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A Further Analysis of Irish Household Budget Data, 1951-1952

by

C. E. V. LESER

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1. INTRODUCTION

In a previous study (Leser, 1962) which will be briefly referred to as E.R.I. Paper No. 4, some of the published results of the 1951–52 household budget enquiry (Central Statistics Office, 1954) were analysed. In view of the limitations of the data which were available in published form, it was at that time considered doubtful whether a very detailed commodity breakdown was warranted for the purposes of constructing expenditure functions and estimating elasticities of demand. Moreover, the mathematical model adopted in E.R.I. Paper No. 4 made extensive computations rather laborious.

In view of the interest in economic planning and in econometric results helping to supply a basis for development plans which has recently been aroused in this country, it is now felt that the results of a more detailed analysis to which the household budget data may be subjected, should be placed on record. Thus, estimates of expenditure elasticities will be given for 87 commodities or components of total expenditure as well as for 14 commodity groups; an attempt is made to isolate the effects of variations in household size and in household composition; and social class differences in expenditure patterns are subjected to scrutiny.

All elasticities calculated here are expenditure elasticities (of demand) or, more precisely, elasticities of demand (in money or real terms) for a commodity or commodity group with regard to total expenditure on all goods and services. They show the percentage increase in expenditure on the commodity concerned which tends to be associated with a 1% increase in total outlay. If it can be assumed that total outlay increases proportionately to income, the elasticities can also be said to show the effect of a 1% increase in income and can thus be described as income elasticities. Moreover, they approximately show the ratio which the percentage increase in commodity expenditure bears to a large increase in total outlay, though this is not strictly correct. If the elasticities remained constant with changing income or total outlay, a compounds interest formula would be appropriate; but for a precise answer it would be necessary to know how the elasticities change over the income range.

It is well known and indeed has been pointed out recently for Ireland (Leser, 1963–64) and for other countries (ASEPELT, 1964) that expenditure elasticities derived from cross-section data like household budgets are not necessarily applicable to changes over time. Experience seems to show that in the course of years, the changes in the pattern of national expenditure are, even with a substantial increase in real income per head, considerably smaller than might be expected on the basis of cross-section expenditure elasticities.

Granted this, a comparison of elasticities, particularly within the same commodity group, may still prove to be a valuable guide to projected expansion rates in demand associated with a given increase in national income or personal expenditure. If a higher elasticity of expenditure is obtained from cross-section data for one commodity than for another, this provides at any rate some evidence for assuming that the elasticity applicable to changes over time will also be higher for the former commodity than for the latter.

Some judgment is almost invariably necessary when utilising results of household budget studies for the purpose of demand forecasting. It is in this light, as background information which supplements but does not replace judgment, that the figures supplied here should be seen.

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2. DATA AND METHOD

Data were taken from the publication of the Central Statistics Office (1954) which will be referred to as the C.S.O. publication. The main source of data were Tables 6 and 6A (pp. 38–45) which give average expenditure data for sixteen groups of households classified by household size and income per person. For the construction of expenditure functions by social class, Tables XVII, XVIII and XXI (pp. XLI–XLIV) were used, with some additional data computed from Tables 7 and 7A (pp. 46–53).

In contrast to E.R.I. Paper No. 4 which used the data as they stand, an adjustment was made to the data. The recorded figures for expenditure on alcoholic beverages were disregarded, and it was assumed that in each group of households, average expenditure on drink was about the same as that recorded for tobacco; the data used for drink and tobacco thus represent the recorded tobacco expenditure multiplied by two. The expenditure data for all goods and services taken together were correspondingly adjusted. The expenditure proportions which were calculated and which figure prominently in this study are thus based on an adjusted total.

The commodity grouping in E.R.I. Paper No. 4 followed the classification into five major expenditure groups in the C.S.O. publication, and largely followed the C.S.O. subdivision of sundries, with some minor exceptions. A somewhat different classification is followed here. Fourteen expenditure groups are distinguished, which follow the C.S.O. classification into groups and sundries' subgroups except that non-durable household goods are combined with fuel since consumers' behaviour is similar with respect to these two categories, and that personal care which is a relatively small category is included in miscellaneous goods.

For each of the sixteen size/income groups, total expenditure per head (for convenience expressed in £), average number of persons per household, and proportion of children to all persons were also obtained. The procedure adopted in E.R.I. Paper No. 4 to count a child as half an equivalent person was not followed here. Instead, the use of the proportion of children as a variable represents an attempt to measure the consumption of children versus that of adults.

The mathematical model chosen—again different from that of E.R.I. Paper No. 4—was as follows:

$$w = a + b \log Y + c \log N + u$$

$$= \overline{w} + b (\log Y - \overline{\log Y}) + c (\log N - \overline{\log N}) + u$$

where w represents proportion of total expenditure devoted to a commodity or commodity group, Y total outlay per head, N number of persons in the household. $\overline{w}$, $\overline{\log Y}$, $\overline{\log N}$ are unweighted means over sixteen size/income groups; natural logarithms are used throughout. The coefficients a, b and c represent estimates for theoretical constants α, β and γ, obtained by least squares, and u are the residuals after regression.

The form of equation used here represents an adaptation of the constant elasticity form and assumes implicitly that demand for a commodity is either inelastic or elastic over the whole income range; although this assumption is questionable, the available data are not suitable for ascertaining variations in elasticities with income. The reasons for choosing this particular form of equation are given elsewhere (Leser, 1963).

The coefficients b then represent changes in the expenditure percentages $100w$ associated with a 1% increase in total outlay. They also permit calculation of average expenditure elasticities $\overline{e}$ by means of the formula

$$\overline{e} = 1 + b / \overline{w}$$

The interpretation of the coefficients c is more difficult. They represent the combined effect of two factors, since an increase in household size is generally accompanied by an increase in the ratio of children to adults, and since changes in both household size and composition affect the expenditure pattern. With the available data, it is not possible to obtain reliable estimates for the two separate effects by partial regression. Some assumptions are therefore made which imply a somewhat different treatment of the following three categories: firstly, food; secondly, fuel, etc. and housing; thirdly, all the rest, that is to say, clothing and sundries.

It is assumed that for fuel, etc. and for housing, the household composition effect is negligible; that is to say, with a given household size, it is irrelevant in this context how many of the persons in the household are adults and how many are children. The regression coefficients c for these commodity groups are thus interpreted as showing the effect of household size on expenditure proportions; that is to say, they compare the proportions spent on fuel, etc. and housing in families of different size but with the same total outlay per head and thus with proportionately higher total outlay. These proportions are found to be considerably lower in the larger than in the smaller households.

In the case of food, on the other hand, the household size effect is assumed to be negligible,

2

that is to say, no noticeable economies of scale are anticipated. As against this, the household composition, as indicated by proportion P of children to all persons, is taken to affect expenditure on various foodstuffs, owing to differences between adults' and children's food consumption. Nevertheless, the variable log N is preferred to P as explanatory variable in the regression, because the use of the same variables for all commodities offers some advantages, and log N varies more and is closer to being uncorrelated with log Y than P. The regression coefficients c are therefore taken as representing household composition effects. It is estimated from partial regression of P on log Y and log N that the coefficients c have to be multiplied by 4·383 (the reciprocal of the coefficient of log N in the regression) to be applied to the proportion of children.

Since with a given expenditure per head on all goods and services, an increase in household size reduces the proportion of this expenditure devoted to fuel and housing without any change in the proportion for food, it raises the proportion going on clothing and sundries. This additional expenditure is assumed to be distributed over the various commodity groups other than food, fuel, etc. and housing, in proportion to their share of total outlay. The differences between the actual values of the coefficients c and those expected on the basis of this assumption are attributed to the varying proportion of children, and they are multiplied by 4·383 for the purpose of application to P. Thus, in dealing with these commodity groups, the household size effect is largely assumed and the household composition effect largely estimated.

For the purpose of obtaining expenditure elasticities, data for individual commodities were generally analysed in as much detail as Table 6A in the C.S.O. publication permitted. However, in the case of commodities forming but a small proportion of the total budget, the results for which were highly uncertain as evidenced by relatively large standard errors, and in a few other cases, several items were combined in the final analysis. Consequently, only nine out of fourteen commodity groups are divided up further into commodities. The groups, together with the number of items distinguished and the importance of the commodity group in the budget, are shown in Table 1.

TABLE 1 : COMMODITY GROUPS IN HOUSEHOLD BUDGET ANALYSIS

Commodity group	Number of items distinguished	Average proportion of total outlay
		%
Food	38	38·71
Fuel, etc.	6	9·05
Housing	1	6·94
Clothing	15	11·22
Drink and tobacco	1	9·56
Household durables	4	2·20
Miscellaneous goods	3	2·29
Travel and holidays	5	4·31
Entertainment	3	2·27
Education	1	1·39
Medical expenses	1	1·42
Social security	1	3·33
Personal services	5	4·46
Miscellaneous expenditure	3	2·85
Total expenditure	87	100·00

Regarding the definition of the groups, it has already been mentioned that " fuel, etc." includes non-durable household goods like household soap in addition to all fuel and light. " Housing " consists of rent or house purchase instalments, rates, repairs where applicable and a few minor items. " Clothing " includes footwear. " Household durables " includes semi-durable items like crockery and glassware. " Travel and holidays " includes all expenditure on motor cars and motor cycles. " Social security " comprises expenditure on health and unemployment insurance, trade union subscriptions and life insurance. " Personal services " include amongst others, hairdressing, shoe repairs, laundry, dry cleaning and domestic service. " Miscellaneous expenditure " includes postage and telephone, subscriptions, licences, pocket-money to children and other items. The other headings may be taken as self-explanatory.

The full results of the regression analysis carried out are presented in the Appendix. They include the regression coefficients b and c with their standard errors which indicate the reliability of the coefficients, and the coefficients of determination R^2 which to some extent indicate the goodness of fit, though a low value of R^2 may arise with an expenditure elasticity near 1 and thus a practically constant expenditure proportion, and in such a case it does not adversely reflect upon the regression. The most important derived results are presented and interpreted in the following sections.

3. EXPENDITURE ON FOOD

Food taken as a whole accounts on the average for nearly two-fifths of all household expenditure, and the individual foodstuffs or foodstuff groups which are distinguished here for anything between 0·1% and 4% of all expenditure. Table 2 gives the importance of each item in the household budget and the estimate for the expenditure elasticity together with its standard error, obtained by

dividing the standard error of the coefficient b by the expenditure proportion $\bar{w}$. The standard errors convey an idea of the degree of accuracy and may be used to construct confidence intervals. If multiplied by 2·15 and subtracted from or added to the estimated value, they give theoretical limits within which the true value lies with a probability of ·95.

The classification is finer than that adopted in E.R.I. Paper No. 4, but in some cases results are given for the same commodity here as previously, and comparison shows some differences in the figures, owing to the various differences in the underlying method. On the whole the present set of figures may be taken as improved estimates.

The demand for food as a whole is inelastic, that is to say, it increases less than proportionately with an increase in household income and total expenditure. This also applies to the majority of individual foodstuffs, and in particular to batch bread, butter, cooking fat, potatoes, tea and sugar which have income elasticities below 0·3. Tinned fish, fresh and tinned fruit, sweets, etc., meals away from home, and other foods are clearly exceptions to the rule; the demand for these foods is elastic, and an increase in income is accompanied by a more than proportionate increase in consumption.

There are also a number of foods with an elasticity of demand which is not, or hardly significantly different from one. These are : bread (other than batch and fancy), biscuits, cakes and buns, cream, mutton, pork, meat (other than beef, mutton, pork, bacon and sausages), fish (fresh, dried and cured), tomatoes, dried fruit, coffee and cocoa. With regard to these foodstuffs, it can only be stated that their demand expands approximately in line with total household expenditure.

The data in Table 2 may be used to compute estimates for the average elasticities of foodstuff groups, which represent weighted averages of the elasticities for individual foods with the expenditure proportions serving as weights. For example, the estimated average expenditure elasticity for all bread is :

$$\bar{e} = \frac{3·00 \times (-0·05) + 0·30 \times 0·90}{3·00 + 0·30} = \frac{0·1200}{3·30} = 0·04$$

The expenditure pattern and the elasticities given here refer to an average household with a weekly expenditure on all goods and services amounting to about £2 13s. per head in 1951–52, and consisting of about 3 adults to each child under 14. However, the analysis carried out permits the estimation of food expenditure patterns for various types of household. Table 3 shows how these compare for households consisting of adults only, households

with as many children as adults and households with twice as many children as adults, all of them with the same expenditure per head on all commodities. The foodstuffs have been combined into somewhat broader groups for this purpose.

The comparison which is made here may be taken, for example, as being between households of six adults, households of three adults and three children, and households of two adults and four children with the same total expenditure. Alternatively, it may be interpreted as a comparison, say, between households with two adults and no children, two children and four children respectively, total expenditure rising proportionately to household size and thus total outlay per head remaining constant.

TABLE 2 : EXPENDITURE ELASTICITIES OF
DEMAND FOR FOOD

Food item	Average proportion of total outlay	Average expenditure elasticity
	%	
Batch and fancy bread ..	3·00	−0.05 ± 0·07
Other bread	0·30	0·90 ± 0·09
Flour	0·59	0·41 ± 0·07
Biscuits	0·51	1·19 ± 0·08
Cakes and buns	0·74	1·14 ± 0·08
Fresh milk	3.99	0·38 ± 0·02
Cream, etc.	0·17	0·96 ± 0·14
Butter	3·98	0·19 ± 0·03
Margarine	0·29	0·69 ± 0·08
Cooking fats	0·20	0·23 ± 0·06
Cheese	0·23	0·63 ± 0·06
Eggs	2.58	0·73 ± 0·03
Beef and veal	3·77	0·57 ± 0·03
Mutton	1·55	1·14 ± 0·05
Pork	0·31	1·24 ± 0·13
Bacon and ham	2·87	0·59 ± 0·04
Sausages	0·99	0·46 ± 0·05
Other meat	0·84	1·11 ± 0·08
Fresh, dried and cured fish	0·72	0·92 ± 0·05
Tinned fish	0·10	1·48 ± 0·09
Potatoes	1·82	0·15 ± 0·05
Cabbage	0·42	0·33 ± 0·02
Tomatoes	0·40	1·03 ± 0·05
Other vegetables	1·00	0·82 ± 0·05
Fresh fruit	0·62	1·55 ± 0·06
Tinned fruit	0·10	2·09 ± 0·12
Dried fruit	0·22	1·11 ± 0·08
Tea	1·01	0·25 ± 0·04
Coffee and cocoa ..	0·11	1·26 ± 0·11
Sugar	0·92	0·28 ± 0·03
Jam and marmalade ..	0·65	0·56 ± 0·04
Oats and breakfast cereals	0·29	0·63 ± 0·06
Rice, sago, etc.	0·29	0·49 ± 0·07
Jellies, custard and blanc-mange	0·24	0·73 ± 0·09
Salt, pepper, mustard and sauces	0·22	0·68 ± 0·06
Sweets, chocolate, ice cream and soft drink	0·63	1·37 ± 0·05
Meals away from home ..	0·35	1·73 ± 0·24
Other food	1·69	1·71 ± 0·08
All food	38·71	0·614 ± 0·014

4

TABLE 3 : FOOD EXPENDITURE PATTERNS FOR DIFFERENT HOUSEHOLD TYPES WITH TOTAL OUTLAY PER HEAD AT AVERAGE LEVEL (£2 13s.)

Food	% of total expenditure for household with		
	Adults only	1 child per adult	2 children per adult
Bread and flour	4·46	3·31	2·92
Biscuits and cakes ..	1·30	1·19	1·15
Milk and cream	4·52	3·81	3·57
Butter	4·22	3·74	3·58
Misc. fats and cheese	0·76	0·69	0·67
Eggs	2·81	2·34	2·18
Beef	3·99	3·55	3·40
Mutton and pork	2·30	1·42	1·12
Bacon and ham ..	3·66	2·06	1·53
Sausages	1·04	0·93	0·90
Miscellaneous meat	0·77	0·91	0·96
Fish	0·88	0·77	0·74
Potatoes	2·13	1·50	1·29
Vegetables ..	1·96	1·68	1·59
Fruit	0·73	1·15	1·29
Tea, etc.	1·47	0·77	0·53
Sugar	1·06	0·77	0·68
Jam and marmalade ..	0·70	0·61	0·58
Sweets, ice cream, etc. ..	0·47	0·80	0·91
Miscellaneous food ..	2·52	3·64	4·02
All food	41·75	35·64	33·61

Not surprisingly, it is seen that the households with a higher proportion of children use a smaller portion of the total budget in buying food than the households with fewer or no children, and thus more spending power is set free for other purposes. In particular, relatively less is spent on bread and flour, eggs, meat, bacon, potatoes, tea and sugar the higher the proportion of children in the households ; on the other hand, relatively more is spent on fruit and on sweets, ice cream, etc. Surprisingly, there is no evidence of milk consumption being relatively higher in the households with children than in those consisting of adults only ; if anything, rather the contrary.

Quite a different matter is a comparison between households of the same income and total outlay with the same number of adults but with a different number of children. In this case the additional child implies a reduction in total expenditure per head, and a negative income effect operates on the expenditure pattern as well as the household composition effect.

In Table 4, this comparison has been developed for households for which total expenditure was running at the average level of £10 12s. 6d., and

which are made up of two adults and either no children, or two children, or four children. The expenditure per head, accordingly, amounted to about £5 6s. 6d., £2 13s. and £1 15s. 6d., respectively. The figures could also have been given in terms of £ s. d., but in the present form they would equally apply to households with three adults and none, three or six children, and with a total expenditure of £15 19s.

TABLE 4 : FOOD EXPENDITURE PATTERNS FOR DIFFERENT HOUSEHOLD TYPES WITH TOTAL OUTLAY AT AVERAGE LEVEL (£10 12s. 6d.)

Food	% of total expenditure for households with		
	2 adults only	2 adults 2 children	2 adults 4 children
Bread and flour	2·00	3·30	4·34
Biscuits and cakes ..	1·43	1·19	1·08
Milk and cream	2·80	3·80	4·57
Butter	1·99	3·73	4·88
Misc. fats and cheese ..	0·53	0·69	0·80
Eggs	2·34	2·34	2·46
Beef	2·86	3·54	4·06
Mutton and pork ..	2·50	1·42	1·01
Bacon and ham ..	2·85	2·06	2·00
Sausages	0·67	0·93	1·11
Miscellaneous meat ..	0·83	0·91	0·92
Fish	0·87	0·77	0·74
Potatoes	1·06	1·50	1·91
Vegetables	1·65	1·68	1·77
Fruit	1·06	1·15	1·10
Tea, etc.	0·96	0·77	0·83
Sugar	0·60	0·77	0·94
Jam and marmalade ..	0·50	0·61	0·69
Sweets, ice cream, etc. ..	0·63	0·80	0·81
Miscellaneous food ..	3·26	3.65	3·59
All food	31·39	35·61	39·61

Thus, Table 4 demonstrates the way in which the needs of the children together with the need to make do with the same amount of spending money bring about a concentration on basic food. With increasing family size, the proportion of the household budget going on basic foodstuffs like bread and flour, milk, butter, potatoes and sugar rises, whilst expenditure on more luxury type of food does not rise sensibly or even declines as in the case of bacon and fish ; consumption of mutton and pork also has to give way to cheaper meat and meat products like beef and sausages. The food bill as a whole still takes an increasing share of the budget, leaving a smaller margin available for non-food purchases.

4. EXPENDITURE ON FUEL AND HOUSING

The two expenditure groups which are studied here account between them for about one-sixth of the total household budget on the average. This proportion, as will be seen, is highly variable, as it is much higher with low incomes per head and a small household size, and it rapidly decreases both with rising income and with increasing number of persons in the household,

The expenditure elasticities for both commodity groups and for individual items in the fuel group are given as follows :

TABLE 5 : EXPENDITURE ELASTICITIES OF DEMAND FOR FUEL AND HOUSING

Item	Average proportion of total outlay	Average expenditure elasticity
	%	
Gas	1·57	0·48 ±0·05
Electricity	1·25	1·01 ±0·04
Coal, coke, etc.	3·31	0·59 ±0·05
Other fuel	1·77	−0·06 ±0·27
Household soap	0·70	0·40 ±0·03
Other household non-durables	0·45	0·63 ±0·03
All fuel, etc.	9·05	0·494±0·066
Housing	6.94	0·934±0·028

Household soap and other non-durable household goods like matches and polish have been included with fuel, as the consumers' behaviour is very similar with regard to these commodities. It appears that the elasticity of demand is in the neighbourhood of 0·5 for most of the items included in this group. The exceptions are electricity with an elasticity of about 1 and fuel other than coal, including turf in particular, with an elasticity of about 0.

The expenditure elasticity observed for housing is higher than that for the fuel group; it is only slightly below 1, and the difference from 1 is of doubtful significance. The relatively high figure is partly accounted for by the higher propensity of households in the upper income groups to own their house, together with higher expenses incurred in connection with owner-occupied than with rented houses.

In recent years, the proportion of national expenditure given over to fuel has not sensibly declined in the face of an increase in income per head. The value of the cross-section elasticity of demand for fuel therefore does not apply to changes over time. It is not easy to lay a finger on any single cause of this discrepancy. The rapid expansion in the use of electrical and other heating appliances in the household may, however, be partly responsible, implying that the results for 1951–52 are no longer applicable. The figure for " other fuel " to which a large sampling error attaches, and which may well be too low, may also have helped to bring the group average down too far.

Although the expenditure elasticity of 0·5 may therefore not be appropriate for a forecast of fuel demand, the relatively high value observed for electricity may be noted and may give a guide to the future demand for electricity as compared with other sources of fuel and power. Some judgment

will of course have to be exercised when utilising the results for this purpose.

The share of fuel and housing expenditure in the total budget varies with household size, though it is assumed to be unaffected by the ratio of children to adults. This may be shown in two ways, by comparing households with a total expenditure which is either proportionate to number of persons or which remains constant. It is done here for households consisting of two, four or six persons respectively. Table 6 gives the comparison for households with a total expenditure of £2 13s. per person; Table 7 the same for households with total expenditure of £10 12s. 6d.

TABLE 6: FUEL AND HOUSING EXPENDITURE FOR DIFFERENT HOUSEHOLD SIZES, WITH TOTAL OUTLAY PER HEAD AT AVERAGE LEVEL (£2 13s.)

Item	% of total expenditure for households with		
	2 persons	4 persons	6 persons
Gas	1·92	1·58	1.38
Electricity	1·44	1.25	1.14
Coal, coke etc.	4·64	3·31	2·54
Other fuel and light	3·23	1·77	0·92
Household soap	0·86	0·70	0·60
Other household non-durables	0·52	0·45	0·41
All fuel etc.	12·61	9·06	6·99
Housing	9·30	6·94	5·56

TABLE 7: FUEL AND HOUSING EXPENDITURE FOR DIFFERENT HOUSEHOLD SIZES, WITH TOTAL OUTLAY AT AVERAGE LEVEL (£10 12s. 6d.)

Item	% of total expenditure for households with		
	2 persons	4 persons	6 persons
Gas	1·35	1·57	1·71
Electricity	1·47	1·25	1·12
Coal, coke etc.	3·70	3·31	3·08
Other fuel and light	1·93	1·77	1·67
Household soap	0·57	0·70	0·77
Other household non-durables	0·40	0·45	0·48
All fuel etc.	9·42	9·05	8·83
Housing	8·98	6·94	5·75

It is clear that the larger households with the proportionately larger budget spend relatively far less on fuel and on housing than the smaller households with the correspondingly lower total outlay. The proportionate decline is particularly marked for coal and for other fuel such as turf. To some extent, this is obviously a phenomenon of economies of scale, though with regard to housing particularly, it may also imply a decline in housing standards.

A decline in the proportion spent on housing, and

thus a decline in the total amount spent, with increasing household size is also observed when households of the same total expenditure, and presumably the same total household income, are compared. As previously seen, the larger households held to the total spending power of the smaller households are forced to devote a larger share of the budget to food, and housing space or quality is an obvious way to effect offsetting economies.

With regard to fuel and other non-durable household goods the decline in expenditure with increasing household size and a constant budget is only slight. Moreover, it does not appear to apply in the case of gas, household soap and other non-durables, expenditure on which is somewhat higher in the larger than in the smaller households.

5. OTHER EXPENDITURE

In the average household budget of 1951–52, somewhat more than one-half of total expenditure went on food, fuel and housing. The remainder is spread over a wide range of items which for the sake of convenience may be divided up into goods on one hand and services—or expenditure of a service-type character—on the other. The former include clothing, drink and tobacco, household durables and miscellaneous goods, and account for about one-quarter of the average budget. Into the latter category fall travel, entertainment, education, medical expenses, social security, services and miscellaneous expenses, and their share in the budget is about one-fifth. The expenditure elasticities of demand obtained for the various items in these groups are given in Tables 8 and 9.

The lesson regarding elasticities for various clothing is that demand for women's clothing appears to be somewhat more elastic than demand for men's clothing, and the demand for outerwear generally more elastic than that for footwear and other clothing. For all types of adults' wear, the elasticity was significantly above one.

For children's clothing, lower elasticities are observed, and the elasticity appears to be lower for boys' than for girls' clothing. These estimates, however, carry a comparatively large margin of error, and it is not clearly established whether the true values of the elasticities are above or below one. More accurate results might have been obtained for these commodity groups using a different mathematical model, since the income effect and the family composition effect are not strictly additive; but with a limited accuracy of the data in any event, it would not be worth while introducing complications into the method adopted.

The estimated value of the elasticity for clothing as a whole is about 1·5, indicating the comparative luxury character of this type of expenditure. The result may be to some extent due to special circumstances of the early post-war years; and it is doubtful whether a new enquiry will find such a high figure, in view of the increased availability of other items for comparative luxury spending. For this and similar reasons, the result as such should not be used for forecasting purposes without exercising some judgment.

TABLE 8: EXPENDITURE ELASTICITIES FOR VARIOUS GOODS.

Item	Average proportion of total outlay	Average expenditure elasticity
	%	
Men's: overcoats & waterproofs	0·64	1·77 ± 0·25
suits, sportscoats and trousers	1·60	1·79 ± 0·15
shirts	0·56	1·50 ± 0·09
footwear	1·06	1·36 ± 0·13
other clothing	0·86	1·42 ± 0·08
Women's: overcoats & waterproofs	0·59	2·17 ± 0·21
costumes, suits & skirts	0·25	2·10 ± 0·41
cardigans, jumpers etc.	0·21	1·90 ± 0·17
dresses	0·29	1·96 ± 0·20
stockings	0·53	1·33 ± 0·10
footwear	0·93	1·49 ± 0·09
other clothing	1·20	1·59 ± 0·14
Boys' clothing	1·10	0·78 ± 0·13
Girls' clothing	1·01	1·20 ± 0·16
Miscellaneous clothing	0·39	0·92 ± 0·17
All clothing	11·22	1·489 ± 0·045
Drink and tobacco	9·56	0·867 ± 0·075
Furniture, floor coverings and curtains	0·83	2·25 ± 0·18
Electrical goods and appliances	0·37	2·25 ± 0·47
Hardware, china, glass etc.	0·33	1·63 ± 0·14
Other household durables	0·67	1·74 ± 0·18
All household durables	2·20	2·000 ± 0·132
Personal care	0·58	1·39 ± 0·07
Newspapers, magazines and books	1·25	1·20 ± 0·04
Other miscellaneous goods	0·46	1·59 ± 0·06
All miscellaneous goods	2·29	1·327 ± 0·055

Expenditure on drink and tobacco appears to be slightly inelastic with regard to total outlay, but the difference in the estimate from one is not significant. As this result has been largely derived from the assumptions made, it is not worth while to pursue the matter further.

Household durable goods generally show high

elasticities of demand, the average for the group being 2. The elasticity appears to be somewhat higher for furniture, floor coverings, curtains, electrical goods and appliances than for hardware, china, glass and other household durables.

There remains a number of goods like toilet soap and similar articles, leather goods, sports goods, toys, reading matter and writing materials, which together form the group of miscellaneous goods. For these goods, the elasticity generally seems to be greater than 1 though not as high as for most household durables. The value of the elasticity of demand for reading material is closer to 1 than that for other goods in the commodity group but still significantly above 1.

Turning now to the commodity groups representing chiefly services, the highest expenditure elasticities, well in excess of 2, are found for expenditure on motoring, holiday and other hotel expenses, for domestic service and apparently for education, though in the last mentioned case the result is subject to a relatively large margin of error.

TABLE 9: EXPENDITURE ELASTICITIES FOR SERVICE-TYPE EXPENDITURE ITEMS.

Item	Average proportion of total outlay %	Average expenditure elasticity
Motoring	1·49	2·83 ±0·28
Bus fares	1·01	1·48 ±0·11
Train fares	0·35	1·59 ±0·12
Other travelling	0·44	1·68 ±0·39
Holiday and hotel expenses	1·02	2·67 ±0·30
All travel and holidays	4·31	2·259 ±0·118
Cinema and Theatre	1·48	1·30 ±0·09
Dancing	0·38	1·59 ±0·18
Other entertainment	0·41	1·94 ±0·03
All entertainment	2·27	1·467 ±0·073
Education	1·39	2·147 ±0·369
Medical expenses	1·42	1·380 ±0·132
Social security	3·33	1·280 ±0·074
Hairdressing	0·57	1·42 ±0·08
Shoe repairs	1·32	0·88 ±0·09
Laundry, dyeing & cleaning	0·97	1·71 ±0·06
Domestic service	0·67	2·64 ±0·28
Other services	0·93	1·40 ±0·92
All personal services	4·46	1·504 ±0·203
Postage and telephone	0·49	1·65 ±0·11
Subscriptions, charity etc.	0·98	1·73 ±0·10
Other expenditure	1·38	0·95 ±0·10
All miscellaneous expenses	2·85	1·339 ±0·068

Elasticities between 1 and 2 are found for most of the expenditure items of this kind, including bus and train fares, entertainment such as cinema, theatre and dance hall visits, medical expenses, social security, hairdressing, laundry and dry cleaning, postage and telephone, and subscriptions.

An exception is provided by expenditure on shoe repairs, which has an income elasticity that appears to be somewhat below 1. This is not surprising, as shoe repairs would generally be thought of as a necessity rather than a luxury; and it may only be wondered that the value of the elasticity is as high as it is and not nearer to 0 than to 1.

As in the case of food, fuel and housing, the results refer to households with an average number of adults and children. An analysis of variations in expenditure pattern with family size and composition has also been made but only for commodity groups, and moreover the small groups "Education" and " Medical expenses " have been combined for this purpose.

It has been assumed that an increase in household size implies a small proportionate increase in the expenditure proportion for each of the commodity groups studied here, to offset the reduction in the expenditure proportions for fuel and housing. The remainder of the regression coefficient of expenditure proportion on household size is attributed to the increased proportion of children in larger households.

It is then found that other things—i.e., total household size, total household expenditure and therefore expenditure per head—being equal, households with children spend more on clothing, household durables, travel and holidays, entertainment, education and medical services and on social security than households of adults only; the latter spend more on drink and tobacco, services and miscellaneous items. For various 4-person households spending altogether £10 12s., or £2 13s. per head, the comparison is given in Table 10.

TABLE 10: EXPENDITURE ON SUNDRY GROUPS FOR DIFFERENT HOUSEHOLD TYPES WITH TOTAL OUTLAY PER HEAD AT AVERAGE LEVEL (£2 13s.)

Commodity group	% of total expenditure for households with			
	4 adults	3 adults 1 child	2 adults 2 children	1 adult 3 children
Clothing	10·28	11·22	12·16	13·10
Drink and tobacco	11·47	9·54	7·62	5·70
Household durables	1·87	2·20	2·52	2·85
Miscellaneous goods	2·36	2.29	2·23	2·16
Travel and holidays	2·92	4·32	5·71	7·10
Entertainment	1·22	2·27	3·32	4·37
Education and medical expenses	0·94	2·82	4·70	6·57
Social security	2·79	3·34	3·89	4·44
Personal services	5·06	4·45	3·84	3·22
Miscellaneous expenses	3·33	2·85	2·37	1·89
All expenditure except food, fuel, etc., housing	42·24	45·30	48·36	51·40

A similar result is obtained when comparing households with the same number of adults but different numbers of children, as long as they have the same expenditure per head on all goods and services. If, on the other hand, they have the same total expenditure, then the effect of a reduced income per head in the larger households operates in addition to the family composition effect. A comparison of this kind is made in Table 11.

Thus it appears that with the same household income, the addition of children to the family generally implies a higher expenditure on entertainment, education and medical services, and on social security, but a lower outlay on drink and tobacco, household durables, travel and holidays, personal services, and on miscellaneous goods and services. The amount spent on clothing remains practically the same.

TABLE 11: EXPENDITURE ON SUNDRY GROUPS FOR DIFFERENT HOUSEHOLD TYPES WITH TOTAL OUTLAY AT AVERAGE LEVEL (£10 12s. 6d.)

Commodity group	% of total expenditure for households of		
	2 adults only	2 adults 2 children	2 adults 4 children
Clothing	12·29	12·18	11·63
Drink and tobacco	9·43	7·62	7·53
Household durables	3·14	2·53	2·01
Miscellaneous goods	2·61	2·23	2·04
Travel and holidays	6·18	5·72	4·75
Entertainment	1·69	3·32	3·75
Education, medical expenses	2·08	4·70	5·29
Social security	3·04	3·89	4·11
Personal services	6·09	3·84	2·84
Miscellaneous expenses	3·66	2·37	1·86
All expenditure except food, fuel etc., housing	50·21	48·40	45·81

6. SOCIAL CLASS DIFFERENCES IN EXPENDITURE PATTERNS

The extent to which the various social classes are represented in the lower and in the upper income groups are, naturally enough, different. It follows that the results obtained for income elasticities represent partly the effect of social class differences in purchasing habits, partly the effect of variations in income in given social groups.

An attempt has been made to isolate the two phenomena, as far as the distribution of total expenditure over fourteen commodity groups is concerned. Only two social classes, white-collar workers (middle-class) and wage-earners (working-class) are distinguished, and households the head of which was retired or engages in agriculture were omitted. For both social classes, average expenditure patterns in four income per head groups are available, as shown in Table 12.

The data cannot be properly analysed as they stand since there are wide variations in household size and composition between the expenditure groups, and also some differences between household characteristics for white-collar workers and wage-earners in the same income group. The effect of household size and proportion of children on the expenditure has therefore been eliminated on the basis of results obtained in the previous parts of the study. The influence of total outlay per head on the expenditure distribution was then estimated by separate simple regressions for middle-class and working-class households. This procedure yielded expenditure functions of the type

$$w_1 = a_1 + b_1 \log Y + c' \log N + c'' P + u_1$$
$$w_2 = a_2 + b_2 \log Y + c' \log N + c'' P + u_2$$

Here, w_1 and w_2 represent middle-class and working-

TABLE 12: EXPENDITURE PATTERNS IN FOUR INCOME GROUPS, MIDDLE-CLASS (M) AND WORKING-CLASS (W) HOUSEHOLDS

	Code	Income per head group			
		1	2	3	4
Total expenditure per head (s.)	M	32/6	46/-	72/6	113/6
	W	23/-	40/-	59/6	95/6
Average number of persons	M	5·79	4·93	4·28	3·37
	W	6·09	4·90	3·75	3·01
Average number of children	M	2·94	1·98	1·30	0·52
	W	3·28	1·73	0·65	0·17
% of total expenditure :					
Food	M	42·68	39·07	32·17	27·86
	W	51·04	42·65	37·76	30·59
Fuel, etc.	M	9·28	7·36	7·40	6·44
	W	9·88	8·27	7·92	6·19
Housing	M	6·67	6·79	6·98	7·99
	W	6·07	5·43	6·16	6·50
Clothing	M	12·27	13·27	15·17	14·25
	W	7·43	11·03	12·55	14·50
Drink and tobacco	M	8·69	8·47	7·87	7·26
	W	11·13	11·84	12·58	11·24
Household durables	M	1·80	2·07	3·77	3·42
	W	0·60	1·35	1·95	4·30
Miscellaneous goods	M	2·24	2·44	2·30	2·95
	W	1·65	2·08	2·25	2·27
Travel and holidays	M	1·79	3·11	6·22	9·78
	W	1·52	2·65	4·21	6·71
Entertainment	M	1·55	2·01	2·22	2·54
	W	1·83	2·84	3·20	3·19
Education	M	2·69	2·38	2·04	2·35
	W	0·36	0·64	0·44	1·44
Medical expenses	M	1·71	2·28	2·35	2·03
	W	0·77	1·08	1·09	1·27
Social security	M	2·70	3·79	4·30	3·37
	W	3·20	3·64	4·16	4·56
Personal services	M	3·21	4·04	4·29	5·87
	W	2·66	4·33	3·28	4·22
Miscellaneous expenses	M	2·72	2·92	2·92	3·89
	W	1·86	2·17	2·45	3·02

class household expenditure proportion, Y total expenditure per head, N number of persons, P proportion of children, u_1 and u_2 residuals. The constants c', c'' which are assumed to be the same for both classes were inserted, and the constants a_1, b_1, a_2, b_2 estimated. The results for the co-efficients are given in the appendix.

Of greatest interest here are the expenditure proportions and elasticities derived for the two social classes with the same average income level, household size and composition. These are shown in Table 13.

The main differences in average expenditure patterns are the relatively high weights given to housing, education, medical expenses and miscellaneous expenditure in the middle-class households, and the relatively high weights given to drink and tobacco and to entertainment in the working-class households. As far as the ordinary significance tests are applicable, they tend to show that these differences are statistically significant.

The differences between elasticities for corresponding expenditure groups in the two social classes are on the whole small and of doubtful statistical significance. An exception is provided by expenditure on education; in this field of expenditure, the relatively low average expenditure observed for the working-class households is accompanied by a relatively high expenditure

elasticity; that is to say, the amount spent, though on the average lower, varies relatively more with income than is the case with middle-class households. There is some indication that the same applies to clothing and the converse to food and to travel and holidays, though this is less firmly established.

TABLE 13 : AVERAGE EXPENDITURE PROPORTIONS AND ELASTICITIES, MIDDLE-CLASS AND WORKING-CLASS HOUSEHOLDS

Commodity group	Expenditure proportion		Expenditure elasticity	
	Middle-class	Working-class	Middle-class	Working-class
	%	%		
Food	37·47	38·16	0·59	0·52
Fuel, etc. ..	8·19	7·40	0·50	0·31
Housing	7·24	5·82	0·94	0·77
Clothing	13·14	12·37	1·30	1·61
Drink and tobacco	8·54	11·33	0·70	0·86
Household durables	2·50	2·43	1·83	2·29
Miscellaneous goods	2·42	2·12	1·23	1·26
Travel and holidays	4·15	4·60	3·00	2·30
Entertainment ..	1·72	3·18	2·20	1·83
Education ..	1·95	1·29	1·90	3·53
Medical expenses	2·03	1·13	1·21	1·52
Social security ..	3·31	4·19	1·42	1·49
Personal services	4·24	3·61	1·38	1·10
Miscellaneous expenses ..	3·10	2·37	1·17	1·16
All groups ..	100·00	100·00	1	1

7. SUMMARY

The goods and services consumed in the household may be classified according to the expenditure elasticity estimated from the 1951–52 household budget data. An elasticity below 1 indicates a less than proportionate, an elasticity above 1 a more than proportionate increase in consumption with higher total expenditure per head; or in other words, they indicate a relative decline or a relative increase of their share in the household budget with rising total outlay.

Elasticities below 1 are found for food as a whole and for the majority of foodstuffs, as well as for all fuel, light, etc., except electricity. Elasticities in the neighbourhood of 1 are obtained for some foodstuffs, the most important ones being biscuits, cakes, mutton and fish (other than tinned fish); for electricity, housing, children's clothing, drink and tobacco, and shoe repairs. Elasticities well above 1 are found for fruit (other than dried fruit), sweets, ice cream, etc., meals away from home, for most clothing articles, household durables, and for various services, particularly motoring, holidays and hotel expenses, and domestic service.

Large households use a smaller proportion of total expenditure on housing, fuel and other household operation than small households with the same total expenditure per head; conversely they spend relatively more on clothing and sundry goods and services.

Households with children under 14 spend relatively less, compared with households of the same expenditure per head but containing adults only, on bread, eggs, meat, bacon, potatoes, tea, sugar and other foods, as well as on drink and tobacco and personal services. On the other hand, they spend relatively more on fruit, sweets, ice cream, etc., on clothing, household durables, travel and holidays, entertainment, education and medical expenses, and social security.

Other things being equal, working-class households spend more than middle-class households on drink and tobacco and on entertainment, while middle-class households spend more on housing, education and medical services. Expenditure on education, however, is more sensitive to variation of total outlay in working-class than in middle-class households.

APPENDIX

FULL RESULTS OF REGRESSION ANALYSIS

All households :

$$w = \overline{w} + b(\log Y - \overline{\log Y}) + c(\log N - \overline{\log N}) + u$$
$$= a + b\log Y + c\log N + u$$

$$\overline{\log Y} = 0.9748$$
$$\overline{\log N} = 1.3886$$

	$\overline{w}$	a	b	s_b	c	s_c	R^2
Batch and fancy bread	·02996	·06514	−·03156	·00202	−·00318	·00184	·949
Other bread	·00302	·00510	−·00030	·00027	−·00129	·00025	·677
Flour	·00586	·01035	−·00347	·00039	−·00080	·00036	·860
Biscuits	·00509	·00498	+·00095	·00039	−·00059	·00035	·446
Cakes and buns	·00735	·00616	+·00106	·00057	+·00011	·00052	·208
Fresh milk	·03991	·06738	−·02457	·00098	−·00253	·00089	·980
Cream, etc.	·00174	·00278	−·00007	·00025	−·00070	·00023	·416
Butter	·03984	·07428	−·03217	·00121	−·00222	·00110	·982
Margarine	·00294	·00364	−·00090	·00023	+·00013	·00021	·566
Cooking fats	·00203	·00378	−·00155	·00012	−·00017	·00011	·924
Cheese	·00227	·00347	−·00083	·00013	−·00028	·00012	·768
Eggs	·02580	·03550	−·00687	·00077	−·00216	·00070	·863
Beef and veal	·03773	·05646	−·01634	·00120	−·00202	·00109	·934
Mutton	·01553	·01879	+·00216	·00077	−·00386	·00070	·775
Pork	·00307	·00255	+·00075	·00039	−·00015	·00036	·241
Bacon and ham	·02869	·05029	−·01173	·00129	−·00732	·00117	·890
Sausages	·00986	·01569	−·00528	·00054	−·00049	·00049	·879
Other meat	·00839	·00662	+·00088	·00065	+·00066	·00059	·170
Fresh, dried and cured fish	·00721	·00853	−·00061	·00034	−·00052	·00031	·283
Tinned fish	·00104	·00048	+·00050	·00009	+·00003	·00008	·694
Potatoes	·01819	·03725	−·01542	·00087	−·00290	·00079	·961
Cabbage	·00416	·00811	−·00277	·00010	−·00090	·00009	·983
Tomatoes	·00402	·00335	+·00010	·00022	+·00041	·00020	·237
Other vegetables	·01005	·01292	−·00182	·00055	−·00079	·00050	·481
Fresh fruit	·00616	·00098	+·00341	·00035	+·00134	·00032	·889
Tinned fruit	·00104	−·00035	+·00114	·00012	+·00020	·00011	·883
Dried fruit	·00218	·00140	+·00023	·00018	+·00040	·00016	·347
Tea	·01014	·02165	−·00760	·00037	−·00295	·00034	·972
Coffee and cocoa	·00106	·00113	+·00027	·00011	−·00024	·00010	·533
Sugar	·00915	·01733	−·00654	·00028	−·00130	·00026	·976
Jam and marmalade	·00652	·00990	−·00288	·00025	−·00041	·00023	·910
Oats and breakfast cereals	·00293	·00326	−·00109	·00017	+·00053	·00015	·830
Rice, sago, etc.	·00293	·00488	−·00150	·00020	−·00035	·00018	·813
Jellies, custard and blancmange	·00238	·00280	−·00064	·00021	+·00015	·00019	·457
Salt, pepper, mustard and sauce	·00221	·00383	−·00071	·00014	−·00067	·00013	·778
Sweets, choc., ice cream and soft drinks	·00632	·00192	+·00236	·00029	+·00151	·00027	·865
Meals away from home	·00351	·00287	+·00254	·00083	−·00132	·00075	·449
Other food	·01685	−·00418	+·01193	·00135	+·00677	·00122	·880
All food	·38713	·57102	−·14894	·00532	−·02787	·00484	·984
Gas	·01576	·03067	−·00823	·00076	−·00496	·00069	·918
Electricity	·01247	·01576	+·00051	·00045	−·00273	·00041	·796
Coal, coke, etc.	·03310	·07268	−·01344	·00174	−·01907	·00158	·933
Other fuel	·01767	·06528	−·01877	·00473	−·02111	·00430	·739
Household soap	·00697	·01424	−·00419	·00023	−·00229	·00021	·967
Other household non-durables	·00452	·00756	−·00168	·00014	−·00101	·00013	·929
All fuel, etc.	·09049	·20619	−·04580	·00600	−·05117	·00545	·907
Housing	·06935	·12109	−·00460	·00196	−·03403	·00178	·966
Men's :							
overcoats, waterproofs	·00644	−·00069	+·00499	·00164	+·00163	·00149	·425
suits, sports-coats, and trousers	·01597	−·00379	+·01265	·00244	+·00535	·00222	·707
shirts	·00558	·00140	+·00278	·00048	+·00106	·00044	·734
footwear	·01057	·00385	+·00375	·00139	+·00221	·00127	·410
other clothing	·00866	·00004	+·00367	·00073	+·00363	·00066	·786
Women's :							
overcoats, waterproofs	·00594	−·00292	+·00694	·00124	+·00151	·00113	·708
costumes, suits and skirts	·00253	−·00051	+·00278	·00103	+·00024	·00094	·360
cardigans, jumpers	·00209	·00073	+·00188	·00035	−·00034	·00031	·721
dresses	·00287	·00005	+·00275	·00058	+·00010	·00053	·636
stockings	·00528	·00462	+·00173	·00052	−·00074	·00047	·546
footwear	·00936	·00644	+·00459	·00082	−·00112	·00075	·740
other clothing	·01198	·00691	+·00710	·00172	+·00133	·00156	·599
Boys' clothing	·01101	−·00182	−·00238	·00146	+·01091	·00133	·854
Girls' clothing	·01009	−·00664	+·00202	·00159	+·01063	·00145	·806
Miscellaneous clothing	·00387	·00278	−·00031	·00065	+·00100	·00059	·212
All clothing	·11224	·01045	+·05494	·00500	+·03474	·00454	·923
Drink and tobacco	·09559	·10938	−·01275	·00721	−·00098	·00656	·195

	$\bar{w}$	a	b	s_b	c	s_c	R^2
Furniture, floor coverings, curtains ..	·00828	−·00400	+·01035	·00152	+·00158	·00138	·782
Electric goods and appliances ..	·00372	−·00558	+·00464	·00175	+·00344	·00159	·439
Hardware, china, glass, etc.	·00333	·00036	+·00209	·00046	+·00067	·00042	·625
Other household durables	·00666	·00037	+·00490	·00123	+·00109	·00111	·553
All household durables	·02199	−·00885	+·02198	·00291	+·00678	·00264	·820
Personal care	·00583	·00175	+·00228	·00041	+·00134	·00037	·747
Newspapers, magazines, books	·01250	·00890	+·00251	·00050	+·00083	·00046	·667
Other miscellaneous goods	·00461	·00030	+·00272	·00027	+·00119	·00025	·611
All miscellaneous goods	·02294	·01095	+·00751	·00126	+·00336	·00114	·753
Motoring	·01488	−·01846	+·02725	·00413	+·00488	·00376	·770
Bus fares	·01011	·00078	+·00490	·00111	+·00328	·00101	·668
Train fares	·00354	−·00176	+·00208	·00042	+·00236	·00038	·806
Other travelling	·00436	−·00092	+·00295	·00169	+·00173	·00154	·224
Holidays and hotel expenses	·01021	−·01743	+·01707	·00306	+·00792	·00278	·729
All travel and holidays ..	·04310	−·03779	+·05425	·00510	+·02017	·00464	·902
Cinema and theatre	·01484	·00034	+·00452	·00134	+·00727	·00122	·761
Dancing	·00375	−·00358	+·00222	·00069	+·00372	·00063	·756
Other entertainment	·00407	−·00317	+·00385	·00014	+·00251	·00013	·888
All entertainment	·02266	−·00641	+·01059	·00165	+·01350	·00150	·891
Education	·01391	−·02758	+·01595	·00513	+·01868	·00466	·631
Medical expenses	·01418	·00431	+·00538	·00187	+·00333	·00173	·440
Social security	·03334	·00924	+·00935	·00247	+·01079	·00225	·713
Hairdressing	·00568	·00075	+·00236	·00047	+·00189	·00043	·749
Shoe repairs	·01315	·01177	−·00156	·00117	+·00209	·00107	·337
Laundry, dyeing, and dry cleaning ..	·00974	·00026	+·00688	·00055	+·00200	·00050	·926
Domestic service	·00674	−·01014	+·01108	·00189	+·00438	·00171	·741
Other services	·00924	·01705	+·00371	·00852	−·00823	·00775	·104
All personal services ..	·04455	·01969	+·02247	·00903	+·00213	·00820	·324
Postage and telephone	·00494	·00164	+·00320	·00056	+·00013	·00051	·719
Subscriptions, charity, etc. ..	·00979	·00248	+·00714	·00102	+·00025	·00092	·794
Other expenditure	·01380	·01419	−·00067	·00137	+·00019	·00125	·022
All miscellaneous expenditure ..	·02853	·01831	+·00967	·00193	+·00057	·00176	·660
Total expenditure	1·00000	1·00000	—		—		

Middle-class and working-class households:

$$w_i = a_i + b_i \log Y + c' \log N + c'' P + u_i \quad (i=1, 2)$$
$$w_i' = w_i - c' \log N - c'' P$$

$$R_i'^2 = 1 - \Sigma u_i^2 / \Sigma (w_i' - \bar{w}_i')^2$$
$$R_i^2 = 1 - \Sigma u_i^2 / \Sigma (w_i - \bar{w}_i)^2$$

	c'	c''	Middle-class				Working-class			
			a_1	b_1	$R_1'^2$	R_1^2	a_2	b_2	$R_2'^2$	R_2^2
Food	—	−·12217	·56452	−·15518	·997	·995	·60069	−·18508	·999	·999
Fuel etc.	−·05117	—	·19765	−·04096	·937	·764	·19933	−·05072	·996	·985
Housing	−·03403	—	·12695	−·00429	·593	·896	·12154	−·01332	·882	·568
Clothing	+·02618	+·03753	·04248	+·03937	·914	·721	−·00067	+·07554	·992	·982
Drink and tobacco ..	+·01656	−·07684	·11007	−·02580	·992	·963	·12841	−·01610	·783	·411
Household durables ..	+·00381	+·01300	−·00495	+·02068	·859	·780	−·01610	+·03145	·930	·895
Miscellaneous goods ..	+·00397	−·00269	·01359	+·00568	·707	·618	·01081	+·00550	·918	·881
Travel and Holidays ..	+·00746	+·05567	−·06797	+·08294	·987	·979	−·04081	+·05973	·986	·963
Entertainment ..	+·00392	+·04197	−·02179	+·02060	·989	·921	−·01278	+·02632	·957	·729
Education	+·00241	+·07131	−·02338	+·01752	·919	−·144	−·04480	+·03271	·994	·911
Medical Expenses ..	+·00246	+·00384	·01124	+·00430	·448	·188	·00073	+·00590	·982	·946
Social security ..	+·00577	+·02201	·00408	+·01392	·631	·262	·00653	+·02044	·992	·967
Personal services ..	+·00772	−·02446	·02292	+·01600	·892	·925	·02855	+·00378	·116	·376
Miscellaneous expenses	+·00494	−·01917	·02459	+·00522	·565	·774	·01857	+·00385	·773	·935
Total expenditure ..	—	—	1·00000	—			1·00000	—		

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