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Part VII

Equivalent Levels of Living: Farm and City

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MEASURING DIFFERENCES in the cost of living on farms and in cities is a recurrent problem. Indexes of retail price movements in rural and urban areas are not suitable for comparing living costs in different places, nor is the 'parity ratio', which compares prices received by the farmer for the products he sells with those he pays for the products he buys. Nathan Koffsky compared the 'purchasing power' of farm and urban families in 1946,[1] and there have been attempts to estimate the cost of a single set of items in farm and nonfarm areas. These approaches have not solved the problem.

Parallel studies for farm and urban families at certain income levels have yielded data on quantity purchases and expenditures. But the different nonmoney incomes the two groups receive and the differences in their family situations have made it difficult to know at what points to equate the two income distributions for comparisons of family expenditures and levels of living. It is increasingly apparent that a real answer can come only by recognizing that farm and city families use different kinds of goods and services, and that a comparison can best be made in terms of two sets of items or budgets which, though different in content, are equivalent in satisfaction.

Studies by the Bureau of Labor Statistics suggested the possibility of using the income elasticity of consumer purchases to investigate differences in the cost of living for farm and urban families.[2] A budget based on this method is composed of commodities and services purchased by families of a certain type at the point on the income scale where the elasticity of quantity purchases with respect to income is at a maximum; i.e., "the first position of satisfaction with the level of consumption in terms of prevailing standards. . . . As the level at which families find the quantity of goods and services purchased sufficient enough to shift the emphasis to higher-quality goods and services, to other types of goods and services, or to savings, it seemed to define a reasonable minimum standard in the judg-

[1] 'Farm and Urban Purchasing Power', *Studies in Income and Wealth, Volume Eleven;* see also discussion by M. G. Reid.

[2] L. S. Kellogg and D. S. Brady, 'The City Worker's Family Budget', *Monthly Labor Review 66* (1948), pp. 133-70 (reprinted as Serial No. R. 1909).

ment of the community."[2] If this interpretation is correct, the method should offer a means for determining equivalence in the income and living standard of different consumer groups in terms of minimum satisfaction for each.

Analysis of the income elasticities of specific goods would by no means resolve all the difficulties. Home grown food is still a major factor in the cost of living differential between farm and nonfarm families. The fact that the farm family characteristically gets its dwelling as a part of its business operations is another troublesome factor. Such income in kind and its effect on residual expenditures for family living need to be evaluated appropriately. Also, because of differences in the data on prices paid by farm and city families there will be difficulties in pricing the two sets of budget quantities for comparing costs. This method cannot, of course, overcome inadequacies or deficiencies in family expenditure data. But a study of income elasticity can yield a set of quantities for the farm family for many categories of consumption that can be priced and compared in terms of cost with a corresponding budget for the city family. It can indicate the categories of consumption that lend themselves to a comparison of urban-farm levels of living and those where the difference in the family situation make comparisons inappropriate.

The application of this method to comparisons of farm and city family expenditure patterns might logically yield one of two sets of budget quantities: first, a set representing a given 'standard' that would be identical for farm and city families but reached at different relative positions on the income scale, indicating that the difference between farm and urban spending is a matter of income rather than of taste. Such differences might be expected to disappear if farm incomes were to continue increasing faster than urban incomes, as they did from 1941 to 1947, so that a common American standard would emerge. The second set might represent a different 'standard' for each group. Differences in the content of the budgets might reflect differences in values or in special needs, such as the farm family's requirements for storing and processing food. They might tend to disappear as farm families engage in more off-farm work and come into contact with urban patterns, but merging of the two standards would be gradual and limited.

Experiments with ascertaining the maximum point of income elasticity for a farm family budget have pointed up several types of problem. Some are inherent in the method and some are peculiar to the farm situation. This report will take up in turn some general aspects and implications of the

[2] D. S. Brady, 'Use of Statistical Procedures in the Derivation of Family Budgets', *Social Service Review 23*, 141-57, June 1949.

method, its application to the determination of a clothing budget for a farm family and possible extension to the determination of food budgets as a first step toward developing a way of comparing farm and city family food expenditure.

The word 'budget' is used here to describe the items constituting a level of living that can be said to meet the minimum standard of satisfaction for the consumer group – in this case, farm families. This budget or minimum standard is useful for comparison with the equivalent one for another consumer group such as city families. It is not intended to be a recommendation of how families should allocate their expenditures or even as an indication of how they actually do allocate them.

A The Quantity-Income Elasticity Method

In analyzing family expenditnre studies over a long period Mrs. Brady found that in the progression from low to high positions on the income scale the primary emphasis in expanding consumption of a given category is on the *quantity* of goods and services purchased. Better *quality,* as reflected in prices, is not emphasized until a certain level of inventory has been reached. A quantity-income curve can be constructed for each category of consumption by averaging and summing for each income class the total number of articles purchased by families in that income class. In the case of clothing and some other items such as 'personal care', the summation is done separately for each family member, but in general the unit of observation is the family, not the individual. To make it possible to add average qnantities of dissimilar articles, e.g., men's suits and handkerchiefs, quantities are converted to dollars by a system of weights that express the relative importance of each article in the aggregate expenditure. The fixed set of prices chosen as weights may be arbitrary, but they must be internally consistent.

To isolate the income elasticity of quantity from that of price a constant set of price weights is applied in adding the quantities for each income class. If the set of prices chosen is one appropriate to an intermediate income level within the range of the survey data, the quantity-income curve (hereafter designated Qp_c) will be less steep with respect to the income axis than the more familiar income-expenditure curve. Qp_c for the lower part of the curve is greater than actual expenditures, while that for higher incomes is less than actual expenditures.

The Qp_c curve is of the familiar S shape, a form similar to a logistic in the log of y (Qp_c) and of X (income). The point of inflection on this curve is where the elasticity with respect to income is at a maximum. The coefficient of elasticity at various points along the curve is estimated directly

from the ratio of the difference between the logarithms of Qp_c for adjacent income classes and the difference between the logarithms of average income for adjacent income classes. The elasticity coefficients are then centered at the midpoint of the income class by a two-point moving average. Plotting the logarithms of the elasticity coefficients against the logarithms of income yields a curve with a determinate maximum. The curve is clearly symmetric and unimodal, and in many cases can readily be approximated by drawing two straight lines intersecting at the maximum or by a curve generally parabolic in shape. The average quantities purchased by families at the income corresponding to the maximum elasticity become the budget to be priced.

1 ASSUMPTIONS AND GENERAL IMPLICATIONS

The quantity-income elasticity method involves certain assumptions. The first is that increasing elasticity indicates increasing urgency of demand, and decreasing elasticity indicates decreasing urgency. As we implied above, the maximum is taken to be "the first position of satisfaction with the level of consumption in terms of prevailing standards". The second assumption narrows the analysis of elasticity to that of quantity with respect to income since quantity appears to be maximized before quality, as reflected in prices. The evidence from the BLS studies and the current analysis of food purchases bear out this assumption for urban families. The analysis so far of farm family clothing confirms the validity of this assumption for clothes purchased by the wife. For the husband the elasticity of price and that of quantity appear to reach a maximum at the same income, but while the quantity-income curve continues to climb, the price-income curve tapers off. (Data for children were too fragmentary to permit analysis of this relation.)

Another factor meriting consideration is that quantity may not continue to be an equally appropriate standard for all categories of expenditure, since the degree to which it has been attained by different population groups varies. The relative urgency for various goods together with the difference in lag between supply and demand combine to bring about differences in the rate at which various groups attain the desired minimum. For example, since food is relatively abundant in this country and incomes are relatively high the common diet in terms of both nutritionally desirable protective foods and generally preferred foods such as animal rather than vegetable sources of protein is well above that prevailing in most parts of the world. The food quantity-income curve is flat and the maximum elasticity relatively low on the income scale, i.e., larger incomes augment demand for certain foods and 'eating out', not for food in general.

Standards of consumption rise and fall with changes in income, living costs, and social position. May it not then be that when the primary, i.e., quantity, standard is met for a given category a higher standard will have to be substituted if the budget level is to express the standard in a given society at a given time under prevailing economic and social conditions?

To a certain degree the disparity in the rate of achievement of implicitly accepted goals for each category is indicated by the difference in the income level at which the various commodity standards determined for the budget are achieved. For example, the maximum elasticity for additional medical care and services in the City Worker's Family Budget was at a much higher income than the maximum for clothing or other areas of consumption. It is reflected also in the fact that the distribution of expenditures in the composite budget constructed by the quantity-elasticity method differs from that customary for families at the income level represented by the cost of the total budget.

The explanation lies partly in the procedure: the budget standard is fixed independently for each consumption group although there is competition for the consumer's dollar *among* as well as *within* groups. This competition poses a major problem also in pricing the budget at different periods. Perhaps it can be lessened by adjusting the budget – modifying the procedure so as to set the standard for more than one category at a time. After the interrelation of categories of consumption has been analyzed, it may be possible to determine for pairs of categories the analogue of an 'indifference curve' for pairs of individual commodities. Since it now seems likely that the method of ascertaining the additional relative urgency for goods as income rises can be applied to derive a budget for most consumption goods including food and housing[4] it should be possible to add the Qp_c curve for two or more categories and determine the standard simultaneously.

The difference between the standard obtained for the individual categories and that obtained by maximizing the elasticity for a group of two or more may be helpful in explaining the difference in the relative importance of various consumption goods to farm and urban families. Within either the farm or urban group it may be an important aid in explaining the degree to which the ultimate goal has had to be modified because of high prices, low income, etc., if the various parts of the country can be assumed to be moving at different rates toward a single evolving standard.

The use of income elasticity to derive the budget is important because family buying practices are the base. It would be helpful if mean purchases

[4] This method was used as a check on the housing standards adopted in the City Worker's Family Budget.

by income class, currently compiled in family expenditure studies, could be supplemented by information collected in special studies of replacement rates, or the age distribution of stocks on hand from which such rates could be derived. These would be especially useful for durable and semi-durable goods for which the customary schedule period, one year, does not coincide with the probable purchasing cycle.

2 TECHNICAL PROBLEMS

Many of the difficulties encountered in the work reported on here are doubtless due to the nature of the data and size of the sample. There are, nevertheless, certain technical problems that must be resolved in any application of the general method.

Even though restricting the analysis to relatively homogeneous family types reduces variability, the Qp_c curves for farm family clothing were often far from smooth. The basic statistical assumption of underlying continuity would permit 'smoothing', but a requirement peculiar to this method exercised an inhibiting influence. In ordinary curve fitting, whether by least squares approximations or by free hand smoothing, the aim is to minimize the squares of the distances between the observed points and the points on the curve chosen for 'fit'. If the 'fitted curve' in the main passes through the observations it will not be rejected simply because an observation or two is obviously out of line. But in using income elasticity to determine the point at which the standard is met, interest is primarily in locating the point of inflection where elasticity, describing urgency for more goods as more income is available, is at its maximum. The Qp_c curve for clothing purchases by income class was sometimes irregular in the area where elasticity seemed highest. Any smoothing at that point could materially influence the budget level selected.

The data should be sufficient to permit classification by narrow income classes: there should be at least 8 or 10 intervals within the effective income range. The assumption that arc elasticity (the elasticity coefficient between adjacent income classes computed as described) represents with reasonable accuracy the elasticity at a given income point is obviously more tenable the smaller the arc. Moreover, the computation increases the error to which the first and last income classes are known to be subject. If the maximum is to be found by fitting straight lines to the elasticities for the lower and upper parts of the income range, fewer than 8 income classes mean that one or both lines have to be determined from fewer than 3 reasonably significant points.

In the experimental work with farm family clothing and urban food consumption the point of maximum elasticity was sometimes found by

fitting straight lines to the coefficients. It could often be better approximated by drawing a curve whose characteristic equation might be that of a parabola in log X and log Y. Even when the intersecting straight lines are useful, the true function may be that of a parabola in log Y and log X. Occasionally the curve tapered at the ends, appearing more bell shaped. No definite conclusions can be based on the few cases studied. If the quantity-income elasticity relationship could be described as a simple second degree function within the effective income range the error about the maximum elasticity and a confidence interval about the income point selected could be fixed. This is, of course, an alternative to a suitable, readily derived function describing the original Qp_c curve from which the inflection point could be determined directly by differentiation – eliminating the need for computing and plotting elasticity coefficients for each income class in order to determine the maximum by inspection.

The problem of negative elasticities arose in working with the food data because quantities purchased decreased slightly in the upper income range. The decrease can probably be eliminated in part by more rigid classification by family size and an amended procedure for handling meals away from home. However, for some categories of consumption the upper income families may buy a smaller quantity than families with slightly lower incomes. To the degree that the decrease is due to the substitution of other goods the negative elasticity could be removed by proper grouping of consumption categories. This would require more knowledge than we now have about the interrelation of expenditures for the different categories of family living. Until a satisfactory basis for this type of adjustment is found, negative elasticities make the determination of the point of maximum elasticity difficult. Although consumption decreases only at upper income levels, there may not be enough income classes below them to determine the shape of the elasticity-income curve. As a makeshift when negative values rendered it necessary, the Qp_c income function was transformed by adding a constant to all points sufficient to make all values positive. This should leave the maximum ordinate at the same income position but may alter the shape of the curve sufficiently to make this income position more difficult to locate.

B Farm Family Clothing Budget

1 Cases selected for study

Because it was relatively simple to group the data and define categories, clothing was the first area of consumption chosen for the farm family budget. After food clothes claim the largest proportion of the farm family

budget at all income levels;[5] consequently, the clothing budget forms a major part of the farm family's cost of living at the level equivalent to that determined for the city worker's family: "The level of adequate living required to satisfy prevailing standards of what is necessary for health, efficiency, the nurture of children, and for participation in community activities."[6]

The most recent income-expenditure data for a national sample of farm families from which to derive a farm family budget are for the group of farm operator families included in the 1941 Survey, which furnished also the basic data for many of the statistical analyses from which the urban family budget was derived, particularly for clothing.[7]

For comparison with urban data the budget should comprise the goods and services required for a family of four (husband, wife, son aged 13, and daughter aged 8) but schedules were too few for an analysis of these families alone to be fruitful. Consequently, all families consisting of husband and wife under 60 years of age, 1-4 children under 16, and no others were used as 'budget-type families'. Of the 762 farm schedules collected in the 1941 Survey, only 170 met the family type requirement: 76 in the South and 94 in the rest of the country. They averaged about 4 persons; the southern families included 20 percent with only 3 persons and 12 percent with 6, while the others included 37 percent with 3 persons and 5 percent with 6. For some analyses, especially for the development of a budget for children of certain ages, it was necessary to widen the definition to take in families with 1-4 children up to but not 18 years old. This added 30 families, yielding a sample of 200.[8] From Table 1 it is apparent that the character and size of the budget-type sample render the findings reported here illustrative rather than definitive.

2 INCOME USED FOR CLASSIFICATION

Since the study of Qp_c income elasticity is essentially an analysis of the variation in the quantity of items purchased as incomes vary, the classification of families by income is crucial. For a farm family there are many

[5] For urban families, housing claims the largest share of the consumer dollar after food costs are met.

[6] *Monthly Labor Review 66*, p. 4.

[7] See Department of Agriculture, *Miscellaneous Publication 520*, 'Rural Family Spending and Saving in Wartime', June 1943, and Bureau of Labor Statistics, *Bulletin 822*, 'Family Spending and Saving in Wartime' (1945), for a description of method and findings.

[8] The BLS used approximately 320 family schedules for the corresponding urban study for the clothing analysis.

Table 1

Farm Families Selected for Budget Analysis from Study of Rural Spending and Saving in Wartime, 1941

NET MONEY INCOME CLASS	TOTAL NATIONAL SAMPLE OF FAMILIES OF 2 OR MORE					BUDGET-TYPE FAMILIES SELECTED FOR ANALYSIS[a]				
	Number	%	Average Size	Family Expenditure *Total*[b]	*Clothing*	Number	%	Average Size	Family Expenditure *Total*[b]	*Clothing*
Negative	•	•	•	•	•	3	2	3.7	$965	$168
$0- 249	104	14	3.9	$329	$58	25	15	4.3	404	86
250- 499	135	18	4.0	465	83	27	16	4.1	453	94
500- 749	102	14	4.1	641	112	27	16	4.3	669	118
750- 999	85	12	4.2	841	128	16	9	4.1	800	131
1,000-1,499	110	15	4.7	977	152	28	16	4.0	925	150
1,500-1,999	79	11	4.4	1,266	180	16	9	4.1	1,037	151
2,000-2,999	64	9	3.6	1,648	234	19	11	3.9	1,753	228
3,000-4,999	28	4	4.5	1,974	308	6	4	3.8	1,416	208
5,000 & over[c]	. .	•	•	•	•	3	2	4.0	2,687	525
All classes[c]	733	100	4.15	886	139	170	100	4.1	873	143

[a] Families with husband and wife under 60 years of age, 1-4 children under 16, and no others.

[b] Includes expenditures for family living, gifts, welfare, and direct taxes.

[c] 'All classes' includes a few families with negative incomes and with annual incomes of $5,000 and over, not shown separately.

'incomes', each suitable for certain purposes. In a given year there is the gross cash income or total receipts from marketings, government payments, and other sources; the net cash income, obtained from the gross by deducting current operating expenses (exclusive of capital investment); and the income obtained from the net cash by allowing for the value of inventory change and for replacements, depreciation, or new investment in farm land, machinery, or buildings. The 'net money' income by which families were classified in the 1941 Survey, as in Table 1, was the net cash income adjusted for changes in inventory of crops and livestock and a fixed depreciation charge on the value of machinery and farm buildings. If nonmoney income in the form of food, fuel, and housing is considered, the farm family can be classified by still another concept of income.

Obviously these income definitions are not independent. Whatever the income concept the relative position of most families in the sample studied remains the same. But one definition may be preferable to another because it minimizes the scatter with respect to the major income-consumption band.

In expenditure studies the choice of the income adopted as a basis for classification has been influenced in large degree by the accounting concept of 'running a business', and in some degree by the desire to obtain data that would add to knowledge of national aggregates. For the purpose of this analysis it seems that some attempt should be made to formulate a 'personal economy' concept of income. In other words, classification on an accounting basis such as net money income may not be the best way of ascertaining the effect of income on the spending of individual families.

Exhaustive research on the appropriate income definition for studying consumption is beyond the scope of this report. Further, following the practice of the 1941 and other recent studies of family expenditure, families are classified only by money income. If the effect of nonmoney income on consumption is to be taken into account in farm-urban comparisons determination of the suitable method must await other analyses. Preliminary analyses of the money income data for the selected group of families from the 1941 Survey indicate clearly the necessity for further study of the income concept. Examination of the relationship of expenditures for total family living (including gifts, welfare, and direct taxes), family clothing, and the wife's clothing to gross income, net cash income, net cash income adjusted for inventory, and net cash income adjusted for inventory and depreciation of farm buildings and machinery, i.e., net money income as defined in the Spending and Saving Survey, indicates that unadjusted net cash income is a better classification for studying the

income elasticity of these selected families than net cash income adjusted for inventory change and depreciation.

The logarithmic graphs of these three expenditure-income relationships were somewhat smoother and steeper when the families were classified by net cash income. The gross cash income classification is perhaps next best. But since 'normal' operating expenses, inventory changes, and depreciation differ for different types of farming and consequently for different regions, more work must be done before data from different regions or types of farming can be compared directly, or added, on a gross cash income basis.

Classifying by net cash income as defined here, with no allowance for capital depreciation or investment, has the effect of putting investment into the category of savings in competition with other forms of saving and with family living for a share of income after current farm operating expenses have been met, and treating capital depreciation as if families were not aware of it in allocating their funds (see Part VI).

3 REGIONAL DIFFERENCES

In constructing a budget for the farm family differences between regions have to be considered. In 1940 more than half the farm households in the country were concentrated in the South where farm incomes are lower than in other areas (see Part III). When all farm families are grouped together the change from left to right along the income scale parallels the shift from the southern part of the country to the North (used loosely to cover all areas other than the South). Since the general income in the community influences the spending pattern of the individual family, the 'maximum' elasticity of quantity with respect to income of all farm families grouped together may in part reflect the shift from the income-expenditure curve of the South to that of the North.

The cases of the specified budget-family type were too few in the 1941 sample to be analyzed separately by region. However, and this is obviously not susceptible to generalization, their analysis suggests that some of the so-called 'regional differences' in family expenditures by income may disappear when the families compared are relatively homogeneous in size and type and an appropriate income definition is used. The 'South' and 'North' families in the budget sample differ less than might be expected with respect to total family expenditures, expenditures for family clothing, and for the wife's clothing. Some family living items do not vary at all.

Although it was impossible to derive a clothing budget for the South separately from that for other regions, the tabulations throughout were

made separately for the South and the North in order that the income class in which the budget level would fall would not be so high as to cause the southern part of the sample to disappear.

Five families with negative incomes were omitted from further study because the logarithmic differential analysis could not be applied to them directly. Their expenditures are frequently out of line with their position on the income curve because their 'negative' position in a given year reflects in part the inappropriateness of the arbitrary income definition and schedule period rather than a continuing unfavorable economic situation. Northern families with incomes of $5,000 or more and the one family in the South with an income over $3,000 were omitted because the few cases were deemed insufficient to represent adequately so broad a range of income.

4 PRICE WEIGHTS

The set of constant price weights, P_c, applied to the purchases in each income class for summation into the Qp_c curve represented the average prices paid for individual articles at the median income class for all families included in the 1941 Survey, $750-1,000 net money income. For some items that were purchased too seldom at this income level to yield a reliable average price, averages from a higher income class were used.

Because it was felt that the level of prices chosen as weights might in itself affect the position of the point of maximum elasticity, a second set of computations for both the husband's and wife's clothing purchases was weighted by a set of lower prices – the lowest prices for the article listed in a commercial mail order catalogue for 1941. The resulting Qp_c curves were uniformly below, but parallel to, those constructed from the prices paid by median income families.

5 GROUPING ITEMS

The original Qp_c computations for each family member were made directly from the family schedules; few items were combined. A recomputation, using, as the BLS had done, about 21 broad groups for the women and 21 for the men, instead of laboriously weighting and adding 81 and 71 items respectively, gave substantially the same result. The broad groups materially reduced the number of computations and helped smooth the sampling variability in individual items. The results for the boys and girls were less satisfactory when broad groups were used but a broad grouping of items more suitable to the particular age groups (11-15 years for the boys and 6-10 for the girls) could probably be found.

6 QUANTITY ELASTICITY

Each family schedule in the group selected for the experimental study provided data on clothing purchases for both husband and wife. However, there were data for only 66 girls in the appropriate age group, 6-10 years, selected to yield clothing quantities for a girl of 8, and for only 56 boys in the age group 11-15 years, considered suitable for the clothing budget of a 13 year old boy. The figures derived from these few observations (Table 2) cannot be regarded as more than suggestive until verified by computations based on more satisfactory samples.

Table 2

Income Elasticity of Clothing Expenditures, Quantity and Price for Clothing Purchased by Members of Budget-Type Farm Families, 1941

Net Cash Income Class	Quantity, Qp_c[a]				Expenditure		Price Pq_c[b]	
	Husband	*Wife*	*Girl*	*Boy*	*Husband*	*Wife*	*Husband*	*Wife*
$0- 499	0.021	0.091	0.040	0.104	0.094	0.192	0.012	0.026
500- 999	0.222	0.222	0.248	0.198	0.421	0.368	0.161	0.117
1,000-1,499	0.549	0.347	0.259	0.324	0.828	0.653	0.450	0.321
1,500-1,999	0.512	0.325	0.093		0.782	0.783	0.322	0.520
2,000-2,999	0.358	0.166	0.063	0.478	0.550	0.796	0.086	0.532
3,000-4,999	0.194	0.084		0.373	0.403	0.734	0.098	0.363

[a] Sum of quantities purchased, Q, weighted by a set of fixed prices, P_c, per article paid by families at the median income class in 1941.

[b] Sum of prices, P, paid per article weighted by a set of fixed quantities, Q_c, of articles purchased by families at the median income class in 1941.

Data for the boys were especially fragmentary and unstable. Maximum elasticity occurred at $1,400 for the husband and about the same for the wife[9] – an income well above the point of zero savings, or break-even point, of $640 for the group of families studied; indeed above the income of about 70 percent of the families in the group. This is of particular interest since account was not taken of the value of home-produced food or other nonmoney income. Home-produced food would have added about $300 to the family income. At the clothing budget income point the

[9] The original sample, 170 cases with 1-4 children under 16, showed maximum elasticity at $1,600 for the wife. The addition of 30 cases with children up to but not 18 years old lowered the income at which the maximum occurred to $1,400. This difference is not considered significant in view of the limitations of the data and the approximations used in locating the maximum position.

average expenditure for food was $270. The clothing expenditure for the husband and wife was about $53 each and about $165 for the whole family. There was a surplus of about $400 for investment in the farm business and other saving.

It is of some interest to compare this income point of maximum elasticity with that obtained from the urban family data for the same year. The urban husband did not obtain his minimum clothing standard until the family income was about $2,750, or at about the third quartile in the income distribution of the group, while the wife reached the minimum standard for her clothing at $2,230, just above the median income.

In the farm family either the clothing requirements of the daughter were easiest to satisfy or it was necessary to provide for her needs earliest. Maximum elasticity was at a family income of about $1,000; for the parents it was $1,400. The girl's clothing expenditure at that level in 1941 was about $22. The city girl attained the budget level in terms of maximum elasticity at about the same relative income as the city wife.

The maximum elasticity of the farm boy's clothing purchases was extremely difficult to determine. If there was a maximum it seemed to be at about $1,950, almost the top of the distribution for the families with boys of appropriate age. So high an income for the boy, compared to that for other family members, seemed unrealistic, especially compared to $1,840 for the city boy. Therefore, in deriving the budget the average quantities for all boys in the budget sample 11-15 were substituted for those at the 'budget-income' point.

The income-elasticity method was applied also to the quantities unweighted by price. The elasticity of the simple total of average quantities of all items purchased by each family member reached its maximum at the same income point for the boys and girls as the weighted Qp, but at a somewhat lower point, about $1,000, for the husbands and wives. There are apparently fewer 'style items' and narrower price differentials between garments of various types for children than for adults.

7 PRICE ELASTICITY

The income elasticity of price was computed by adding the average price paid per garment at each income class weighted by a fixed set of quantities purchased by families at the median income group in the 1941 Survey. Families report prices less accurately than quantities. For the wife the elasticity of quantity or Qp_c is maximized first, that of quality or Pq_c next, while that of the expenditure curve, a composite of the two, reaches a maximum somewhat higher on the income scale (Table 3).

For the husband there appeared to be little difference in the income at

which the quantity purchased reached a maximum elasticity compared to either price or expenditure; however, the quantity curve continued to climb even after maximum elasticity had been reached, while the price curve levelled off quickly.

Table 3

Expenditure, Quantity, and Price for Clothing Purchased by Members of Budget-Type Farm Families, 1941

Net Cash Income Class	Husband			Wife			Girl		Boy	
	Expenditure	Qp_c[a]	Pq_c[b]	*Expenditure*	Qp_c[a]	Pq_c[b]	*Expenditure*	Qp_c[a]	*Expenditure*	Qp_c[a]
$0- 499	$28	$33	$30	$24	$30	$27	$15	$19	$21	$19
500- 999	34	34	31	36	35	28	19	20	31	24
1,000-1,499	48	43	37	43	41	31	24	26	32	27
1,500-1,999	67	54	45	58	47	36	30	27	36	29
2,000-2,999	80	60	45	71	50	43	33	28	42	32
3,000-4,999	101	71	48	110	53	54	46	27	75	48

[a] Sum of quantities purchased, Q, weighted by a set of fixed prices, P_c, per article paid by families at the median income class in 1941.

[b] Sum of prices, P, paid per article weighted by a set of fixed quantities, Q_c, of articles purchased by families at the median income class in 1941.

8 FARM AND CITY CLOTHING BUDGETS

Quantities of various clothing items differed more for the farm and city husband than for the farm and city wife (Tables 4 and 5). Many of the differences are explainable on the basis of occupation and activity which differ more for the husband than for the wife. Farm men do more heavy outdoor work than city men. Among the city husbands there may have been some clerical workers who are less likely to need special work clothing than wage earners. For the women, whose main occupation both on the farm and in the city is housekeeping and child care, one would expect less difference in types of clothing required.

The chief differences in quantity between the city and farm wife's lists were in hats, blouses, shorts and other sport clothes, slips, and stockings, purchased in larger quantities by the city wife, and in aprons, rubbers, and overshoes, purchased in larger quantities by the farm wife, pointing up the longer hours she is likely to spend at household chores and outdoor work. The number of coats, suits, dresses, and other relatively expensive garments differed little.

The lists for the city husbands included more coats, suits, underclothing, nightwear, socks, and handkerchiefs. The lists for the farm men included more overalls, rubbers, overshoes, cotton gloves (probably work gloves),

Table 4

Urban and Farm Clothing Budgets, Husband and Boy (quantity per year)

	Husband		Boy	
	Farm	*Urban*	*Farm*	*Urban*
Hats	2.2	1.3	1.1	0.7
Coats	0.1	0.3	0.1	0.3
Sweaters and jackets	0.9	0.6	1.1	1.2
Suits	0.4	0.9	0.3	0.4
Trousers, slacks, overalls	4.1	1.8	4.0	2.6
Shirts	5.0	5.1	3.9	3.7
Sportswear	0.3	0.5	0.4	1.1
Underwear	5.0	7.5	5.1	6.0
Nightwear and bathrobes	0.2	0.9	0.3	0.7
Socks	10.8	13.5	7.3	10.5
Shoes	2.4	2.3	2.7	3.2
Rubbers, arctics	0.7	0.4	0.3	0.4
Accessories: gloves, handkerchiefs, etc.	12.9	15.0	5.2	6.3
Shoe repairs	3% of	1.7	4% of	2.0
Dry cleaning and pressing	total	9.0	total	0.0
Cleaning supplies	cost of	$0.25*	cost of	$0.15*
Miscellaneous accessories	clothing	3% of total	clothing	2% of total

*1947 dollar allocation.

Source for urban data: Monthly Labor Review 66, pp. 133-70.

straw hats, and fabric caps, reflecting in part that much of the farmer's work is outdoors.

The lists for the urban and farm family members are more notable for their similarities than for their differences. No basic differences in the standards of what constitutes minimum adequate annual clothing purchases are apparent. Most of such differences as do occur reflect differences in activity or occupation.

The lists seem reasonable in the light of what is known about farm and urban family living. Therefore, it may be concluded that the income-elasticity technique is not only an objective but also a valid way to measure cost differences of equivalent levels of living on the farm and in the city, at least for a category such as clothing where problems of definition and difficulties of differentiating between family living and the family business are at a minimum.

For other categories such as housing and food, where these difficulties are considerable, the technique may be less useful. But in the light of the exploratory work already done, it seems reasonable that even for these categories it will be useful in determining the differences in the items that make up the 'standard' and the income level at which it is attained. A way to compare the *cost* of the standard for each group will still remain a problem.

Table 5

Urban and Farm Clothing Budgets, Wife and Girl (quantity per year)

	Wife		Girl	
	Farm	*Urban*	*Farm*	*Urban*
Hats	1.4	2.0	1.1	1.2
Coats	0.5	0.5	0.7	1.2
Sweaters and jackets	0.4	0.4	1.0	0.8
Suits	0.1	0.1	0.1	0.0
Dresses	4.2	4.2	2.4	3.5
Skirts	0.2	0.2	0.2	0.5
Blouses	0.4	0.5	0.5	1.0
Housewear, sportswear	1.4	1.3	0.6	1.7
Underwear	7.2	7.4	6.3	8.6
Nightwear and robes	1.2	1.4	0.8	1.0
Hosiery	9.7	12.9	10.2	12.5
Shoes	2.8	3.0	2.8	3.7
Rubbers, arctics	0.5	0.2	0.6	0.5
Accessories: gloves, handkerchiefs, etc.	5.6	5.4	2.7	3.1
Yardgoods	6% of total cost of clothing	3.0	8% of total cost of clothing	3.0
Shoe repairs		3.0		1.5
Dry cleaning and pressing	5% of total cost of clothing	8.0	2% of total cost of clothing	
Cleaning supplies		$0.20*		$0.10*
Miscellaneous accessories		3% of total		2% of total

* 1947 dollar allocation.

Source for urban data: Monthly Labor Review 66, pp. 133-70.

C An Urban Food Budget

Since food takes the largest share of the family living dollar, whether the family is farm or urban, differences in food costs will be a major factor in the spread between estimates of the farm and urban family budget at any selected level of comparison.

The selection of a level of food consumption, whether for the purpose of comparing costs of equivalent welfare for urban and farm families or merely of measuring costs for each group separately, requires the conciliation of somewhat divergent values. Since a scientific standard for adequate nutrition exists in the National Research Council's recommended daily allowances for different sex-age activity groups, it seems desirable to require any set of food quantities selected for a budget to meet it on the average. On the other hand, the food portion of a budget that follows the methods used for other categories in the City Worker's Family Budget and for the corresponding budget now being developed for the farm family should logically depend more upon customs and habits than upon scientific knowledge. It is not a new discovery that the daily diet of Americans

does not follow scientific principles of nutritional economy. For example, though the level of food consumption in the spring of 1948 was relatively high, the average amount of milk and milk products (other than butter) consumed per person per week by urban housekeeping families was about one quart less than the weighted per capita average based on the suggested quantities in the current low cost family food plan of the Bureau of Human Nutrition and Home Economics. In fact, about two-thirds of the families consumed less per person on the average than the amount of milk equivalent stipulated in the plan per person per week.

In deriving the food portion of the City Worker's Family Budget the BLS departed from the income-elasticity technique. Using the most recent suitable data on food consumption patterns of urban families, the family food schedules collected in the Consumer Purchases Study, 1935-36, it "chose the food budget at that level on the nutrient scale which was closest to the standard [i.e., recommended dietary allowances of the National Research Council]. This selection was made simply by dividing the calorie-nutrient frequency surface into nine parts, approximately equal in number of families, and taking the shortest distance from the standard point on the lines connecting the averages of the segments of the frequency distribution. The resulting diet was below the standard in calcium about nine percent; it provided approximately the standard in calories; and it was above the standard, in some cases substantially, in the quantities of the other nutrients."[10]

In planning the farm family budget it was decided to experiment with an analysis of the income elasticity of food consumption. The preliminary work now reported is based on data gathered in spring 1948 from urban households, data chosen because urban food consumption is not complicated to any considerable degree by home-produced food – so important on the farm.

1 THE DATA AND THEIR LIMITATIONS

The results of the survey of food consumed by 1,558 urban housekeeping families of 2 or more during a week in the spring of 1948 have been published in a series of preliminary reports by the Bureau of Human Nutrition and Home Economics.[11] The distribution of the 1,411 families of known income in this study together with the household size, family size, and

[10] *Social Service Review*, 23, p. 154.

[11] See, for example, 1948 Food Consumption Surveys, Preliminary Report 5, 'Food Consumption of Urban Families in the U. S., Spring 1948' (May 1949); and Preliminary Report 12, 'Nutritive Value of Diets of Urban Families, United States, Spring 1948, and Comparison with Diets in 1942' (November 1949).

Table 6

Income, Family Size, and Food Expense, Urban Housekeeping Families of Two or More, One Week, Spring 1948

Income in 1947 (after federal income tax)	Number of Families	Average 1947 Income after Federal Tax	Expense for Food per Member during Week*				Family Size	
			Total	*At Home*	*Out*	*% of Food Exp. away from Home*	*Average No. of Persons*	*21 Meals: 1 Person*
Under $1,000	53	$610	$5.482	$4.932	$0.550	10.03	2.51	2.81
1,000-1,999	204	1,555	5.903	5.434	0.469	7.94	2.90	3.23
2,000-2,999	410	2,505	6.814	6.046	0.768	11.27	3.28	3.49
3,000-3,999	351	3,485	7.687	6.693	0.994	12.93	3.52	3.65
4,000-4,999	167	4,421	8.616	7.112	1.504	17.46	3.49	3.50
5,000-7,499	154	5,861	9.224	7.124	2.100	22.77	3.40	3.31
7,500 & over	72	11,766	11.539	8.526	3.013	26.11	3.82	3.84

Source: Bureau of Human Nutrition and Home Economics, 1948 Food Consumption Surveys, Preliminary Report 5, 'Food Consumption of Urban Families in the United States, Spring 1948', May 30, 1949.

* Expense per family member, excluding boarders, regardless of number of meals eaten at home; includes expense for alcoholic beverages.

food expenditure per family member are shown in Table 6. The data have two defects. First, although the larger families show the frequently observed concentration at upper income levels, most of the preliminary analysis was carried out on data for all family types. The crude correction, restricting the analysis to a per person in household basis (21 meals at home equal one person), does not allow for the so-called economy factor of the large family, but it was not considered a deterrent to a test of the method. Obviously, to make an actual budget for purposes of cost of living comparisons it would be necessary to restrict the analysis to data from families of a given size and composition.

A more serious defect is the lack of information on meals and other food 'eaten out'. At upper incomes an increasing proportion of food expenditure is incurred away from home. The trend is so marked that it undoubtedly is more than just an accentuation of the American between-meal coke, coffee, or other snack habit. It probably includes the substitution of lunch ordered from the corner drugstore or eaten in the company or school cafeteria for a lunch carried from home as well as family dinners in restaurants. Counting 21 meals at home as one person regardless of the proportion of breakfasts, lunches, or dinners included is, in effect, assigning equal cost, quantity, and quality weight to each meal. Although as yet no other procedure can be recommended, this assumption is obviously invalid. In urban families particularly, where the husband and even high school children are not at home for lunch, the evening meal is likely to be the main meal of the day. If a large proportion of 'dinners' or other expensive meals make up food-away-from-home expenditures at the higher incomes, as we suspect, we may be understating the quantity and cost of certain foods such as meat, and finding less urgency for more food the higher the income as measured by elasticity than is actually the case.

2 QUANTITY ELASTICITY

As with clothing, the assumption of the importance of quantity-income elasticity for food required the construction of a Qp_c income curve; that is, adding for each income class weekly quantities of food per person, weighted by a set of fixed prices, the average price paid per pound of the food or foods reported by all families in the study.[12] The elasticity coefficient for each income class was computed by dividing the differences between the logarithms of successive values of the variables.

Grouping items for the Qp_c total appeared more difficult than for cloth-

[12] The income class $7,500 and over was not used because the small number of cases and the very broad range of incomes render average quantities and elasticities suspect.

ing because the better qualities, as reflected in the price per pound, of food items purchased by high income families are likely to be sold as different items. The criterion of substitutability was hard to apply because in a sense so many foods are possible substitutes for one another. On the other hand, failure to group the items would yield, for practical purposes, nothing but the simple expenditure curve, confounding the elasticity of quantity with that of price.

Three arbitrary methods of grouping were tested. First, foods were classified into 16 broad groups, called for convenience 'menu groups'. Next, the 16 groups were divided into 55 subgroups. Finally, the foods were rearranged into 31 groups on the basis of what foods made reasonable purchase or market groups. In each case the average price per pound for the group was computed for all families in the study and this single set of prices used to weight the quantities of the group of foods purchased per person by families in each income class. The three Qp_c income curves for these classification systems were almost indistinguishable and the income-elasticity coefficients reached a maximum at an income of about $2,750.[18]

As an experiment the quantities per person, unweighted by price weights of any kind, were added for each income class and the elasticity coefficients computed. Maximum elasticity was again reached at about $2,750. If the same result is obtained in further tests the work of locating the budget point can be greatly simplified. These are obviously crude approximations. The foods are in total pounds, including bone, rind, and other waste in preparation and at the table, not in 'edible' pounds. There is, for the most part, no allowance for equivalence of purchases of prepared or precooked relative to uncooked food. But whether the considerable additional work required to make such an adjustment, in view of all the approximations and estimates used in the process, would be justified by the degree of additional precision achieved is questionable.

Less food was consumed per person at the upper income levels, confirming the findings of a 1942 study and observed when the current diets were analyzed for protein and calories. The negative elasticity at higher incomes causes technical difficulties in processing (see Sec. A 2). Preliminary examination of unpublished data from this urban study for fam-

[18] In the $2,000-2,999 income class the average nutritive value of diets per nutrition unit per day exceeded the allowances recommended by the National Research Council for calories and 7 other nutrients, and just equalled the recommended allowance for calcium. However, 44 percent of the families failed to meet the recommended allowance for calcium, 25 percent for calories, and between 10 and 14 percent for the other 7 nutrients.

ilies classified by household size (21 meal units) indicates that the decrease in quantities is due in part to the larger average household at upper income levels. When families are classified by number of persons, i.e., 21 meal units, as well as by income, larger families tend to purchase fewer pounds per person, especially of leafy green and yellow vegetables, other fruits and vegetables, milk and milk products other than butter, and meat, poultry, and fish, than smaller families at the same income level. Factors in addition to family size may explain this difference. Furthermore, it is likely that if the families were classified on a more rigorous composition basis than household size, and meals away from home were accounted for in a more realistic way, the negative elasticities of the total quantity of food would be less of a problem.

3 PRICE ELASTICITY

As a check on the Qp_c curve, a Pq_c curve was constructed with the price paid per pound of food (grouped into the 16 menu groups) as the variable with income and the average quantity purchases of all families in the study as the fixed set of weights. The elasticity of price rises with income to a much higher point on the income scale than that of quantity, although in both cases it changes little (Table 7). The elasticity of expenditures for food at home reached a maximum at $3,100 income; for quantity alone it was $2,750, and for price alone about $4,500.

Table 7

Income Elasticity of Expenditures, Quantity, and Price for Food at Home per Person, Urban Housekeeping Families of Two or More, One Week, Spring 1948

INCOME IN 1947 (AFTER FEDERAL INCOME TAX)	INCOME ELASTICITY			
	Expenditure[a]	Q[b]	Qp_c[c]	Pq_c[d]
Under $1,000	0.049	0.026	0.025	0.012
1,000-1,999	0.150	0.065	0.035	0.049
2,000-2,999	0.276	0.140	0.115	0.072
3,000-3,999	0.274	0.082	0.070	0.089
4,000-4,999	0.166	−0.043	−0.059	0.093
5,000-7,499	0.100	−0.072	−0.072	0.059

21 meals at home equal one person.

[a] Does not include expense for alcoholic beverages.

[b] Total pounds of food per person in household.

[c] Total pounds of food (grouped into 16 broad classes) per person in household, weighted by set of fixed average price per pound paid by all families in study.

[d] Total price per pound of food (grouped into 16 broad classes) weighted by fixed average pounds per person in household consumed by all families in study.

4 ELASTICITY OF NUMBER OF FOOD ITEMS USED

Preliminary findings in an earlier rural dietary study indicated that variety was as much (or more) of a factor in satisfaction as quantity, and seemed to be associated also with adequacy. Therefore a measure of variety was tested for change with additional income. Using as an indicator the total number of food items consumed by the family during the survey week, a very crude measure, the elasticity of number of items by income was computed (Table 8). The maximum elasticity occurred at about $2,550. Within the limits of the accuracy of the data used, this income is probably not significantly different from the $2,750 obtained by using quantity. Some purchased and home-produced or gift items were duplicated and it was not feasible to eliminate the double count for the entire sample. The distribution of purchased items only was compared with that for the combined total for about 100 two-adult families covered in a parallel survey in Minneapolis-St. Paul. The increase in the number of items purchased the higher the income was even clearer, showing the damping effect of including the home-produced food and gift items which are more common at low incomes.[14]

Table 8

Income Elasticity by Income Level of Total Food Items Used in Household, Urban Housekeeping Families of Two or More, One Week, Spring 1948

Income in 1947 (after federal income tax)	United States		North	South
	Average Number of Items	*Income Elasticity*	*Average Number of Items*	*Average Number of Items*
Under $1,000	35.8	0.066	36.1	35.4
1,000-1,999	40.6	0.206	44.4	34.0
2,000-2,999	46.3	0.265	47.8	41.1
3,000-3,999	50.4	0.171	51.2	46.0
4,000-4,999	51.4	0.056	52.3	47.2
5,000-7,499	51.8	0.016	52.5	48.5

Includes all items purchased, home-produced, and received as gift or pay. Duplication because the same item occurs in all three categories not eliminated.

If this is corroborated in further research with a corrected number of items, it would afford a relatively simple procedure for locating the point on the income scale where the elasticity of food consumption is at a maxi-

[14] To check the possibility that the change in the number of items with income might be due merely to the shift from southern to northern families, or from small to large households, the average number of items in each income class was determined separately for each region and for families classified by household size. The relation with income appeared to hold.

mum, and to use the list of foods consumed at that income for comparing levels of living of dissimilar consumer groups.

5 FURTHER STEPS

The income-elasticity method can be used to measure the change in relative urgency for additional food the higher the income. Thus the conceptual basis for the derivation of budgets for clothing and other categories of consumption is valid for food as well.

These tentative findings suggest that a crude measure, such as simple quantities or number of foods consumed, can be used to determine the point of maximum elasticity in food purchases. Such a procedure would be especially useful in comparisons of farm and urban food costs because it would eliminate, or at least postpone until the pricing of the budget, the valuation of home-produced items. The ultimate choice of method will depend on what is most effective when applied to data for farm families.

Other methods yet to be examined are the change in 'percentage purchasing' of certain foods with a change in income,[15] and a study of menus to ascertain the kinds of meals and number of courses that go with food consumption at different income levels. The income elasticity of certain foods varies more than that of others. Study of the foods with high elasticity may reveal those accounting for the major portion of quantity elasticity or of variety of items consumed. Theoretically it would then be possible to use a selected group of foods as an index for all food in computing income elasticities if it is recognized that such relationships may change from time to time as price relationships and market situations change.

There remain the problems of interpreting a food budget level that expenditure studies have demonstrated to be 'satisfactory' to families but that does not take account of scientific findings about nutritional needs and the most economical combination of foods to meet these needs. The many meanings attached to the word 'budget' account for much of the difficulty. The emphasis in this section has been on the compilation of a separate food list for use in comparative cost of living studies among consumer groups whose situations differ so much as to make impossible the use of a single list of goods and services that represent a common 'need'. Experiments with the income-elasticity method indicate the feasibility of compiling separate food lists from expenditure data for farm and city populations.

[15] There appears to be much more variation with income in percentage purchasing of specific items of food than there is for clothing.