. In order to construct combined CPIs for 1968-69 and 1969-70, we need weights for the three occupational groups. These weights have been derived by utilizing the data for the period from 1972-73 to 1974-75. This step has been taken because in this period CPIs are available for different occupational groups separately as well as for all the groups combined. These weights are then applied to the corresponding occupational categories to construct the combined CPIs for the years 1968-69 and 1969-70. In this way we have constructed a general combined CPI as well as combined CPIs for only four broad expenditure groups, viz.

[3]In Box-Cox test, we compare the residual sum of squares after making adjustment for the difference in the unit of measurement of the dependent variable.

food, clothing and footwear, housing and miscellaneous, as published sources do not report CPI for food sub-groups for either the pre-1970 or the post-1970 period. For all food sub-groups, viz. cereals, pulses, milk and milk products, vegetables, meat, fish & poultry, edible oil and tea, CPIs are constructed by utilizing data available in different *Household Income and Expenditure Surveys.*[4]

II. RESULTS

Consumption patterns of both the rural and the urban population are reported in Table 1. Five broad commodity groups, viz. food, clothing and footwear, fuel and lighting, housing and miscellaneous, are distinguished. Food accounts for 50 percent of the total expenditure in urban areas and for 60 percent in rural areas. Hence food has been sub-divided into seven groups, viz. cereals, pulses, milk and milk products, vegetables, meat, fish, poultry, edible oil and tea.

Table 1

Percentage Distribution of Expenditure on Commodity Groups

Commodity Groups	Percentage of Total Expenditure	
	Urban	Rural
Food		
Cereals	12.36	20.81
Pulses	1.41	1.90
Milk & Milk Products	8.68	15.18
Vegetables	3.93	3.80
Meat, Fish, Poultry	4.94	3.22
Edible Oil	4.07	1.84
Tea	1.36	1.27
Other food items	11.65	9.32
Total	*48.40*	*57.34*
Clothing	9.53	10.97
Fuel and Lighting	5.11	5.39
Housing	12.80	6.58
Miscellaneous	21.99	19.15

Source: Household Income & Expenditure Survey 1971-72.
Note: The percentage shares do not add up to 100 percent because taxes, remittances to household members living away, and personal effects are not included here.

[4]Each food sub-group includes different items. For example cereals include wheat, rice and others, and 'Others' include maize, barley and millet. But price and quantity information for 'others' is not available from the surveys. So, to construct CPI for cereals, we have used price and quantity information for wheat and rice. The exclusion of 'Others' may give a biased CPI, but the bias is expected to be small as expenditure on 'Others' is quite low.

From Table 1, it is clear that consumption patterns for urban and rural areas differ significantly. Higher shares are devoted to food expenditure in rural areas than in urban areas. Within the sub-groups for food, expenditure patterns also differ significantly, particularly in the cases of cereals, milk and milk products and edible oil. These differences may arise due to different income levels and preferences. The relative shares of total expenditures on clothing, fuel and lighting and miscellaneous, in urban areas are not much different from those in rural areas. However, the expenditure on housing in urban areas exceeds significantly that in the rural areas; it is 12.8 percent in urban areas as against 6.58 percent in rural areas.

The next step is to examine the elasticities of different food and non-food items with respect to total expenditure and household-size. (These elasticities are referred to hereinafter as expenditure elasticity and household-size elasticity.) *A priori,* these elasticities are expected to lie between zero and one for the necessities. Expenditure elasticity is expected to be at least equal to unity, while household-size elasticity may range between zero and one for 'comforts'. For luxuries, the expenditure elasticity is expected to exceed unity and household-size elasticity is expected to be negative. The results of rural and urban consumption patterns are discussed against these *a priori* expectations.

Urban Consumption Patterns[5]

The elasticity estimates of different commodity groups with respect to total expenditure and household size, for urban areas, as obtained from both linear and log-linear relations are reported in Table 2.

For basic carbohydrate items, low expenditure elasticities reflect that people have to spend on these items irrespective of the level of their income as these items, viz. cereals, pulses, and vegetables, are the basic necessities of life. Expenditure elasticity for meat, fish and poultry reflects that as incomes rise, people tend to shift to animal products in preference to other items, e.g. pulses, vegetables, etc.[6] For milk and milk products expenditure elasticity is quite high compared to that for other food items. As milk products are relatively expensive sources of calorie, the expenditure on milk products – butter and *desi* ghee – increases with the increase in income. For edible oil, low expenditure elasticity is quite unexpected as it is considered to be an expensive calorie source. The reason may be that this group consists of vegetable ghee and mustard oil which are relatively cheaper items than butter and *desi* ghee available in urban areas of Pakistan. The expenditure elasticity for tea reflects that tea is not considered to be a basic necessity in family buget.

[5]Detailed estimates of urban consumption functions are available from the author.
[6]Other studies [2;13;14], too, give very high expenditure elasticity for meat, fish and poultry in Pakistan.

Table 2

Elasticity Estimates for Urban Areas, 1971 - 72

Commodity Groups	Linear Form		Log-Linear Form	
	E_1 (Expenditure Elasticity)	E_2 (Household-size Elasticity)	E_1 (Expenditure Elasticity)	E_2 (Household-size Elasticity)
Food				
Cereals	0.072	1.033	0.160	0.857
Pulses	0.016	1.059	0.129	0.957
Milk & Milk Products	0.498	0.983	0.608	0.855
Vegetables	0.316	0.903	0.425	0.773
Meat, Fish, Poultry	1.236	0.080	1.048	0.623
Edible Oil	0.210	1.044	0.332	0.853
Tea	0.662	0.639	0.737	0.561
All Food	*0.510*	*0.703*	*0.651*	*0.433*
Clothing	0.623	0.611	0.787	0.277
Fuel and Lighting	0.424	0.627	0.603	0.281
Housing	1.616	–0.975	1.429	–0.666
Miscellaneous	2.053	–0.460	1.410	–0.074*

*Estimated coefficient is not significant at the 5-percent level. Elasticities corresponding to linear estimates are obtained at the mean value.

For all food, expenditure elasticity is less than one. This result confirms Engel's law. For the miscellaneous group,[7] the Engel's law is also confirmed; its expenditure elasticity is greater than unity, suggesting that mostly luxury items are included in this group. Expenditure elasticity for fuel and lighting and clothing falls short of unity. This result is in contradiction of Engel's law. The expenditure elasticity for housing is greater than unity. This may be due to the demonstration effect leading to a shift from low-rent houses to high-rent houses and an increase in expenditure on furniture and fixtures.

On the other hand, household-size elasticities are very high, approximately equal to one, for basic necessities, e.g. cereals and pulses, implying that there exist no economies of scale in the consumption of these products. For milk and milk products, too, household-size elasticity is quite high. The reason may be that, with an increase in household size, the consumption of milk products decreases, while the consumption of milk (fresh and boiled) increases. Household-size elasticity is quite low for food, reflecting scale economies in food consumption of a family and the substitution of cheaper calorie sources for the more expensive ones as household-size increases. For other non-food items, household-size elasticity also is very low. Indeed it is negative for housing and 'miscellaneous' items. This implies that absolute expenditure on these items tends to decline as household size increases.

We may note that, as expected, for most of the commodity groups where expenditure elasticity is low, the household-size elasticity is very high, especially for basic necessities. On the other hand, household-size elasticities are low, even negative, for commodity groups with high expenditure elasticities, especially for non-food items.

[7]In the 'miscellaneous' group, expenditures on the following are included: personal care, medical care, education, goods and services relating to recreation and reading, telegraph and telephone, postage, stationery, domestic help, gifts and charity, goods and services relating to travelling, transportation, laundry and cleaning and other items.

Rural Consumption Patterns[8]

The estimates of expenditure and household-size, elasticities for rural areas obtained from linear and log-linear forms are reported in Table 3.[9]

Here detailed discussion is limited to only those results which differ from those for urban areas. There are three products for which estimates of household-size elasticity deserve attention. Household-size elasticity for milk and milk products exceeds unity; but it is negative for edible oils. This may be due to the preference of rural households for *desi* ghee and butter, which are milk products and are also domestically available in rural areas.

For clothing, we see that the expenditure elasticity approximates unity. This result confirms Engel's law. The negative household-size elasticity for clothing is a result which is quite unexpected. It is interesting to note that although the magnitudes of elasticities for some items are different for urban and rural areas, the difference is not statistically significant in most cases.

Differences in Urban-Rural Consumption Patterns (1971-72)

The consumption behaviour of an urban household is expected to be considerably different from that of a rural household because of differences in income, relative product price patterns, needs and tastes and the existence of structural and cultural differences between the two areas. In order to test if the consumption behaviours of rural and urban areas are similar, we have used covariance analysis, using

[8]Detailed estimates of rural consumption functions are available from the author.

[9]Test for heteroscedasticity for each and every commodity group (for both urban and rural areas) shows that X_2 (household size) causes the problem only for vegetables, for rural areas. So rural consumption function for vegetables is estimated after making required transformation.

pooled data for urban and rural areas. This analysis[10] shows that, except for cereals and edible oils, differences in both the expenditure and household-size elasticities for rural and urban areas are statistically insignificant. The urban-rural differences in the elasticities in the case of cereals may be due to the differences in preferences and in the relative prices of the items included in this group. We may note that cereals account for 36.2 percent of the total food expenditure in rural areas and for 25.5 percent of the total food expenditure in urban areas. While consumption of maize, millet and barley is negligible in urban areas, their consumption is not quite insignificant in rural areas. The negative household-size elasticity for edible oils in rural areas, as explained in the previous section, is due to the differences of tastes in the two areas.

Table 3

Elasticity Estimates for Rural Areas, 1971 - 72

Commodity Groups	Linear Form		Log-Linear Form	
	E_1 (Total Expenditure Elasticity)	E_2 (House-hold-size Elasticity)	E_1 (Total Expenditure Elasticity)	E_2 (House-hold-size Elasticity)
Food				
Cereals	0.353	0.667	0.569	0.327**
Pulses	0.239	0.738	0.374**	0.546*
Milk & Milk Products	0.519	1.042	0.49**	1.197
Vegetables	0.121**	1.129**	0.356**	0.622
Meat, Fish, Poultry	1.861	–0.903**	1.182	0.168*
Edible Oil	0.668	–0.58**	0.552*	–0.40**
Tea	1.080	–0.871*	0.835**	0.353*
All Food	*0.583*	*0.565*	*0.705*	*0.376*
Clothing	0.843	0.145	0.944	–0.04*
Fuel and Lighting	0.549	0.174	0.64	0.06*
Housing	2.625	–2.864**	1.267	–0.581*
Miscellaneous	1.884	–0.82**	1.471	–0.211*

* Coefficients are not significant at both the 5-percent and 1-percent levels.
** Coefficients are significant at the 5-percent level but not at the 1-percent level.

It follows from the above discussion that differences in slopes of consumption functions for various commodity groups are not statistically significant, implying

[10] See Tables I and II in Appendix A.

that these slopes are homogeneous for all commodity groups except for cereals and edible oils. However, there are significant differences in the intercepts for all products except for all food and pulses reflecting significant differences between rural and urban areas, with respect to relative product price patterns, tastes and structural and cultural factors. It follows that aggregate consumption functions, based on pooled data for rural and urban areas would be very misleading for policy-formulation purposes.

Test of Stability in Consumption Behaviour over Time

In order to project demand for various products and to formulate meaningful policies, we should test the stability of consumption patterns in addition to estimating consumption functions of households.[11]

To test stability, we have used covariance analysis by pooling data for all the four years (1968-69 to 1971-72) and by introducing dummies for the years prior to 1971-72. The dummies for differences in slopes[12] do not show any significant change over time in urban areas except in the cases of cereals, tea and 'miscellaneous' items. Similarly, except for clothing, slopes do not show any change in rural areas. However, the intercepts for most of the products show significant changes over time.

From the above discussion, it is quite clear that while slopes are stable for almost all the commodity groups, the intercepts are not. This reflects changing tastes, political unrest and overall slow-down of economic activities during the period under consideration. However, because it is difficult to predict changes in the intercepts, we made no attempt to predict shifts in the consumption functions for different products.

Inter-Country Comparison of Elasticity Estimates

Estimates of the expenditure and household-size elasticities for the developing and developed countries are reported in Table 4(a) and (b). The inter-country comparison of elasticities should be viewed with some reservations because of differences in tastes and geographical, climatic and cultural conditions. The elasticity estimates for four broad expenditure groups, viz. food, clothing, housing and 'miscellaneous', are reported in Table 4(a) and for food sub-groups in Table 4(b), because for food sub-groups comparable elasticity estimates are not available for all the countries included in Table 4(a).

[11] Interested readers can get the estimated results for covariance analysis from the author.
[12] The dummy is significant only for 1970-71 in the case of cereals and for 1968-69 in the case of the 'miscellaneous' group. As regards tea, dummy variables are significant for all the years, which may be a reflection of the separation of East Pakistan (now Bangladesh).

The inter-country comparison of elasticities in Table 4(a) reveals two important points. Firstly, expenditure elasticities for food items, though below unity for all countries, are relatively higher in the cases of less developed countries, which may reflect the lower income levels in those countries. Secondly, while for most countries reported in Table 4(a) the expenditure elasticity for clothing exceeds unity and for housing it is less than or equal to unity, for clothing it is less than or equal to unity and for housing it is greater than unity in the case of Pakistan. Table 4(b) shows that for most of the products elasticity estimates are not substantially different among countries except for some products in Kenya and Dar-es-Salam. These are the major differences arising, may be mainly, from differences in income levels and tastes.

Table 4 (a)

Inter-Country Comparison of Elasticity Estimates
(For Four Broad Expenditure Groups)

Countries/ Cities	Food		Clothing		Housing		Miscellaneous	
	E_1	E_2	E_1	E_2	E_1	E_2	E_1	E_2
Austria[a]	0.554	0.351	1.767	–0.35	0.741	–0.21	1.62	–0.392
Canada[a]	0.647	0.292	1.337	–0.114	1.114	–0.447	1.131	–0.061
Finland[a]	0.621	0.272	1.622	–0.31	0.802	0.008	1.445	–0.367
France[a]	0.483	0.466	1.158	0.232	1.099	–0.652	1.656	–0.536
Germany[a]	0.473	0.295	1.049	0.102	0.906	0.196	1.447	0.034
Ireland[a]	0.597	0.323	1.177	0.009	0.705	–0.221	1.478	–0.219
Switzerland[a]	0.46	0.397	1.445	0.044	0.824	–0.137	1.879	–0.629
Japan[a]	0.556	0.309	1.593	–0.051	0.861	–0.383	1.416	–0.178
Latvia[a]	0.43	0.482	1.094	–0.065	1.024	0.002	1.567	–0.516
U.K.[a]	0.519	0.33	1.096	0.139	0.477	–0.045	1.64	–0.358

Continued–

Table 4 (a) – *(Continued)*

Countries/ Cities	Food		Clothing		Housing		Miscellaneous	
	E_1	E_2	E_1	E_2	E_1	E_2	E_1	E_2
Netherlands[a]	0.502	0.291	1.088	1.001	0.613	–0.001	1.406	–0.2
Norway[a]	0.515	0.131	1.266	–0.044	0.8	0.031	1.524	–0.296
Poland[a]	0.731	0.213	1.784	–0.497	0.662	–0.068	1.774	–0.534
Sweden[a]	0.631	0.311	1.119	0.003	0.803	0.008	1.446	–0.269
U.S.A.[b]	0.513	0.332	1.021	0.338	1.041	–0.244	–	–
Rural India[c]	0.871	0.482	1.342	–1.29	–	–	–	–
Urban India[c]	0.97	0.528	1.462	–0.629	–	–	–	–
Kenya[d]	–	–	0.89	0.37	2.34	–0.32	–	–
Urban Greece 1[e]	0.477	0.46	0.844	0.15	0.962	0.54	–	–
Urban Greece 2[e]	0.434	0.372	1.047	0.592	0.55	0.063	–	–
Rural Malawi[f]	0.706	2.444	0.846	1.017	1.564	Insig.	–	–
Urban Malawi[f]	0.766	0.367	0.683	0.574	1.047	1.68	–	–
Nairobi[g]	0.483	0.357	1.644	–0.285	1.076	–0.231	–	–
Dare-es-Salam[f]	–	–	0.55	0.15	–	–	–	–
Rural Pakistan[h]	0.705	0.376	0.944	–0.04	1.27	–0.58	1.47	–0.211
Urban Pakistan[h]	0.651	0.43	0.787	0.28	1.429	–0.67	1.41	–0.07

Sources: For (a), see [8].
For (b), see [9].
For (c), see [22]. The results reported are based on pooled data for the period 1952–69 for grouped households.
For (d), see [16].
For (e), see [6]. For Urban Greece(1) results are for 55 groups of households and for Urban Greece (2) groups of households were increased to 62.
For (f), see [10].
For (g), see [17].
For (h), see Tables 2 and 3 of this study.

Table 4 (b)

Inter-Country Comparison of Elasticity Estimates
(For Food Sub-Groups and Fuel and Lighting)

Expenditure Groups	Nairobi[a]		Urban Malawi[b]		Kenya[c]		Dar-es-Salam[b]		Rural Pakistan[e]		Urban Pakistan[e]	
	E_1	E_2	E_1	E_2	E_1	E_2	E_1	E_2	E_1	E_2	E_1	E_2
Food												
Cereals	0.227	0.525	0.445	0.984	0.59	0.15	–	–	0.569	0.327	0.16	0.89
Pulses	0.022	1.312	–	–	0.79	0.08	–	–	0.374	0.546	0.13	0.96
Milk & Milk Products	0.493	0.516	1.009	1.06	2.34	–0.59	1.15	–0.15	0.49	1.197	0.61	0.86
Vegetables	0.563	0.512	0.788	0.703	0.79	0.09	0.6	0.05	0.356	0.622	0.43	0.773
Meat, Fish, Poultry	0.477	0.499	–	–	1.2	0.12	0.61	0.28	1.182	0.167	1.048	0.623
Edible Oil	–	–	0.903	1.24	1.22	–0.3	–	–	0.552	–0.4	0.332	0.85
Tea	0.287	0.583	0.913	1.143	–	–	–	–	0.835	0.353	0.737	0.561
Fuel & Lighting	–	–	0.886	0.276	0.69	–0.08	1.22	–0.22	0.64	0.06	0.603	0.28

Sources: For (a), see [17].
For (b), see [10].
For (c), see [16].
For (e), see Tables 2 and 3 of this study.

III (a) DEMAND PROJECTIONS

Demand projections,[13] up to 1983, are made on the basis of the following assumptions: (i) Relative prices of individual commodities with respect to general price level would remain constant, and (ii) Other factors like education, number of earners per household, tastes, etc., either are relatively unimportant or their relationship with the variables being studied remains the same over the forecast period.

Demand projections are made on the basis of different expenditure growth rates for different time periods. First, the realized growth rate of expenditure during the period from 1969-70 to 1977-78 is equal to 1.45 percent. Secondly, the aggregate private consumption expenditure projected in the Fifth Five-Year Plan (1978–83) will grow at an annual compound rate of 6.2 percent, which amounts to a 2.89-percent growth rate of expenditure per household. Thirdly, corresponding to the two G.N.P. growth rates, 5 percent and 7.2 percent (projected in the Fifth Five-Year Plan), and two marginal rates of saving *(0.15* percent and *0.20* percent), we get four different expenditure growth rates per household, viz. 2.06 percent, 0.83 percent, 4.2 percent and 2.94 percent, while the population growth rates are 4.36 percent and 2.86 percent for urban and rural areas respectively. Demand growth rates pertaining to the assumption that household size remains the same are reported in Table 5, and those pertaining to the assumption that the number of households remains the same over the projection period are reported in Table 6.[14] (For detail, see Appendix B.) The estimated growth rates of demand based on different expenditure growth rates show that demand growth rates are higher for all commodity groups when household size rather than the number of households is assumed to remain unaltered. Though differences in demand growth rates are quite significant for all commodity groups, they are more pronounced in the cases of housing and miscellaneous groups. The difference arises from the fact that in the first set of projections only changes in income are included, while the effect of changes in the household size on consumption behaviour is ignorned; and the elasticity of consumption to expenditure is higher than it is to the size of household, depending on the nature of the products. In the first set of demand projections, we get higher demand growth rates for luxury items while in the second set demand growth rates are higher for food items and even negative in those cases where the effect, on demand, of negative household-size elasticities dominates the positive effects of expenditure elasticities.

The demand growth rates are higher for urban areas than for rural areas mainly due to the fact that the urban population growth rate is higher (4.36 percent) than the rural population growth rate (2.86 percent). In order to eliminate the impact of differences in population growth rates we have compared the expected growth rates

[13] For methodology, see Appendix B.
[14] Demand projections corresponding to different assumptions for the marginal propensity to save are not reported here. The interested reader can get these tables from the author.

of demand, if population grows at the same rate, of 3.22 percent per annum in both areas.[15] We get higher demand growth rates for all commodity groups, except milk and milk products, vegetables and housing, in rural areas than in urban areas if we assume that the household size remains the same. This is due to the sensitivity of demand growth rates to differences in the expenditure elasticities in the two areas: expenditure elasticities are higher in rural areas for all commodities except milk and milk products, vegetables and housing.

Table 5

Projected Growth Rates of Consumer Demand

$N_u = 4.36$ $N_r = 2.86$

Commodity Groups	$\dot{X}_1 = 1.45^*$			$\dot{X}_1 = 2.89^{**}$		
	Urban	Rural	Weighted	Urban	Rural	Weighted
Food						
Cereals	4.59	3.69	4.12	4.82	4.5	4.65
Pulses	4.55	3.40	3.99	4.73	3.94	4.35
Milk & Milk Products	5.24	3.57	4.34	6.12	4.28	5.13
Vegetables	4.98	3.38	4.36	5.59	3.89	4.93
Meat, Fish, Poultry	5.88	4.57	5.49	7.39	6.28	7.05
Edible Oil	4.84	3.66	4.57	5.32	4.46	5.13
Tea	5.43	4.07	4.92	6.99	5.27	6.02
All Food	*5.3*	*3.88*	*4.68*	*6.24*	*4.9*	*5.65*
Clothing	5.5	4.23	4.96	6.63	5.59	6.18
Fuel and Lighting	5.23	3.79	4.64	6.1	4.71	5.53
Housing	6.43	4.7	6.00	8.49	6.52	8.00
Miscellaneous	6.4	4.99	5.88	8.43	7.11	7.94

*Consumption growth rate is calculated on the basis of the growth rate of aggregate private consumption, observed during the '70s.

**$\dot{X}_1$ is calculated on the basis of growth rate of aggregate private consumption expenditure, viz. 6.2 percent reported in the Fifth Five-Year Plan (1978–83).

However, if we assume that the number of household remains the same, urban demand growth rates turn out to be higher for all commodity groups, except milk and milk products and housing, than rural demand growth rates because household-size elasticities are higher in urban areas for all commodity groups, except milk and milk products and housing.

[15]Demand growth rates calculated on the basis of same growth rates of urban and rural population are available from the author.

Table 6

Projected Growth Rates of Consumer Demand

$\dot{X}_{2_u} = 4.36$ $\dot{X}_{2_r} = 2.86$

Commodity Groups	$\dot{X}_1 = 1.45$			$\dot{X}_1 = 2.89$		
	Urban	Rural	Weighted	Urban	Rural	Weighted
Food						
Cereals	3.97	1.77	2.83	4.2	2.58	3.36
Pulses	4.36	2.10	3.38	4.54	2.64	3.63
Milk & Milk Products	4.61	4.13	4.35	5.49	4.84	5.14
Vegetables	3.99	2.3	3.33	4.6	2.81	3.91
Meat, Fish, Poultry	4.24	2.19	3.63	5.75	4.9	5.50
Edible Oil	4.2	–0.34	3.15	4.68	0.46	3.71
Tea	3.53	2.22	3.02	4.58	3.42	4.14
All Food	*2.83*	*2.1*	*2.51*	*3.77*	*3.12*	*3.48*
Clothing	2.35	1.26	1.88	3.48	2.62	3.11
Fuel and Lighting	2.10	1.098	1.69	2.97	2.02	2.58
Housing	–0.83	0.18	–0.57	1.23	2.00	1.42
Miscellaneous	1.72	1.53	1.65	3.75	3.65	3.71

These demand projections should be accepted with some reservations because a number of factors, such as monetization, redistribution of income, sources of increased income and changes in price levels,[16] are ignored in a cross-section analysis. However, despite these limitations, demand projections are quite helpful for making future plans for production and development. This is because expenditure and household-size elasticities are stable over time for almost all products in both urban and rural areas. The pattern of demand growth for different food and non-food items would be approximately the same with respect to changes in income and population growth rates, as shown in Tables 5 and 6. Therefore, in order to reduce demand pressure on one commodity and to divert it to another, we can, to some extent, use the information contained in these tables.

III. (b) POLICY IMPLICATIONS

The analysis of consumer behaviour is important as it provides information on consumer's responsiveness to changes in income, prices, household size, number of

[16]The assumption of constant general price is extremely restrictive as inflation rate in Pakistan was 2.03 percent in 1970, 9.03 percent in 1972 and 23.234 percent in 1975. It still remains quite high.

earners, tastes, and cultural and structural factors. We can see from Table 1 that the proportion of total expenditure on milk and milk products in rural areas is quite high as compared with the demand in urban areas which may be largely due to higher consumption of butter and *desi* ghee; the reverse is the case for edible oil. Per capita consumption of basic necessities (wheat, rice, and milk and milk products) is higher in rural areas. On the other hand, however, consumption of edible oil and meat, fish, and poultry is higher in urban areas. It shows that demand pressure on basic necessities is higher in rural areas.

For policy purposes it is important to examine the responsiveness of consumers to changes in different economic and non-economic factors. Our analysis shows that consumption of food and non-food items is significantly affected by changes in total expenditure and household size. The analysis of demand projections shows that demand for basic necessities will increase at a higher rate if population growth rate is higher than total expenditure growth rate and vice versa. With total expenditure growth rate higher than population growth rate, demand for basic carbohydrate food items increases at a rate slower than that of the demand growth for other food items, e.g. meat, fish, poultry, tea, etc. It is, therefore, obvious that to make truly meaningful output plans, all the factors including population growth rate, expenditure growth rate, the difference between the two growth rates and consumer responsiveness to these changes should be taken into consideration.

IV. CONCLUSIONS

An analysis of urban and rural consumption patterns shows that in Pakistan expenditure elasticities for necessities (cereals, pulses, milk and milk products and 'other' commodities) are lower, while household-size elasticities are higher. For luxury items (housing and 'miscellaneous' goods) expenditure elasticities are higher and household-size elasticities are lower. In some cases, household-size elasticities are even negative. It is important to note that in the case of clothing, housing and fuel & lighting, Engel's law is contradicted by Pakistan's data.

Consumption behaviours of urban and rural households are analysed separately as the covariance analysis suggests different consumption behaviours in urban and rural areas. Although for most of the commodity groups coefficients of expenditure and household size for urban areas are not significantly different from those for rural areas, the differences in intercepts of consumption functions are highly significant for almost all commodity groups. Similarly, slopes are stable over time in both rural and urban areas but intercepts of consumption functions have tended to shift over time.

Growth rates of demand for different commodity groups, despite some limitations mentioned above, are helpful in making consistent production plans. For this purpose, the differences in consumption growth rates and population growth rates

and also the consumer's responsiveness to change in these and other factors should be taken into consideration. With higher growth rate of income, demand for items with higher expenditure elasticity – meat, fish, poultry and edible oil – will increase at a higher rate, whereas if population growth rate is higher than the growth rate of total expenditure, demand for basic necessities like cereals, pulses and milk and milk products will increase at a higher rate.

Appendix A

Table I

Estimation for Differences with Dummy Variables (Urban-Rural 1971-72) (Log–Linear Form)

Commodity Groups	BOi	Bli (X_1)	Bli (X_2)	(D_1) (differential intercepts)	(D_2X_1) (differential slopes) (X_1)	(D_3X_2) (differential slope) (X_2)
	(1)	(2)	(3)	(4)	(5)	(6)
Cereals	1.352	0.16	0.857	–1.1191	0.4088	–0.53
	(17.101)	(5.3653)	(13.751)	(–5.0003)	(4.969)*	(–3.82)*
Pulses	–0.8521	0.13	0.957	–0.625	0.245	–0.411
	(–4.951)	(1.992)	(7.052)	(–1.282)	(1.368)	(–1.36)
Milk & Milk Prod.	–1.673	0.6084	0.855	0.4221	–0.1182	0.3421
	(–10.373)	(9.9972)	(6.7202)	(0.9244)	(–0.7044)	(1.2084)
Vegetables	–1.209	0.425	0.773	–1.067	0.074	0.151
	(–8.523)	(10.002)	(5.67)	(–2.121)	(0.4427)	(0.54)
Meat, Fish, Poultry	–4.497	1.0521	0.6107	–0.288	0.1294	–4.433
	(–22.488)	(13.945)	(3.874)	(–0.5058)	(0.6215)	(–1.263)
Edible Oil	–0.764	0.3321	0.8527	–0.0361	0.2198	–1.2527
	(–2.22)	(2.5597)	(3.1448)	(–0.0371)	(0.614)	(–2.075)*
Tea	–3.72	0.737	0.5612	–0.365	0.0981	0.2081
	(–14.023)	(7.36)	(2.685)	(–0.488)	(0.355)	(–0.4471)
All Food	0.5788	0.651	0.4334	–0.185	0.0548	–0.0576
	(17.518)	(51.413)	(16.383)	(–1.947)	(1.562)	(–0.979)
Clothing	–1.5214	0.799	0.206	–0.3065	0.1435	–0.244
	(–13.527)	(18.828)	(2.319)	(–0.9627)	(1.243)	(–1.2338)
Fuel & Lighting	–1.083	0.6026	0.2811	0.0512	0.0376	–0.221
	(–11.853)	(17.478)	(3.902)	(0.198)	(0.395)	(–1.3776)
Housing	–3.407	1.429	–0.6658	0.2172	–0.1613	0.0852
	(14.047)	(15.61)	(–3.482)	(0.3164)	(–0.6391)	(0.2001)
Miscellaneous	–3.887	1.41	0.0742	–0.04	–0.065	–0.14
	(–30.502)	(29.242)	(0.740)	(–0.101)	(–0.49)	(–0.614)

Note: $D_1 = D_2 = D_3 = 1$ for rural sector.
$D_1' = D_2' = D_3' = 0$ for urban sector.

*Dummy coefficient significant at the 5-percent level.

Appendix A

Table II

Test in (Log-Linear Form) of Differential Intercepts (Urban-Rural 1971-72)

Commodity Groups	BOi	D_1 (Differential intercepts)	B1i (X_1)	B2i (X_2)
	(1)	(2)	(3)	(4)
Cereals	1.21	0.1673	0.188	0.851
	(10.026)	(8.22)*	(4.3641)	(10.300)
Pulses	–0.9204	–0.0101	0.1632	0.8863
	(–5.66)	(–0.37)	(2.804)	(7.9321)
Milk & Milk Products	–1.666	0.367	0.564	0.996
	(10.403)	(13.526)*	(9.834)	(9.052)
Vegetables	–0.663	–0.97	0.536	0.134
	(–1.361)	(–11.733)*	(3.076)	(0.3994)
Meat, Fish, Poultry	–4.492	–0.3415	1.1142	0.4063
	(–21.766)	(–9.7714)*	(15.086)	(2.8662)
Edible Oil	–2.118	0.1151	0.8793	–0.329
	(–1.71)	(0.549)	(1.983)	(–0.387)
Tea	–3.74	–0.1915	0.7599	0.4982
	(–15.47)	(–4.678)*	(8.784)	(3.00)
All food	0.566	0.0087	0.652	0.443
	(16.288)	(1.477)	(52.446)	(18.547)
Clothing	–1.6041	0.0503	0.82	0.193
	(–16.372)	(3.0321)	(23.362)	(2.863)
Fuel & Lighting	–1.065	0.12	0.639	0.153
	(–10.007)	(6.63)*	(16.781)	(2.088)
Housing	–3.33	–0.499	1.4417	–0.755
	(–14.284)	(–12.642)	(17.302)	(4.722)
Miscellaneous	–3.90	0.0785	1.421	–0.115
	(33.502)	(3.983)	(34.097)	(–1.432)

Note: $D_1 = 1$ For Rural Sector.
$D_1' = 0$ For Urban Sector.

*Dummy coefficients are significant at 5% and 1%.

Appendix B

We have projected demand for various products on the basis of the following relationship:

$$Log\, y_i = B_o + B_{1i}\, log\, X_1 + B_{2i}\, log\, X_2 \quad .. \quad .. \quad (1)$$

Differentiating (1) with respect to time, we get

$$\dot{y}_i = B_{1i}\, \dot{X}_1 + B_{2i}\, \dot{X}_2 \quad .. \quad .. \quad .. \quad (2)$$

where

$\dot{y}_i$ = demand growth rate for 'ith' commodity group

B_{1i} = total expenditure elasticity for 'ith' commodity group

B_{2i} = Household-size elasticity for 'ith' commodity group

$\dot{X}_1$ = Total expenditure growth rate per household*, and

$\dot{X}_2$ = Household-size growth rate (equivalent to population growth rate).

We get two different sets of demand growth rates on the basis of the following two assumptions.

(i) Population growth rate is equal to the growth rate of the number of households, while the size of household remains the same.

(ii) Population growth rate is equal to the growth rate of household size. The number of households remains constant.

Corresponding to these two assumptions, we get the following two equations:

$$\dot{y}_i = N + B_{1i}\, \dot{X}_1 \qquad \text{Set I}$$

$$\dot{y}_i = B_{1i}\, \dot{X}_1 + B_{2i}\, \dot{X}_2 \qquad \text{Set II}$$

N: is growth rate of number of households which is assumed to be equal to population growth rate. Set I corresponds to the first assumption and Set II corresponds to the second assumption.

* $\dot{X}_1$ is assumed to be the same for urban and rural areas, as disaggregated expenditure over time is not available separately for the two areas.

For more meaningful demand projections, population growth rate should be decomposed as: growth rate of number of households and growth rate of household size. But the problem is that the required data for Pakistan for the number of households and household size are not available for two different points of time, viz. 1960 and 1972. As for the latest available census of 1972, there was a significant under-estimation of households because of population under-enumeration. (Population was adjusted for under-enumeration afterwards.) In addition to that there are differences in coverage, too, in the two censuses.

We have calculated the demand growth rates for urban and rural areas separately, as well as for Pakistan as a whole.

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