ANALYSIS OF OCCUPATIONAL DIFFERENCES IN CONSUMER EXPENDITURE PATTERNS IN INDIA

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1. Introduction

The socio-occupational factors have been known to be important determinants of the consumer expenditure pattern.[1] In this context, the present study attempts to answer two questions : first, within their observed range of total expenditure per capita, do the Engel curves for a given item of expenditure differ amongst occupations ? If the answer is affirmative, the next question arises : where do these differences originate, that is, what are the pairs of occupations such that within each pair, consumption patterns are distinct from each other ? Statistical tests based on a dummy variable model developed for this purpose are discussed in Section 2 on methodology. Section 3 describes the data and their limitations. Section 4 deals with the choice of the functional form of the Engel curve for each item in urban and rural sectors separately; the next section then takes up for analysis of the occupational differences in consumption expenditure. The final section contains concluding observations.

2. Methodology

To investigate the differential effects of occupational factors on the consumer expenditure pattern of an average household, we consider the following dummy-variables model :[2]

$$y_j^{(i)} = \alpha_1 + \sum_{i=2}^{5} \alpha_i D_{ij}^{(i)} + \beta_1 E_j^{(i)} + \sum_{i=2}^{5} \beta_i Z_{ij}^{(i)} + U_j^{(i)}$$

where

$$D_{ij}^{(i)} = \begin{cases} 1 & \text{when } i = k \qquad (k = 1, 2, \ldots, 5) \\ 0 & \text{otherwise} \end{cases}$$

and

$$Z_{ij}^{(i)} = D_{ij}^{(i)} E_j^{(i)}.$$

Here $y_j^{(i)}$ and $E_j^{(i)}$ represent the average monthly expenditure in per capita terms, on a specific item and total respectively, for the households in the j-th ($j = 1, 2, \ldots, 13$)

[1] We are indebted to Dr. N. Bhattacharya for his detailed comments on an earlier version of this paper which was presented to the Eleventh Indian Econometric Conference at Hyderabad (March 3-5, 1972).

[1] See Ganguly (1960), Gupta (1968) and Balvir Singh (1968).

[2] See Suits (1957).

per capita total expenditure class and belonging to the k-th ($k = 1, 2, ..., 5$) occupational group; α_i's and β_i's are the parameters of the model and $U_j^{(k)}$'s are the random error terms which have the usual assumptions of a linear regression model.

If we write $E(y_j^{(k)})$ to represent the expected value of $y_j^{(k)}$, given the k-th occupational group, then we can have the following five regression relationships (Engel curves) corresponding to the five occupational groups :

$$E(y_j^{(1)}) = \alpha_1 + \beta_1 E_j^{(1)} = \alpha^{(1)} + \beta^{(1)} E_j^{(1)}$$
$$E(y_j^{(2)}) = (\alpha_1 + \alpha_2) + (\beta_1 + \beta_2) E_j^{(2)} = \alpha^{(2)} + \beta^{(2)} E_j^{(2)}$$
$$E(y_j^{(3)}) = (\alpha_1 + \alpha_3) + (\beta_1 + \beta_3) E_j^{(3)} = \alpha^{(3)} + \beta^{(3)} E_j^{(3)}$$
$$E(y_j^{(4)}) = (\alpha_1 + \alpha_4) + (\beta_1 + \beta_4) E_j^{(4)} = \alpha^{(4)} + \beta^{(4)} E_j^{(4)}$$
$$E(y_j^{(5)}) = (\alpha_1 + \alpha_5) + (\beta_1 + \beta_5) E_j^{(5)} = \alpha^{(5)} + \beta^{(5)} E_j^{(5)}$$

where $\alpha^{(k)}$ and $\beta^{(k)}$ denote the intercept and slope for the Engel curve relating to the k-th occupation. Further, in matrix notation, the combined model can be expressed as :

$$Y = X\beta$$

where

$$Y = \begin{bmatrix} y_1^{(1)} \\ \cdot \\ \cdot \\ \cdot \\ y_{12}^{(1)} \\ \cdots \\ y_1^{(2)} \\ \cdot \\ \cdot \\ \cdot \\ y_{12}^{(2)} \\ \cdots \\ \cdot \\ \cdot \\ \cdot \\ \cdots \\ y_1^{(5)} \\ \cdot \\ \cdot \\ \cdot \\ y_{12}^{(5)} \end{bmatrix}_{(65\times 1)} \quad X = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & E_1^1 & 0 & 0 & 0 & 0 \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ 1 & 0 & 0 & 0 & 0 & E_{12}^1 & 0 & 0 & 0 & 0 \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ 1 & 1 & 0 & 0 & 0 & E_1^2 & E_1^2 & 0 & 0 & 0 \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ 1 & 1 & 0 & 0 & 0 & E_{12}^2 & E_{12}^2 & 0 & 0 & 0 \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ 1 & 0 & 0 & 0 & 1 & E_1^5 & 0 & 0 & 0 & E_1^5 \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ 1 & 0 & 0 & 0 & 1 & E_{12}^5 & 0 & 0 & 0 & E_{12}^5 \end{bmatrix}_{(65\times 10)} \quad \beta = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \\ \cdots \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \end{bmatrix}_{(10\times 1)}$$

It may be noted here that while constructing the dummy variables model for a specific item of consumption we have postulated the same functional form of Engel curve for each occupational category which fits best at all occupation level of a sector (urban and rural).

For all the items of consumption considered, the parameters α_i's and β_i's ($i = 1, 2, \ldots, 5$) are estimated by the classical least square method by giving weights to each expenditure class in proportion to the estimated number of persons in that expenditure class.

It may be worth pointing out here that there is one great advantage in going for a dummy variable model. That is it supplies us with test statistics for testing some interesting hypotheses in a simple and lucid manner, which can also be obtained from the analysis of covariance techniques[3].

The statistical test regarding the differences among Engel curves for different occupations can be formulated by setting the following null hypothesis :

$$\alpha^{(1)} = \alpha^{(2)} = \alpha^{(3)} = \alpha^{(4)} = \alpha^{(5)}$$

and $$\beta^{(1)} = \beta^{(2)} = \beta^{(3)} = \beta^{(4)} = \beta^{(5)}.$$

In terms of the dummy variable-model, this is equivalent to

$$H_0(w_1) : \quad \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$$

and $$\beta_2 = \beta_3 = \beta_4 = \beta_5 = 0.$$

Similarly, whatever the intercepts for various Engel curves, whether their slopes are identical can be tested by formulating the null hypothesis :

$$\beta^{(1)} = \beta^{(2)} = \beta^{(3)} = \beta^{(4)} = \beta^{(5)}$$

that is equivalent to testing

$$H_0(w_2) : \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0.$$

Let us define S, S_{w_1} and S_{w_2} to be the residual sums of squares for the general dummy-variables model, the dummy-variables model under hypothesis $H_0(w_1)$ and the dummy-variables model under $H_0(w_2)$, and v_0, v_1 and v_2 be their degrees of freedom respectively. Then we have

$$S = \sum_{k=1}^{5} \sum_{j=1}^{13} \left[y_j^{(k)} - \alpha_1 - \beta_1 E_j^{(k)} - \sum_{i=2}^{5} (\alpha_i D_{ij}^{(k)} + \beta_i Z_{ij}^{(k)}) \right]^2$$

$$S_{w_1} = \sum_{k=1}^{5} \sum_{j=1}^{13} (y_j^{(k)} - \alpha_1 - \beta_1 E_j^{(k)})^2$$

$$S_{w_2} = \sum_{k=1}^{5} \sum_{j=1}^{13} (y_j^{(k)} - \alpha_1 - \beta_1 E_j^{(k)} - \sum_{i=2}^{5} \alpha_i D_{ij}^{(k)})^2$$

and

$$v_0 = 65 - 10 = 55$$
$$v_1 = 65 - 2 = 63$$
$$v_2 = 65 - 6 = 59.$$

Now we can form the test-statistics

$$F_1(8, 55) = \frac{S_{w_1} - S}{v_1 - v_0} \Big/ \frac{S}{v_0}$$

and $$F_2(4, 55) = \frac{S_{w_2} - S}{v_2 - v_0} \Big/ \frac{S}{v_0}$$

[3]Rao, C. R. (1952), Ch. III, pp. 112-14.

which are variance-ratios and distributed as F-statistics with (8, 55) and (4, 55) degrees of freedom and provide the test for the two null hypotheses $H_0(w_3)$ and $H_0(w_4)$ respectively. If both slopes and intercepts of regression for the five occupational groups turn out to be statistically identical, then the occupational factor considered can be neglected and efficient estimation can be obtained by combining the data on all occupational groups into a single homogeneous sample. However, if the differences among regression equations corresponding to the five occupational groups are proved to be significant, the test for $H_0(w_2)$ can be undertaken. Here one can go a step further if $H_0(w_2)$ is proved to be correct; that is, one can go for testing a third null hypothesis[4] $H_0(w_2)$: $\alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ when $\beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$, with a suitable third statistics, to be constructed similar to the first two.

3. DATA AND THEIR LIMITATIONS

The present study is based on the household expenditure data relating to the nineteenth round of National Sample Survey which covers the period from July 1964 to June 1965. The data used is taken from NSS draft report no. 207 which provides, in a tabular form, the distribution of the number of sample households and household size, the average monthly total expenditure per head by its usual commodity break down, in thirteen size classes of monthly total expenditure per head, and by ten major occupation divisions, separately for rural and urban areas of India.

Occupational categories adopted in this study have been dictated by two considerations. One is the classification given (for rural and urban areas separately) in the NSS report and this conforms to the broad divisions prescribed by the Standard Indian Occupational Classification.[5] Secondly, the broad divisions had to be further aggregated in order to overcome the problem of having too few sample households especially in the expenditure classes at the two extremes.

TABLE 1. OCCUPATIONAL CLASSIFICATION

occupational categories adopted in this study	coverage under the standard occupational classification
(1)	(2)
1. professional, technical, administrative, executives, managerial, clerical and related workers	divisions 0, 1 and 2
2. sales workers	division 3
3. farmers, fishermen, hunters, loggers and related workers	division 4
4. craftsmen, production process and related workers	division 7-8.
5. miners, quarrymen, workers in transport and communications, service, sport and recreation workers and workers not classified elsewhere	divisions 5, 6, 9 and 10

[4] See Rao, C. R. (1952).

[5] See Government of India (1962), Part II, pp. 36-57.

The details are presented in Table 1. Broadly, our first two categories cover the white collar jobs, the last two, the blue collar jobs and the third one, agricultural occupations. The major drawback of this breakdown for rural areas is the fact that cultivators and agricultural labourers have been lumped together in Division 4, where there are reasons to believe that consumption patterns of these two groups may differ significantly. Moreover, white and blue collar workers with predominant urban locations, have a very small weight in the rural areas (see Table 2) with 81 percent of the population accounted by the agricultural occupations. Urban population is somewhat more evenly distributed (See Table 3) although the first group here is still fairly heterogenous with respect to both levels of income earned and the types of skills and qualifications required as well as the characteristics of the work they entail. For example, the occupational division covering 'professional, technical and related workers' includes the whole range of jobs from architects, engineers and surveyers to draughtsmen, laboratory assistants, ordained religious workers, astrologers, palmists and related workers.

TABLE 2. OCCUPATION-WISE GENERAL CHARACTERISTICS
(Rural India 1964-65)

	occupational groups					all occupations
	1	2	3	4	5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. sample no. of households	251	236	5819	646	340	7312
2. average household size	4.49	5.41	5.38	5.06	4.38	5.22
3. proportion of estimated no. of persons in each group	0.0290	0.0359	0.8118	0.0848	0.0385	1.0000
4. average per head total expenditure (Rs. 0.00)	30.74	27.85	24.90	21.81	25.82	24.93
5. proportion in total expenditure of items covered in this study	0.6505	0.7203	0.7742	0.6900	0.8021	0.7634

TABLE 3. OCCUPATION-WISE GENERAL CHARACTERISTICS
(Urban India 1964-65)

	occupational groups					all occupations
	1	2	3	4	5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. sample no. of households	1108	691	389	1574	1256	5018
2. average household size	5.15	5.63	5.44	4.63	3.75	4.75
3. proportion of estimated no. of persons in each group	0.2410	0.1643	0.0909	0.3070	0.1968	1.0000
4. average per head total expenditure (Rs. 0.00)	53.17	36.23	26.43	28.78	33.01	36.55
5. proportion in total expenditure of items covered in this study	0.4000	0.5671	0.7015	0.6302	0.5540	0.5617

It may also be added that the composition of the group 4 is expected to differ in the two sectors. In the rural sector, this group consists of mainly village craftsmen working in household and cottage industries whereas in the urban areas, they would comprise mostly the production process workers or the "blue" collar workers proper. In the following discussion, occupational groups 4 and 5 have been described in short as blue collar jobs in both the sectors for brevity subject to the qualification stated above.

As regards the general economic characteristics of the population, it may be observed that the average total expenditure per capita in the urban areas is about one-and-a-half times that in the rural areas, and for every occupation higher level of total expenditure is observed in the urban sector. Part of this differential is due to what *Kuznets* describes as the PTD component i.e. the processing-transportation-distribution component which is added to everything that is imported into the urban areas from outside. Another contributing factor is that the urban environment creates demand for certain specialised services like within-city transportation that do not exist in the rural surroundings. The range of total expenditure per capita across occupations is fairly narrow, between Rs. 22.00 (group 4) to Rs. 31.00 (group 1) in the rural sector and wide between Rs. 26.00 (group 3) and Rs. 53.00(group 1) for the urban sector. The minimum rural-urban differential is observed for the agricultural occupations (group 3) and the maximum for the professional, technical and related workers (group 1). The average household size, in the urban sector is higher for the white collar occupations and lower for the blue collar jobs than in the rural sector and about equal in both the sectors for the agricultural occupations.

The following nine items of expenditure are taken up for detailed study :

(1) Foodgrains, (2) Pulses, (3) Milk and milk products, (4) Oil, oilseeds and their products, (5) Meat, fish, eggs, etc., (6) Milk, oil, oilseeds, meat, fish, eggs etc., (7) Sugar, sugar candy, gur, etc., (8) Fuel and light, (9) Clothing.

Item (6) has been formed by combining items (3), (4) and (5).

These items cover, on the average, 75 percent of the total consumer expenditure in the rural areas and about 56 per cent in the urban areas.

4. CHOICE OF ENGEL CURVES

In selecting the functional form of the Engel curves, the following ones were tried :

(a) linear : $y = a_0 + a_1 E$

(n) log-linear : $\log y = b_0 + b_1 \log E$

(o) semi-log : $y = c_0 + c_1 \log E$

(d) log-inverse : $\log y = d_0 + d_1/E$

(e) hyperbolic : $y = g_0 + g_1/E$

(f) exponential : $\log y = h_0 + h_1 E$

where y and E are expenditure on a particular item and total expenditure, in per capita terms, respectively. A two-stage procedure was followed. In the first stage, for each item of consumer expenditure all the Engel curves were fitted to the urban and rural areas separately. As a selection criterion, the following distance function was computed for each item :

$$D^2 = \sum_{i=1}^{12} w_i(y_i - \hat{y}_i)^2$$

where y_i is the observed level of consumer expenditure on a given item in the i-th expenditure class; $\hat{y}_i$ is the expenditure on that item in the i-th expenditure group as estimated from a given Engel curve; and w_i is the estimated proportion of the population in the i-th expenditure class. The Engel curve that yielded the minimum value of the distance function was chosen in the second stage for testing occupational differences.[4]

Two general comments on this procedure are necessary. It is recognised that the first stage of the two-stage procedure need not necessarily lead to the best form of the Engel curve in the second stage. Our limited experimentation, however, indicated that in practice we did locate the best fitting curve in the second stage as well. The procedure was evolved from the considerations relating to the costs of computations. Secondly, since our focus of attention was on the original variable (i.e. consumer expenditure on a given item) and not on its transformed logarithmic form (especially for Engel curves (b), (d) and (e)), a distance function criterion rather than corrected squared correlation criterion was adopted.

TABLE 4. VALUES OF THE DISTANCE FUNCTION OF VARIOUS FORMS OF THE ENGEL CURVE FOR DIFFERENT ITEMS OF HOUSEHOLD CONSUMPTION : RURAL AND URBAN INDIA, 1964-65

functional form of Engel curve	food-grains	pulses	milk & milk products	oil, oil seeds & products	meat, fish & egg etc.	sugar, sugarcandy & gur etc.	fuel and light	clothing
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Rural				
linear	2.4483	0.0626	0.1364	0.0053	0.0072	0.0033	0.0235	0.1647
semi-log	0.0362	0.0088	0.2751	0.0225	0.0069	0.0724	0.0074	1.6308
hyperbolic	2.0178	0.0853	0.9666	0.0842	0.0355	0.2144	0.0615	4.0723
exponential	11.8635	1.2021	122.9414	0.4763	0.3149	3.8284	0.2303	605.5106
log-linear	1.5305	0.1674	7.3099	0.0107	0.0173	0.0877	0.0106	14.0221
log-inverse	0.0081	0.0213	0.3248	0.0523	0.0179	0.1368	0.0347	2.5141
				Urban				
linear	1.5740	0.0533	0.3528	0.0479	0.0122	0.0307	0.0398	0.1848
semi-log	0.8210	0.0078	0.4490	0.0067	0.0593	0.0038	0.0225	3.3168
hyperbolic	0.2499	0.0283	2.4345	0.1098	0.2835	0.0343	0.2205	8.4061
exponential	1.7096	0.1003	8.0648	0.2259	0.3441	0.0798	0.2173	33.9777
log-linear	1.1214	0.0424	2.3531	0.0564	0.0326	0.0219	0.0177	3.6821
log-inverse	0.3449	0.0084	0.8081	0.0367	0.1632	0.0119	0.1193	5.7000

[4]One specification error may be noted. The grouped data given for different expenditure classes indicate the arithmetic means of the observations relating to the households in the group. The use of arithmetic means is inappropriate when the original variable is transformed to logarithm or reciprocal where, conceptually, geometric and harmonic means of the variable are relevant. Nothing, however, can be done about this deficiency as only the grouped observations are available for use.

The values of the distance function for various items in urban and rural areas separately using six alternative forms of the Engel curve are presented in Table 4. It is interesting to note that the distance function criterion led to the rejection of the Engel curves with logarithmic transformation of the dependent variable in fifteen out of sixteen cases. In particular, the most widely used log-linear form that was found to be the best on the squared correlation criterion[7] in five-out of sixteen cases, was replaced by the semi-log form (2 cases) and linear form (3 cases) on the distance function criterion. Only in one case viz fuel and light (urban) did the log-linear form turn out to be the best with the semi-log a close second. In this case, however, we preferred the semi-log form because (a) the goodness of fit was only marginally better for the log-linear form and (b) our interest in using the results for projection purposes required that we choose a form that yielded the best prediction of y.[8]

It can be seen from Table 4 that out of 16 cases, the semi-log form was preferred in 8 cases (4 each in rural and urban areas), the linear form in 7 (4 in rural and 3 in urban) cases whereas for foodgrains in the urban areas, the hyperbolic form performed best. A general feature of all these forms is that the expenditure elasticity is not constant but becomes a function of the *level* of expenditure. The problem arose regarding the functional form to be used for the combined group (6) consisting of 3 items-milk and milk products (3) oil, oilseeds and products (4) and meat, fish, eggs, etc.(5) as the individual component items did not turn out to be possessing the same best functional form of the Engel curve. The linear form was finally selected for this combined group because the components possessing this form accounted for 9 per cent out of 11 per cent in the rural areas and 11 per cent out of 15 per cent in the urban areas of the total expenditure on the combined group.

Coming to the discussion of individual items, the per capita monthly consumer expenditure on foodgrains (accounting for 53 and 24 percent of total for rural and urban sectors respectively) was found to be explained by the semi-log Engel curve in the rural and hyperbolic Engel curve in the urban areas. This choice, in turn, implies that the expenditure elasticity declines faster, as we may expect, in the urban areas than in the rural sector.[10] The absolute value of the elasticity in the urban sector is also lower than that in the rural sector. This difference is partly due to the behavioural differences (as reflected in different functional forms of the Engel curve and differences in the parameters even though the Engel curve may be the same) and partly due to the higher *level* of total expenditure per capita in the urban sector. In the observed

[7]The results using this criterion are not reproduced here for lack of space.

[8]It may be noted that the log-linear form used for the least-squares estimation implies lognormal error term for the original constant elasticity form of the Engel curve. This leads to a bias in the projection of y though best prediction can be made for log y. The least-squares properties hold only for log y but not for y in which we are interested.

[9]The expenditure elasticity varies inversely with log E in the semi-log form and level of E in the hyperbolic form. In the linear form, it increases or declines with the level of total expenditure depending on whether the share of the item in total expenditure declines or increases with rise in total expenditure.

[10]This follows from the general statement about the behaviour of elasticities for different Engel curves made in footnote 9.

range of total expenditure per capita, both the sectors confirm the Engel's law regarding the declining share of the expenditure on food with rising per capita total expenditure (a proxy for income).[11] (See Table 5).

The semi-log form also provided the best fit for pulses and fuel and light in both the sectors, meat, fish and eggs (rural) and oil, oilseeds and products (urban) —all the items with a declining tendency for their share in total expenditure and with less than unit elasticities.

The simple linear form turned out to be the best for (a) milk and milk products, sugar, sugar candy, gur, etc. (all in rural areas) and clothing (in rural as well as in urban sectors); (b) milk and milk products (urban) and combined group (6) (rural); (c)oil, oilseeds and products (rural) meat, fish, eggs etc. and combined group (6) (urban). The above grouping of the items has been done in such a way that their share in total expenditure indicated a tendency to rise for items in group (a), to remain constant for those in (b) and to decline for those in (c)[12]. The elasticities at observed mean level of per capita expenditure can be seen from Table 5 to exceed unity for items in (a), around unity for those in (b) and less than (though not very much) unity for items in (c). Since the elasticity in the linear form of Engel curve is an inverse function of the

TABLE 5. ITEM-WISE DESCRIPTION OF THE ENGEL CURVE, THE EXPENDITURE ELASTICITY AND THE SHARE OF EACH ITEM FOR THE ENTIRE RURAL AND URBAN SECTORS

name of the item	rural			urban		
	description of Engel curve	elasticity	share	description of Engel curve	elasticity	share
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. foodgrains	semi-log	0.5258	0.4492	hyperbola	0.1657	0.2332
2. pulses	semi-log	0.8130	0.0453	semi-log	0.4834	0.0338
3. milk and milk products	linear	1.3107	0.0681	linear	1.0085	0.0807
4. oil, oilseeds and products	linear	0.7027	0.0306	semi-log	0.6577	0.0365
5. meat, fish, eggs, etc.	semi-log	0.8771	0.0218	linear	0.8557	0.0311
6. milk, oil, meat etc. (3)+(4)+(5)	linear	1.0572	0.1105	linear	0.8752	0.1483
7. sugar, sugarcandy, gur etc.	linear	1.1823	0.0300	semi-log	0.5257	0.0275
8. fuel and light	semi-log	0.6100	0.0483	semi-log	0.6224	0.0504
9. clothing	linear	1.7703	0.0801	linear	1.8184	0.0085

The estimated parametors of these Engel curves along with their standard errors appear in the last line in the sets of tables I.R. and I.U., given in the appendix, covering the items of expenditure considered in this study.

[11]The share can be shown to be declining for total expenditure per capita exceeding

$$e^{1-e_0 e^{\alpha_1}}$$ for the semi-log Engel curve

and $$-\frac{2\alpha_1}{\alpha_0}$$ for the hyperbolic Engel curve

following the notation in the text.

[12]This can be determined by observing whether the estimated intercept parametor $\alpha_1 \gtrless 0$ statistically for groups (a), (b) and (c) respectively.

share of expenditure,[13] we further conclude that the expenditure elasticity for items in group (a), although greater than unity at the observed mean level, would go on declining, whereas the elasticity for items in group (c) would tend to increase with the rise in per capita level of expenditure.

On the basis of approximate standard errors,[14] and at the observed level of total expenditure per capita, the greater than unit expenditure elasticity is found only for clothing in both the sectors. Milk and milk products, meat, fish, eggs etc. and the combined group (6) in both the rural and urban sectors as well as sugar, sugar candy, gur, etc (rural areas only) indicate around unitary elasticity. The remaining items viz foodgrains, pulses, oil, oilseeds and products and fuel and light (all in both the sectors) along with sugar, sugar candy, gur etc (urban sector only) possess a less than unitary expenditure elasticity. It may also be added that rural expenditure elasticities are uniformly higher than their urban counterpart for all the items except meat, fish, eggs etc. and fuel and light for which the elasticities are not markedly different across sectors. As already mentioned, these are the reflections of both the behavioural differences and the total expenditure differential across sectors.

5. Analysis of occupational differences

As outlined in Section 2, the first step in testing the occupational differences is to examine whether the Engel curves for a given item of consumer expenditure differ significantly among occupations. If $\alpha^{(k)}$ and $\beta^{(k)}$ denote the intercept and the slope respectively of the Engel curve for the k-th occupational group, this test involves the composite null hypothesis :

$$H_0(w_1) : \alpha^{(1)} = \alpha^{(2)} = \alpha^{(3)} = \alpha^{(4)} = \alpha^{(5)}$$

and

$$\beta^{(1)} = \beta^{(2)} = \beta^{(3)} = \beta^{(4)} = \beta^{(5)}.$$

The statistical tests indicated (See Table 6, panel (a)) that in fourteen out of eighteen cases for both the sectors, this hypothesis was rejected at 5% level of significance, the exceptions being pulses in both the sectors, sugar, sugar candy and gur etc. (urban) and fuel and light (rural). Thus, it follows that for nearly 67 per cent of the consumer expenditure in rural areas and for 50 per cent of the urban consumer expenditure, the Engel curves differ significantly among occupations. The exceptional items for which the Engel curves were found homogeneous accounted for around 9 per cent and 8 per cent of the consumer expenditure for rural and urban areas respectively. So long as intercepts as well as slopes differ across occupations, there would exist an occupation-specific differential response of the share of a given item to variations in total consumer expenditure.

Since the expenditure elasticity depends on the slope of the Engel curve, it was decided to test the following null hypothesis, viz

$$H_0(w_2) : \beta^{(1)} = \beta^{(2)} = \beta^{(3)} = \beta^{(4)} = \beta^{(5)}.$$

[13] See footnote 9.

[14] See explanatory note (8) in the Appendix for the method of calculation. The statements that follow have been made on the basis of the interval derived as ± 3 times the approximate standard error from the point estimate.

TABLE 6. SUMMARY RESULTS OF HYPOTHESIS TESTS REGARDING OCCUPATIONAL DIFFERENCES*

level of significance	no. of items	item specification number	share of the percentage items in total expenditure	
			rural	urban
	Panel (a)	$H_a(w_1)$: $\alpha^{(1)} = \alpha^{(2)} = \alpha^{(3)} = \alpha^{(4)} = \alpha^{(5)}$ $\beta^{(1)} = \beta^{(2)} = \beta^{(3)} = \beta^{(4)} = \beta^{(5)}$		
1%	12	rural : 1, 3, 4, 7, 9 urban : 1, 3, 4, 5, 6, 8, 9	64.80	50.04
5%	2	rural : 5, 6	2.18	—
10%	2	rural : 2 urban : 2	4.53	3.38
more than 10%	2	rural : 8 urban : 7	4.83	2.75
	panel (b)	$H_b(w_2)$: $\beta^{(1)} = \beta^{(2)} = \beta^{(3)} = \beta^{(4)} = \beta^{(5)}$		
1%	9	rural : 4, 7, 9 urban : 1, 2, 5, 6, 8, 9	14.07	41.70
5%	2	rural : 1, 2	49.45	—
10%	1	urban : 4	—	3.65
more than 10%	6	rural : 3, 5, 6, 8 urban 3, 7	12.82	10.82

*The values of the test-statistics F_1 and F_2 for testing the null hypotheses $H_a(w_1)$ and $H_b(w_2)$ respectively are given in tables I.R.1 to I.R.9 and I.U.1 to I.U.9 in the appendix.

If this hypothesis is rejected, this means that the estimated slope parameters differ statistically among occupations whatever the values assumed by the intercepts. The statistical analysis (see Table 6, panel (b)) showed that for 11 out of eighteen cases, accounting for 64 per cent and 42 per cent of the rural and urban consumer expenditure, the hypothesis was rejected at 5% level of significance. This implies that for these items, even if total expenditure per capita were to remain the same for all occupations, the expenditure elasticities would indeed differ significantly across occupation due to occupation-specific behavioural differences as reflected in the slope parameter estimates. The items for which the slope parameters were found to be homogeneous among occupations accounted for 13 per cent (covering 4 items) and 14 per cent (covering 3 items) of the rural and urban consumer expenditure respectively.

Having established the statistical differences between Engel curve parameters among the occupations, the next step is to analyse the pair-wise differences in order to locate the dominant occupational groups between which the consumer expenditure patterns for an item differ significantly. Item-wise results are summarised in Tables I.R.1 to I.R.9 and II.R. for the rural areas and in Tables I.U.1 to I.U.9 and II.U for the urban areas (given in the Appendix). An explanatory point may be made at the outset. Two sets of elasticities along with their approximate standard errors are presented in columns (4) and (5) in each table.[16] $\eta(\bar{E})$ given in column (4) is the expenditure elasticity calculated at the observed mean level of total expenditure per capita in each sector. $\eta(\bar{E}')$, given in column (5), is the elasticity calculated at the

[16]Tables I.R.1 to I.R.9 and I.U.1 to I.U.9.

observed mean level of i-th occupation-specific total expenditure per capita in each sector.[14] The rationale behind this is as follows. The observed occupational differences in elasticities can be traced to

(a) the occupation-specific behavioural differences due to differences in slope and/or intercept parameters of the Engel curve,

(b) the occupation-specific mean *level* of total expenditure per capita.

$\eta(\bar{E}^i)$ incorporates both these factors whereas an attempt is made in column (4) to equalise the effect of the *level* of expenditure in calculating $\eta(\bar{\bar{E}})$. In other words, even if all the occupations were to enjoy the same mean level of total expenditure per capita, the elasticity differences that still remain across occupation may be traced to the occupation-specific behavioural differences. The figures given in column (4) are to be interpreted in this light. In the rural areas, the range of the mean level of total expenditure across occupations is limited between Rs. 22.00 to Rs. 31.00 whereas in the urban areas, the same range is much wider, between Rs. 26.00 to Rs. 53.00. We may, therefore, expect the expenditure level effect (b) to be relatively less important and the effect (a) to be more important in the rural than their counterparts in the urban areas in interpreting the results given in column (5).

Let us now examine item-wise, the differences in the consumer expenditure of different occupational groups for rural and urban areas.

1. *Foodgrains* : In the rural areas, intercept differences dominate over those in slopes with agricultural occupations showing themselves to be distinct from all others. The observed range of expenditure elasticities varies between 0.55 for agricultural occupations to 0.40 for all others groups. In the urban areas, on the other hand, the slopes as well as intercepts, statistically significant though they are, result in a very narrow range of expenditure elasticities between 0.23 to 0.14 when the level of total expenditure per capita is equalised across occupations. A wider range of observed occupation specific elasticities between 0.36 for agricultural occupations to 0.09 for the professional group is a reflection of the level of expenditure effect already noted. The visual picture of the occupational differences in Engel curves is presented in figure 1(a) for the rural sector and in figure 1(b) for the urban sector. It is clear that in the rural areas, the agriculturists alongwith miners, quarrymen etc. possess similar foodgrains consumer expenditure pattern that differs from the pattern for the other occupations. In the urban areas, however, the agriculturists (group 3) and professional workers (group 1) form polar cases with other occupations exhibiting the demand pattern nearer to the professional group.

2. *Pulses* : The intercepts are fairly homogeneous in the rural areas whereas the estimated slope parameter has high values for agricultural occupations and craftsmen (groups 3, 4) that differ significantly from that of the remaining three occupations. The expenditure elasticity ranges between 0.80 (groups 3, 4) to 0.65 for others when expenditure levels are equalised whereas the range is a little wider between 0.90 to

[14]Occupation-specific as well as all-occupations mean level of total expenditure per capita in rural and urban sectors are reported in Tables 2 and 3 respectively in section 3.

0.59 when elasticities are calculated at occupation specific expenditure levels. In the urban sector, occupation groups 3 and 4 differ from groups 1 and 5 both in intercepts and slopes with group 2 closer to groups 3 and 4. Pure behaviour differences in expenditure elasticities between around 0.40 (groups 1, 5) to 0.63 (group 3) widen, as we should expect, to between 0.40 to 0.80 at the observed occupation specific expenditure levels. It is interesting to note that in this case, the professionals, and miners, quarrymen etc. possess a fairly homogeneous demand pattern with a low elasticity around 0.4 despite the wide differences in their observed mean levels of expenditure. This is an illustration of the behavioural differences offsetting the expenditure level effects.

3. *Milk and milk products*: For this item, intercept differences dominate over those in slopes, the estimates of marginal propensity to spend ranging between a narrow band 0.05 to 0.08 (rural) and 0.07 to 0.10 (urban). Agricultural occupations and blue collar workers in both the sectors show a tendency towards an increasing share of this item with a greater than unit expenditure elasticity whereas the white collar occupations indicate a slightly less than unit expenditure elasticity with the share of the item declining or constant with a rise in total expenditure. Miners, quarrymen, etc. in the rural areas and agricultural occupations in the urban areas possess the highest expenditure elasticities in each sector.

4. *Oil, oilseeds and products*: Both the intercept and slope differences dominate over the expenditure level effect in the rural areas thereby producing a range of expenditure elasticities between 0.70 (for the professional group) to 1.25 (for sales workers). It may be noted that in rural areas the agricultural occupations and craftsmen, quarrymen etc. identify themselves in respect of consumption pattern with the professional group in showing a tendency towards reducing the share of this item with a rise in total expenditure. Only sales workers prefer to raise the share of this item in their total budget. In urban areas also the sales workers distinguish themselves in having the lowest absolute intercept as well as slope of the Engel curve. This results in their possessing the lowest expenditure elasticity of 0.53 with agricultural occupations with 0.70 at the other end when total expenditure are equalised. The expenditure level effect makes this range wider between 0.48 and 0.01.

5. *Meat, fish, eggs etc.*: In respect of the consumption pattern of this item, sales workers group emerges as distinct from each of the rest in both the sectors. This group exhibits the lowest elasticity around 0.70 in the rural and around 0.50 in the urban areas although in the latter case, the intercept being positive, the elasticity may be expected to rise with an improvement in the level of living. The highest elasticity around or above unity is reported by miners, quarrymen, etc. in rural and agricultural occupations in the urban areas.

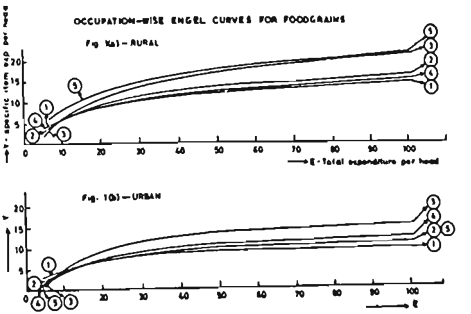
6. *Milk, oil, oilseeds, meat, fish, etc.*: This group aggregates the previous three items of expenditure. Slope differences do not turn out to be important in the rural sector, whereas they do so along with the intercept differences in the urban sector. Sales workers (group 2) again exhibit the lowest expenditure elasticity around

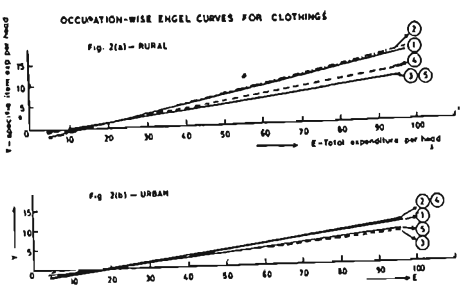
0.85 in the rural and 0.70 in the urban areas where professional workers (group 1) identify themselves with this group. Intercepts being strictly positive (more so in magnitude in the urban than in the rural areas) expenditure elasticities would show a tendency to increase with rising levels of total expenditure. Agricultural and blue collar occupations indicate a constant share of this item with around unitary expenditure elasticity in both the sectors.

7. *Sugar, sugar candy, gur, etc.* : The sales workers (group 2) emerge as a dominant group in the rural areas with their linear Engel curves differing from that of every other occupation. They reveal a significantly negative intercept around unity and the highest marginal propensity to spend around 0.08 in comparison with zero intercept and a low marginal propensity to spend on this item for all the other occupations. This implies that this group with the highest expenditure elasticity around 2.00 shows a tendency towards increasing the share of this item with an improvement in their level of living. At the other end of the spectrum are the professional workers (group 1) and miners, quarrymen, etc. (group 5) with expenditure elasticity around 0.70. Agriculturists and craftsmen find themselves in between with a unitary expenditure elasticity. The semi-logarithmic Engel curves for the urban sector were statistically homogeneous in respect of both intercepts and slopes. The range of expenditure elasticities between 0.42 (group 1) to 0.80 (group 3) is a reflection of the wide differentials in expenditure per capita in the urban sector.

8. *Fuel and light* : The rural sector shows little differences across occupations in the consumption of this item producing a fairly narrow range of expenditure elasticities between 0.62 (group 3) to 0.77 (group 2) when expenditures are equalised. In the urban sector, the Engel curves exhibit a distinction between professionals (group 1) and all the rest. This dominant group possesses a high estimated slope parameter as well as negative intercept relative to all the other occupations. This, however, is not very pronounced so that elasticities lie within a fairly narrow band between 0.53 (group 4) to 0.68 (group 1) when expenditures are equalised and between 0.54 (group 1) to 0.72 (group 3) when the occupation specific expenditure level effect is allowed for.

9. *Clothing* : This is an item for which all the occupations in both the sectors show a uniform tendency towards an increasing share with greater than unit elasticity, The differences are significant but only in degrees. In the rural sector, the white collar occupations differ from all the rest in respect of the linear Engel curve with a large negative intercept combined with a high marginal propensity to spend on clothing around 0.22. In other words, the share of clothing in total expenditure goes up faster for the white collar workers than the rest. Amongst the rest, the craftsmen (group 4) show themselves to be distinct from agriculturists and miner, quarrymen etc. (see figure 2(a)). The expenditure elasticities show a wide range between 1.60 (group 5) to 3.64 (group 1) when expenditure are equalised. The introduction of the expenditure level effect narrows down the range between 1.60 (group 5) to 2.45 (group 1 and 4). In the urban areas, the white collar and production process occupations (groups 1, 2 and 4) differ from agricultural and mining and quarrying occupations


OCCUPATION-WISE ENGEL CURVES FOR FOODGRAINS
Fig 1(a) – RURAL
Y - specific item exp per head
E - Total expenditure per head
Fig. 1(b) – URBAN
Y
E


OCCUPATION-WISE ENGEL CURVES FOR CLOTHINGS
Fig. 2(a) – RURAL
Y - specific item exp per head
E - Total expenditure per head
Fig 2(b) – URBAN
Y
E

(groups 3, 5) the former indicating a relatively high negative intercept as well as slopes (see Figure 2(b)). The resulting elasticities range between 1.37 (group 3) to 2.13 (group 1) with expenditure equalisation and between 1.59 (group 3) and 2.21 (group 4) when the expenditure level effect is brought into the picture.

It can be worked out from the Engel curves (as is also visually clear from figures 2(a) and 2(b)) that differences in slopes and intercepts would lead to reversals in the occupation specific expenditure on clothing depending on the level of total expenditure per capita. For example, roughly around total expenditure of Rs. 30.00 per capita, agriculturists (group 3) and craftsmen (group 4) spend the same amount on clothing. For total expenditure per capita less than Rs. 30.00 agriculturists would spend higher amounts relatively to the production process workers whereas for total expenditure per capita exceeding Rs. 30.00 production process workers would spend more on clothing than the agriculturists. Similarly, in the urban areas, the cut-off point between two polar occupational groups viz professional workers (group 1) and miners, quarrymen, etc (group 5) may be derived as Rs. 36.00 per capita. The professional workers spending less than Rs. 36.00 per capita would tend to spend lower amounts on clothing than their counterparts amongst the miners, quarrymen etc. The situation would be reversed for total expenditure per capita exceeding Rs. 36.00 per capita.

6. Conclusions

The major conclusions of this study may now be recapitualted under three convenient categories :

(1) general occupational differences in each sector with respect to the consumer expenditure on all the commodities,

(2) general observations about the magnitude and the behaviour of the expenditure elasticity for each item across occupations,

(3) the relative ranges of rural and urban commodity specific expenditure elasticities across occupations and the factors governing them.

In the rural areas, agricultural occupations (group 3) turn out to be the dominant group. Village craftsmen (group 4) and miners, quarrymen, postmen, messangers and policemen (group 5) identify themselves with agricultural occupations in respect of consumer demand for most of the commodities covered in this study. The white collar occupations mainly consisting of teachers, nurses, village and district administration workers, clerks etc. (group 1) and wholesale and retail traders, money-lenders and pawnbrokers (group 2) indicate consumption patterns distinct from the rest. Only in respect of 3 items, viz. meat, fish, eggs etc., oil, oilseeds and products and sugar, sugar candy, gur etc., does the sales worker group (group 2) turn out to be dominant. Fuel and light is the sole item for which consumer expenditure patterns are homogeneous across occupations in the rural areas. The occupational groups in the urban sector are more heterogeneous in respect of consumer expenditure patterns. The dominant group here is the professional, technical and related workers (group 1) whose demand patterns, in general, are distinct from all others. The other white collar group

of sales workers (group 2) possess consumption patterns that are homogeneous with that of the dominant group in respect of clothing and milk and milk products. It is also interesting to observe that this group (sales workers) like their counterparts in the rural sector turns out to be dominant in the consumer expenditure on oil, oilseeds and products and meat, fish, eggs etc. The explanation may lie in the caste-specific consumption pattern of this class of workers in both the sectors. Agriculturists (group 3) dominate the consumer expenditure pattern in respect of foodgrains, pulses and milk and milk products. Production process workers (group 4) associate themselves with the agriculturists in the consumption of pulses and milk and milk products whereas for most other items, they identify themselves with the professional group. Miners, quarrymen, etc. (group 5) go generally with the professional group. Sugar, sugar candy, gur etc. was the only item for which urban consumption patterns were found homogeneous across occupations.

At the occupation-specific level of total expenditure per capita, foodgrains, pulses and fuel and light are the three items for which the expenditure elasticity, in general, is less than unity whereas for clothing, the demand is expenditure elastic for all the occupations whether in rural and urban surroundings. For all these items, expenditure elasticities are expected to decline with a rise in total expenditure per capita. The demand for milk and milk products tends to be expenditure elastic with a weak tendency to decline for all the occupations in the rural and urban areas with the exception of urban professional group which exhibits less than unit expenditure elasticity that is expected to rise with the improvement in the level of living. For oil, oilseeds and products, agriculturists, professionals (group 1) and miners, quarrymen etc. (group 5) in the rural areas possess an expenditure elasticity that is less than unity but rising whereas for other rural and all urban occupations, the elasticity is expected to decline from around or less than unity. For the remaining two items, viz meat, fish, eggs etc. and sugar, sugar candy, gur etc., the demand is expenditure elastic in almost all the cases with a tendency to decline or remain constant.

Finally, it is also interesting to note that for mostly expenditure elastic items like meat, fish, eggs, etc. sugar, sugar candy, gur, etc. and clothing, the urban sector exhibits a much wider range of elasticities across occupations than the rural sector. This is indeed a reflection of the pure behavioural differences amongst occupations in the urban areas irrespective of the effect due to the level of expenditure. For pulses, milk and milk products and fuel and light, the range of elasticities in both the sectors are not dissimilar whether expenditures are equalised or not. For oil, oilseeds and products, the rural range is much wider when expenditures are equalised whereas the the expenditure level effect reduces the gap between the rural and urban sectors considerably. In the case of foodgrains, the rural areas indicate a somewhat broader range of elasticities than the urban areas with expenditure equalisation. The introduction of the expenditure level effect reverses the picture completely. The urban sector now turns out to be more diversified in respect of foodgrains consumption pattern than the rural one. It is clear that this is mainly due to the wide differences in the occupation specific levels of total expenditure per capita in the urban areas.

Appendix

EXAPLANATORY NOTES ON TABLES I.R. and I.U.

1. $\bar{R}^2$ refers to squared multiple correlation coefficient (adjusted for the degrees of freedom) related to the dummy-variables regression model under consideration.

2. $F_1(8, 55)$ and $F_2(4, 55)$ are the test statistics (see page 241) for testing the null hypothesis $H_0(\alpha_i)$ and $H_0(\alpha_2)$ respectively.

3. '**' and '*' indicate significance levels of the F ratios at 1% level and 5% level respectively;
'+' indicates that the estimated parameter is significant only at 10% level;
'@' indicates that the estimated parameter is not significant even at 10% level;
All unmarked estimates of the intercept and slope are significant at least at 5% level of significance.

4. The figures within brackets refere to the standard errors of the estimated parameters.

5. Item number (6) is formed by combining the previous three items (3), (4) and (5).

6. The estimates of elasticities $\eta(\bar{E})$ and $\eta(\overline{E^1})$ given in columns (4) and (5) (except for the last line) have been calculated respectively at the common observed mean level of total expenditure per capita (i.e., at $\bar{E}$, the average total expenditure per capita at all occupations level) for each occupational group and at $\overline{E^1}$, the observed mean level of occupation-specific total expenditure per capita.

The figure given in the brackets just below each elasticity estimate refers to its approximate standard error which is derived as follows :

Let us write the expenditure elasticity, η, for an item as equal to $\beta K_1/(\alpha+\beta K_2)$, where α and β stand for the intercept and slope parameters of the specific item's Engel curve and K_1 and K_2 are non-random variables, being some functions of the per capita total expenditure variable E. Since η is a function of α and β, we may write

$$\eta = f(\alpha, \beta) = \beta K_1/(\alpha+\beta K_2).$$

It can be easily seen that this formula gives us the expenditure elasticities for the following forms of Engel curve with corresponding values of K_1 and K_2 :

Linear form	: $K_1 = E$	$K_2 = E$
Semi-log form	: $K_1 = 1$	$K_2 = \log E$
Hyperbolic form	: $K_1 = -1/E$	$K_2 = 1/E$.

$\hat{\eta}$, the estimate of expenditure elasticity, can be taken as

$$\hat{\eta} = f(\hat{\alpha}, \hat{\beta}) = \hat{\beta}K_1/(\hat{\alpha}+\hat{\beta}K_2)$$

where $\hat{\alpha}$ and $\hat{\beta}$ are the least squares estimates of α and β.

Let us consider a Taylor's series expansion of the function $f(\hat{\alpha}, \hat{\beta})$ around parameter values α and β of $\hat{\alpha}$ and $\hat{\beta}$. As a first order approximation, we may have

$$f(\hat{\alpha}, \hat{\beta}) \simeq f(\alpha, \beta)+(\hat{\alpha}-\alpha)\left[\left(\frac{\partial f}{\partial \hat{\alpha}}\right)\right]_{\alpha,\beta}+(\hat{\beta}-\beta)\left[\left(\frac{\partial f}{\partial \hat{\beta}}\right)\right]_{\alpha,\beta}$$

$$\therefore\ \hat{\eta} \simeq \eta+(\hat{\alpha}-\alpha)\left[\left(\frac{\partial f}{\partial \hat{\alpha}}\right)\right]_{\alpha,\beta}+(\hat{\beta}-\beta)\left\{\left(\frac{\partial f}{\partial \hat{\beta}}\right)\right\}_{\alpha,\beta}.$$

Now we can have the mean square error of $\hat{\eta}$ as

$$\text{M.S.E.}(\hat{\eta}) \simeq \text{var}(\hat{\alpha})\left(\frac{\partial f}{\partial \hat{\alpha}}\right)^2+\text{var}(\hat{\beta})\left(\frac{\partial f}{\partial \hat{\beta}}\right)^2+2\,\text{cov}(\hat{\alpha}, \hat{\beta})\left(\frac{\partial f}{\partial \hat{\alpha}}\right)\left(\frac{\partial f}{\partial \hat{\beta}}\right).$$

Hence from this, one may have the following formula for the approximate standard error of $\hat{\eta}$ as

$$(\text{S.E.}(\hat{\eta}))^2 \simeq \widehat{\text{M.S.E.}}(\hat{\eta})$$
$$\simeq \widehat{\text{var}}(\hat{\alpha})\left(\frac{\partial f}{\partial \hat{\alpha}}\right)^2+\widehat{\text{var}}(\hat{\beta})\left(\frac{\partial f}{\partial \hat{\beta}}\right)^2+2\,\widehat{\text{cov}}(\hat{\alpha}, \hat{\beta})\left(\frac{\partial f}{\partial \hat{\alpha}}\right)\left(\frac{\partial f}{\partial \hat{\beta}}\right)$$

where $\dfrac{\partial f}{\partial \hat{\alpha}} = -\hat{\beta}K_1/(\hat{\alpha}+\hat{\beta}K_2)^2$ and $\dfrac{\partial f}{\partial \hat{\beta}} = \hat{\alpha}K_1/(\hat{\alpha}+\hat{\beta}K_2)^2$.

7. The last line of each table gives the parameter estimates along with their standard errors for the Engel curve calculated for the entire rural or urban sector as the case may be for the item under consideration. The corresponding expenditure elasticity given in column (4) or (5) has been calculated at the observed mean level of total expenditure per capita for the sector under consideration. Its approximate standard error is given in the brackets just below it which is obtained from the formula derived in the previous explanatory note (6).

TABLE I.R.[1]. ESTIMATES OF ENGEL CURVES FOR VARIOUS ITEMS OF HOUSEHOLD CONSUMPTION FOR EACH OF THE FIVE OCCUPATIONAL GROUPS AND FOR ALL OCCUPATIONS TOGETHER : RURAL INDIA : 1964-65

I.R.1 : **Foodgrains**

Form of Engel curve : Semi-log : $y = \alpha + \beta \log X$

$\bar{R}^2 = 0.987$ $F_2(8, 55) = 14.8181^{**}$ $F_2(4, 55) = 3.5759$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities $\eta(\bar{E})$	elasticities $\eta(\bar{E}^1)$	percentage share the item in total expenditure
(1)	(2)	(3)	(4)	(5)	(6)
1	−2.3436@ (2.2163)	3.7429 (0.6664)	0.3861 (0.0719)	0.3572 (0.0615)	32.68
2	−4.8640 (2.0877)	4.7063 (0.6329)	0.4541 (0.0619)	0.4324 (0.0561)	36.85
3	−9.5010 (2.0124)	6.8537 (0.6484)	0.5465 (0.0498)	0.5169 (0.0496)	46.01
4	−3.9285* (2.1887)	4.2718 (0.7270)	0.4355 (0.0680)	0.4024 (0.0766)	40.15
5	−4.7342 (1.8649)	5.8048 (0.5985)	0.4166 (0.0450)	0.4106 (0.0403)	50.51
all occupations	−8.4311 (0.3316)	6.4155 (0.1083)	0.5258 (0.0058)	0.5258 (0.0058)	44.92

[1]See the explanatory notes on page 256.

I.R.2 : **Pulses**

Form of Engel curve : Semi-log : $y = \alpha + \beta \log X$

$\bar{R}^2 = 0.9649$ $F_1(8, 55) = 2.0017^{*}$ $F_2(4, 55) = 2.2936^{*}$

(1)	(2)	(3)	(4)	(5)	(6)
1	−1.2793 (0.4001)	0.7408 (0.1203)	0.6715 (0.1202)	0.5887 (0.0924)	3.76
2	−1.2423 (0.3769)	0.7597 (0.1179)	0.6326 (0.0998)	0.5912 (0.0872)	4.14
3	−2.2330 (0.3033)	1.1059 (0.1170)	0.8355 (0.0862)	0.8363 (0.0864)	4.61
4	−1.8043 (0.3051)	0.9583 (0.1337)	0.8089 (0.0981)	0.9045 (0.1233)	4.36
5	−1.1418 (0.3369)	0.6850 (0.1080)	0.6455 (0.0992)	0.6312 (0.0949)	3.70
all occupations	−2.0872 (0.1636)	1.0510 (0.0534)	0.8130 (0.0402)	0.8130 (0.0402)	4.63

TABLE I.R. (*contd.*) I.R.3 : Milk and milk products

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\overline{R}^2 = 0.9492$ $F_1(6, 55) = 4.7247^{**}$ $F_2(4, 55) = 1.9281$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities		percentage share of the item in total expenditure
			$\eta(\overline{E})$	$\eta(\overline{E^1})$	
(1)	(2)	(3)	(4)	(5)	(6)
1	−0.2318@	0.0742	1.1432	1.1131	6.67
	(0.2573)	(0.0072)	(0.1582)	(0.1293)	
2	0.3324*	0.0628	0.8249	0.8403	7.47
	(0.2062)	(0.0057)	(0.1002)	(0.0931)	
3	−0.4686	0.0782	1.1363	1.3188	5.94
	(0.2226)	(0.0072)	(0.1681)	(0.1684)	
4	−0.1441@	0.0451	1.1469	1.1715	3.85
	(0.2824)	(0.0115)	(0.2930)	(0.3495)	
5	−0.5096	0.0645	1.4638	1.4408	4.48
	(0.2150)	(0.0066)	(0.2349)	(0.2197)	
all occupations	−0.4490	0.0761	1.3107	1.3107	5.81
	(0.1589)	(0.0063)	(0.1113)	(0.1113)	

I.R.4 : Oil, oilseed and products

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\overline{R}^2 = 0.9705$ $F_1(6, 55) = 9.5050^{**}$ $F_2(4, 55) = 16.5519^{**}$

(1)	(2)	(3)	(4)	(5)	(6)
1	0.2823	0.0249	0.6674	0.7308	3.41
	(0.1014)	(0.0028)	(0.0991)	(0.0908)	
2	−0.2380	0.0456	1.2046	1.2309	3.70
	(0.0813)	(0.0023)	(0.1020)	(0.0865)	
3	0.1763	0.0228	0.7633	0.7632	2.99
	(0.0877)	(0.0020)	(0.1091)	(0.1092)	
4	0.0602@	0.0297	0.9248	0.9150	3.24
	(0.1113)	(0.0045)	(0.1381)	(0.1545)	
5	0.2258	0.0219	0.7074	0.7148	3.27
	(0.0848)	(0.0026)	(0.0984)	(0.0970)	
all occupations	0.1881	0.0243	0.7927	0.7927	3.06
	(0.0318)	(0.0012)	(0.0410)	(0.0410)	

TABLE I.R. (*contd.*) I.R.5 : **Meat, fish and eggs etc.**

Form of Engel curve : Semi-log : $y = \alpha + \beta \log E$

$\overline{R}^2 = 0.9202$ $F_1(8, 55) = 2.2647^*$ $F_2(4, 55) = 1.8740$

occupational group	intercept and its s.e. error	slope and its s.e. error	elasticities $\eta(\bar{E})$	elasticities $\eta(\bar{E}^1)$	percentage share of the item in total expenditure
(1)	(2)	(3)	(4)	(5)	(6)
1	−1.2427	0.5931	0.8921	0.7517	2.30
	(0.3895)	(0.1171)	(0.2039)	(0.1447)	
2	−0.9071	0.4899	0.7328	0.6778	2.20
	(0.3669)	(0.1147)	(0.1767)	(0.1512)	
3	−1.1074	0.5294	0.8893	0.8902	2.05
	(0.3537)	(0.1140)	(0.1877)	(0.1881)	
4	−1.3337	0.6682	0.8195	0.9208	2.98
	(0.3846)	(0.1280)	(0.1391)	(0.1764)	
5	−1.9102	0.8666	0.9882	0.9551	2.88
	(0.3277)	(0.1052)	(0.1224)	(0.1144)	
all occupations	−1.1489	0.5535	0.8771	0.8771	2.18
	(0.1445)	(0.0472)	(0.0552)	(0.0552)	

I.R.6 : **Milk, oil, oilseeds, and their products, meat, fish and eggs.**

Form of Engel curve : Linear : $y = \alpha + \beta E$ . . . . . .

$\overline{R}^2 = 0.9732$ $F_1(8, 55) = 2.3917^*$ $F_2(4, 55) = 0.1747$

(1)	(2)	(3)	(4)	(5)	(6)
1	0.2394@	0.1160	0.9235	0.9371	12.38
	(0.3422)	(0.0096)	(0.1060)	(0.0885)	
2	0.5098	0.1163	0.8505	0.8640	13.46
	(0.2744)	(0.0076)	(0.0751)	(0.0694)	
3	−0.1768@	0.1170	1.0645	1.0646	10.98
	(0.2962)	(0.0096)	(0.1105)	(0.1107)	
4	−0.0669@	0.1039	1.0265	1.0304	10.07
	(0.3767)	(0.0153)	(0.1493)	(0.1720)	
5	−0.2049@	0.1122	1.0700	1.0761	10.43
	(0.2861)	(0.0088)	(0.1138)	(0.1093)	
all occupations	−0.1674@	0.1168	1.0572	1.0572	11.05
	(0.2007)	(0.0081)	(0.0762)	(0.0762)	

TABLE I.R. (*contd.*) I.R.7 : Sugar, sugarcandy and gur, etc.

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\bar{R}^2 = 0.9291$ $F_1(6, 55) = 15.9317^{**}$ $F_2(4, 55) = 29.2412^{**}$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities		percentage share of the item in total expenditure
			$\eta(E)$	$\eta(\bar{E}')$	
(1)	(2)	(3)	(4)	(5)	(6)
1	0.2920@	0.0232	0.6645	0.7095	3.26
	(0.1643)	(0.0052)	(0.1852)	(0.1712)	
2	−0.9986	0.0765	2.0991	1.8822	4.06
	(0.1477)	(0.0041)	(0.2574)	(0.1852)	
3	−0.1374@	0.0358	1.1838	1.1839	3.00
	(0.1594)	(0.0052)	(0.2274)	(0.2278)	
4	0.0400@	0.0252	0.9401	0.9322	2.70
	(0.2023)	(0.0082)	(0.3010)	(0.3383)	
5	0.1988@	0.0169	0.6794	0.6870	2.46
	(0.1540)	(0.0044)	(0.2205)	(0.2177)	
all occupations	−0.1384	0.0355	1.1823	1.1823	3.00
	(0.0247)	(0.0010)	(0.0429)	(0.0429)	

I.R.8 : Fuel and lights

Form of Engel curve : Semi-log : $y = \alpha + \beta \log E$

$\bar{R}^2 = 0.9703$ $F_1(6, 55) = 0.7697$ $F_2(4, 55) = 0.7685$

(1)	(2)	(3)	(4)	(4)	(6)
1	−1.6503	0.0376	0.6808	0.6004	4.65
	(0.4110)	(0.1236)	(0.1001)	(0.0765)	
2	−1.8691	0.0714	0.7740	0.7129	4.29
	(0.3872)	(0.1211)	(0.0999)	(0.0847)	
3	−1.3034	0.8142	0.6191	0.6195	4.76
	(0.3732)	(0.1202)	(0.0878)	(0.0879)	
4	−1.6049	0.0294	0.6714	0.7376	5.29
	(0.4059)	(0.1350)	(0.0870)	(0.1050)	
5	−1.0069	0.7267	0.5859	0.5741	4.37
	(0.3458)	(0.1110)	(0.0868)	(0.0834)	
all occupations	−1.3245	0.8264	0.6199	0.6199	4.83
	(0.1496)	(0.0488)	(0.0322)	(0.0332)	

TABLE I.R. (*contd.*) I.R.9 : **Clothing**

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\overline{R}^2 = 0.9388$ $F_1(8, 55) = 4.4734^{**}$ $F_2(4, 55) = 8.8104^{**}$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities		percentage share the item in total expenditure
			$\eta(\bar{E})$	$\eta(\bar{E}')$	
(1)	(2)	(3)	(4)	(5)	(6)
1	−4.0448	0.2237	3.6401	2.4284	9.22
	(0.5697)	(0.0160)	(0.8373)	(0.3022)	
2	−3.5206	0.2187	2.8226	2.3098	9.23
	(0.4567)	(0.0127)	(0.4748)	(0.2006)	
3	−1.3565	0.1351	1.6744	1.6767	8.06
	(0.4930)	(0.0161)	(0.3116)	(0.3125)	
4	−2.0385	0.1578	2.0755	2.4528	6.43
	(0.6254)	(0.0254)	(0.4014)	(0.6409)	
5	−1.2531	0.1339	1.6010	1.5685	8.54
	(0.4762)	(0.0147)	(0.2889)	(0.2878)	
all occupations	−1.5402	0.1422	1.7762	1.7762	8.01
	(0.1747)	(0.0069)	(0.0911)	(0.0911)	

TABLE I.U.[a] : ESTIMATES OF ENGEL CURVES FOR VARIOUS ITEMS OF HOUSEHOLD CONSUMPTION FOR EACH OF THE FIVE OCCUPATIONAL GROUPS AND FOR ALL OCCUPATIONS TOGETHER, URBAN INDIA : 1964-65

I.U.1 : **Foodgrains**

Form of Engel curve : Hyperbolic : $y = \alpha + \beta/E$

$\overline{R}^2 = 0.9893$ $F_1(8, 55) = 13.05767^{**}$ $F_2(4, 55) = 5.1437^{**}$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities		percentage share of the item in total expenditure
			$\eta(\bar{E})$	$\eta(\bar{E}')$	
(1)	(2)	(3)	(4)	(5)	(6)
1	0.4675	−42.7645	0.1410	0.0028	15.34
	(0.4401)	(11.6747)	(0.0381)	(0.0240)	
2	10.0704	−64.7152	0.1925	0.1945	23.05
	(0.5316)	(11.5170)	(0.0315)	(0.0319)	
3	15.2291	−105.8929	0.2349	0.3570	38.05
	(0.5634)	(10.2799)	(0.0192)	(0.0321)	
4	11.8501	−72.1002	0.1997	0.2681	29.78
	(0.5674)	(11.1401)	(0.0273)	(0.0387)	
5	10.1764	−51.8607	0.1629	0.1826	24.18
	(0.5312)	(10.9944)	(0.0317)	(0.0363)	
all occupations	10.8139	−56.1666	0.1657	0.1657	23.32
	(0.2615)	(6.3313)	(0.0172)	(0.0172)	

[a] See the explanatory notes on page 256.

TABLE I.U. (*contd.*) I.U.2 : **Pulses**

Form of Engel curve : Semi-log : $y = \alpha + \beta \log E$

$\bar{R}^2 = 0.9799$ $F_1(8, 55) = 1.9405^*$ $F_2(4, 55) = 3.3719^{**}$

occupational group	intercept and s.e.	slope and its std.	elasticities		percentage share of the item in total expenditure
			$(\bar{E})$	$\psi(\bar{E})$	
(1)	(2)	(3)	(4)	(5)	(6)
1	−0.6921	0.5785	0.4163	0.3601	2.74
	(0.2751)	(0.0728)	(0.0570)	(0.0427)	
2	−1.1866	0.7182	0.5137	0.5161	3.42
	(0.2856)	(0.0833)	(0.0580)	(0.0565)	
3	−1.8296	0.9134	0.6267	0.7865	3.93
	(0.3242)	(0.1019)	(0.0545)	(0.0859)	
4	−1.3745	0.7911	0.5373	0.6164	4.06
	(0.3225)	(0.0990)	(0.0566)	(0.0745)	
5	−0.4608	0.4836	0.3780	0.3931	3.46
	(0.2995)	(0.0894)	(0.0639)	(0.0691)	
all occuptations	−1.0245	0.6696	0.4834	0.4834	3.38
	(0.1434)	(0.0424)	(0.0289)	(0.0289)	

I.U.3 : **Milk and milk products**

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\bar{R}^2 = 0.9636$ $F_1(8, 55) = 3.0309^{**}$ $F_2(4, 55) = 1.2821$

(1)	(2)	(3)	(4)	(5)	(6)
1	1.0553	0.0715	0.7123	0.7827	9.13
	(0.3280)	(0 0048)	(0.0751)	(0.0823)	
2	0.4689@	0.0784	0.8504	0.8584	9.14
	(0.3225)	(0.0089)	(0.0916)	(0.0922)	
3	−0.6829	0.0994	1.2314	1.3514	7.35
	(0.3976)	(0.0129)	(0.1354)	(0.2254)	
4	−0.5647@	0.0874	1.2147	1.2896	6.77
	(0.3905)	(0.0116)	(0.1519)	(0.2174)	
5	−0.1503@	0.0702	1.0606	1.0676	7.14
	(0.3440)	(0.0084)	(0.1333)	(0.1405)	
all occupations	−0.0252@	0.0814	1.0085	1.0085	8.07
	(0.2277)	(0.0061)	(0.0721)	(0.0721)	

TABLE I.U. *(contd.)* I.U.4 : **Oil, oilseeds and products**

Form of Engel curve : Semi-log : $y = \alpha + \beta \log E$

$\bar{R}^2 = 0.9826$ $F_1(8, 55) = 3.4511^{**}$ $F_2(4, 55) = 2.2514^{+}$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities $\eta(\bar{E})$	elasticities $\eta(\bar{E}')$	percentage share of the item in total expenditure
(1)	(2)	(3)	(4)	(5)	(6)
1	−1.9812	1.0197	0.6969	0.4878	3.44
	(0.2563)	(0.0757)	(0.0509)	(0.0340)	
2	−1.3226	0.7685	0.5326	0.5351	3.50
	(0.2972)	(0.0867)	(0.0564)	(0.0569)	
3	−2.1635	0.9949	0.7022	0.9002	3.64
	(0.3374)	(0.1000)	(0.0573)	(0.0960)	
4	−2.4002	1.1143	0.6900	0.8350	4.08
	(0.3356)	(0.1030)	(0.0526)	(0.0757)	
5	−1.6153	0.8539	0.5858	0.6230	3.67
	(0.3117)	(0.0927)	(0.0571)	(0.0646)	
all occupations	−2.1334	1.0266	0.6577	0.6577	3.65
	(0.1237)	(0.0393)	(0.0217)	(0.0217)	

I.U.5. **Meat, fish and eggs, etc.**

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\bar{R}^2 = 0.9586$ $F_1(8, 55) = 4.6019^{**}$ $F_2(4, 55) = 7.7698^{**}$

(1)	(2)	(3)	(4)	(5)	(6)
1	0.0790@	0.0280	0.0283	0.0496	2.95
	(0.1248)	(0.0018)	(0.1094)	(0.0787)	
2	0.5008	0.0140	0.5009	0.4988	2.80
	(0.1235)	(0.0026)	(0.1011)	(0.1011)	
3	−0.1574@	0.0334	1.1480	1.2170	2.75
	(0.1513)	(0.0049)	(0.1424)	(0.2214)	
4	0.0071@	0.0351	0.9945	0.9930	3.54
	(0.1486)	(0.0044)	(0.1152)	(0.1458)	
5	0.0154@	0.0311	0.9806	0.9853	3.16
	(0.1398)	(0.0032)	(0.1207)	(0.1333)	
all occupations	0.1298	0.0275	0.8857	0.8857	3.11
	(0.0423)	(0.0011)	(0.0477)	(0.0447)	

TABLE I.U. (*contd.*) I.U.6 : Milk, oil, oilseeds and products, meat, fish, eggs

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\bar{R}^2 = 0.9773$ $F_1(8, 55) = 3.7405^{**}$ $F_2(4, 55) = 3.7339^{**}$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities $\eta(\bar{E})$	elasticities $\eta(\bar{E}^1)$	percentage share of the item in total expenditure
		(3)	(4)	(5)	(6)
1	2.1232	0.1153	0.6650	0.7427	15.52
	(0.4431)	(0.0065)	(0.0570)	(0.0489)	
2	1.7142	0.1072	0.6957	0.6037	16.44
	(0.4357)	(0.0093)	(0.0691)	(0.0694)	
3	−0.7414@	0.1654	1.1308	1.2042	13.74
	(0.5372)	(0.0178)	(0.1013)	(0.1554)	
4	−0.3887@	0.1574	1.0724	1.0938	14.39
	(0.5275)	(0.0157)	(0.0980)	(0.1307)	
5	0.4887@	0.1249	0.9033	0.8940	13.97
	(0.4647)	(0.0114)	(0.0806)	(0.0972)	
all occupations	0.6765	0.1298	0.8752	0.8752	14.83
	(0.3314)	(0.0088)	(0.0608)	(0.0608)	

I.U.7 : Sugar, sugarcandy and gur etc.

Form of Engel curve : Semi-log : $y = \alpha + \beta \log E$

$\bar{R}^2 = 0.9803$ $F_1(8, 55) = 1.8608$ $F_2(4, 55) = 2.0306$

(1)	(2)	(3)	(4)	(5)	(6)
1	−0.9030	0.6225	0.4091	0.4205	2.48
	(0.2369)	(0.0627)	(0.0560)	(0.0398)	
2	−0.9266	0.6051	0.4837	0.4858	3.08
	(0.2450)	(0.0717)	(0.0639)	(0.0543)	
3	−1.7112	0.8103	0.6726	0.8601	3.16
	(0.2792)	(0.0877)	(0.0561)	(0.0918)	
4	−1.0666	0.6253	0.5283	0.6046	3.28
	(0.2777)	(0.0852)	(0.0808)	(0.0796)	
5	−0.6073	0.4702	0.4289	0.4485	2.97
	(0.2570)	(0.0767)	(0.0626)	(0.0684)	
all occupations	−1.0777	0.6363	0.5267	0.5267	2.75
	(0.0994)	(0.0294)	(0.0093)	(0.0093)	

TABLE I.U. (*cont'd.*) I.U.8 : **Fuel and light**

Form of Engel curve : Semi-log : $y = \alpha + \beta \log E$

$\bar{R}^2 = 0.9892$ $F_1(8, 55) = 3.1733^{**}$ $F_2(4, 55) = 3.0314^{**}$

occupational group	intercept and its s.e.	slope and its s.e.	elasticities		percentage share of the item in total expenditure
			$\eta(\bar{E})$	$\eta(\bar{E}')$	
(1)	(2)	(3)	(4)	(5)	(6)
1	−3.3062	1.5487	0.6831	0.5439	4.60
	(0.3136)	(0.0829)	(0.0432)	(0.0274)	
2	−2.2784	1.2242	0.5755	0.5784	5.11
	(0.3255)	(0.0949)	(0.0419)	(0.0424)	
3	−2.1720	1.1553	0.5819	0.7171	5.51
	(0.3695)]	(0.1161)	(0.0462)	(0.0702)	
4	−1.8741	1.0829	0.5353	0.6139	5.59
	(0.3670)	(0.1128)	(0.0476)	(0.0618)	
5	−2.2097	1.1961	0.5710	0.6063	5.06
	(0.3390)	(0.1015)	(0.0436)	(0.0491)	
all occupations	−2.6498	1.3301	0.6224	0.6224	5.04
	(0.2190)	(0.0638)	(0.0282)	(0.0282)	

I.U.9 : **Clothing**

Form of Engel curve : Linear : $y = \alpha + \beta E$

$\bar{R}^2 = 0.9841$ $F_1(8, 55) = 5.6761^{**}$ $F_2(4, 55) = 9.8120^{**}$

(1)	(2)	(3)	(4)	(5)	(6)
1	−2.5608	0.1320	2.1312	1.5745	8.38
	(0.2482)	(0.0037)	(0.1858)	(0.0897)	
2	−2.5473	0.1365	2.0432	2.0619	6.62
	(0.2440)	(0.0052)	(0.1498)	(0.1540)	
3	−0.8968	0.0915	1.3084	1.5800	5.76
	(0.3009)	(0.0098)	(0.1240)	(0.2338)	
4	−2.0700	0.1312	1.7601	2.2146	5.92
	(0.2955)	(0.0088)	(0.1234)	(0.2482)	
5	−1.3179	0.0975	1.5868	1.6031	5.76
	(0.2003)	(0.0064)	(0.1395)	(0.1760)	
all occupations	−2.0432	0.1242	1.8184	1.8184	6.85
	(0.1648)	(0.0044)	(0.0722)	(0.0722)	

TABLE II.R. OCCUPATIONAL PAIRWISE COMPARISON OF THE ESTIMATED INTERCEPTS AND SLOPES OF ENGEL CURVES FOR DIFFERENT ITEMS (Rural)

name of the item	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(2, 3)	(2, 4)	(2, 5)	(3, 4))	(3, 5)	(4, 5)
foodgrains	— —	5% 1%	— —	— 5%	— 5%	— —	— —	10% 1%	10% —	— —
pulses	— —	10% 5%	— —	— —	10% 5%	— —	— —	— —	5% 2%	— 1%
milk & milk products	5% —	— —	— 1%	— —	1% 5%	— 10%	1% —	— 5%	— 10%	— 7
oil, oilseeds & products	1% 1%	— —	— —	— —	1% 1%	1% 1%	1% 1%	— —	— —	— 10%
meat, fish eggs etc.	— —	— —	— —	— —	— —	— —	5% —	— —	5% —	— —
milk, oil meat & products	— —	— —	— —	— —	5% —	— —	5% —	— —	— —	— —
sugar, sugar candy & gur etc.	1% 1%	10% 10%	— —	— —	1% 1%	1% 1%	1% 1%	— —	— 10%	— —
fuel & light	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —
clothing	— —	1% 1%	5% 5%	1% 1%	1% 1%	10% 5%	1% 1%	— —	— —	— —

Note : For each pair of occupations, the (two sided) level of significance is given for the differences in intercepts in the first sub-column and for differences in slopes in the second sub-column.

TABLE II.U. OCCUPATIONAL PAIRWISE COMPARISON OF THE ESTIMATED INTERCEPTS AND SLOPES OF ENGEL CURVES FOR DIFFERENT ITEMS (Urban)

name of the item	(1, 2)	(1,3)	(1, 4)	(1, 5)	(2, 3)	(2, 4)	(2, 5)	(3, 4)	(3, 5)	(4 5)
foodgrain	5% 10%	1% 5%	1% 5%	— —	1% 1%	— —	— —	1% 5%	1% 1%	5% 10%
pulses	— —	1% 1%	— 10%	— —	— —	— —	10% 10%	— —	1% 1%	5% 10%
milk & milk product	— —	1% 5%	1% —	1% —	2.5% —	2.5% —	— —	— —	— —	— —
oil, oilseeds & product	— 5%	— —	— —	— —	10% 10%	2% 5%	— —	— —	— —	10% 5%
meat, fish & eggs etc.	2% 1%	— —	— —	— —	1% 1%	2% 1%	2% 1%	— —	— —	— —
milk, oil, meat & product	— —	1% 5%	1% 5%	1% —	1% 5%	1% 5%	2.5% —	— —	5% 5%	10% 5%
sugar, sugar candy & gur etc.	— —	10% 10%	— —	— —	5% 10%	— —	— —	10% —	1% 1%	— —
fuel & light	5% 2%	5% 1%	1% 1%	5% 1%	— —	— —	— —	— —	— —	— —
clothing	— —	1% 1%	— —	1% 1%	1% 1%	— —	1% 1%	1% 1%	— 10%	10% 5%

Note : For each pair of occupations, the (two-sided) level of significance is given for the differences in intercepts in the first sub-column and for differences in slopes in the second sub-column.

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