# Deflation of Private Consumption Expenditure

M Mukherjee
G S Chatterjee

*It is possible to obtain a series of aggregate private consumption expenditure based on NSS data for the period 1953-54 to 1963-64. This series does not vary materially from the series obtained from official national income statistics.*

*The series and its commodity components have been deflated to find the changes in levels and cost of living over the period. The commodity items have been grouped both in traditional categories and under essential and non-essential distinguished on the basis of cross-section expenditure elasticities.*

[*This paper was presented at the tenth general conference of the International Association for Research in Income and Wealth, Maynooth, Ireland, August 1967, and is being published with the Association's concurrence.*]

## I

IT is possible to estimate private consumption expenditure in India from two entirely independent bodies of statistics. First, it can be derived from the official national income estimates based mainly on production and income data by taking out government consumption and capital formation. Second, it can be obtained by blowing up the National Sample Survey (NSS) estimates of per capita private consumption expenditure. Either way, the estimates obtained are at current prices, and it is not easy to deflate the series so as to obtain the changes in real terms. If private consumption expenditure is taken as an aggregate, it is possible, however, to work out an indirect deflator by making use of the deflators relevant for national income, capital formation and government consumption, of which only the first two are readily available in India and the third can be approximated by the deflator of the contribution of government administration to net domestic product as implicit in the revised series of national income worked out by the Central Statistical Organisation (CSO). This procedure obviously breaks down when deflation is sought for certain classes of goods and services. Available consumer price index numbers are all urban in character and relate frequently to restricted markets, e.g. to working classes, etc. As such, they do not furnish adequate deflators at the national level for items of consumption taken individually or in groups.

The central theme of the present paper is the problem of deflation of household consumption expenditure. But before we consider this problem, it is of some interest to see how far the estimates prepared on the basis of national income statistics tally with those based on the sample survey. This will be the concern of section II of the paper. Since the survey estimates are based on two interpenetrating independent sub-samples each furnishing a valid estimate of the population parameter, it is possible to make this comparison in a more rigorous manner than it is usually possible for such aggregative statistics. When our interest centres round comparability of two sets of data on consumption expenditure, it is sufficient to work in terms of current prices. Consequently, we have not introduced the question of deflation at this stage.

Section III of the paper is concerned with the problem of deflation. Here we consider the deflation of aggregate consumption expenditure of households derived from the official national income statistics as well as from the sample surveys. We then pass on to the deflation of the survey estimates by conventional commodity groups in section IV. The survey questionnaires include data on quantities in addition to values for various items of consumption and consequently it is possible to obtain the weighting diagrams as well as the prices from the survey data. We have made use of this material and obtained a deflated estimate of household consumption expenditure for the year 1960-61 with 1953-54 as base largely based on the survey data. At this stage, we have presented the estimates by conventional classes of consumption such as food, clothing, etc, separately for urban and rural areas. The overall deflators obtained in this manner are consumer price index numbers covering the entire body of private consumers in urban or rural areas. Such index numbers are frequently used to examine whether the wage rates are keeping pace with cost of living.

In a situation in which large-scale outlays are taking place in connection with national planning as well as for defence purposes, it may be desirable to ensure that the increase in wage rates are at least commensurate with the increase in the price index numbers of the essential goods and services. If this is done, then the inflationary consequences of the outlays would not cut into the level of essential consumption of the population even when there is a decline in the real level of living. For this, in section V, we have studied the index numbers by two groups of items of consumption, essentials and non-essentials. We have done this on the basis of a subjective classification of the items of consumption. In addition, we have formed these groups on the basis of cross-section elasticities of the items of consumption. In this case, the procedure is objective except for the cut-off points which are determined arbitrarily. The last section furnishes a brief summary of the important results.

## II

## Comparison of Estimates

An attempt has been made in this section to work out estimates of household consumption expenditure of India for the period 1953-54 to 1963-64 on the basis of the NSS consumption expenditure data relating to the household sector. The estimates obtained in this manner have been compared with the estimates of consumption expenditure derived from the official and revised estimates of national income prepared by CSO. All figures in this section are given at current prices, since the purpose here is to compare the estimates of private consumption expenditure obtained from the two sources.

To obtain consumption expenditure at market prices from national income at factor cost, one has to *deduct* (i) net capital formation, (ii) exports of goods and services including factor payments, (iii) government consumption and (iv) subsidies and *add*, (v) imports of goods

TABLE 1: ESTIMATE OF PRIVATE CONSUMPTION EXPENDITURE AT CURRENT MARKET PRICES

Based on NSS and Official National Income Sources

(in Rs abja)

| Year | NSS | | | CSO | |
|---|---|---|---|---|---|
| | SS1 | SS2 | Comb | Official | Revised |
| (1) | (2) | (3) | (4) | (5) | (6) |
| 1953-54 | 89.4 | 85.5 | 87.4 | 95.1 | n a |
| 1954-55 | 80.0 | 83.9 | 81.9 | 86.3 | n a |
| 1955-56 | 85.7 | 87.0 | 86.4 | 88.8 | 81.0 |
| 1956-57 | 94.7 | 92.8 | 93.8 | 100.2 | 94.0 |
| 1957-58 | 101.5 | 98.2 | 100.0 | 105.3 | 99.0 |
| 1958-59 | 109.8 | 111.0 | 110.4 | 114.3 | 109.4 |
| 1959-60 | 114.3 | 115.1 | 114.8 | 116.6 | n a |
| 1960-61 | 122.3 | 122.0 | 122.2 | 127.3 | n a |
| 1961-62 | 125.1 | 126.0 | 125.5 | 133.9 | n a |
| 1962-63 | 131.1 | 134.9 | 133.4 | 136.5 | n a |
| 1963-64 | 140.7 | 140.3 | 140.6 | 151.6 | n a |

abja = $10^9$

*Note*: At the time of the preparation of this paper, the revised series of national income estimates was available only for the period 1955-56 to 1959-60.

TABLE 2: DEFLATED ESTIMATES OF AGGREGATE AND PER CAPITA HOUSEHOLD CONSUMPTION EXPENDITURE AT 1953-54 PRICES

| Year | Total Consumption Expenditure (Rs abja) | | Per Capita Consumption Expenditure | |
|---|---|---|---|---|
| | NSS | CSO | NSS | CSO |
| (1) | (2) | (3) | (4) | (5) |
| 1953-54 | 87.4 | 95.1 | 230.1 | 250.3 |
| 1954-55 | 91.5 | 96.4 | 236.2 | 248.8 |
| 1955-56 | 94.8 | 97.5 | 240.0 | 246.8 |
| 1956-57 | 95.3 | 101.8 | 236.6 | 252.7 |
| 1957-58 | 99.8 | 105.2 | 242.9 | 256.1 |
| 1958-59 | 106.7 | 110.4 | 254.7 | 263.5 |
| 1959-60 | 109.9 | 111.6 | 257.3 | 261.2 |
| 1960-61 | 115.0 | 119.8 | 263.9 | 275.0 |
| 1961-62 | 115.8 | 123.5 | 260.6 | 278.0 |
| 1962-63 | 120.5 | 123.3 | 265.9 | 272.1 |
| 1963-64 | 119.3 | 128.6 | 258.2 | 278.4 |

and services including factor payments and (vi) cost raising indirect taxes.

Data relating to item (i) have been culled from S G Tiwari, B Kumar and Jagdish Kumar ("Estimates of Capital Formation in India for 1950-51 to 1961-62, mimeo, 1963) projected to cover the period 1962-63 to 1963-64 on the basis of other available data. All other figures required are taken from the different issues of the Estimates of National Income, an official release of CSO. The revised estimates of national income used in the paper are taken from the National Income Statistics: Proposals for a Revised Series of National Income Estimates for 1955-56 to 1959-60 published by CSO. The survey consumption expenditure data are taken from various NSS reports, drafts and final, covering 7th to 19th rounds of the survey. The nature of the basic data used is considered below.

The estimates of capital formation prepared by the CSO are not very accurate. In particular, the estimates of changes in stocks are extremely weak. Insofar as the estimate of gross fixed capital formation out of imported commodities and commodities produced by domestic large-scale industries are concerned, the figures are reasonably accurate except for the distributive margins and installation costs which are partly notional in character. Capital formation out of commodities produced in unorganised industries is less accurately estimated. The estimate of capital formation in the public authority sector is reasonably accurate. The estimate of construction is not very reliable for any particular year but the general dimensions are not unsatisfactory. Since some of the constituent estimates of capital formation are obtained by a commodity flow approach, some by a final expenditure approach and a few by other methods, there is a danger of double counting and adjustments are necessary to avoid this. The estimate of depreciation is weak in the absence of relevant data but the aggregate figure is perhaps not unrealistic.

All other information listed under items (ii) to (vi) are based on either published government accounts or published balance of payments statistics and here the basic material may be considered as more or less satisfactory. The difficulties here do not relate to availability of statistics but to certain conceptual matters.

To give an example, one such difficulty centres round the concepts of indirect taxes and subsidies affecting the overall validity of the estimate of consumption expenditure at market prices based on national income data. Should we include the miscellaneous fees received by administrative departments under indirect taxes? Not all of these could be cost raising. Second, while excise duties could be cost raising, export duties may not have a direct influence on domestic prices. Also some of the constituents of 'other taxes and duties' and stamp duties under indirect taxes in the official national income statistics may not all be cost raising. Therefore, it may not be desirable to take all taxes and fees other than direct taxes for adjusting the factor cost figures to obtain the market price figures. Next, there is a possibility that some transfers to final consumers get included under subsidies. But since the dimension of the subsidy is small, one need not probably worry about this. For the purpose of this paper, we have taken all taxes listed under "indirect taxes" in the Estimates of National Income and left out completely the "fees and miscellaneous receipts".

The estimate of general government consumption expenditure should be fairly reliable. Insofar as balance of payments data on exports and imports of goods and services (including factor services) are concerned, the main difficulty relates to the reference period, and this problem has dimensionally large repercussion on the estimates because of heavy imports of foodgrains during some of the years under study. When the balance of payments data show a large borrowing from abroad in a particular year, it may be quite possible that not all the commodities obtained against this go in for either consumption or capital formation in the same year. Thus while a moving average of net borrowings from abroad centering a particular year is likely to be consistent

with the corresponding moving average of consumption expenditure plus capital formation out of imports for the same year, there may be considerable divergences in particular years, and this fact should be kept in mind while interpreting the results.

We may now examine the NSS data on household consumer expenditure used in the preparation of our estimates. Estimates of per capita consumption expenditure for a period of 30 days are given in the NSS reports separately for urban and rural areas. In each round, the sample of households was drawn according to a probability design, allowing the estimation of population characteristics in a statistically valid manner. The sample also consisted of two independent and interpenetrating sub-samples; the agreement between the sub-sample estimates provides a rough idea of the margin of error of the combined estimate.

It is possible to make use of the above figures and get blown up estimates of aggregate urban and rural consumption expenditure by making use of relevant population data. Population data to be used for the purpose can either be worked out from census population estimates or estimated from the information available in the NSS consumer expenditure schedule. Since NSS consumption expenditure surveys have not been designed to furnish estimates of population and as official national income estimates partly depend on census data, we have blown up the NSS per capita figures by making use of population estimates based on the census. As one of our purposes is to compare our estimates with the estimates derived from official national income statistics, this procedure seems to be justified.

The alternative procedure of using the NSS population estimates would not, however, give widely different results because the NSS population estimates compare favourably with the projections based on census counts. Because of the procedure adopted, we can probably take the underlying population estimates as free from sampling errors and need concern ourselves only with the errors of the estimates of per capita consumption expenditure without going into the question of non-sampling error of the interpolated population figures. Presence of non-sampling error in the population estimates does not affect the comparability of our series and the series based on official national income data. It is also necessary to get the breakdown of the population by urban and rural areas for our calculations. This is obtained by applying the interpolated figures of urbanisation ratio on the interpolated population figures.

TABLE 3: CHANGES IN CONSUMER PRICE LEVELS BETWEEN 1953-54 AND 1960-61 BY CONVENTIONAL CATEGORIES OF CONSUMPTION

| Categories of Consumption | Weights 7th Round | | Price Index Numbers (Laspeyres form) | |
|---|---|---|---|---|
| | Rural | Urban | Rural | Urban |
| (1) | (2) | (3) | (4) | (5) |
| Food | 64.58 | 57.90 | 110.88 | 108.90 |
| Clothing | 9.63 | 7.04 | 121.19 | 124.09 |
| Fuel and light | 6.61 | 6.28 | 112.59 | 105.05 |
| Others | 19.18 | 28.78 | 113.74 | 108.18 |
| Total | 100.00 | 100.00 | 112.53 | 109.52 |

TABLE 4: CHANGES IN PRIVATE CONSUMPTION EXPENDITURE BETWEEN 1953-54 AND 1960-61 BY CONVENTIONAL CATEGORIES

(in Rs abn)

| Categories of Consumption | In 1953-54 At Current Prices | | | In 1960-61 At Current Prices | | | At 1953-54 Prices | | |
|---|---|---|---|---|---|---|---|---|---|
| | Rural | Urban | Total | Rural | Urban | Total | Rural | Urban | Total |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Food | 42.22 | 12.78 | 55.00 | 61.89 | 18.76 | 80.65 | 55.82 | 17.23 | 73.05 |
| Clothing | 6.30 | 1.55 | 7.85 | 7.70 | 1.88 | 9.58 | 6.35 | 1.52 | 7.87 |
| Fuel and light | 4.32 | 1.39 | 5.71 | 5.32 | 1.87 | 7.19 | 4.73 | 1.78 | 6.51 |
| Others | 12.54 | 6.35 | 18.89 | 16.29 | 8.46 | 24.75 | 14.32 | 7.82 | 22.14 |
| Total | 65.38 | 22.07 | 87.45 | 91.20 | 30.97 | 122.17 | 81.22 | 28.35 | 109.57 |

## ESTIMATION METHODS

NSS data on consumption expenditure relate to "rounds" comprising periods ranging from a few months to one full year, and this material has to be used for working out estimates for financial years. The method adopted for this is as follows. The average per capita consumption expenditure in the ith round may be depicted as $e_i$; this is supposed to be spread uniformly over all months of the round. To the extent the months in a financial year are covered by an NSS round, the relevant $e_i$, $e_j$, etc, are adopted for these months. When, however, some of the months are missed, the procedure has been to adopt the average of the preceding and the succeeding rounds for these months. Since the number of months missed is small, this procedure is likely to give the best possible annual estimates under the circumstances.

The NSS estimates do not include the imputed rentals while the official national income estimates include this. It is, therefore, necessary to make an adjustment before any comparison is attempted. For adjustment, the difference between the total rental as obtained from the national income statistics and total rental as obtained from the NSS has been added to the NSS estimates. Thus, conceptually, the NSS series given in this paper include imputed rentals. Since, estimates of rental actually paid have not been worked out yet for the 17th to 19th rounds of the NSS, we have used the 16th round ratio of rentals paid to total consumption expenditure to obtain our figures for the 17th to 19th rounds.

As noted earlier, the NSS estimates of per capita consumption expenditure are available by two independent and interpenetrating sub-samples in addition to the pooled estimate. We have worked out our aggregate estimates of consumption expenditure also by two sub-samples as well as for the pooled sample. The two sub-sample estimates demarcate an interval and such intervals could be worked out for all the years

TABLE 5: HOUSEHOLDS COVERED BY NSS 7TH AND 16TH ROUNDS

| | Number of Households | | |
|---|---|---|---|
| | Rural | Urban | Total |
| (1) | (2) | (3) | (4) |
| 7th round | 1413 | 558 | 1971 |
| 16th round | 3763 | 2568 | 6331 |

TABLE 6: CHANGE IN CONSUMER PRICE LEVEL BETWEEN 1953-54 AND 1960-61 BY CLASS RANGES OF EXPENDITURE ELASTICITY

| Categories of Consumption | Weights 7th Round | | Index Numbers for 1960-61 with 1953-54 = 100 (Laspeyres) | |
|---|---|---|---|---|
| | Rural | Urban | Rural | Urban |
| (1) | (2) | (3) | (4) | (5) |
| | | *Scheme I* | | |
| Essentials ($0 < e < 1$) | 57.22 | 42.25 | 109.27 | 105.55 |
| Non-essentials ($1 < e$) | 42.78 | 57.75 | 116.89 | 112.43 |
| Total | 100.00 | 100.00 | 112.53 | 109.52 |
| | | *Scheme II* | | |
| Essentials ($0 < e < 1.5$) | 74.13 | 71.43 | 111.78 | 109.82 |
| Non-essentials ($1.5 < e$) | 25.87 | 28.57 | 114.71 | 108.78 |
| Total | 100.00 | 100.00 | 112.53 | 109.52 |
| | | *Scheme III* | | |
| Essentials | | 53.89 | | 114.03 |
| Non-essentials | | 46.11 | | 111.95 |
| Total | | 100.00 | | 113.07 |

for which we have presented estimates. The probability of the true value of consumption expenditure lying within the interval is approximately half, on the assumption of no error in the population estimates. The intervals thus demarcate error margins for the pooled estimates and can be used for obtaining rough estimates of standard errors.

### REGULAR NSS SERIES POSSIBLE

The comparable estimates of consumption expenditure obtained from the NSS and from the official national income sources are presented in Table 1. The estimates obtained from the NSS generally lie within the two estimates derived from the official and the revised national income statistics. The wide differences between the estimates based on the two official series indicate that the use of subjective judgment by persons making the estimates could be a source of sizeable error. As it is possible to compute a margin of error from sub-sample estimates, one can even test the statistical significance of the difference between the estimates for two years in a somewhat rough way. It is also possible to increase the sample size and thus reduce the sub-sample divergence. The cost of the surveys need not be increased very much in order to enable us to study the significance of most of the differences which we have observed. This type of analysis is not possible when national income and allied estimates are prepared by following conventional methods because, under the circumstances, no objective margin of uncertainty could be attached to the aggregates. The sample sizes of the NSS surveys used are given in Table 9 towards the end of the article.

The estimates presented seem to indicate that it is possible to think of a regular NSS series of consumption expenditure. Since a sub-round wise estimate of consumption expenditure could be obtained quickly after the completion of the field survey, it should be possible to work out estimates of consumption expenditure for parts of a year with a small time lag, thus facilitating preparation of quick annual estimates.

## III

## Deflation of National Income Based Estimates

We have seen that it is comparatively easy to obtain an estimate of aggregate household consumption expenditure from the available national income statistics. Such an estimate can be reduced to real terms by making use of a consumption expenditure deflator based on deflators associated with national income, government consumption and capital formation. We have already indicated that it is possible to work out such a deflator from available sources. It is, therefore, not very difficult to arrive at a deflated series of aggregate household consumption expenditure. Of course, some inaccuracy must arise out of the use of the deflator relevant for gross capital formation for net capital formation and as we have indicated, the deflator for government consumption is an approximate one. Further, deflation of net lending abroad is avoided in the procedure, but since the magnitude of this is small, refinement here is not necessary. Insofar as the inaccuracy of consumption expenditure deflator is concerned, the contribution to this from the inaccuracies in deflators for government consumption and capital formation cannot be large because both these magnitudes form relatively small percentages of the net national product. In fact, there is not much difference between the national income deflator and the private consumption expenditure deflator obtained in this manner, and it is possible to use the national income deflator itself for the present purpose.

But, even when the detailed procedure is used, we get a more reliable deflator for consumption expenditure at factor cost than at market prices because there is a large rise in net indirect taxes during the period. Any deflator derived from factor cost estimates can serve the purpose of deflating market price estimates only when the rate of increase in aggregate net indirect taxes at current prices is similar to that of the general price level. Since in India, net indirect taxes increased much more rapidly than the general price level, the two alternative solutions of the problem are (i) to use factor cost estimates of consumption expenditure, or (ii) to work out the current period values at base period market prices, i.e. at base period factor cost and base period tax rates. We have not attempted these refinements in this paper, and have presented our estimates at market prices. Consequently, they are rather crude because they include inadequately deflated components of net indirect taxes. The deflated figures of aggregate and per capita consumption expenditure based on Table 1 are given in Table 2. Figures have been given in respect of the pooled NSS estimate and the conventional official estimates both deflat-

TABLE 7: AGGREGATE HOUSEHOLD CONSUMER EXPENDITURE AT CONSTANT 1953-54 PRICES — SCHEMES I, II AND III

(in Rs abja)

| Categories of Consumption | 1953-54 | | | 1960-61 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | At Current Prices | | | At Current Prices | | | At 1953-54 Prices | | |
| | Rural | Urban | Total | Rural | Urban | Total | Rural | Urban | Total |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | | | | *Scheme I* | | | | | |
| Essentials ( $0 < e < 1$ ) | 37.41 | 9.32 | 46.73 | 54.79 | 13.44 | 68.23 | 50.14 | 12.73 | 62.87 |
| Non-essentials ( $1 < e$ ) | 27.97 | 12.75 | 40.72 | 36.41 | 17.53 | 53.94 | 31.15 | 15.59 | 46.74 |
| Total | 65.38 | 22.07 | 87.45 | 91.20 | 30.97 | 122.17 | 81.29 | 28.32 | 109.61 |
| | | | | *Scheme II* | | | | | |
| Essentials ( $0 < e < 1.5$ ) | 48.46 | 15.76 | 64.22 | 69.03 | 22.93 | 91.96 | 61.76 | 20.88 | 82.64 |
| Non-essentials ( $1.5 < e$ ) | 16.92 | 6.31 | 23.23 | 22.17 | 8.04 | 30.21 | 19.33 | 7.39 | 26.72 |
| Total | 65.38 | 22.07 | 87.45 | 91.20 | 30.97 | 122.17 | 81.09 | 28.27 | 109.36 |
| | | | | *Scheme III* | | | | | |
| Essentials | | 11.89 | | | 16.33 | | | 14.32 | |
| Non-essentials | | 10.18 | | | 14.64 | | | 13.08 | |
| Total | | 22.07 | | | 30.97 | | | 27.40 | |

ed by the national income deflator.

The official and NSS estimates of per capita real consumption both rose by about 11-12 per cent during the period. But during 1953-54 to 1960-61 taken up for our subsequent study, NSS estimates rose by about 15 per cent and the official by about 10 per cent. Figures change little if we use a proper consumption expenditure deflator as discussed earlier. In this case, the whole period shows a rise of about 15 per cent for both the series, and for the shorter period 16 per cent for NSS and 11 per cent for official.

While some attempts have been made in India to obtain commodity flow estimates of household consumption expenditure by a number of categories of goods and services, we do not have a regular series furnishing the information. In view of this, it is not necessary to consider the problem of deflation of commodity-wise estimates of consumption expenditure obtained from official sources. Suffice it to point out that it would be extremely difficult to undertake the deflation on the basis of implicit deflators of national income statistics available by industrial categories. A better way will be to press into service available data on retail prices. We have had occasion to point out that available consumer price data are generally urban in character and consumer price index numbers, by and large, relate to working classes, and this will be one major difficulty associated with the procedure.

Apart from this, it will also be necessary to take account of and adjust for the differential movements in net indirect taxes.

## IV

## Deflation of NSS Estimates: Conventional Categories

This section is concerned with the deflation of the survey estimates of household consumption expenditure, both aggregate and by categories of goods and services. In this section, we have presented the deflators as well as the movements in real household consumption expenditure by conventional categories: food, clothing, fuel and light, etc. The methodological details about the procedure used for obtaining the estimates are given in the next section in which we have shown how the deflators and deflated estimates of consumption expenditure are obtained by two categories of commodities chosen in accordance with their cross section expenditure elasticities. Here, the same material has been reclassified by the conventional categories.

The price index numbers are given in Table 3 and the movements in consumption expenditure both in current prices and in real terms are given in Table 4. When our own deflator is used, consumption expenditure rises by 25.3 per cent during the period, against 25.9 per cent of the official series deflated by national income deflator. Urban consumption increases slightly more (28.4 per cent) than rural consumption (24.2 per cent). At the national level, food expenditure increases by 32.8 per cent; other items move more slowly with clothing showing no rise in real terms.

It should be pointed out that the pattern of household consumption expenditure as obtained from the National Sample Survey systematically differs from the pattern based on the product flow estimates worked out for one or two years, even though the aggregate consumption expenditure based on the two sources more or less tallies. We do not know which of the two sets approximates more closely to reality. By and large, the survey share of cereals and consequently of food is higher than the corresponding product-flow share. This is compensated by the fact that the product-flow shares for various service items are much larger than the corresponding survey shares. Insofar as other items are concerned, the shares obtained from both the sources are reasonably close, judged against the errors of the estimates.

## V

## Comparison of Cost and Level of Living by New Categories

We have departed from the general practice in this section insofar as groups of commodities are concerned and, instead of using conventional

TABLE 8: PER CAPITA CONSUMPTION EXPENDITURE AT CONSTANT 1953-54 PRICES : SCHEMES I, II AND III

(Rs)

| Categories of Consumption | 1960-61 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | At Current Prices | | | At Current Prices | | | At 1953-54 Prices | | |
| | Rural | Urban | Comb | Rural | Urban | Comb | Rural | Urban | Comb |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | | | | *Scheme I* | | | | | |
| Essentials ($0 < e < 1$) | 119.26 | 140.81 | 123.02 | 153.21 | 172.15 | 156.61 | 140.21 | 163.06 | 144.31 |
| Non-essentials ($1 < e$) | 89.17 | 192.62 | 107.19 | 101.82 | 224.55 | 123.81 | 87.11 | 199.69 | 107.28 |
| Total | 208.43 | 333.43 | 230.21 | 255.03 | 396.70 | 280.42 | 227.32 | 362.75 | 251.59 |
| | | | | *Scheme II* | | | | | |
| Essentials ($0 < e < 1.5$) | 154.49 | 238.10 | 169.06 | 193.03 | 293.72 | 211.08 | 172.71 | 267.45 | 189.69 |
| Non-essentials ($1.5 < e$) | 53.94 | 95.33 | 61.15 | 62.00 | 102.98 | 69.34 | 54.05 | 94.66 | 61.33 |
| Total | 208.43 | 333.43 | 230.21 | 255.03 | 396.70 | 280.42 | 226.76 | 362.11 | 251.02 |
| | | | | *Scheme III* | | | | | |
| Essentials | | 179.63 | | | 209.18 | | | 183.43 | |
| Non-essentials | | 153.80 | | | 187.52 | | | 167.54 | |
| Total | | 333.43 | | | 396.70 | | | 350.97 | |

groups, we have taken two categories: (a) essentials and (b) non-essentials. The idea behind this has already been explained in section I.

It is possible to categorise commodities into several classes from different considerations. One may, for example, classify food articles by using considerations relating to biological requirements. Norms based on subjective judgment could also be used for the purpose. Both these approaches are arbitrary. We have used one such arbitrary scheme of classification in one variant of our calculation for purposes of comparison. But since an arbitrary scheme is basically unsatisfactory, we have considered it desirable to classify commodities into the two categories chosen by us on an objective basis using magnitudes of expenditure elasticities obtained from cross section data. Elasticity co-efficients of some 70 items of consumer purchase have been computed and used for this purpose (more details later).

We have used two different definitions of the two categories, I and II, as indicated below.

| Categories of Commodities | Ranges of Elasticity Co-efficients in Schemes | |
|---|---|---|
| | I | II |
| (a) Essentials | 0.0-1.0 | 0.0-1.5 |
| (b) Non-essentials | 1.0 and above | 1.5 and above |

It should be noted that though the cut off point is arbitrary, the procedure is objective once this is chosen. Further, other groupings of elasticity co-efficients are possible for defining the terms essentials, etc, and as such the procedure appears to be superior to purely subjective approaches of categorisation.

If the supply of commodities either does not increase or increases uniformly in all sectors, then an increase in per capita disposable income would lead to relatively smaller rise in prices of commodities with lower elasticity and relatively higher rise in prices of commodities with larger elasticity. Thus, with the supply situation as conceived here, one would expect smaller price rise for bare essentials and higher rise for non-essentials. The figures computed by us present this picture under both schemes in rural areas and under one scheme for urban areas. As such one may perhaps conclude that the supply situation in India remained of this type in rural areas during the period under consideration. In a situation like this, relatives included in a class range would have shown similar degrees of variation and the average of the relatives would have been subject to a smaller margin of uncertainty than in conventional commodity classes.

This analysis, however, is highly simplified. Particularly, when the increase in per capita income itself is very low, the consumption in the current period will be influenced much more by the price situation during the period than by the increase in income. Also, in general, supply situations and prices for individual commodities must have ups and downs. Further, while supply and demand do play a role in determination of prices, there are various other factors which influence prices of individual commodities. Hence, it is conceivable that we get a different picture of price changes of essentials and non-essentials in India when we compare two other points of time. However, it does appear that the picture we have obtained is not contrary to our general expectations and the distortions we have just discussed may not affect the picture materially under normal circumstances.

One further point can be added. A change in the size distribution of disposable income will affect the results in the following way. With a less egalitarian distribution, the rise in the prices of bare essentials will be still lower and the rise in non-essential prices will be still higher. A more egalitarian distribution will have just the opposite effect. But in any case the effect of the change in distribution on the cost of living indexes by these groups of commodities is likely to be dimensionally small unless there is a drastic distributional change which is an unlikely practical contingency.

Coming to the procedural details, the NSS gives, for each commodity consumed by the households, data on quantity and value of consumption. It thus implicitly provides the price per unit of the commodity, on a probabil-

ly basis. These data have been used in this paper for the construction of consumer price index numbers separately for the rural and urban areas of India.

We have presented our price index numbers under three schemes of analysis, namely, schemes I and II by certain elasticity classes and scheme III in which a subjective system of classification has been used, following Mathew.[1] Since Mathew's study related to urban population, scheme III has been used for urban areas only. We have worked out Laspeyres index numbers for all the three schemes.

The periods covered by the NSS rounds selected by us are as follows. The 7th round of the survey covers the period October 1953 to March 1954 and the 16th round, July 1960 to June 1961. Table 5 shows the total number of households surveyed during these NSS rounds. Weights used by us are based on 1971 households surveyed during the 7th round. NSS reports furnish estimates of average monthly per capita expenditure on specified items of consumption, separately for rural and urban areas. These monthly figures form the basis of percentage shares which are taken as weights.

For calculation of price relatives, a sample of 367 schedules was used for the 7th round and a sample of 621 schedules for the 16th round. The base period prices have been compiled on the basis of 220 schedules for the rural sector and 147 schedules for the urban sector and the current period prices are compiled on the basis of 390 schedules for the rural sector and 231 schedules for the urban sector.

Prices have been calculated by dividing the value figures by quantity figures, converted into standard units, and tabulated itemwise for the different rounds by sub-samples for rural and urban areas separately. A simple average is taken to represent the price of a particular item. Altogether 116 items of consumption were thus covered and price relatives were worked out for these items.

There were some items for which the price relatives could not be worked out in this way because the schedules did not include both quantity and value information. These items were footwear, amusement, musical instruments, education, medicine, toilet, petty articles, conveyance (excluding railways), services, furniture, utensils, sundry equipment, ornaments, ceremonials, rent and taxes. Of the total budget, they accounted for about 13 per cent in the rural sector and 21 per cent in the urban sector. The average price of the part covered is taken to represent the price of the uncovered part of the field. This ought not to distort the picture very much because the weight of the uncovered sector is not large. Further, we have undertaken a special field study of very restricted geographical coverage to obtain price relatives for these items in order to make a general check of our procedure. The average relative for the uncovered part obtained in this manner was only slightly higher than the average we have adopted. In our general procedure, the individual items were grouped so as to correspond to the weighting pattern and price relatives were worked out for these groups. For important groups, weighted averages of relatives were used. But simple averages of price relatives have also been used in some cases on the assumption that movements of prices of the constituent items within a group are similar, the groups being more or less homogeneous in character.

A graphical method was used for getting the estimates of elasticities. Small inaccuracies which arise because of using this method do not affect the overall results. The method is described by N S Iyengar ("On a Method of Computing Engel Elasticities from the Concentration Curves", *Econometrica*, Vol 28, No 4, 1960). The elasticities have been worked out for about 70 items of consumption using NSS 10th round data. Some use has also been made of other available data on expenditure elasticities.[2]

Some details about scheme III are given below. In P C Mathew's paper, an attempt was made to construct separate consumer price index numbers for bare essentials, other essentials and non-essentials for the non-manual employees of Delhi. As already pointed out, the classification used by him was based on subjective considerations. In appendix 1 of Mathew's paper, a model weighting diagram was given showing, for each group or sub-group of items, the total weight and its breakdown into the three categories: bare essentials, other essentials and non-essentials. We have dubbed bare essentials as 'essentials' in our paper and combined the other two categories and called it non-essentials. The total weight for each group and sub-group of items as given in this model weight-

TABLE 9: SAMPLE SIZE OF VARIOUS NSS SURVEYS USED FOR DERIVING AGGREGATE CONSUMER EXPENDITURE

| NSS Round and Period | Rural | | | | | | Urban | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample Villages | | | Sample Households | | | Sample Blocks | | | Sample Households | | |
| | SS 1 | SS 2 | Comb | SS 1 | SS 2 | Comb | SS 1 | SS 2 | Comb | SS 1 | SS 2 | Comb |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 7th (Oct 1953 - Mar 1954) | 476 | 478 | 954 | 702 | 711 | 1413 | 224 | 217 | 441 | 297 | 261 | 558 |
| 8th (July 1954 - Mar 1955) | 353 | 353 | 706 | 931 | 938 | 1869 | 238 | 228 | 466 | 963 | 892 | 1855 |
| 9th (May 1955 - Nov 1955) | 812 | 812 | 1624 | 808 | 808 | 1616 | 1052 | 1050 | 2102 | 1051 | 1048 | 2099 |
| 10th (Dec 1955 - May 1956) | 812 | 812 | 1624 | 808 | 808 | 1616 | 664 | 664 | 1328 | 663 | 663 | 1326 |
| 11th (Aug 1956 - Jan 1957) | 920 | 920 | 1840 | 3645 | 3610 | 7255 | 291 | 291 | 582 | 1430 | 1410 | 2840 |
| 12th (Mar 1957 - Aug 1957) | 918 | 918 | 1830 | 3628 | 3620 | 7248 | 292 | 292 | 584 | 1419 | 1439 | 2858 |
| 13th (Sept 1957 - May 1958) | 924 | 924 | 1848 | 3361 | 3377 | 6738 | 585 | 583 | 1168 | 1748 | 1835 | 3583 |
| 14th (July 1958 - Jun 1959) | 1288 | 1285 | 2573 | 3789 | 3800 | 7589 | 1111 | 1109 | 2220 | 1111 | 1107 | 2218 |
| 15th (July 1959 - Jun 1960) | 1300 | 1298 | 2598 | 3820 | 3880 | 7700 | 1107 | 1106 | 2213 | 1107 | 1094 | 2201 |
| 16th (July 1960 - Jun 1961) | 1865 | 1873 | 3738 | 1882 | 1881 | 3763 | 1112 | 1124 | 2236 | 1294 | 1274 | 2568 |
| 17th (Sept 1961 - July 1962) | 1836 | 1836 | 3672 | 2569 | 2449 | 5018 | 1118 | 1119 | 2237 | 1758 | 1658 | 3416 |
| 18th (Feb 1963 - Jan 1964) | — | — | 8466 | — | — | 21721 | — | — | 4571 | — | — | 4257 |
| 19th (July 1964 - Feb 1965) | — | — | 1412 | — | — | 2563 | — | — | 757 | — | — | 1679 |

ing diagram has been adopted by us for purposes of classification. Of course, our budget pattern is based on the NSS 7th round data. The items, however, have been first regrouped so as to conform to the budget pattern given in the model weighting diagram constructed by Mathew and the weights were calculated for the regrouped items from the NSS weights. We have applied this scheme only for the urban sector for obvious reasons.

### Alternative Schemes

The consumer price index numbers are presented in Table 6. The shares in total weight of essentials and non-essentials for rural and urban areas under the three schemes may first be noted. While under scheme I, about 57 per cent of the budget is accounted for by bare essentials for rural areas, the corresponding urban figure is only about 42 per cent. Under scheme II, however, this disparity gets reduced, the corresponding figures for rural and urban areas being about 74 per cent and 71 per cent, respectively.

The consumer price index number for rural areas shows larger increase under non-essentials for both I and II. For urban areas, however, the higher rise is seen under 'non-essentials' in scheme I and 'essentials' in scheme II. The index numbers for essentials for rural areas show a small rise under both I and II. For urban areas, I indicates a smaller rise than II. The urban consumer price index numbers under scheme III follow a pattern somewhat different from our index numbers.

In our view scheme I is possibly more satisfactory than scheme II. The index numbers here show an interesting picture, the percentage increases being lowest for essentials and highest for non-essentials, both in rural and in urban areas.

We would like to point out some of the limitations of the estimates. We have already mentioned that for about 13 per cent of the total budget in the rural sector and 21 per cent in the urban sector, we could not form the price relatives from the NSS data and it was necessary to use arbitrary methods including a special field study and other information. This is a major limitation of our estimates. But apart from this, the sample size on which the relatives are based may not be adequate for purposes of estimation, and errors associated with our index numbers could be large. For more satisfactory estimates, it will be desirable to use the full material of NSS rounds for purposes of obtaining the estimates. The present study thus is more of methodological interest, because of the possible weakness of the estimates it presents. In allocating the budget pattern under schemes I and II, we have mainly been guided by expenditure elasticities. For a few items, however, subjective consideration has been used. The allocation of the budget pattern under scheme III is based on some previous investigation confined to the non-manual employees of Delhi region and is far from satisfactory in the context of urban India as a whole.

Estimates of household consumer expenditure at market prices are then worked out for essentials and non-essentials separately under scheme I, II and III on the basis of the 7th and 16th round weights for rural and urban areas separately. The estimates for 1960-61 are deflated with the help of the index numbers given in Table 6. The results are given in Table 7. It will be seen that real consumption went up by about 25 per cent at the national level, 28 per cent in urban areas and 24 per cent in rural areas.

Per capita consumer expenditures at 1953-54 prices under schemes I, II and III are shown in Table 8 which indicates that per capita real consumer expenditure for the country as a whole rose by 9 per cent between 1953-54 and 1960-61. We have seen earlier that the rise is 15 per cent when we use the national income deflator instead of our price index number. It is interesting to note, however, that the rise is again about 10 per cent when the estimate of per capita consumption expenditure based on national income data is deflated by national income deflator. Under both schemes I and II, per capita real consumer expenditure on essentials shows some rise in 1960-61 over the base level in 1953-54 both in rural and in urban areas. For non-essentials, there appears to be a dimensional stability in the per capita levels. It is of interest to note that the per capita level of real consumption of high elasticity items did not rise while that of low elasticity items indicated some progress. This is partly due to the fact that overall rise in per capita real expenditure was small during the period. The pattern of consumer purchases during 1960-61 was determined more by the prevailing supply prices than by increased incomes of consumers. However, in the classification adopted from Mathew, non-essentials shows a higher rise than essentials.

## VI

## Summary

We have shown in this paper that it is possible to obtain a series of aggregate private consumption expenditure based on NSS data for the period 1953-54 to 1963-64. The NSS estimates are based on two independent interpenetrating sub-samples, and hence one can make some general probability statements about the pooled estimates. The series based on the NSS has been compared with the series obtained from the official national income statistics, and it has been observed that the two series do not differ widely from each another. The problem of deflation of the two series has then been considered briefly. Since it is easier to obtain commodity breakdowns of the series based on the sample survey, we have attempted to find out how best one could deflate the survey series and its commodity components. Itemwise data on value and quantity available in the survey schedules naturally give the best possible material for the purpose. This information has therefore been pressed into service to obtain commodity-wise price relatives. At first, we have obtained estimates of consumption and their deflators for certain conventional groups of commodities and services. Next we have attempted to group the items into two categories: essentials and non-essentials on the basis of cross section elasticities of a large number of items computed from the survey data and studied the movement of real consumption.

### Notes

1 P C Mathew: 'A Note on Linking Up Wages with the Consumer Price Index', *Monthly Abstract of Statistics*, Vol 13, No 11, November 1960.

2 See A K Biswas and H P Biswas: "Engel Elasticities of Consumption Expenditure on Some Selected Items and Estimation of Increase in their Demand during the Third Five Year Plan" (mimeo working paper No 238, Studies relating to Planning for National Development, Indian Statistical Institute, July 1961); and A K Biswas and D K Bose: "Consumption Projections of Selected Items over the Period of Third Five Year Plan", (mimeo working paper No 198, Studies relating to Planning for National Development, Indian Statistical Institute, July 1960).