The Effect of Household Size on Consumption Expenditure

Ravindra Pd. Pandey[*]

Nepal Rastra Bank underwent the Household Budget Survey to determine the expenditure pattern of the Nepalese households in the urbanised areas and development centres. It provided data for the derivation of expenditure weights needed to construct consumer price indices and supplied data for the formulation and evaluation of development plans.

This paper proposes to study the effect of household size on household consumption on the basis of the data provided by the household Budget survey. This has been examined for a number of countries by research workers in the field of consumer behaviour. Most of these studies have used the logarithamic function with family size and total expenditure as explanatory variables; however the conclusions are not always the same.

Houthakker (1957) considered total expenditure and family size elasticities for a large number of commodities and he concluded that for all countries taken together, the sum of exponents of family size and total expenditure did not differ appreciably from unity. Tobin (1950), Crockett (1960), Liviatan (1964) and Iyengar and other (1966) have shown on the contrary that significant economics (or diseconomies) of scale in household consumption may result due to changes in family size.[1]

This study is confined to Dhankuta district, in relation to some urban areas of Nepal (namely, Surkhet, Pokhara, Biratnagar, Kathmandu). The conclusions which we may draw from

★ Mr pandey is an Asst. Statistics Officer, Agricultural Credit Division, Nepal Rastra Bank, Kathmandu.

1 Quoted by D, B. Gupta. "Household Size and Expenditure" Artha Vijana, March 1969 Vol 2.

the study of these areas are likely to be indicative of the consumption habbits of the   people in the rest of the country. The relationship between household size and consumption is   investigated for all the eleven major commodity groups rearranged from   those of the   Household Budget Surveys; these are grains, cereals products and pulses; vegetable spices, fruits, and nuts; meat fish eggs, oils and fats; milk and milk products; other food items; Housing; medical care; education; cloth, clothing and footwear: social and other expenses; other goods and services. The   choice of these commodities is somewhat arbitrary, although we are   mainly guided in our selection by the general interest in these items, as well as their   relative   importance in the   consumption patterns.

In view of inadequate degrees of freedom as   is evident, we   have not carried   out regression   analysis seperately for   tobacco and related   products; personnal   care, gifts and contributions, transportation; reading materials and recreation; but we have   combined   them altogether to constitute one commodity namely 'other goods and services'.

In Engel–Curve analysis various approaches are used to study the effects of changes in household size on consumption expenditure. One   such approach   is to group the   sample households in cells such that each cell contains   households of equal size. In another approach, the differences in the househld size are built in the regression model itself. This is achieved by introducing household size as an additional variable in the regression model. The standard tests of significance are applied to study the influence of the new variable   on household   consumption. Although both these approaches are   simple to follow in practice, there is one serious   limitation of the former approach. It requires an extensive body of data such that each cell has an adequate number of observation. The latter approach is less limited in its application to small   sample, though the result will reflect the small–sample effect in their   lack of precision.

In view of the limited sample size for most of the items of consumption, we   follow the latter approach. We therefore choose the following log–linear model to estimate the effect of household size on consumption.

$$\text{Log } y = a + b \log x + c \log H + u \text{ —————— (i)}$$

Where y is the monthly household expenditure on a specific item' X is the   monthly total expenditure of the household. H is the corresponding household size. a,b,c, are rregression parameters and u is the error term. The parameters b and c are interpreted as partial elasticities of y with respect to X and H.

, The choice of log–linear model may be criticized on the ground that it is not always the best fitting equation; but in view of its extensive use in the recent budget studies, it has the advantage of being comparabie with other studies.[2]

Appendices 1 & II give estimate of regression parameters for various categories of consumption. If we, for sometime, draw our attention on Appendix II we find that in Dhankuta expenditure elasticities for all the food items except other food items are less than unity. The other fooditems include such items of consumption as meals away from home, sugar, sweet, and beverages. The expenditure elasticities for social and other expenses, othergoods and services are greater than unity thus, as to be expected, cereal products grains and pulses, vegetables, spices, fruits and nuts; meat, fish, eggs, oils and fats milk and milk products medical care, education, cloth, clothing and footwear fall in the category of necessities; while the rest belong to the class of luxuries. However housing, social and other expenses, in case of urban areas of Nepal fall in the category of necessities and for meat, fish, eggs, oils and fats, other food items and other goods and services, the estimates are ignored because of poor fit.

It is also observed from the Appendix table 2 that the expenditure elasticities on the whole are higher for Dhankuta as compared to those for the urban areas of Nepal. It is further noted that the expenditure elasticities and family size elasticities tend to move in the opposite directions. For example a relatively higher positive elasticity with respect in household size is to be found in the case of food-grains, education, and madical care and lower in case of items of luxury type.

The occurrence of significant negative elasticities implies that an increase in the household size at any given level of total expenditure, results in an absolute decrease in the expenditure of the specific item under consideration.   Thus given total outlay increase in the expenditure on one item can be met only by sacrificing expenditure on other. This explains why we expect negative houshold–size elasticties in the case of luxuries and positive and high elastici- ties in the case of necessities and inferior goods. Liviatan (1964), Prais and Houthakker (1955) have infact suggested the use of this relation to measure the extent of economics (or diseceno- mics) of scale.What we do is to test if the sum of household size and total expenditure elasticities differ significantly from unity. This also tests the validity of per capita formulation.[3]

2   D. B Gupta, Ibid.

3   Quoted by Iyengar N S , Jain L. R., Srlnivasan T. N., (1969), "Economics Scale in Household consumption. A case study", Paper presented at the Indian Econometric Conferrence, Calcutta.

If we for sometime draw ourattention on the following regression models:-

log y = a+blo g X + c log H ---------- (ii)

and log y/H = a+b log X/I₃ -------- (iii)

The two models are similar if b + c = 1

These indicate that in the former model if b+c is not significantly different from unity we are correct in using percapita figures and that no economies (or constant return to scale) occur. If it happens to be greater than unity, we infer the existence of diseconomies; if less, it implies economies of scale. The results have been presented in Appendix III.

It is further cocluded from the Appendix table III that for the most necessity items the sum (b+c-1)[4] is negative, whereas for the comparatively less necessary and luxury items, this sum is either positive or nearly zero, thus indicating reallocation of expenditure among various items of consumption when the total expenditure per person is kept constant.[5] The F-values listed in the table in Appendix III shows that in Dhankuta for most major items of consumption b+c is significantly different from unity. However this is not true in case of cereal products, grains and pulses, which are necessities. This sugges s that the effect of household size on consumption differs between commodities,

The main question examined in this paper was whether household consumption is affected significantly by household size. Eleven expenditure categories were studies seperately for Dhankuta, and logarithmic type of equations were computed,using total expenditure and house-hold size as determinining variables.

The results of this study reveals that household size affects consumption expenditure of a household and the extent of this effect varies between expenditure groups. (commodities).

We can further conclude from this that it is dangerous to use percapita formulation without first assessing the effect of household size on consumption expenditure. Also we conclude that household size is an important factor in atleast the urban areas of Nepal, and it is desirable to consiaer its influence on the consumer bahaviour. However the validity of our conclusions is tied with the limitations of statistical data used here. For a more complete and detail study, it may also be necessary to include other variables such as age, sex composition of a household, education and occupation of the head etc.

4 log Y/H =₋a+b logX/H+ (b+c-1) log N is the same as model (i) above   (b+c-1) could be interpreted as partial elasticity of Y/H w.r.t H

5 ibid,

Appendix I

Elasticities for Dhankuta district and the standard Error of Estimate

Item	Dhankuta		
	b	c	R^2
1. Grains, Cereal Products and pulses	0.4220+(.2270)	0.4916+(0.3034)	0.9960
2. Vegetables, Apices Fruits & Nuts	0.7228+(0.0863)	0.0561+(0.1148)	0.9940
3. Meat, Fish, eggs, oils & Fats	0.7547+(0.0606)	0.03688+(01056)	0.9952
4. Milk and Milk products	0.8820±(0.6270)	1.0231±(0.9312)	0.9348
5. other food Items⊙	1.1358±(0.3322)	0.2229±(0.4392)	0.9705
6. Housing	@	−0.8757+(0 0990)	0.9959
7. Medical care	0.5321+(0.7917)	2.9647+(1.0468)	0.3629
8. Education	0.2768+(0.1857)	3.2843+(0.2456)	0.9926
9. Cloth, clothing and Footwear	0.6872+(0.4786)	2.3465+(0 6327)	0.9951
10. Social and other expenses	@	1.0184+(0.8503)	0.9443
11. Other goods and services**	@	−0.3492+(0.2940)	0.9878

Figures within bracket indicate the standard error of estimate

⊙ other Food items includes. meals away from home, sugar and sweets, beverages.

@ absurd result

** − other goods and services include. tobacco and related products, personal care, gifts
contribution, transportation, reading materials and recreation .

Appendix II

Elasties for Dhankta district and Urban areas of Nepal

Item	Dhankuta		Urban areas of Nepal	
	b	c	b	c
1. Grains, cereal prdducts and pulses	0.4220+(0.6302)	0.4916+(0.8421)	0.0177+(0.1220)	1.2434+(2024)
2. Vegetable, spices, fruits and nuts	0.7228+(0.2410)	0.0561+(0.3186)	0.1072+(0.4019)	1.3070+(0.4910)
3. Meat, fish, eggs, oils and fats	0.7547+(0.2217)	0.0368+(0.2931)	0.0368+(0.2931)	1.5449+(0.6083)
4. Milk and Milk products	0.8820+(1.7405)	1.0231+(1.2492)	0.3648+(0.7852)	2.4121+(0.9595)
5. Other food items	1.1358+(0.9221)	0.2229+(2192)	@	@
6. Housing	1.3801+(0.2079)	-0.8757+(0.2748)	0.1507+(0.6491)	1.4310+(0.8310)
7. Medical care	0.5321+(2.1979)	2.9647+(2.9059)	0.0583+(1.0832)	2.9461+(1.3235)
8. Education	0.2786+(0.5156)	3.2843+(0.6816)	0.3189+(0.5216)	3.1950+(0.6372)
9. Cloth, clothing and footwear	0.6872+(1.3285)	2.3465+)1.7565)	0.1382+(0.7610)	2.2748+(0.9287)
10. Social and other expenses	1.0581+(1.7852)	1.0184+(2.3603)	0.3419+(2.1309)	2.8897+(2.6035)
11. Other goods and services	(1.6477+)0.6173	-0.3492+(0.8162)	@	2.0416+(0.5874)

Figure within brackets indicate the confidence interval

@ –insignificant results.

Appendix III

F-test for the significance of (b+c-1)

Expenditure Group	Dhankuta			
	b	c	(b+c-1)	F-statistics
1. Grains, Cereal Products and Pulses	0.4220	04916	−0.0864	3.4407
2. Vegetables, spices, Fruits and Nuts	0.7228	0.0561	−0.2211	18.4684*
3. Meat, Fish, eggs, oils & Fats	0.7547	0.3688	0.2708	0.1235
4. Milk and Milk products	0.8820	1.0231	0.9051	4.0967
5. Other Food Items	1.1358	0.2229	0.3587	2.3292
6. Housing	1.3801	0.8757	0.4956	125.549*
7. Medical care	0.5321	2.9647	2.4968	28.0538
9. Education	0.2768	3.9693	2.0842	60.7393*
9. Cloth, clothing and Footweer	0.6872	2.3465	2.0337	51.7112*
10. Social and other expenses	1.0581	1.0184	1.0765	8.0254
11. Other goods and services	1.6477	0.3492	0.2985	5.0111

* − Significant at 5% level only.

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