# A Study of Consumer Prices, Part 1

Terence J. Baker and Peter Neary

Special Article

in

# QUARTERLY ECONOMIC COMMENTARY

March 1971

TERENCE J. BAKER
PETER NEARY

ESRI

# SECTION 4: A STUDY OF CONSUMER PRICES, PART 1[1]

## by T. J. BAKER and P. NEARY

### §4.1  *Introduction*

Given the importance attached to the consumer price index, it is perhaps surprising that little analysis has been undertaken of the index itself, and relatively few attempts have been made to relate it to other key macro-economic variables. Previous studies by O'Herlihy and by Geary and Pratschke[2], have greatly increased our knowledge of the subject, but much work remains to be done.

This study therefore, will attempt to establish relationships between the consumer price index and other variables, which may form the basis of a fairly precise short-term forecasting model. The actual econometric estimation of these relationships will form the second part of the study, to be published in a future edition of the Quarterly Economic Commentary. This first part considers the index itself, and discusses some of the difficulties which might distort the relationship between the index and other variables. Methods of adjusting the index to overcome or minimise these difficulties are explored and alternative indices constructed. Since some of the points covered are of a fairly technical nature, those interested solely in the conclusions will find them summarised in §4.7 below. The charts illustrate the major alternative indices constructed.

### §4.2  *The Trend of Consumer Prices, 1958-70*

Chart 1 illustrates the movement of the consumer price index for all items over the period 1958 to 1970. The outstanding features of the graph would appear to be, first, the absence of seasonal variation, and secondly, the fact that there seem to be three distinct phases in the movement of the index. From 1958 until towards the end of 1960 it fluctuates around a fairly stable level; as the Minister for Finance remarked in his Budget speech for 1960, the index for February of that year stood at exactly the same level as it had two years previously. Next, from 1961 until the end of 1968 it tends to move upwards at a relatively steady rate. Finally, the period since 1968 has also exhibited a steady upward trend, but the rate of increase has noticeably accelerated. The average annual increases in the three periods were 0.2%, 4.0% and 7.8% respectively.
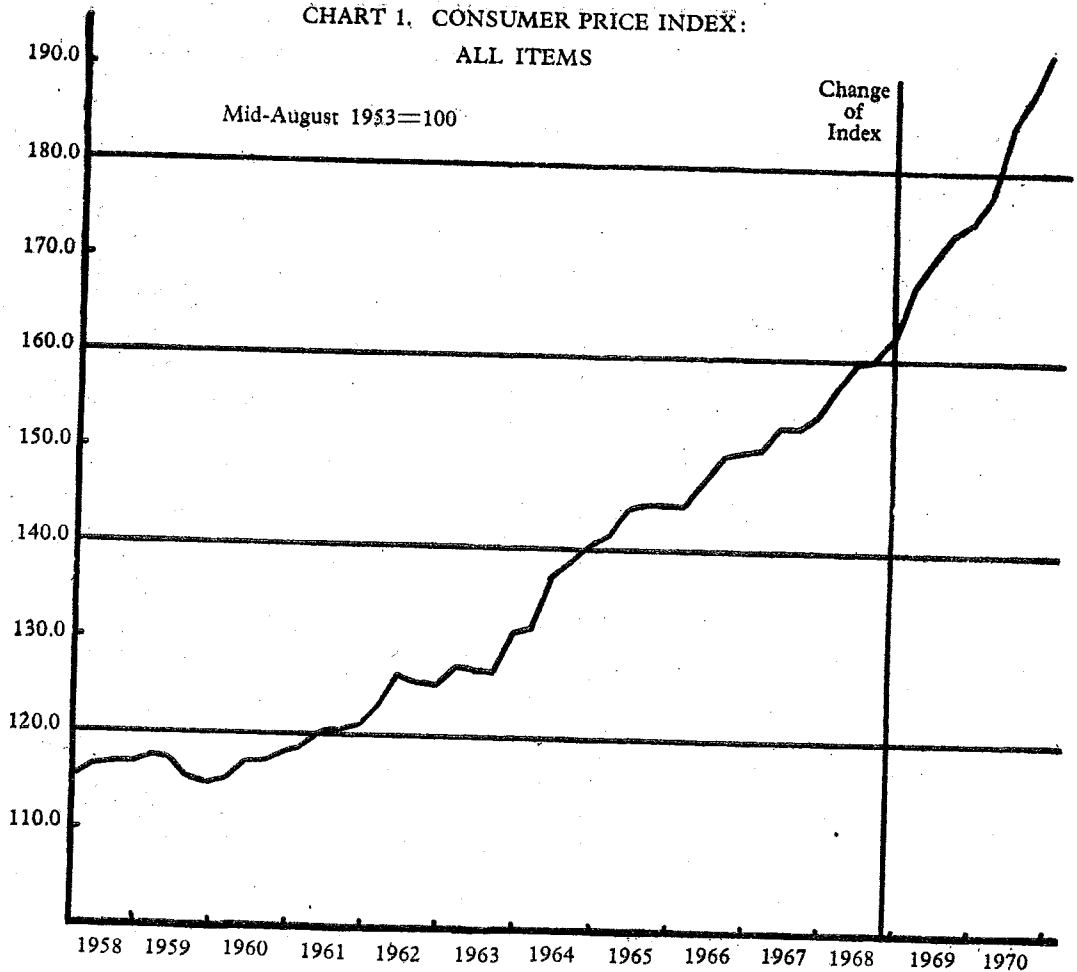
Obviously, a major aim of a regression analysis of the consumer price index would be to attempt to explain these variations in trend in terms of fluctuations in the independent variables which we expect to influence consumer prices. However, it is a suspicious coincidence that the second shift (the more abrupt of the two) took place in November 1968, coinciding exactly with the changeover from the old consumer price index, with base August 1953=100, to the new one, with base

CHART 1. CONSUMER PRICE INDEX:
ALL ITEMS

```
190.0

           Mid-August 1953=100                                    Change
                                                                    of
180.0                                                              Index

170.0

160.0

150.0

140.0

130.0

120.0

110.0

        1958  1959  1960  1961  1962  1963  1964  1965  1966  1967  1968  1969  1970
```

November 1968=100[3]. Since the two indices differ widely in both the range of commodities covered and in the sample of shops from which price quotations are obtained, it is conceivable that the acceleration was caused, not by any significant shift in the economic structure, but rather by the change of index alone. If this were the case, it would mean that regression analysis would not be a suitable tool for studying the consumer price index over the whole period. This possibility, therefore, is considered in the next section.

Another factor which might be expected to limit the applicability of regression analysis is government price control, which was introduced in October 1965. This is discussed in §4.4 below.

---

[3]Chart 1 is derived by linking these two indices (which are henceforth referred to as the 1953 and 1968 indices respectively). For a full discussion of the 1968 index, and a comparison between it and the 1953 index, see the 'Irish Statistical Bulletin', March, 1969, pp. 27-33.

| Quarter | Food | Drink and Tobacco | Clothing and Footwear | Fuel and Light | Housing | Durable Household Goods | Other Goods | Transport | Services and Related Expenditure | All Items |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Base: Mid-August 1953 = 100 | | | | | |
| 1958 i | 116.7 | 121.1 | 103.2 | 121.0 | 117.0 | 105.7 | 119.2 | 118.4 | 113.4 | 115.4 |
| ii | 119.0 | 121.8 | 103.2 | 120.4 | 117.0 | 106.9 | 120.1 | 120.3 | 114.0 | 116.6 |
| iii | 119.2 | 121.9 | 103.3 | 119.7 | 117.5 | 107.0 | 120.2 | 120.6 | 115.0 | 116.9 |
| iv | 119.4 | 121.9 | 103.4 | 116.4 | 119.8 | 107.7 | 120.3 | 120.9 | 115.0 | 116.9 |
| 1959 i | 121.7 | 121.9 | 103.3 | 112.6 | 119.6 | 108.8 | 120.7 | 121.2 | 115.5 | 117.7 |
| ii | 121.4 | 121.9 | 103.5 | 111.8 | 119.3 | 108.6 | 121.1 | 121.3 | 116.2 | 117.6 |
| iii | 115.7 | 123.1 | 104.2 | 111.2 | 119.8 | 108.6 | 121.1 | 121.4 | 117.2 | 115.6 |
| iv | 113.6 | 122.8 | 105.1 | 109.7 | 122.6 | 107.9 | 121.3 | 121.5 | 117.6 | 114.9 |
| 1960 i | 114.2 | 122.8 | 105.4 | 109.3 | 122.7 | 108.6 | 121.5 | 125.5 | 118.0 | 115.4 |
| ii | 117.1 | 126.9 | 105.5 | 109.1 | 122.9 | 108.9 | 121.5 | 125.3 | 118.8 | 117.2 |
| iii | 116.6 | 127.4 | 105.7 | 108.9 | 123.5 | 109.2 | 121.5 | 125.4 | 119.2 | 117.2 |
| iv | 118.0 | 127.3 | 106.1 | 110.4 | 126.8 | 110.4 | 121.7 | 125.4 | 119.3 | 118.1 |
| 1961 i | 119.8 | 127.3 | 106.2 | 110.5 | 126.8 | 110.5 | 122.0 | 125.9 | 119.5 | 118.9 |
| ii | 121.7 | 129.1 | 106.4 | 110.5 | 127.0 | 110.5 | 129.8 | 126.0 | 120.2 | 120.3 |
| iii | 120.3 | 130.9 | 106.9 | 114.9 | 127.6 | 110.4 | 129.8 | 125.4 | 121.5 | 120.5 |
| iv | 120.5 | 130.8 | 107.3 | 117.2 | 131.3 | 111.2 | 130.0 | 125.5 | 122.2 | 121.1 |
| 1962 i | 122.5 | 134.9 | 108.2 | 119.4 | 131.7 | 112.2 | 133.7 | 131.5 | 123.3 | 123.3 |
| ii | 126.1 | 143.4 | 109.4 | 119.8 | 131.8 | 112.6 | 134.9 | 132.4 | 127.0 | 126.5 |
| iii | 123.1 | 144.9 | 109.9 | 120.1 | 133.1 | 113.0 | 135.2 | 133.0 | 128.6 | 125.9 |
| iv | 121.1 | 144.9 | 110.5 | 122.0 | 138.0 | 113.0 | 135.3 | 133.1 | 128.9 | 125.6 |
| 1963 i | 126.1 | 144.9 | 110.7 | 122.1 | 138.0 | 113.1 | 135.5 | 133.3 | 129.3 | 127.7 |
| ii | 124.6 | 145.1 | 111.3 | 122.9 | 138.0 | 113.4 | 135.5 | 132.9 | 130.6 | 127.4 |
| iii | 123.2 | 145.2 | 111.7 | 124.0 | 139.0 | 113.7 | 135.6 | 132.9 | 133.6 | 127.3 |
| iv | 126.1 | 152.4 | 114.7 | 131.4 | 144.2 | 116.3 | 139.5 | 134.8 | 136.6 | 131.2 |
| 1964 i | 126.7 | 152.6 | 116.0 | 132.0 | 144.3 | 118.0 | 140.5 | 134.8 | 137.9 | 131.9 |
| ii | 132.8 | 161.4 | 118.5 | 132.2 | 144.7 | 120.4 | 149.5 | 143.3 | 142.1 | 137.1 |
| iii | 134.7 | 161.5 | 119.1 | 132.4 | 147.2 | 121.0 | 149.7 | 144.4 | 148.7 | 138.8 |
| iv | 137.1 | 161.6 | 120.0 | 132.6 | 153.0 | 121.3 | 149.8 | 144.6 | 149.2 | 140.3 |
| 1965 i | 140.4 | 161.5 | 120.5 | 132.2 | 153.0 | 122.0 | 150.2 | 145.1 | 149.8 | 141.8 |
| ii | 143.8 | 165.2 | 121.5 | 132.2 | 153.0 | 123.0 | 154.5 | 147.4 | 152.3 | 144.3 |
| iii | 140.2 | 174.2 | 121.8 | 132.3 | 156.4 | 123.0 | 157.6 | 147.4 | 155.5 | 144.8 |
| iv | 139.0 | 174.3 | 122.0 | 133.0 | 163.3 | 123.2 | 158.8 | 147.5 | 155.9 | 144.8 |
| 1966 i | 139.5 | 172.2 | 122.4 | 133.1 | 163.3 | 123.4 | 158.7 | 147.8 | 156.6 | 144.9 |
| ii | 142.2 | 181.1 | 123.0 | 133.1 | 163.3 | 123.3 | 159.2 | 150.1 | 158.9 | 147.6 |
| iii | 143.6 | 186.2 | 123.4 | 133.2 | 165.3 | 123.8 | 164.5 | 158.3 | 162.3 | 150.0 |
| iv | 141.5 | 187.1 | 123.8 | 138.1 | 173.3 | 125.9 | 165.2 | 160.6 | 163.5 | 150.4 |
| 1967 i | 141.4 | 187.2 | 124.2 | 138.6 | 173.3 | 127.6 | 166.0 | 160.9 | 164.6 | 150.6 |
| ii | 145.0 | 192.6 | 124.8 | 139.1 | 173.3 | 128.0 | 166.5 | 161.3 | 167.4 | 153.2 |
| iii | 145.9 | 192.6 | 125.2 | 138.8 | 175.3 | 128.3 | 167.1 | 163.2 | 161.7 | 153.3 |
| iv | 145.2 | 192.6 | 125.6 | 139.7 | 183.6 | 128.4 | 181.1 | 163.2 | 163.2 | 154.3 |
| 1968 i | 150.8 | 192.7 | 126.2 | 142.7 | 184.0 | 129.0 | 181.6 | 171.9 | 164.8 | 157.5 |
| ii | 154.2 | 198.1 | 126.7 | 142.9 | 184.0 | 129.5 | 182.1 | 173.3 | 167.2 | 160.0 |
| iii | 153.3 | 198.0 | 127.4 | 143.3 | 187.3 | 130.0 | 187.8 | 174.3 | 169.0 | 160.3 |
| iv | 152.6 | 208.3 | 128.0 | 147.2 | 198.9 | 131.0 | 188.7 | 175.2 | 169.9 | 162.7 |
| 1969 i | 158.6 | 213.5 | 129.3 | 150.0 | 201.9 | 136.1 | 200.3 | 184.9 | 174.8 | 168.1 |
| ii | 162.1 | 218.7 | 130.8 | 150.3 | 202.9 | 137.9 | 206.2 | 187.0 | 176.6 | 171.0 |
| iii | 163.6 | 226.6 | 132.0 | 151.6 | 211.4 | 139.4 | 207.3 | 190.3 | 177.9 | 173.8 |
| iv | 163.3 | 228.5 | 133.8 | 154.0 | 219.6 | 142.0 | 210.5 | 191.0 | 179.3 | 175.1 |
| 1970 i | 167.4 | 228.7 | 135.8 | 159.7 | 221.0 | 144.4 | 213.1 | 192.7 | 183.2 | 178.0 |
| ii | 177.5 | 236.8 | 141.7 | 164.0 | 223.2 | 149.4 | 218.6 | 196.6 | 191.2 | 185.3 |
| iii | 175.6 | 240.0 | 144.5 | 167.5 | 230.7 | 151.3 | 246.7 | 202.8 | 196.6 | 188.4 |
| iv | 176.6 | 240.6 | 148.5 | 169.3 | 239.1 | 154.9 | 250.3 | 221.7 | 202.1 | 192.6 |
| | | | | | Base: Mid-November 1968 = 100 | | | | | |
| 1969 i | 103.9 | 102.5 | 101.0 | 101.9 | 101.5 | 103.9 | 106.2 | 105.6 | 102.9 | 103.3 |
| ii | 106.2 | 105.0 | 102.2 | 102.1 | 102.0 | 105.3 | 109.3 | 106.7 | 104.0 | 105.1 |
| iii | 107.2 | 108.8 | 103.1 | 103.0 | 106.3 | 106.5 | 109.9 | 108.6 | 104.7 | 106.8 |
| iv | 107.0 | 109.7 | 104.5 | 104.6 | 110.4 | 108.4 | 111.6 | 109.0 | 105.5 | 107.6 |
| 1970 i | 109.7 | 109.8 | 106.1 | 108.5 | 111.1 | 110.2 | 112.9 | 110.0 | 107.8 | 109.4 |
| ii | 116.3 | 113.7 | 110.7 | 111.4 | 112.2 | 114.1 | 115.9 | 112.2 | 112.5 | 113.9 |
| iii | 115.1 | 115.2 | 112.9 | 113.8 | 116.0 | 115.5 | 130.8 | 115.8 | 115.7 | 115.8 |
| iv | 115.7 | 115.5 | 116.0 | 115.0 | 120.2 | 118.3 | 132.7 | 126.5 | 118.9 | 118.4 |

Finally, still considering Chart 1, it may be noticed that a number of large quarter-to-quarter rises come immediately after major increases in direct taxes. The effects of turnover tax are particularly evident, causing large increases in the index for November 1963 and May 1970. Other taxes too have had a significant impact, which may be seen more clearly by studying the indices for individual commodity groups, which are set out in Table 1[4]. For example, the index for the Drink and Tobacco group is almost a step function, with most of the large, discrete changes coinciding with tax increases. Similarly the effect of wholesale tax is especially evident on the Durable Household Goods group.

In the face of this evidence it is obvious that no study of consumer prices can afford to ignore indirect taxes. However there are a number of different ways of dealing with them. A review of the different methods available, and a discussion of the methods adopted in this study are given in §4.5.

## §4.3  Comparison between 1953 and 1968 indices

The suspicion that the sudden acceleration in the rate of increase of the consumer price index after 1968 may be due simply to the shift from the 1953 to 1968 indices,

TABLE 2: CHANGES IN WEIGHTS BETWEEN 1953 AND 1968 INDICES

| Commodity Group | Percentage Expenditure Weights of Consumer Price Index | | Increase (+) or Decrease (−) in Weight between 1953 and 1968 | Price Index for November 1968 to base August 1953 = 100 |
|---|---|---|---|---|
| | August 1953 | November 1968 | | |
| | 1 | 2 | 3 | 4 |
| Food ... ... ... ... | 40.8 | 32.4 | − | 152.6 |
| Drink and Tobacco ... ... | 13.2 | 15.7 | + | 208.3 |
| Clothing ... ... ... | 12.7 | 8.8 | − | 128.0 |
| Fuel and Light ... ... | 7.0 | 5.5 | − | 147.2 |
| Housing ... ... ... | 6.2 | 6.9 | + | 198.9 |
| Durable Household Goods ... | 2.5 | 4.0 | + | 131.0 |
| Other Goods ... ... ... | 3.2 | 4.9 | + | 188.7 |
| Transport ... ... ... | 4.7 | 10.2 | + | 175.2 |
| Services and Related Expenditure ... ... | 9.7 | 11.6 | + | 169.9 |
| Total (All Items) ... ... | 100.0 | 100.0 | | 162.7 |

Note: Cols. 1 and 2 are taken from Irish Statistical Bulletin: March 1969, p. 30.

[4]While this table is broadly similar to that published in any issue of the 'Irish Statistical Bulletin' (e.g. see p. 238 of the December 1970 issue) some changes have been made. In particular the category "Other Goods and Services" in the 1953 index has been further disaggregated, (using the C.S.O.'s own basic data) to make it comparable with the classifications of the 1968 index. (A corollary of this is that motor cars, which were formerly included in the group Durable Household Goods, have been included in the Transport group instead.)

One disadvantage of this procedure is that many of the groups in the 1953 index contain a very small number of commodities, so that their movement may be distorted by fluctuations in the price of a single major component. Thus, for example, the Transport group, which contains only seven items,is heavily influenced by the relatively infrequent increases in bus and train fares, which together account for almost two fifths of the weighting in this group.

However, while this factor should be kept in mind in interpreting the indices, it was felt to be offset by the advantages of providing a longer period of continuity,

is based on a comparison between the weighting schemes of the two indices. These are shown in columns 1 and 2 of Table 2, which are adapted from the table on page 30 of the March 1969 'Irish Statistical Bulletin'. By comparing these in turn with column 4, which gives the index for all commodity groups in November 1968 to base August 1953=100, it is apparent that the new index gives significantly greater weights to those groups whose price increased more quickly than the average between 1953 and 1968, i.e. Drink and Tobacco, Housing, Other Goods, Transport and Services. On the other hand, the only three groups whose share in the total weighting actually fell (Food, Clothing, and Fuel and Light) were among the lowest in terms of rate of price increase over the period.

There is nothing inherently surprising about these results. To some extent they reflect a relatively low degree of price elasticity for each of these aggregate commodity groups. They also indicate that there are considerable differences in income elasticity between the groups. What is significant about these results is that they imply that the new consumer price index is more sensitive to price increases than the old. (This is borne out by the fact that the distribution of commodity groups between above-average and below-average rates of price increase has not changed significantly in the 1968 index, as of November, 1970).

If this conclusion is true, it has important consequences, which are described below. First, however, it would be extremely useful if some measure of the extent of "index bias" could be derived, thus quantifying the general conclusion that some such bias exists, and offering the means to eliminate it. Unfortunately, no direct measure of the bias is available, since this would involve comparing one of the existing series with a hypothetical index: i.e., comparing the published consumer price index (with base August 1953=100) for the years prior to 1968, with a price index covering the same period, but sampled in exactly the same way and constructed using the same weights as the published 1968 index.[5] This would provide a theoretically justifiable measure of the extent of "index bias", but the requisite data are simply not available.

Nevertheless, by ignoring the (admittedly substantial) differences in coverage between the two indices, and by assuming that the differences in weighting can be adequately represented by considering only major commodity groups, a number of fairly crude measures of "index bias" can be derived.[6] The first of these was obtained by recalculating the consumer price index from 1958 to 1968, applying to the nine commodity groups in Table 2 the weights of the 1968 index, instead of those of the 1953 index. The resulting index is compared with the published index over the same period in Chart 2. The cumulative divergence between the two, which by 1968 amounted to over $2\frac{1}{2}\%$, confirms the existence of a significant degree of index bias.

However, to assume that the 1968 weights were appropriate from 1958 onwards is no more reasonable than to assume (as in the case of the simple link of the two

[5]Of course, the converse would also provide a measure of "index bias": viz., comparing the actual index since 1968 with a hypothetical index covering the same period and constructed in the same way as the 1953 index. However, the reason why "index bias" makes it incorrect to study price movements in recent years by simply linking the two series, is not that the 1968 index overstates the increase in prices since 1968, but rather that the 1953 index understates the increase in previous years. For this reason, therefore, the formulation in the text has been preferred.

[6]All the results described in the next paragraphs (as well as many of those in section 5 below) were produced using a computer program specially written for this study.

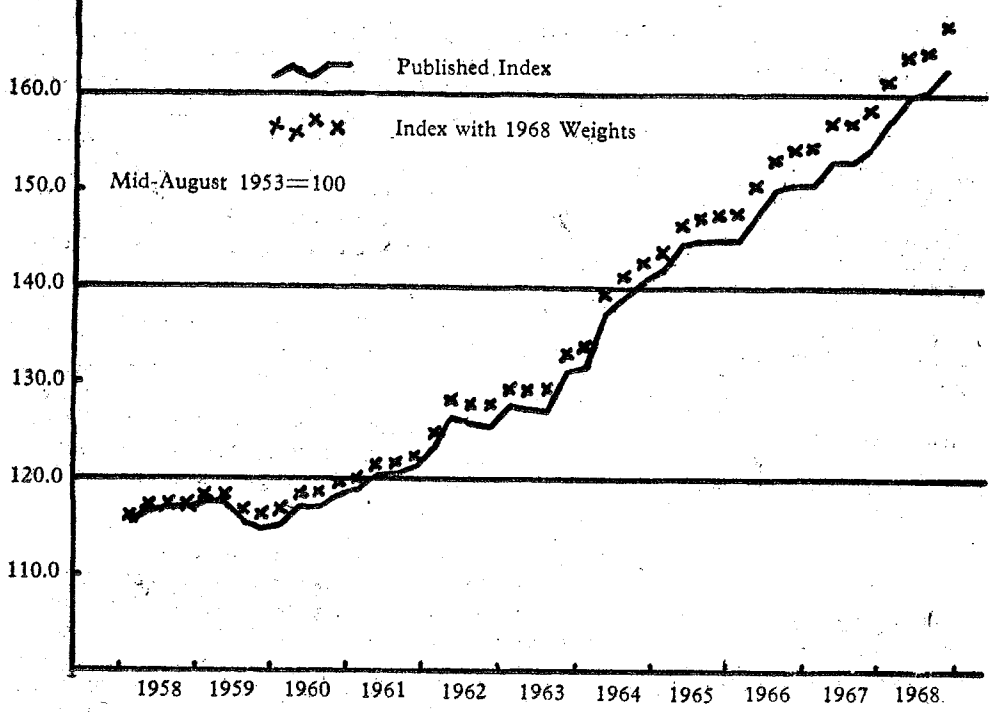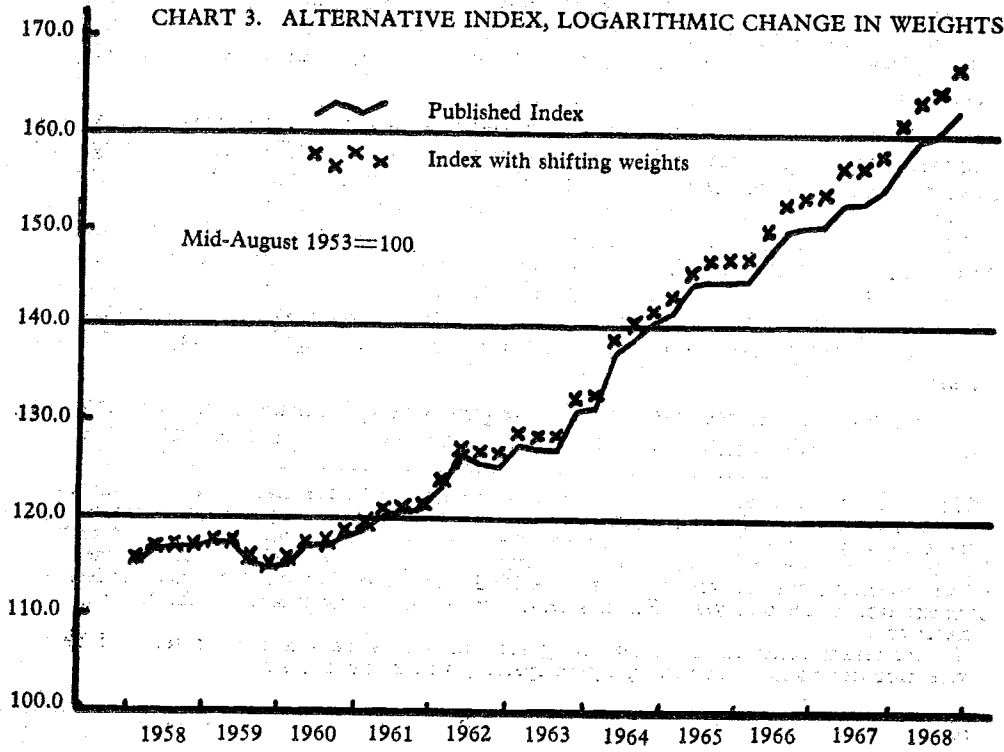CHART 2. ALTERNATIVE INDEX, 1968 WEIGHTS



CHART 2. ALTERNATIVE INDEX, 1968 WEIGHTS

Published Index

Index with 1968 Weights

Mid-August 1953=100



CHART 3. ALTERNATIVE INDEX, LOGARITHMIC CHANGE IN WEIGHTS

Published Index

Index with shifting weights

Mid-August 1953=100

indices) that the 1953 weights were valid throughout the 1960s until a sudden shift to the new pattern in 1968. To obtain a truer link between the two indices, which removes the bias as far as possible rather than merely demonstrating its existence, it is necessary to allow for a gradual movement through time from the first weighting pattern to the second. In the absence of actual data for the period between the two base years recourse must be had to some form of interpolation. Two methods of interpolation were tried, one assuming a linear and the other assuming a logarithmic rate of change in the weights attached to each commodity group in Table 2, between 1953 and 1968. Since the two calculated indices were found to move very closely together, only the index using logarithmic interpolation (which is marginally preferable in logic) is shown. It is compared with the published index for 1958-68 in Chart 3. As would be expected from its method of construction, the index is similar to that based on the 1968 weights in the later years, but diverges less from the 1953 index in the earlier years.

Taken together, the charts support the contention made above that the weighting pattern of the 1968 index is more likely to reflect price increases than is that of the 1953 index. We conclude from this discussion, therefore, that the consumer price index is relatively sensitive to the assumptions made concerning the weights to be attached to different commodity groups; and as a result that the increase in prices in the years immediately prior to 1968 is understated by the 1953 index.

This conclusion has important consequences. For it means that a simple link between the 1953 and 1968 indices may give a distorted picture of price movements in recent years. Indeed, since the weighting scheme of the 1968 index derives from the Household Budget Inquiry of 1965-66, it may be argued that either of the artificial indices described above is more representative of price movements in the years immediately preceding 1968 than is the published 1953 index (which is based on the Household Budget Enquiry of 1951-52). In case other researchers may wish to use these indices, therefore, they are reproduced in Table 3.

Another issue raised by the above discussion, is the question of interpreting any regression results where the dependent variable consists of the 1953 and 1968 indices, linked to form a single series. Since such a series has been shown to lack complete continuity, it could be argued that attempting to explain it by applying the usual regression techniques might produce distorted results. However, as always in econometrics, it is prudent to experiment with alternative forms of the data. The second part of this study, therefore, will make use of the published indices, as well as constructed indices such as those in Table 3, and may experiment with a dummy variable to represent the change of index after 1968. Finally, some attempt will be made to ensure that any relationships estimated remain stable over both the period before and the period after the change of index.

One last point which deserves mention is that the considerable difference in sensitivity to price increases between the two indices was mainly due to the large change in the weighting pattern. This in turn can be attributed to the length of time which elapsed between the two Household Budget Inquiries on which the respective weighting schemes were based. It is possible, therefore, that this difference could be avoided in future by making more frequent Household Budget Inquiries, thus permitting the weights in the consumer price index to be revised at, say, five-year intervals. If this were to prevent a recurrence of some of the difficulties discussed in this section, it might well justify the greatly increased labour which would be necessary.

## TABLE 3: CONSEQUENCES OF DIFFERENT WEIGHTING SCHEMES

| Quarter | | | | Published C.P.I. (i.e., 1953 weights) | C.P.I. Applying 1968 weights | C.P.I. Assuming Logarithmic Change in Weighting 1953–68 |
|---|---|---|---|---|---|---|
| 1958 | I | ... | ... | ... | 115.4 | 115.9 | 115.6 |
| | II | ... | ... | ... | 116.6 | 117.1 | 116.8 |
| | III | ... | ... | ... | 116.9 | 117.4 | 117.0 |
| | IV | ... | ... | ... | 116.9 | 117.5 | 117.1 |
| 1959 | I | ... | ... | ... | 117.7 | 118.2 | 117.8 |
| | II | ... | ... | ... | 117.6 | 118.1 | 117.8 |
| | III | ... | ... | ... | 115.6 | 116.6 | 116.0 |
| | IV | ... | ... | ... | 114.9 | 116.1 | 115.4 |
| 1960 | I | ... | ... | ... | 115.4 | 116.8 | 116.0 |
| | II | ... | ... | ... | 117.2 | 118.5 | 117.8 |
| | III | ... | ... | ... | 117.2 | 118.5 | 117.8 |
| | IV | ... | ... | ... | 118.1 | 119.4 | 118.8 |
| 1961 | I | ... | ... | ... | 118.9 | 120.1 | 119.5 |
| | II | ... | ... | ... | 120.3 | 121.5 | 120.9 |
| | III | ... | ... | ... | 120.5 | 121.7 | 121.1 |
| | IV | ... | ... | ... | 121.1 | 122.3 | 121.7 |
| 1962 | I | ... | ... | ... | 123.3 | 124.8 | 124.1 |
| | II | ... | ... | ... | 126.5 | 128.0 | 127.4 |
| | III | ... | ... | ... | 125.9 | 127.7 | 127.0 |
| | IV | ... | ... | ... | 125.6 | 127.6 | 126.8 |
| 1963 | I | ... | ... | ... | 127.7 | 129.4 | 128.8 |
| | II | ... | ... | ... | 127.4 | 129.1 | 128.5 |
| | III | ... | ... | ... | 127.3 | 129.2 | 128.6 |
| | IV | ... | ... | ... | 131.2 | 133.1 | 132.5 |
| 1964 | I | ... | ... | ... | 131.9 | 133.8 | 133.2 |
| | II | ... | ... | ... | 137.1 | 139.4 | 138.7 |
| | III | ... | ... | ... | 138.8 | 141.1 | 140.5 |
| | IV | ... | ... | ... | 140.3 | 142.4 | 141.9 |
| 1965 | I | ... | ... | ... | 141.8 | 143.7 | 143.3 |
| | II | ... | ... | ... | 144.3 | 146.2 | 145.8 |
| | III | ... | ... | ... | 144.8 | 147.3 | 146.8 |
| | IV | ... | ... | ... | 144.8 | 147.6 | 147.1 |
| 1966 | I | ... | ... | ... | 144.9 | 147.5 | 147.1 |
| | II | ... | ... | ... | 147.6 | 150.4 | 150.0 |
| | III | ... | ... | ... | 150.0 | 153.4 | 152.9 |
| | IV | ... | ... | ... | 150.4 | 154.2 | 153.7 |
| 1967 | I | ... | ... | ... | 150.6 | 154.5 | 154.0 |
| | II | ... | ... | ... | 153.2 | 157.0 | 156.6 |
| | III | ... | ... | ... | 153.3 | 157.0 | 156.7 |
| | IV | ... | ... | ... | 154.3 | 158.3 | 158.0 |
| 1968 | I | ... | ... | ... | 157.5 | 161.5 | 161.3 |
| | II | ... | ... | ... | 160.0 | 164.0 | 163.8 |
| | III | ... | ... | ... | 160.3 | 164.6 | 164.5 |
| | IV | ... | ... | ... | 162.7 | 167.3 | 167.3 |

Another factor which might be expected to render less effective a regression analysis of the consumer price index is the government's policy of price control. Since October 1965, increases in ex-factory, wholesale, and import prices of a wide range of commodities have been permitted only if 3 months notice in advance is given to the Minister for Industry and Commerce, and if adequate justification for the proposed increase can be provided. Practically all the items in the consumer price index are nominally subject to this control, the only exceptions being: fresh meat and vegetables, services, and indirect taxes;[7] and although its effect on the overall index is not very evident, its impact on the index for Drink and Tobacco is noticeable, being responsible for an actual fall in this index between August 1965 and February 1966.

On purely theoretical grounds, the existence of price control would suggest that regression analysis may not be the best method of studying movements in the consumer price index since 1965, because such movements have been at the discretion of the authorities, whose active intervention may have led to price movements other than those which might be expected from the unhampered action of free-market forces. While this is undoubtedly true, it may equally well be argued that price control may have strengthened the relationship between consumer prices and certain underlying economic variables. For, since increases in costs are the only justification normally accepted for price increases, we would, as a result, expect to find a high correlation between consumer prices and variables representing wages costs, taxes, and import prices. Indeed, if price control were rigidly enforced, this correlation would be almost complete (allowing for appropriate time-lags), and there would be little or no residual variation to be explained by reference to other variables.

Of course, such an extreme form of price control is inconceivable in a mixed economy such as Ireland's. The argument merely illustrates the point that there is no 'a priori' reason why price control should necessarily distort the relationship between consumer prices and variables representing costs, and thus make regression analysis an unsuitable tool for studying prices.[8] Nevertheless, it may be worthwhile to test the stability of any relationships estimated in the second part of this study over the periods before and after the imposition of price control, as suggested in a different context in Section 3 above.

### §4.5 *Indirect Taxes and the Consumer Price Index*

Turning now to the impact of indirect taxes on the consumer price index, it is apparent that this might be investigated in a number of different ways. The simplest method would be to make use of a dummy variable in the regression analysis, taking on the value 1 in a quarter immediately following a major tax increase, and the value 0 in all other quarters. This would have the disadvantage however, that all tax

---

[7]The original orders announcing the imposition of price control are conveniently reproduced in the Irish Statistical Bulletin, December 1965, pp. 305-6. The list of items subject to price control has remained unchanged since 1965, with the exception of newspapers and periodicals, which were exempted in 1967 (See 'Irish Statistical Bulletin', June 1967, p. 117).

[8]A possible exception to this, however, is provided by the Taoiseach's statement to the Dail on the seventeenth of December, 1969, that wage increases greater than 7 per cent would not be accepted as valid justification for a corresponding increase in price. Since a number of wage demands in excess of that figure have since been conceded, the rigid enforcement of this rule would undoubtedly lead to some distortion of the relationship between prices and wages costs.

changes would be assumed to have the same impact, unless a number of dummy variables were used, each one representing a different form of tax change (in which case the regression would soon become unmanageable).

A better method, therefore, would be to construct a variable to represent quantitatively the effect of indirect taxes. This was done by O'Herlihy, who devised an excise tax variable "by constructing separate price indices for the consumption elements of excise taxes, using as weights the revenue returns for 1960-61." (O'Herlihy, *op. cit.*, p. 39). However, this variable did not give very convincing results on either annual or quarterly data. Furthermore, if a similar variable were applied to more recent years, we would expect it to be highly correlated with other variables influencing the consumer price index, such as wholesale price indices and industrial earnings.

Fortunately, a third method of taking account of indirect taxes is available, which though more tedious to apply in practice, seems to promise more reliable results. This method, which was used successfully by W. A. H. Godley and D. A. Rowe of the National Institute of Economic and Social Research in London, involves eliminating altogether the effects of indirect tax increases from the consumer price index [9] This is done by adjusting each individual component of the index by an estimate of the effect of tax changes on its price. In this way a second series of indices (which we shall call "net of tax" indices) can be constructed, which will measure changes in prices, on the assumption of a constant level of indirect taxation. It should be obvious that this approach is based on a form of "full-cost pricing" hypothesis: that is, wholesalers and retailers are assumed to pass on to their customers the bulk, if not all, of any increase in indirect taxes, rather than absorbing them in their profit margins.

To repeat this exercise for Ireland required a detailed study of the data used in calculating the consumer price index, which were kindly made available to the authors by the Director of the Central Statistics Office. In general the method used was to compare the published changes in tax rates with the movements in price in succeeding quarters of the commodities subject to tax, and thus to estimate the proportion of the change in price which was due to the tax. However, certain modifications of this basic procedure had to be made for different categories of tax.

(a) Specific taxes were by far the easiest to handle, since the method of computing the consumer price index used by the Central Statistics Office consists in calculating every quarter national average prices for each "standardized" commodity, which are then multiplied by the appropriate expenditure weights, derived from the Household Budget Inquiry taken for the base year of the series. Furthermore, since in recent years, the commodities subject to specific indirect taxes (mainly drink, tobacco and petrol) have been a particular target of government price control, so that increases in their prices have tended to take place on the same date throughout the country, it was a relatively straightforward matter to identify the increases in price due solely to tax.[10] Therefore, despite the 'ad hoc' nature of the corrections made, they are almost certainly reliable to within a small margin of error. In almost all cases, it appears that increases in such specific taxes were fully passed on to the consumer.

(b) Estimates of the effects of *ad valorem* indirect taxes (i.e. the turnover and wholesale taxes) were of necessity more crude. Here the procedure adopted was to

[9]See 'National Institute Economic Review', No. 30, November 1964, p. 52.
[10]The authors are grateful to the Prices Section, Department of Industry and Commerce, for much useful information on this point.

compare the actual rise in prices of the affected commodities in the quarters immediately following the tax change with the "normal" range of quarter-to-quarter price increases for these commodities. In this way the percentage of the tax passed on could be estimated, and it was found to be virtually 100% in the case of turnover tax, and about 60% in the case of wholesale tax (though considerably more than this in the case of the special wholesale tax on luxury goods). Needless to say, these estimates have a wider margin of error than those associated with the specific taxes; nevertheless they may be taken as a reasonable approximation towards the true impact of tax increases.

(c) Finally, two taxes are included as individual items in the consumer price index, and therefore require special treatment: these are, motor tax, and local authority rates. The former poses no problems, since motor tax is not included in the 1953 index, while in the 1968 index it is included as two separate items (car tax and motor cycle tax respectively). Changes in this tax can therefore be unambiguously identified.

However, considerable problems were met with in attempting to eliminate the effects of changes in local authority rates. This was so because one of the items in the index which represents rates is a composite one, covering both rent and rates of rented dwellings. This item is calculated on the basis of inquiries addressed to all local authorities and to a sample of property owners throughout the country, in which no attempt is made to distinguish between the rates content of a given rent, and the remaining portion which accrues directly to the landlords.[11] It would therefore be impossible to eliminate directly the effects of increases in rates from this item, and attempts to indirectly estimate these effecs failed to give satisfactory results.[12]

Therefore, rather than prejudice the whole exercise, it was thought preferable to make no attempt to deal with rates, but to treat them rather as payment for services. While this fact does not affect any of the conclusions reached in the following sections, it should be borne in mind in interpreting the "net of tax" indices in Table 4 (especially the "net of tax" index for the Housing group).

Before considering the "net of tax" indices themselves, it is necessary to emphasize certain points which should be kept in mind in interpreting them. (These are in addition to the reservations attached to the methods used in eliminating the impact of the tax increases, as described above.)

(a) In the first place, it frequently happens that following a tax increase the retail price of a commodity rises by more than the increase in tax. No allowances were made for this in calculating the net of tax indices. In other words, it was assumed that the total price rise less the tax component would have taken place in any case, and that the imposition of the tax merely affected the timing of the increase. Even this influence, however, if it is substantial, may introduce some bias into regression analysis of the net of tax indices.

(b) Secondly, no account was taken of changes in post office charges or in prices

---

[11]For a detailed discussion of how the rent index is computed, see "Irish Statistical Bulletin", December 1953, p. 225, and March 1969, p. 29.

[12]These attempts sought to estimate the proportion of a given increase in the item "rent and rates of rented dwellings" which could be attributed to rates only, by relating it to the corresponding increase in the other rates item in the consumer price index: "rates of owner-occupied dwellings" (which can be unambiguously identified as rates). However the results derived were found to be extremely sensitive to the assumptions made, and to be subject, in any case, to a wide margin of error.

| Quarter | Food | Drink and Tobacco | Cloth-ing and Foot-wear | Fuel and Light | Hous-ing | Durable House-hold Goods | Other Goods | Trans-port | Services and Related Expen-diture | All Items |
|---|---|---|---|---|---|---|---|---|---|---|
| Base: Mid-August 1953 = 100 | | | | | | | | | | |
| 1958  i | 116.7 | 121.1 | 103.2 | 121.0 | 117.0 | 105.7 | 119.2 | 118.4 | 113.4 | 115.4 |
| ii | 119.0 | 121.8 | 103.2 | 120.4 | 117.0 | 106.9 | 120.1 | 120.3 | 114.0 | 116.6 |
| iii | 119.2 | 121.9 | 103.3 | 119.7 | 117.5 | 107.0 | 120.2 | 120.6 | 115.0 | 116.9 |
| iv | 119.4 | 121.9 | 103.4 | 116.4 | 119.8 | 107.7 | 120.3 | 120.9 | 115.0 | 116.9 |
| 1959  i | 121.7 | 121.9 | 103.3 | 112.6 | 119.6 | 108.7 | 120.7 | 121.2 | 115.5 | 117.7 |
| ii | 121.4 | 121.9 | 103.5 | 111.8 | 119.3 | 108.6 | 121.1 | 121.3 | 116.2 | 117.6 |
| iii | 115.7 | 123.1 | 104.2 | 111.2 | 119.8 | 108.6 | 121.1 | 121.4 | 117.2 | 115.6 |
| iv | 113.6 | 122.8 | 105.1 | 109.7 | 122.6 | 107.9 | 121.3 | 121.5 | 117.6 | 114.9 |
| 1960  i | 114.2 | 122.8 | 105.4 | 109.3 | 122.7 | 108.6 | 121.5 | 125.5 | 118.0 | 115.4 |
| ii | 117.1 | 125.2 | 105.5 | 109.1 | 122.9 | 108.9 | 121.5 | 125.3 | 118.8 | 117.0 |
| iii | 116.6 | 125.7 | 105.7 | 108.9 | 123.5 | 109.2 | 121.5 | 125.4 | 119.2 | 116.9 |
| iv | 118.0 | 125.6 | 106.1 | 110.4 | 126.8 | 110.4 | 121.7 | 125.4 | 119.3 | 117.9 |
| 1961  i | 119.8 | 125.6 | 106.2 | 110.5 | 126.8 | 110.5 | 122.0 | 125.9 | 119.5 | 118.7 |
| ii | 121.7 | 125.6 | 106.4 | 110.5 | 127.0 | 110.5 | 129.8 | 126.0 | 120.2 | 119.8 |
| iii | 120.3 | 127.4 | 106.9 | 114.9 | 127.6 | 110.4 | 129.8 | 125.4 | 121.5 | 120.0 |
| iv | 120.5 | 127.4 | 107.3 | 117.2 | 131.3 | 111.2 | 130.0 | 125.5 | 122.2 | 120.6 |
| 1962  i | 122.5 | 131.5 | 108.2 | 119.4 | 131.7 | 112.2 | 133.7 | 131.5 | 123.3 | 122.8 |
| ii | 126.1 | 133.7 | 109.4 | 119.8 | 131.8 | 112.6 | 134.9 | 132.4 | 127.0 | 125.2 |
| iii | 123.1 | 133.8 | 109.9 | 120.1 | 133.1 | 113.0 | 135.2 | 133.0 | 128.6 | 124.4 |
| iv | 121.1 | 133.8 | 110.5 | 122.0 | 138.0 | 113.0 | 135.3 | 133.1 | 128.9 | 124.1 |
| 1963  i | 126.1 | 133.8 | 110.7 | 122.1 | 138.0 | 113.1 | 135.5 | 133.3 | 129.3 | 126.3 |
| ii | 124.6 | 134.0 | 111.3 | 122.9 | 138.0 | 113.4 | 135.5 | 132.9 | 130.6 | 125.9 |
| iii | 123.2 | 134.1 | 111.7 | 124.0 | 139.0 | 113.7 | 135.6 | 132.9 | 133.6 | 125.8 |
| iv | 123.0 | 137.7 | 111.9 | 128.3 | 143.7 | 114.0 | 136.1 | 133.0 | 134.8 | 127.0 |
| 1964  i | 123.6 | 137.9 | 113.2 | 128.9 | 143.8 | 115.2 | 137.2 | 133.1 | 135.9 | 127.6 |
| ii | 129.7 | 140.1 | 115.7 | 129.1 | 144.3 | 117.6 | 146.1 | 140.9 | 140.2 | 131.9 |
| iii | 131.6 | 140.2 | 116.3 | 129.3 | 146.7 | 118.1 | 146.4 | 141.0 | 146.8 | 133.6 |
| iv | 134.0 | 140.3 | 117.2 | 129.5 | 152.6 | 118.4 | 146.4 | 141.2 | 147.2 | 135.2 |
| 1965  i | 137.3 | 140.3 | 117.7 | 129.1 | 152.6 | 119.1 | 146.8 | 141.7 | 147.9 | 136.6 |
| ii | 140.7 | 140.7 | 118.7 | 129.1 | 152.6 | 120.1 | 151.1 | 142.3 | 150.3 | 137.7 |
| iii | 137.2 | 144.8 | 119.0 | 129.2 | 155.9 | 120.2 | 154.3 | 142.3 | 153.6 | 138.4 |
| iv | 135.9 | 144.8 | 119.2 | 129.9 | 162.9 | 120.4 | 155.4 | 142.5 | 153.9 | 138.5 |
| 1966  i | 136.4 | 142.8 | 119.6 | 130.0 | 162.9 | 120.5 | 155.3 | 142.7 | 154.6 | 138.6 |
| ii | 139.2 | 142.8 | 120.2 | 130.0 | 162.8 | 120.5 | 155.8 | 143.3 | 156.2 | 140.0 |
| iii | 140.5 | 144.1 | 120.6 | 130.1 | 164.9 | 120.9 | 161.1 | 151.4 | 159.6 | 141.8 |
| iv | 138.5 | 145.0 | 121.0 | 135.0 | 172.1 | 121.1 | 161.8 | 151.9 | 160.7 | 142.0 |
| 1967  i | 138.3 | 145.1 | 121.4 | 135.5 | 172.1 | 121.5 | 162.6 | 152.1 | 161.9 | 142.2 |
| ii | 141.9 | 145.2 | 122.0 | 136.0 | 172.1 | 121.9 | 163.1 | 152.4 | 164.6 | 144.1 |
| iii | 142.8 | 145.2 | 122.4 | 135.7 | 174.1 | 122.2 | 163.7 | 154.4 | 158.9 | 144.2 |
| iv | 142.1 | 145.2 | 122.8 | 136.6 | 182.4 | 122.3 | 177.7 | 154.3 | 160.4 | 145.2 |
| 1968  i | 147.7 | 145.2 | 123.4 | 139.6 | 182.8 | 122.9 | 178.2 | 163.0 | 162.1 | 148.4 |
| ii | 151.2 | 145.2 | 123.9 | 139.8 | 182.8 | 123.4 | 178.7 | 163.4 | 164.4 | 150.1 |
| iii | 150.2 | 145.2 | 124.6 | 140.2 | 186.1 | 123.9 | 184.4 | 164.3 | 166.2 | 150.5 |
| iv | 149.5 | 147.9 | 125.2 | 144.1 | 197.7 | 124.9 | 185.3 | 165.2 | 167.1 | 151.8 |
| 1969  i | 155.5 | 152.6 | 126.6 | 146.8 | 198.7 | 126.4 | 190.0 | 172.5 | 172.0 | 156.3 |
| ii | 159.0 | 152.6 | 128.1 | 147.2 | 199.7 | 128.1 | 195.9 | 172.9 | 173.9 | 158.3 |
| iii | 160.5 | 155.4 | 129.2 | 148.6 | 208.2 | 129.1 | 197.0 | 174.1 | 175.1 | 160.3 |
| iv | 160.2 | 157.3 | 131.0 | 150.9 | 216.4 | 131.6 | 200.1 | 174.8 | 176.5 | 161.6 |
| 1970  i | 164.3 | 157.4 | 133.0 | 156.7 | 217.8 | 134.0 | 202.7 | 176.5 | 180.4 | 164.6 |
| ii | 170.3 | 160.0 | 135.6 | 157.0 | 218.8 | 135.5 | 202.8 | 177.4 | 186.5 | 168.2 |
| iii | 168.4 | 163.2 | 138.5 | 160.5 | 226.4 | 137.3 | 231.0 | 183.7 | 191.9 | 171.4 |
| iv | 169.3 | 163.9 | 142.4 | 162.3 | 234.7 | 140.4 | 234.4 | 197.7 | 197.4 | 175.0 |
| Base: Mid-November 1968 = 100 | | | | | | | | | | |
| 1969  i | 103.9 | 102.2 | 101.0 | 101.9 | 100.5 | 101.2 | 102.5 | 104.1 | 102.9 | 102.8 |
| ii | 106.2 | 102.2 | 102.2 | 102.1 | 101.0 | 102.5 | 105.7 | 104.4 | 104.0 | 104.0 |
| iii | 107.2 | 103.6 | 103.1 | 103.0 | 105.3 | 103.2 | 106.2 | 105.1 | 104.7 | 105.3 |
| iv | 107.0 | 104.5 | 104.5 | 104.6 | 109.4 | 105.1 | 107.9 | 105.5 | 105.5 | 106.0 |
| 1970  i | 109.7 | 104.6 | 106.1 | 108.5 | 110.1 | 107.0 | 109.2 | 106.5 | 107.8 | 107.9 |
| ii | 113.6 | 105.8 | 108.1 | 108.8 | 110.6 | 108.1 | 109.3 | 107.0 | 111.4 | 110.1 |
| iii | 112.4 | 107.3 | 110.3 | 111.2 | 114.4 | 109.5 | 124.2 | 110.5 | 114.6 | 112.0 |
| iv | 113.0 | 107.7 | 113.4 | 112.4 | 118.6 | 111.9 | 126.0 | 118.5 | 117.8 | 114.3 |

charged by state-sponsored bodies (e.g. bus-fares, electricity rates, etc.). Although all of these are subject to more or less direct government control, it was thought preferable to treat them as payment for services.

(c) No account has been taken of the impact of subsidies on the consumer price index. Although in National Accounts terms subsidies are regarded as negative indirect taxes, such a procedure appears neither possible nor appropriate in considering the price as distinct from the income and expenditure effects of subsidies. Thus changes in the officially controlled prices of, for instance, milk and dairy produce have not been regarded as reflecting changes in indirect tax rates.

(d) Customs duties were also ignored, on the practical grounds that it would have been virtually impossible to distinguish between home-produced and imported goods. This is no disadvantage, however, since it permits the use of price indices for imported goods as independent variables in the regression analysis.

(e) Finally, it must be emphasised that the 'net of tax' indices provide nothing more than an estimate of that proportion of the increase in prices since 1958 which can be attributed to all factors other than the immediate impact of changes in the rates of indirect taxation. It should not be inferred from this that they show how prices would have moved in the period, if indirect taxes had remained at their 1958 level. Obviously, such an unlikely occurence would have necessitated radical changes in the pattern of government expenditure or impossibly high rates of direct taxation, which would in turn have had repercussions on all the major economic variables, including the consumer price index itself.

Keeping these reservations in mind, we may now consider Table 4, which gives the end results of the calculations described earlier. These are a group of indices corresponding to the indices in Table 1, but from which the estimated effects of indirect tax changes since 1958 have been netted out.[13]

To facilitate comparison between Tables 1 and 4, Table 5 has been constructed,

TABLE 5: TAX SHARE OF PRICE INCREASES 1958–NOV. 1970

| | Published index Feb. 1958 = 100 | "Net of tax' index Feb. 1958 = 100 | % of increase in price since Feb. 1958 attributable to changes in indirect taxation. |
|---|---|---|---|
| All Items ... ... ... | 166.8 | 151.6 | 22.8 |
| Food ... ... ... ... | 151.3 | 145.1 | 12.0 |
| Drink and Tobacco ... ... | 198.7 | 135.3 | 64.3 |
| Clothing and Footwear ... | 143.9 | 138.0 | 13.5 |
| Fuel and Light ... ... | 139.9 | 134.2 | 14.5 |
| Housing[1] ... ... ... | 204.2 | 200.6 | 3.5 |
| Durable Household Goods ... | 146.6 | 132.9 | 29.4 |
| Other Goods ... ... ... | 210.0 | 196.6 | 12.1 |
| Transport ... ... ... | 187.2 | 166.9 | 23.2 |
| Services and Related Expenditure ... ... | 178.1 | 174.0 | 5.3 |

[1] Note: Rates are not excluded from the "net of tax" index for the Housing group.

[13]The year 1958 was chosen as a starting point since it coincides with a relatively long period of stability in the level of indirect taxation.

CHART 4. ACTUAL AND "NET OF TAX" INDICES:
ALL ITEMS

CHART 4. ACTUAL AND "NET OF TAX" INDICES: ALL ITEMS
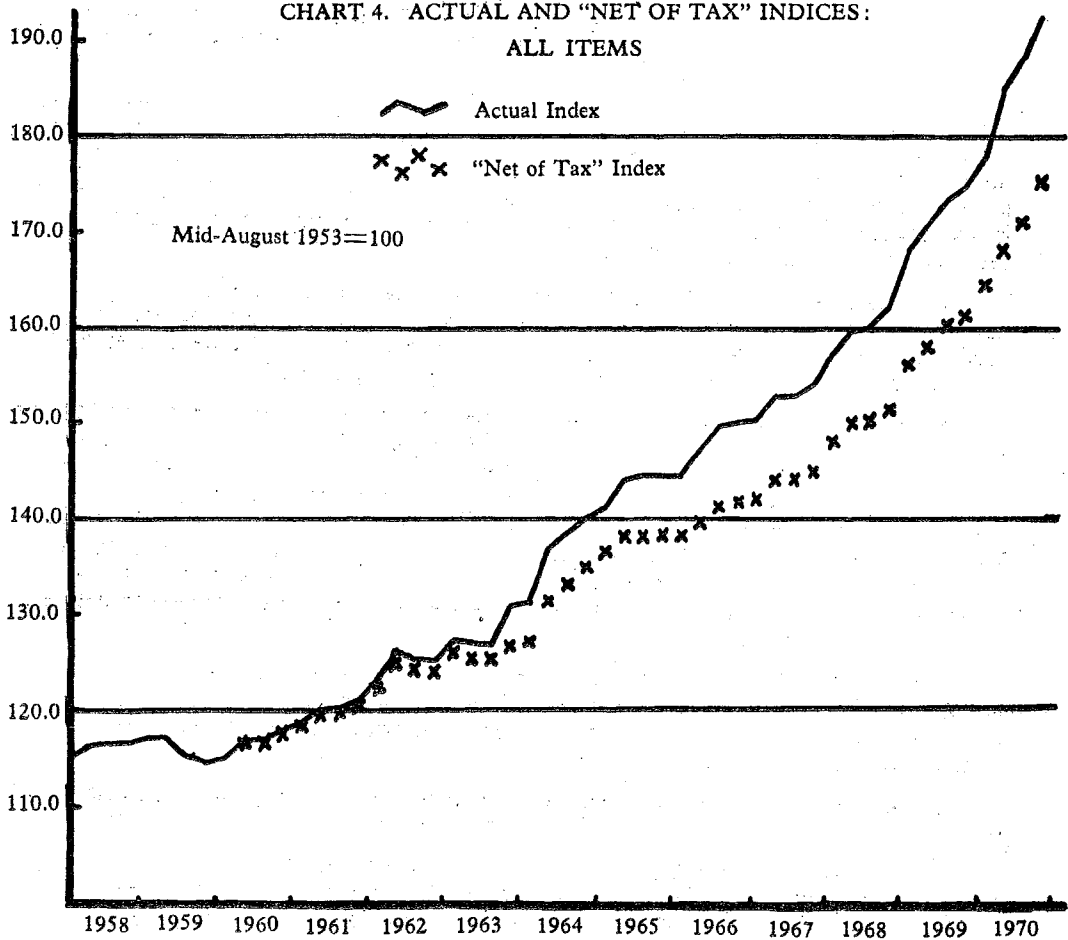
giving both the actual and the "net of tax" indices in May 1970 for all items and for the nine commodity groups, this time with base February 1958=100. The proportion of the increase in prices since that date which can be attributed to changes in indirect taxation is also given.

As already explained, the degree of accuracy in estimating the impact of different taxes varies considerably. Nevertheless column 3 of Table 5 may reasonably be regarded as indicating the relative impact of indirect taxes on different commodity groups. Thus, of the overall increase in consumer prices since 1958, just under one quarter is due to tax, though this figure varies greatly between commodity groups, ranging from 12 per cent for Food to 67 per cent for Drink and Tobacco. This contrast is best brought out by considering Charts 4, 5 and 6, which compare the actual with the "net of tax" indices for All Items, for Food and for Drink and Tobacco.

An alternative method of illustrating the effect of indirect taxes on the consumer price index is to construct an index which excludes all such taxes, whether imposed

CHART 5. ACTUAL AND "NET OF TAX" INDICES:
FOOD



CHART 5. ACTUAL AND "NET OF TAX" INDICES: FOOD
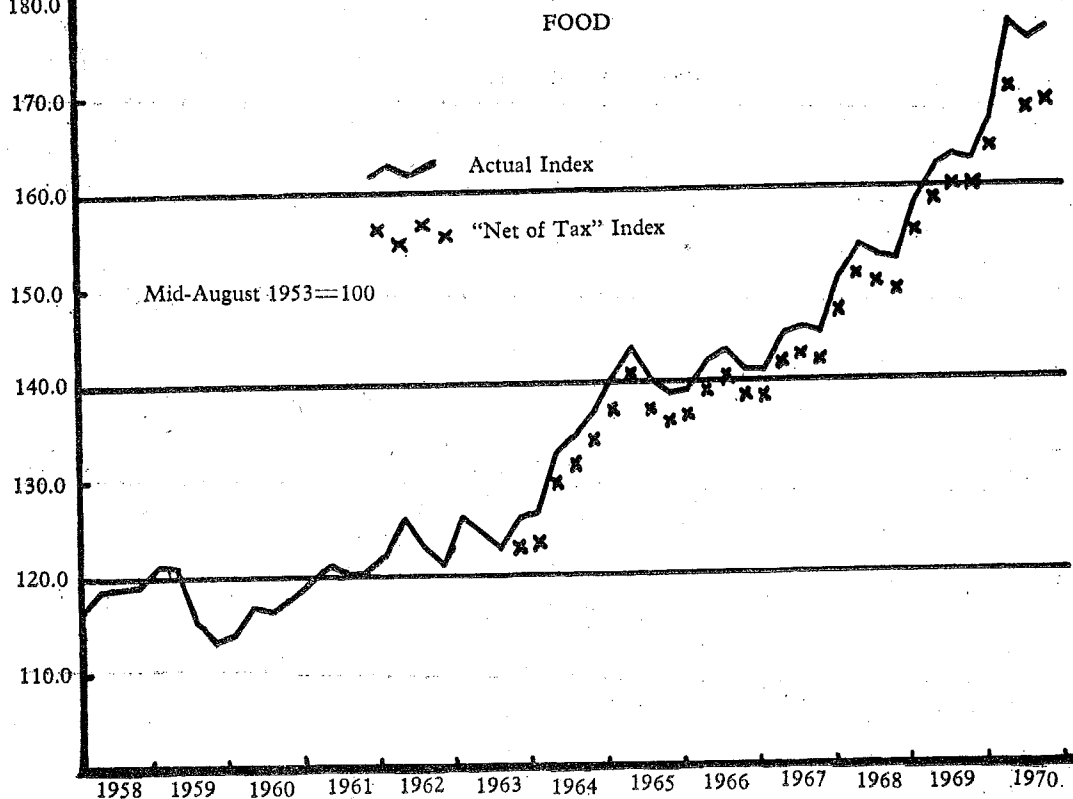
before or after February 1958.[14] It will be remembered that the indices in Table 4 take no account of taxes already in effect on that date: they merely show how prices have moved since then, if the effects of additional taxes are excluded.

However, by estimating the tax content in February 1958 of all the items included in the consumer price index, we have been able to construct a "tax free" index.[15] This index is compared in Chart 7 with the published index, both to base February 1958=100. We have already seen (in Table 5), that increased indirect taxes have been responsible for almost one quarter of the increase in prices between 1958 and 1970. Now, in addition, the difference in slope of the two indices in Chart 7, reveals that indirect taxes have been increasing at a faster rate than the consumer price index itself.

[14]No account is taken of the possibility that if indirect taxes in force in 1953 are eliminated this would alter the weighting pattern in the base year. By implication it is thus assumed that each commodity group had a price elasticity of unity in the base year.

[15]The authors are grateful to the Office of the Revenue Commissioners, Dublin Castle, for supplying the data on which this index is based.

Because of the wide margin of error involved, no attempt was made to construct such an index for each commodity group. In addition, due to the problems of estimating the tax content of all the items included in the 1968 consumer price index, it was not thought feasible to extend the "tax-free" index beyond 1968.

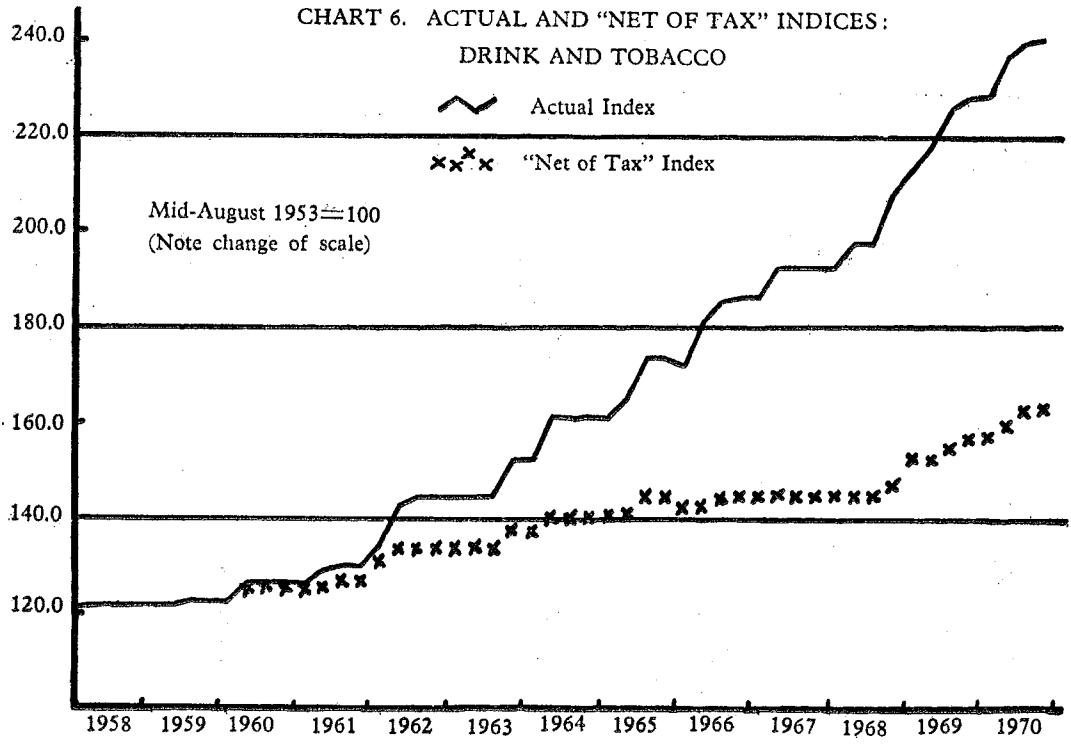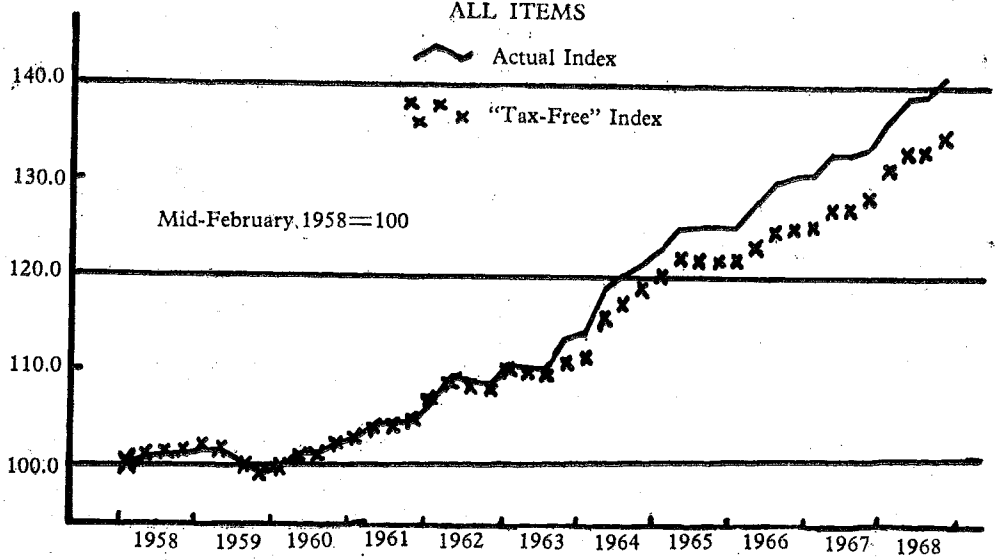CHART 6. ACTUAL AND "NET OF TAX" INDICES:
DRINK AND TOBACCO

⌇ Actual Index

✗✗✗✗ "Net of Tax" Index

Mid-August 1953=100
(Note change of scale)

CHART 7. ACTUAL AND "TAX-FREE" INDICES:
ALL ITEMS

⌇ Actual Index

✗✗✗ "Tax-Free" Index

Mid-February, 1958=100

31

| Quarter | | | | Consumer Price Index, Net of Tax, Uncorrected for change in weighting | Linked Net of Tax Index |
|---|---|---|---|---|---|
| | | | | Base: Mid-August 1953=100 | |
| 1958 I ... | ... | ... | ... | 115.4 | 115.6 |
| II | | | | 116.6 | 116.8 |
| III | ... | ... | ... | 116.9 | 117.0 |
| IV | ... | ... | ... | 116.9 | 117.1 |
| 1959 I ... | ... | ... | ... | 117.7 | 117.8 |
| II | | | | 117.6 | 117.8 |
| III | ... | ... | ... | 115.6 | 116.0 |
| IV | ... | ... | ... | 114.9 | 115.4 |
| 1960 I ... | ... | ... | ... | 115.4 | 116.0 |
| II | | | | 117.0 | 117.5 |
| III | ... | ... | ... | 116.9 | 117.5 |
| IV | ... | ... | ... | 117.9 | 118.5 |
| 1961 I ... | ... | ... | ... | 118.7 | 119.3 |
| II | | | | 119.8 | 120.4 |
| III | ... | ... | ... | 120.0 | 120.6 |
| IV | ... | ... | ... | 120.6 | 121.2 |
| 1962 I ... | ... | ... | ... | 122.8 | 123.6 |
| II | | | | 125.2 | 126.0 |
| III | ... | ... | ... | 124.4 | 125.3 |
| IV | ... | ... | ... | 124.1 | 125.2 |
| 1963 I ... | ... | ... | ... | 126.3 | 127.1 |
| II | | | | 125.9 | 126.8 |
| III | ... | ... | ... | 125.8 | 126.9 |
| IV | ... | ... | ... | 127.0 | 128.2 |
| 1964 I ... | ... | ... | ... | 127.6 | 128.8 |
| II | | | | 131.9 | 133.2 |
| III | | | | 133.6 | 134.9 |
| IV | ... | ... | ... | 135.2 | 136.4 |
| 1965 I ... | ... | ... | ... | 136.6 | 137.7 |
| II | | | | 138.7 | 139.7 |
| III | ... | ... | ... | 138.4 | 139.8 |
| IV | ... | ... | ... | 138.5 | 140.1 |
| 1966 I ... | ... | ... | ... | 138.6 | 140.1 |
| II | | | | 140.0 | 141.4 |
| III | ... | ... | ... | 141.8 | 143.7 |
| IV | ... | ... | ... | 142.0 | 144.2 |
| 1967 I ... | ... | ... | ... | 142.2 | 144.4 |
| II | | | | 144.1 | 146.2 |
| III | ... | ... | ... | 144.2 | 146.2 |
| IV | ... | ... | ... | 145.2 | 147.5 |
| 1968 I ... | ... | ... | ... | 148.4 | 150.8 |
| II | | | | 150.1 | 152.4 |
| III | ... | ... | ... | 150.5 | 153.0 |
| IV | ... | ... | ... | 151.8 | 154.6 |
| 1969 I ... | ... | ... | ... | 156.3 | 159.2 |
| II | | | | 158.3 | 161.2 |
| III | ... | ... | ... | 160.3 | 163.2 |
| IV | ... | ... | ... | 161.6 | 164.6 |
| 1970 I ... | ... | ... | ... | 164.6 | 167.6 |
| II | | | | 168.2 | 171.2 |
| III | ... | ... | ... | 171.4 | 174.5 |
| IV | ... | ... | ... | 175.0 | 178.2 |

Notes to Table 6:—

Col. 1: Reproduced from last column of Table 4.

Col. 2: Up to November 1968, this index was constructed by applying the logarithmically shifting weights underlying column 3 of Table 3 to the last column of Table 4.

After November 1968, it is assumed that the weights of the 1968 consumer price index continue to hold.

They have, therefore, been increasing proportionately as well as absolutely. In fact, indirect taxes accounted for 8.5 per cent of the consumer price index, in February 1958, and for 12.7 per cent in November 1968: an increase of almost 50 per cent in less than eleven years.

### §4.6   Linked Index net of tax

It was demonstrated in §4.2 that the abrupt change of weighting when the 1968 consumer price index replaces the 1953 index causes some degree of discontinuity in the series. It has also been argued in §4.5 that the impact of indirect taxes might well obscure econometric relationships between prices and other variables. The final stage of the exercise is therefore to attempt to construct a smoothly linked index, net of tax changes since 1958.

The logarithmically shifting weights underlying column 3 of Table 3 have been applied to the "net of tax" indices for commodity groups set out in Table 4. The resulting "linked net of tax" index is shown in Table 6. As in the case of the "tax free" index, the method implies a unitary price elasticity for each commodity group. Resting as it does on this heroic assumption, along with the equally unrealistic assumption that the weights of each commodity group have changed smoothly over time from their 1953 to their 1968 pattern, and allowing for some inevitable degree of arbitrariness in the calculation of tax effects, the index must of course be regarded as rather experimental. However, in the absence of a continuous Household Budget Inquiry, such arbitrary assumptions are unavoidable, and, despite its artificality, this index could well prove a useful tool in the regression analysis in Part 2 of this Study.

### §4.7   Summary and Conclusions

This article has discussed some problems suggested by the movement of the consumer price index over the last twelve years. While it will be remembered that the main object of the exercise was to derive suitable variables for econometric analysis, some of the conclusions reached may be of interest in themselves. They are therefore summarised below.

1. Between February 1958 and November 1970, the published consumer price index increased by almost exactly two-thirds, with the fastest increases occurring in the Drink and Tobacco, Other Goods, and Housing groups.

2. The rate of increase of the overall index has varied considerably in this period, with a noticeable acceleration since 1968 particularly evident.

3. A comparison between the 1953 and 1968 indices suggests that this acceleration may be due partly to the change of index itself. While the 1968 index can be taken as an accurate measure of the movement of consumer prices since its introduction, their movement in the years immediately prior to 1968 appears to have been somewhat underestimated by the 1953 index.

4. This element of "index bias" may introduce some error when the two indices are linked to form a continuous series, and suggests the need for a more frequent revision of the weighting scheme used in computing the consumer price index. In the meantime an attempt has been made to overcome the difficulty by constructing an index based on a gradual change of the weighting pattern between 1953 and 1968. This is presented in Table 3.

5. The imposition of price control does not render invalid the use of regression analysis to study the movement of consumer prices, though its existence should be kept in mind in interpreting the results.

6. The immediate impact of increases in indirect taxes is estimated to have been responsible for almost one quarter of the increase in the consumer price index since 1958. However, this percentage varies greatly between different commodity groups, the figure for Food being only 12% while that for Drink and Tobacco is over two thirds.

As well as accounting for a large proportion of the increase in prices since 1958, indirect taxes have also increased their share of the total consumer price index. It is estimated that the tax content of the index increased by one half beween February 1958 and November 1968. Indices net of indirect tax have been constructed and are presented in Tables 4 and 6.

### Appendix: Retail Sales Deflator

The primary short term indicator of consumer expenditure in Ireland is the index of weekly retail sales. Although the coverage of this index is not co-terminous with total personal consumption—the principal differences being that the index does not cover housing and certain other services but does include tourists' expenditure—it is nevertheless a valuable proxy for the National Accounts item, personal expenditure on current goods and services.

The index is published in value terms, that is, reflecting changes in both the volume and the price of retail sales. For many analytical purposes, the economist is interested in the volume, as distinct from the value, of consumption. To obtain volume figures it is necessary to deflate the value series by an appropriate price index. A crude approximation to a volume index can be obtained by deflating by the consumer price index. This procedure is sufficient to indicate substantial movements in the volume of sales, and has on occasion been used in the Quarterly Economic Commentary.

However, the consumer price index, being based on the pattern of total consumer expenditure, (from the Household Budget Inquiry), is not really appropriate for deflating the retail sales index, which is based on the pattern of sales through different types of retail outlet (from the Census of Distribution). Because of this difference of structure, no complete reconciliation of coverage of the two indices is possible. Nevertheless, by removing the more obvious divergences, the coverage of the consumer price index can be brought much closer into line with the pattern of goods and services sold through retail outlets.

The disaggregation of the consumer price index carried out in this study enabled these adjustments to be made more or less as a by-product to the main exercise. Because of its possible interest to other researchers in this field, this "retail sales deflator" is shown in Table A.1, together with the resulting "volume of retail sales index". It should be stressed that these series are still somewhat experimental, although it is hoped that they may prove useful in short-term economic analysis.

| Quarter | | | Retail Sales Index (as published) | Retail Sales Index Deflator (see text) | Volume of Retail Sales Index |
|---|---|---|---|---|---|
| | | | Base: Average for year 1961 = 100 | | |
| 1961 | I | ... ... | 90 | 99.1 | 91 |
| | II | ... ... | 99 | 100.5 | 99 |
| | III | ... ... | 101 | 100.1 | 101 |
| | IV | ... ... | 109 | 100.3 | 109 |
| 1962 | I | ... ... | 96 | 102.1 | 94 |
| | II | ... ... | 106 | 105.3 | 101 |
| | III | ... ... | 107 | 104.2 | 103 |
| | IV | ... ... | 118 | 103.4 | 114 |
| 1963 | I | ... ... | 101 | 105.7 | 96 |
| | II | ... ... | 113 | 105.2 | 107 |
| | III | ... ... | 115 | 104.6 | 110 |
| | IV | ... ... | 125 | 107.8 | 116 |
| 1964 | I | ... ... | 109 | 108.3 | 101 |
| | II | ... ... | 123 | 113.2 | 109 |
| | III | ... ... | 128 | 114.2 | 112 |
| | IV | ... ... | 137 | 115.4 | 119 |
| 1965 | I | ... ... | 119 | 117.0 | 102 |
| | II | ... ... | 132 | 119.5 | 110 |
| | III | ... ... | 135 | 119.4 | 113 |
| | IV | ... ... | 141 | 118.9 | 119 |
| 1966 | I | ... ... | 120 | 118.9 | 101 |
| | II | ... ... | 130 | 121.7 | 107 |
| | III | ... ... | 142 | 123.3 | 115 |
| | IV | ... ... | 148 | 122.8 | 121 |
| 1967 | I | ... ... | 127 | 122.9 | 103 |
| | II | ... ... | 139 | 125.4 | 111 |
| | III | ... ... | 144 | 126.0 | 114 |
| | IV | ... ... | 154 | 126.2 | 122 |
| 1968 | I | ... ... | 135 | 128.9 | 105 |
| | II | ... ... | 151 | 131.4 | 115 |
| | III | ... ... | 157 | 131.3 | 120 |
| | IV | ... ... | 170 | 132.7 | 128 |
| 1969 | I | ... ... | 146 | 137.0 | 107 |
| | II | ... ... | 170 | 139.9 | 121 |
| | III | ... ... | 176 | 142.2 | 124 |
| | IV | ... ... | 186 | 142.9 | 130 |
| 1970 | I | ... ... | 168 | 145.1 | 116 |
| | II | ... ... | 180 | 151.8 | 119 |
| | III | ... ... | 188 | 153.4 | 123 |
| | IV | ... ... | 209 | 155.2 | 135 |
| | | | Base: Average for year 1968 = 100 | | |
| 1968 | I | ... ... | 88 | 98.3 | 89 |
| | II | ... ... | 98 | 100.3 | 98 |
| | III | ... ... | 103 | 100.2 | 103 |
| | IV | ... ... | 109 | 101.2 | 108 |
| 1969 | I | ... ... | 96 | 104.5 | 92 |
| | II | ... ... | 111 | 106.7 | 104 |
| | III | ... ... | 115 | 108.5 | 106 |
| | IV | ... ... | 122 | 109.0 | 112 |
| 1970 | I | ... ... | 110 | 110.7 | 99 |
| | II | ... ... | 118 | 115.8 | 102 |
| | III | ... ... | 123 | 117.0 | 105 |
| | IV | ... ... | 137 | 118.4 | 115 |