

The Recent Price Trend in Ireland

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"I have no sympathy with the sentimentalists who hold that we should surround children with an artificial happiness shutting out from their ken pain and sorrow and retribution and the world's law of unending strife; the keynote of the school-life I would desiderate is *effort* on the part of the child himself, struggle, sacrifice, self-discipline."¹

IN the first section we set out the major price trends since 1958 and indicate the principal cause of price inflation. In later sections we examine the effects of productivity, wage and profit rates, prices of imports and exports on (a) the general level of internal prices and (b) prices in different sectors of the economy, using the Input, Output technique, with particular regard to what seems likely to happen price-wise in 1970.

Prices 1958-1969

Table 1 shows most of the macro price indexes during the period 1958 (as 100). Attention is directed to the Notes to the table, especially for their emphasis on the speculative character of most of the figures for 1969.

This qualification does not apply to the consumer price indices in columns 9 and 10, which are official and definitive. In [3] it was shown that in the whole postwar period to 1966 the trend in consumer prices in Ireland and the United Kingdom were closely similar. The reason is not to be found in import prices, as column 4 clearly shows; rather, probably, because the persisting tendency for money incomes to exceed productivity was similar in degree in both countries. Also similar are the figures in columns 5 and 9, as might be expected, enabling us to make a confident estimate for the price index for personal expenditure (column 5) and hence for GNP (column 2) in 1969.

In [3] it was suggested that in future close regard should be had to comparative price trends in the two countries, in the interest of Ireland's export competitiveness, expressing the hope that, at least, the similarity in trend would continue. This hope has not been realized. In 1966 the difference between the indexes was 1.6

1. P. H. Pearse (quoted by Patrick O'Connor in *Hibernia*, 6 February 1970).

TABLE I: Selected Price Indexes. A: Macro Price and Unit Cost Indexes, 1958 to 1969 (1958 as 100)
B: Percentage Year-to-Year Increases in A

| Year | Implicit | | | | Unit Cost | | | Consumer price | |
|---|----------|--------|--------|------------------|-----------------|--------------|--------------|----------------|----------------|
| | GNP | Export | Import | Personal expend. | Employee remun. | Other income | Total income | Ireland | United Kingdom |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <i>A. Price indexes</i> | | | | | | | | | |
| 1958 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1959 | 100.7 | 102.7 | 98.0 | 100.4 | 99.4 | 103.9 | 101.3 | 100.0 | 100.6 |
| 1960 | 102.4 | 101.7 | 99.6 | 101.2 | 103.2 | 106.6 | 104.7 | 100.4 | 101.6 |
| 1961 | 105.0 | 101.6 | 100.5 | 103.6 | 107.5 | 109.2 | 108.3 | 103.2 | 105.0 |
| 1962 | 111.1 | 103.1 | 101.0 | 107.6 | 115.7 | 111.1 | 115.0 | 107.6 | 109.5 |
| 1963 | 114.4 | 105.2 | 102.8 | 110.4 | 120.6 | 112.3 | 117.0 | 110.2 | 111.6 |
| 1964 | 122.6 | 110.4 | 104.1 | 117.5 | 132.3 | 118.8 | 126.5 | 117.6 | 115.3 |
| 1965 | 128.5 | 112.7 | 106.8 | 122.6 | 138.8 | 119.1 | 130.3 | 123.5 | 120.8 |
| 1966 | 133.3 | 114.8 | 107.2 | 126.7 | 148.2 | 115.5 | 134.1 | 127.2 | 125.6 |
| 1967 | 137.5 | 115.2 | 106.5 | 130.5 | 151.4 | 122.0 | 138.8 | 131.2 | 128.7 |
| 1968 | 143 | 123 | 115 | 136 | 156 | 129 | 144 | 137.4 | 134.7 |
| 1969 | 153 | 129 | 122 | 146 | 169 | 133 | 153 | 147.6 | 142.0 |
| <i>B. Year-to-year percentage increases</i> | | | | | | | | | |
| 1958-9 | 0.7 | 2.7 | -2.0 | 0.4 | -0.6 | 3.9 | 1.3 | — | 0.6 |
| 1959-60 | 1.7 | -1.0 | 1.6 | 0.8 | 3.8 | 2.6 | 3.4 | 0.4 | 1.0 |
| 1960-1 | 2.5 | 0.0 | 0.9 | 2.4 | 4.2 | 2.4 | 3.4 | 2.8 | 3.3 |
| 1961-2 | 5.8 | 1.5 | 0.5 | 3.9 | 7.6 | 1.7 | 6.2 | 4.3 | 4.3 |
| 1962-3 | 2.9 | 2.0 | 1.8 | 2.6 | 4.2 | 1.1 | 1.7 | 2.4 | 2.0 |
| 1963-4 | 7.2 | 4.9 | 1.3 | 6.4 | 9.7 | 5.8 | 8.3 | 6.7 | 3.3 |
| 1964-5 | 4.9 | 2.2 | 2.6 | 4.3 | 4.9 | 0.8 | 5.1 | 5.0 | 4.8 |
| 1965-6 | 3.7 | 1.9 | 0.4 | 3.3 | 6.8 | -3.0 | 2.9 | 3.0 | 3.9 |
| 1966-7 | 3.2 | 0.3 | -0.7 | 3.0 | 2.2 | 5.6 | 3.5 | 3.1 | 2.5 |
| 1967-8 | 4 | 6 | 8 | 4 | 3 | 6 | 4 | 4.7 | 4.7 |
| 1968-9 | 7 | 5 | 6 | 7 | 8 | 3 | 6 | 7.4 | 5.4 |

Basic Sources: [1], [5].

Notes: Cols. 2-5 Quotient ($\times 100$) of current and constant prices values.

Col. 6 Quotient ($\times 100$) of employee remuneration and GNP at constant prices.

„ 7 Quotient ($\times 100$) of other income and GNP at constant prices.

„ 8 Quotient ($\times 100$) of total income and GNP at constant prices.

„ 9 Consumer Price Index (Ireland).

„ 10 Index of Retail Prices (UK).

We are indebted to our Institute colleagues T. J. Baker and J. Durkan for their assistance in making the estimates in cols. 2-8 for 1969; they are, however, solely the responsibility of the authors.

points, widening to 5.6 points in 1969, with a marked rise in 1969. Having regard to the close similarity for a long period before, the seriousness of this aberration will be evident. The restoration of the parity, in the interest of our great exports to UK, will obviously be a difficult task. At present we are pricing ourselves out of the British market.

The most comprehensive price index is that of GNP (column 2) 153 in 1969, having risen by 7 per cent in 1968-1969 and certain to rise by a like amount in 1970. As section B shows, the annual rate in 1968-1970 will have been twice as high as in the ten preceding years. There cannot be any doubt that the nation is in a grave inflationary situation and shows no signs of emerging therefrom without intervention.

Columns 6-8 are designed to throw light on the cause of inflation. In 1969 the index cost of employee remuneration was 169, far in advance of the index for Other income of 133. (It may be noted that Other income includes farm income, rent, professional earning as well as profit (or interest on capital) which, in fact, is only a small fraction of the total.) Tentative analysis in [3] showed that earnings on capital—and volume of gross fixed capital formation more than doubled between 1958 and 1969—was inflationary in only minor degree. Wage push is seen to be the major cause of inflation since 1966. Trade union claims realized and pending are of a different order of magnitude from those of previous wage rounds and our conjecture of a 10 per cent rise in 1970 for the whole employee class may well be on the low side.

One effect of the different trends in unit cost of employee remuneration and of other income is that the employee share of added value (= total income) increased from 57 per cent to 63 per cent between 1958 and 1968. The similarity of the price or cost indexes of GNP (column 2) and total income (column 8) is due to the fact that total income is a large part of GNP at current prices, each subject to the same divisor, GNP at constant prices.

Relations between Price, Incomes, Productivity and Balance of Payments

We have heard and read so much about such terms as productivity, price, income, balance of payments and their inter-relationships in purely verbal terms that it seems worth while to set out the points at issue in simple algebra which, at least, has the virtue of brevity. Let Y_0 and Y_1 be the values of income in the years 0 and 1. We assume, for simplicity, that income = expenditure, i.e. that saving is nil. Let Y'_1 be the value of expenditure in year 1 at year 0 prices and let the number of income earners be the same in the two years. Then, as indexes (to base year 0 as unity),

$$\begin{array}{ll} \text{income} & w = Y_1/Y_0, \\ \text{productivity} & \pi = Y'_1/Y_0, \\ \text{price} & p = Y_1/Y'_1, \end{array}$$

$$p = \frac{Y_1}{Y_0} \cdot \frac{Y_0}{Y'_1}$$

whence it follows that $p = w/\pi$. This fundamental identity, though developed only for a trivially simple case, is almost universally true. It requires qualification

in only one respect: if export prices rise more than import prices, the effect is the same as a rise in productivity. As the identity stands, however, we infer that if the money wage index outstrips productivity, prices will rise. The result applies to each sector as well as to the whole economy.

In this article we have constant recourse to what are termed "accounting identities", i.e. inevitabilities in cause-effect phenomena. One inevitability is that pay rises greater than productivity rises will cause price rises. Experience does not support the hope that wage increases can be met without price rises by making sufficient inroads into the earnings of farmers and non-wage incomes of others.

The outstanding characteristics of inflation are (1) increase in prices, and (2) worsening of the current balance of payments. These phenomena are related, the common cause being rise in incomes, uncompensated by a rise in productivity. D. McAleese [9] has, in fact, estimated that a £1 rise in income in Ireland will induce a rise of £0.8 in imports, a marginal ratio therefore far larger than the average ratio (imports to GNP) of about 0.4. An uncompensated rise in income will cause a rise in prices and a rise in imports, and hence a rise in the import balance since, at the best, exports will be unchanged. If, on the other hand, incomes rise through a rise in productivity, prices will be unchanged and the rise in imports can be compensated by a rise in exports cancelling the rise in imports. This, of course, is very rudimentary—in actual practice there can be all kinds of effects—but on broad lines it is true enough.

Prices in the Whole Economy

As an introduction to full Input-Output (10) treatment we deal first with the national accounting identity income = expenditure which in 10 terminology would be primary input = final demand, the economy being now regarded as of one sector only and interindustry transactions ignored. The accounting identity in question, relating, like the 10 table, to 1964, is as follows:—

| <i>Primary Input</i> | £ million | <i>Per Unit 7</i> |
|--|----------------|-------------------|
| 1. Imports | 369.4 | 0.3779 |
| 2. Indirect taxes | 154.2 | 0.1578 |
| 3. <i>Less</i> subsidies | -33.8 | -0.0346 |
| 4. Wages | 437.0 | 0.4471 |
| 5. Profits | 296.5 | 0.3034 |
| 6. Depreciation, etc. | 92.1 | 0.0942 |
| Total input | 1,315.4 | |
| <i>Final demand</i> | | |
| 7. Goods and services available (input) <i>less</i> exports | 977.4 | 1.— |
| 8. Exports | 338.0 | 0.3458 |

Basic source: [5], Tables A.2, A.5.

We are interested in the effect on price p of item 7 (internal supply of goods and services) of changes in prices or rates in any or all the remaining seven items. After all price changes and with quanta unchanged another identity must transpire, which enables us to calculate p from a simple equation. It is evident that to calculate *change* in p , namely, Δp , we have only to add the contributions of the separate items, leaving change in labour productivity out of account. If the money wage multiplier is $(1 + k)$ and the productivity factor $(1 + \tau)$ with w the basic unitary value ($= .4471$) above, the *change* in wages, as affecting prices is

$$(1) \quad \frac{w(1 + k)}{1 + \tau} - w = \frac{w(k - \tau)}{1 + \tau}$$

and *not* wk .

As an example: there are some grounds² for thinking that percentage changes, in order, of the seven item 1—6 and 8 between 1969 and 1970 will be 5, 9, 15, (10) 5, 5 and 4. The productivity factor is 1.035, i.e. 3.5 per cent increase in productivity. The latter figure and those for items 2 and 3 are average annual percentages obtaining during the period 1958—1967. Using (1) the true increase in wages is $(0.10 - 0.035)/1.035 = 0.063$. The unitary price increase

$$\begin{aligned} \Delta p &= .3779 \times .05 + .1578 \times .09 - .0346 \times .15 \\ &+ .4471 \times .063 + .3034 \times .05 + .0942 \times .0 \\ &- .3458 \times .04 = 0.057 \end{aligned}$$

or 6 per cent increase, say.

Sectoral Price Changes

In [2], on theoretical lines, the method was indicated of deriving the effect of rises in income and of other primary input on the prices of output of the different sectors of the economy using an input-output (10) table. During the past month the first official Input-Output Tables for Ireland have been published. The Report is a document of the first importance and CSO is to be warmly congratulated on its appearance. While it contains three analyses of interindustry transactions, of 17, 33, 92 industrial groups, with inversion of the $I - A$ matrix for each, in what follows we confine attention to the 17-sector table, as possibly adequate for our prices problem. The tables relate to the single year 1964.

It seemed to us that the 10 table for price study required modification in two respects (i) the fact that year-to-year changes in export prices are normally lower than in home prices—see Table 1—and (ii) annual increase in labour productivity.

Prices

In the Irish context (perhaps, indeed, in all contexts) exports require special treatment. To quote from [2]:—

“On one point the hypothesis that all outward (i.e. from each sector) flows

2. See footnote 4.

have the same price index is scarcely tenable, namely as regards export prices. If wages and/or import prices increase it might be reasonable to assume that home sales (interindustry as well as final demand) could be made uniformly to bear the brunt, but surely not export prices, determined by final demand."

In the basic IO table, with n sectors ($n = 17$ in the Irish table we use), let

- X_i = gross output, sector i
- X_{ij} = sales (sellers' prices), sector i to sector j
- E_j = exports, sector j
- B_j = primary input, sector j
- π_j = given price, etc. index, primary input, sector j
- p_{ie} = given export price index, sector i
- p_i = internal price index, sector i , to be determined
- i, j = $1, 2, \dots, n$.

We express all values in terms of basic gross outputs, thus—

$$\begin{aligned} X_{ij} &= a_{ij}X_j, \\ E_j &= e_jX_j, \\ B_j &= b_jX_j, \end{aligned}$$

$$e_j = \frac{E_j}{X_j}$$

introduce the vectors—

$$\begin{aligned} \mathbf{c} &= \{b_1\pi_1, b_2\pi_2, \dots, b_n\pi_n\}, \\ \mathbf{d} &= \{e_1p_{1e}, e_2p_{2e}, \dots, e_np_{ne}\} \end{aligned}$$

and \mathbf{e} a square matrix with e_i in the principal diagonal and zeroes elsewhere.

On price adjustment, the fundamental set of column = row identities become—

$$(5) \sum_{i=1}^n X_{ij}p_i + B_j\pi_j = (X_j - E_j)p_j + E_jp_{je}, \quad j = 1, 2, \dots, n,$$

which, on substitution, transposition and division across by X_j , yields the solution for $\mathbf{p} = \{p_1, p_2, \dots, p_n\}$, transpose \mathbf{p}' —

$$(6) \mathbf{p}' = (\mathbf{c} - \mathbf{d})' (\mathbf{I} - \mathbf{A} - \mathbf{e})^{-1},$$

where \mathbf{A} is the square $[a_{ij}]$ matrix.

In the foregoing analysis primary input has been regarded as a single row. The modifications are obvious if there are several rows.

It is useful to note that if the prefix Δ is taken as indicating *percentage changes*, (6) assumes the form—

$$(7) (\Delta\mathbf{p})' = (\Delta\mathbf{c} - \Delta\mathbf{d})' (\mathbf{I} - \mathbf{A} - \mathbf{e})^{-1}.$$

This is obvious from (5). In form (7) it is also obvious (i) that the solutions in Δp of percentage price increases for single primary inputs are additive and (ii) if $(\Delta c - \Delta d)$ be multiplied by a constant scalar k the solution will be $k \Delta p$. The properties lend great flexibility to later application.

Labour Productivity

So far no allowance has been made for the increasing labour productivity effect, a permanent feature of economic advance. We shall show how, by lowering the values of the coefficients B_j , and hence the elements of the vector c in (6) and (7), the solution vector p is lower than it would be without allowance for productivity. The adjustment is very easily made, on lines already indicated for the whole economy. It may be illustrated by reference to sector (3)—Food. The basic 10 unitary cost column may be summarized as follows:—

| | |
|---|---------|
| Interindustry input (home-produced) from each of 17 sectors, aggregating | 0.8170 |
| <i>Primary input</i> | |
| Import | 0.0739 |
| Indirect taxes | 0.0023 |
| Less subsidies | -0.0322 |
| Wages, etc. | 0.1040 |
| Profits | 0.0168 |
| Depreciation | 0.0182 |
| | <hr/> |
| Total input = total output | 1.0000 |

Annual average increase in labour productivity in the Food sector is estimated as 3.0 per cent. Hence, after allowance for productivity change but before changes in wages and, in consequence, prices, we can state that the unit of output is now produced by 0.1010 units of labour instead of 0.1040. The other elements of cost will be unchanged including, on the output side, the export proportion 0.2892 for Food. All the figures quoted here relate to the 10 year 1964. Finally, the price = total cost identity (in form (7)) is written down, assuming a 10 per cent rise in money wages, and a 4 per cent rise in exports for equation (3) of the 17 equation system.

$$(0.8170\Delta p) + 0.1010 \times 0.11 = (1 - 0.2892)\Delta p_3 + 0.2892 \times 0.04,$$

where the expression in brackets () on the left stands for a sum-product in the Δp_i . The 17 values of the Δp_i are found from the 17 linear simultaneous equations.

In algebraic terms, let w_j be the unitary wage fraction for sector j ($w_3 = 0.1040$ in the foregoing example). If the annual productivity factor is $(1 + \tau_j)$ then the

productivity-corrected labour input is $w_j/(1 + \tau_j)$. If the wage-factor, assumed the same for all sectors is $(1 + k)$ then the annual change is

$$(8) \Delta \dot{w}_j = w_j(1 + k)/(1 + \tau_j) - w_j \\ = w_j(k - \tau_j)/(1 + \tau_j).$$

As might be expected the unitary wage change for its effect on prices is strongly influenced by the factor $(k - \tau_j)$, the difference between the rises in money wages and productivity.

Admittedly the treatment of labour productivity is somewhat complicated: No such difficulty attaches to allowances for given changes in other primary inputs, imports, indirect taxes, etc. listed above. IO analysis on the lines indicated has the great advantage that each of the inputs can be treated separately, the results being additive, i.e. the aggregate effect of given changes in prices, rates, etc. of imports, etc. are the sum of the sectoral price changes for each input treated separately. Furthermore the results are multiplicative for each input, using a multiplier constant for all sectors.³

Application

K. A. Kennedy and B. R. Dowling [8] have shown that the overall annual increase in labour productivity in *manufacturing industries* has been remarkably stable in different periods of postwar years, at 3.4 per cent per annum. We have found a practically identical figure, namely 3.5 per cent, for the *whole economy* during the period 1958-1967. Major sectoral figures were as follows:—

| At factor cost— | Lab. productivity % per annum |
|--------------------------------|----------------------------------|
| Agriculture, forestry, fishing | 3.8 |
| Industry | 3.6 |
| Government service | 1.8 |
| Other service | 2.4 |
| At market prices—GNP | 3.5 |

Basic sources: Table A.4 in [5]; Table 9 in [6] (sectoral labour force at work).

Within industry, annual average rates of growth of output Q in the 10 industrial sectors were found by grouping of industries as classified in the Census of industrial production. Productivity was calculated there from using Kennedy's 1960-1967 formula [7]—

$$(9) P = 0.82 + 0.478Q.$$

The results were adjusted slightly to bring them into line with the aggregate 3.6 per cent cited above.

3. On account of the isolation of export price from home price in our treatment, certain adjustment was necessary to ensure this multiplicative property for Table 2.

TABLE 2: The $(I-A-e)^{-1}$ Matrix

| Sector | Agriculture, forestry, fishing | Mining, peat | Food | Drink, Tobacco | Textiles except hosiery | Clothing | Wood Furniture | Paper, printing | Chemicals | Clay, cement, glass | Metal, engineering, vehicles | Other Manufactures | New, repair, construction | Electricity, gas, water | Services, except government | Government services | Artificial sectors, n.e.s. |
|-----------------------------------|--------------------------------|--------------|--------|----------------|-------------------------|----------|----------------|-----------------|-----------|---------------------|------------------------------|--------------------|---------------------------|-------------------------|-----------------------------|---------------------|----------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 1. Agriculture, forestry, fishing | 1.9685 | 0.0009 | 1.6655 | 0.1638 | 0.0993 | 0.0505 | 0.1074 | 0.0019 | 0.0231 | 0.0015 | 0.0013 | 0.0019 | 0.0030 | 0.0008 | 0.0033 | 0.0565 | 0.0052 |
| 2. Mining, peat | 0.0977 | 1.0627 | 0.0125 | 0.0109 | 0.0034 | 0.0040 | 0.0038 | 0.0073 | 0.0036 | 0.0639 | 0.0033 | 0.0024 | 0.0588 | 0.0891 | 0.0019 | 0.0136 | 0.0032 |
| 3. Food | 0.2387 | 0.0006 | 1.9337 | 0.0430 | 0.0126 | 0.1038 | 0.0259 | 0.0012 | 0.0263 | 0.0010 | 0.0007 | 0.0004 | 0.0013 | 0.0005 | 0.0035 | 0.0386 | 0.0036 |
| 4. Drink, Tobacco | 0.0002 | 0.0000 | 0.0012 | 1.4512 | 0.0000 | 0.0001 | 0.0000 | 0.0000 | 0.0006 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0002 | 0.0000 |
| 5. Textiles, except hosiery | 0.0067 | 0.0031 | 0.0091 | 0.0055 | 1.7244 | 0.4394 | 0.0605 | 0.0067 | 0.0039 | 0.0047 | 0.0037 | 0.0263 | 0.0059 | 0.0034 | 0.0044 | 0.0075 | 0.0174 |
| 6. Clothing | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 1.5967 | 0.0000 | 0.0007 | 0.0001 | 0.0000 | 0.0001 | 0.0023 | 0.0000 | 0.0001 | 0.0002 | 0.0028 | 0.0004 |
| 7. Wood, furniture | 0.0004 | 0.0011 | 0.0010 | 0.0010 | 0.0006 | 0.0009 | 1.3579 | 0.0064 | 0.0007 | 0.0030 | 0.0062 | 0.0003 | 0.0243 | 0.0005 | 0.0008 | 0.0042 | 0.0033 |
| 8. Paper, printing | 0.0108 | 0.0212 | 0.0333 | 0.0405 | 0.0249 | 0.0369 | 0.0094 | 1.4853 | 0.0277 | 0.0328 | 0.0141 | 0.0118 | 0.0167 | 0.0157 | 0.0211 | 0.0189 | 0.1314 |
| 9. Chemicals | 0.0739 | 0.0021 | 0.0753 | 0.0080 | 0.0069 | 0.0059 | 0.0235 | 0.0214 | 1.3697 | 0.0139 | 0.0111 | 0.0018 | 0.0121 | 0.0016 | 0.0083 | 0.0114 | 0.0121 |
| 10. Clay, cement, glass | 0.0025 | 0.0062 | 0.0056 | 0.0053 | 0.0036 | 0.0046 | 0.0055 | 0.0034 | 0.0039 | 1.2794 | 0.0028 | 0.0017 | 0.1111 | 0.0025 | 0.0042 | 0.0041 | 0.0185 |
| 11. Metal, engineering, vehicles | 0.0337 | 0.0293 | 0.0524 | 0.0375 | 0.0251 | 0.0416 | 0.0442 | 0.0303 | 0.0269 | 0.0283 | 1.3789 | 0.0114 | 0.0950 | 0.0160 | 0.0416 | 0.0168 | 0.1256 |
| 12. Other manufactures | 0.0203 | 0.0314 | 0.0326 | 0.0220 | 0.0198 | 0.0296 | 0.0204 | 0.0179 | 0.0181 | 0.0461 | 0.0831 | 1.2512 | 0.0328 | 0.0742 | 0.0136 | 0.0184 | 0.0448 |
| 13. New, repair, construction | 0.0021 | 0.0017 | 0.0040 | 0.0029 | 0.0020 | 0.0027 | 0.0008 | 0.0018 | 0.0021 | 0.0023 | 0.0011 | 0.0009 | 1.0865 | 0.0013 | 0.0157 | 0.0265 | 0.0097 |
| 14. Electricity, gas, water | 0.0089 | 0.0230 | 0.0206 | 0.0117 | 0.0218 | 0.0191 | 0.0207 | 0.0264 | 0.0119 | 0.0483 | 0.0143 | 0.0146 | 0.0108 | 1.0551 | 0.0085 | 0.0144 | 0.0090 |
| 15. Services except govt. | 0.1383 | 0.1026 | 0.2546 | 0.1740 | 0.1179 | 0.1636 | 0.0496 | 0.1095 | 0.1248 | 0.1450 | 0.0633 | 0.0533 | 0.1574 | 0.0805 | 1.1300 | 0.1525 | 0.5666 |
| 16. Govt. services | 0.0032 | 0.0063 | 0.0105 | 0.0121 | 0.0082 | 0.0105 | 0.0031 | 0.0078 | 0.0091 | 0.0076 | 0.0046 | 0.0039 | 0.0039 | 0.0051 | 0.0030 | 1.0016 | 0.0433 |
| 17. Artificial sectors, n.e.s. | 0.0838 | 0.1666 | 0.2773 | 0.3186 | 0.2149 | 0.2764 | 0.0803 | 0.2043 | 0.2397 | 0.2002 | 0.1217 | 0.1023 | 0.1031 | 0.1332 | 0.0777 | 0.0412 | 1.1399 |

IRISH PRICE TREND

Basic source: [4], Table A.2.

353

The $(I - A - e)^{-1}$ matrix of formula (7) is given in Table 2. The input (row) vector (the so-called $(\Delta c - \Delta d)$ of (7)) is actually

$$(II) \quad -e_j \Delta p_{je} + m_j \Delta p_{jm} + t_j \Delta p_{jt} - s_j \Delta p_{js} + \Delta w_j + f_j \Delta p_{jt}, \\ \Delta w_j = w_j(k_j - \tau_j)/(1 + \tau_j), j = 1, 2, \dots, 17,$$

where the respective terms (with appropriate signs) relate respectively to exports, imports, indirect taxation, subsidy, wages and profit. The unitary coefficients e_j , etc. most of which are given or derivable from Table A1 or A2 of [4]. For convenience these, all the "constants" of our exercise, are reproduced as Table 3. The variables are the Δ inputs and the k_j for wages. When the input vector has been determined the elements of the Δp vector, $\Delta p_1, \Delta p_2, \dots, \Delta p_{17}$ are each found as the sum product of the inputs by the appropriate column of Table 2.

Tables 2 and 3 are designed for a quick appraisal of how cost elements in the inputs affect prices in each of the 17 sectors of the economy, designed for use as inflation gathers momentum during 1970. For instance, when the statistics become available it will be possible to estimate the sectoral price increases to month X, in 1970 compared with the corresponding period in 1969, and to understand precisely, by reference to the input elements, how these increases came about.

Attention is particularly directed to the last three columns of Table 3. We have suggested earlier as plausible the following schedule of cost increases between 1969 and 1970 in the input elements export 4 per cent, import 5 per cent indirect taxes 9 per cent, subsidies 15 per cent, wages 10 per cent, profits 5 per cent, assumed to apply uniformly to all sectors.⁴ These need not, however, be regarded as forecasts here but merely figures for use in showing how the tables are to be used. Thus the first entry in column 11—

$$- \cdot 1974 \times \cdot 04 + \cdot 0503 \times \cdot 05 + \cdot 0326 \times \cdot 09 - \cdot 0240 \times \cdot 15 \\ + \cdot 0539 \times \cdot 062 + \cdot 4483 \times \cdot 05 = \cdot 01971.$$

Finally, the 5.5 per cent increase (column 12, sector 1) is derived as the sum—product of column 11, Table 3, by column 1, Table 2—

$$\cdot 01971 \times 1.9685 + \cdot 03226 \times \cdot 0977 - \cdot 00182 \times \cdot 2387 + \dots + \cdot 01728 \times \cdot 0838 = \cdot 0552.$$

We recall our earlier result, using the same input data, that internal prices in the aggregate would rise by 5.7 per cent. This figure is, of course, consistent with the showing of column 12, the percentages ranging from 4.4 for sector 10 (clay, cement, glass) to 7.4 for government. The magnitude of the latter figure is due mainly to the estimated small rise of productivity in government services, accordingly subject to the qualification that the methodology of estimation of volume (and hence of productivity) of services here and elsewhere is in a primitive

4. The percentage increases for indirect taxes and subsidies are those experienced in 1958-1967. The 10 per cent rise in money wage has already been mentioned with the qualification "at least". The 5 per cent rise in profit was surmised having regard to the trend in the ratio Other income to total income.

TABLE 3: Input Constants for 10 Price Change Determination

= 10% minus τ_j

| i | Sector | ϵ_j | m_j | t_j | s_j | Wages | | f_j | Example | | | j |
|-----|--------------------------------|--------------|-------|-------|-------|--------------|--------------------|-------|---------------|---------|-----------------|----|
| | | | | | | $1 + \tau_j$ | $w / (1 + \tau_j)$ | | $10 - \tau_j$ | Input | $100\Delta p_j$ | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 1. | Agriculture, forestry, fishing | ·1974 | ·0503 | ·0326 | ·0240 | 1·038 | ·0539 | ·4483 | ·062 | ·01971 | 5·5 | 1 |
| 2. | Mining, peat | ·0501 | ·0176 | ·0103 | — | 1·056 | ·3707 | ·3230 | ·044 | ·03226 | 4·7 | 2 |
| 3. | Food | ·2652 | ·1100 | ·0024 | ·0322 | 1·030 | ·1010 | ·0168 | ·070 | —·00182 | 5·4 | 3 |
| 4. | Drink, tobacco | ·2206 | ·1762 | ·0029 | — | 1·014 | ·2420 | ·1630 | ·086 | ·02921 | 6·5 | 4 |
| 5. | Textiles (ex. hos.) | ·2427 | ·3847 | ·0008 | — | 1·032 | ·1945 | ·0468 | ·068 | ·02516 | 5·8 | 5 |
| 6. | Clothing | ·2897 | ·2520 | ·0011 | — | 1·034 | ·2565 | ·0597 | ·066 | ·02102 | 6·4 | 6 |
| 7. | Wood, furniture | ·1507 | ·2891 | ·0044 | — | 1·032 | ·2797 | ·1152 | ·068 | ·03360 | 5·7 | 7 |
| 8. | Paper, printing | ·1768 | ·2465 | ·0017 | — | 1·028 | ·3123 | ·0797 | ·072 | ·03188 | 6·0 | 8 |
| 9. | Chemicals | ·1008 | ·3345 | ·0030 | — | 1·056 | ·1503 | ·1198 | ·044 | ·02556 | 5·0 | 9 |
| 10. | Clay, cement, glass | ·1608 | ·1505 | ·0062 | — | 1·057 | ·2548 | ·1426 | ·043 | ·01973 | 4·4 | 10 |
| 11. | Metals, eng., veh. | ·1950 | ·4365 | ·0527 | ·0006 | 1·044 | ·2136 | ·0507 | ·056 | ·03317 | 5·5 | 11 |
| 12. | Other manufacturing | ·1567 | ·5885 | ·0002 | — | 1·075 | ·1219 | ·1023 | ·025 | ·03133 | 4·6 | 12 |
| 13. | Construction | 0·0 | ·1237 | ·0043 | — | 1·041 | ·3732 | ·0484 | ·059 | ·03101 | 5·4 | 13 |
| 14. | Elec., gas, water | 0·0 | ·0687 | ·0022 | — | 1·041 | ·2713 | ·2299 | ·059 | ·03114 | 4·6 | 14 |
| 15. | Services, ex. govt. | ·0173 | ·0480 | ·0590 | — | 1·024 | ·4039 | ·2353 | ·076 | ·04948 | 6·1 | 15 |
| 16. | Govt. services | 0·0 | ·0346 | ·0211 | — | 1·018 | ·6936 | 0·0 | ·082 | ·06046 | 7·4 | 16 |
| 17. | Artificial, n.e.s. | ·0261 | ·1738 | ·1186 | — | 1·035 | 0·0 | 0·0 | ·065 | ·01728 | 6·0 | 17 |

IRISH PRICE TREND

↑
from Table 2

state. The main inference to be drawn from column 12 is that price increases in 1970 will be all-pervasive.

ADDENDUM

The foregoing may stand as an exercise in IO methodology with tables designed to be useful. Since it was written the prognosis for 1970 has become more grave. We are now advised by our colleagues T. J. Baker and J. Durkan, that the rise in money wages will probably be nearer 15 per cent than the 10 per cent assumed in the paper. Assuming a $4\frac{1}{2}$ per cent rise in productivity and rises of $3\frac{1}{2}$ per cent and 3 per cent in export and import prices respectively the increase in internal prices, namely 100Δ p, using the foregoing formula would be 8 per cent. In regard to 1970 in the comment that follows it is assumed that no such action as freezing of incomes and prices will be taken, e.g., in the forthcoming Budget.

In [3] it was argued that the concomitant on the capital side of money wages per hour was profits per £1 of fixed capital at constant prices. Tentative estimates relating to the non-agricultural companies' sector were given for the years 1958-1965. Readers are referred to pages 27-30 of [3] for method, a discussion and qualification. The following are the indexes for 1965-1970, in continuation of those in Table 20, using base A for the capital series, index base 1962 as 100:—

| Index base 1962 as 100 | | |
|------------------------|----------------------------------|-------------------------------|
| Year | Earnings per hour in TG industry | Profit as per cent of capital |
| 1965 | 121.3 | 102 |
| 1966 | 135.2 | 94 |
| 1967 | 142.5 | 105 |
| 1968 | 155.6 | 115 |
| 1969 | 176.8 | 118 |
| 1970 | 200 | 116 |

It goes without saying that 1970 for earnings and for 1969 and 1970 for profit are speculative apart from the tentative character of all the latter series, which are described in [3] as "impressionistic". The differences between the two series are, however, so great that they cannot be explained away by statistical imperfection. Following are some comments on the foregoing few figures:—

1. Between 1962 and 1969 consumer prices in Ireland have risen by 37 per cent (see column 9, Table 1), earnings of labour by 77 per cent, earnings of capital by 18 per cent. The purchasing power of labour earnings has therefore substantially increased (by 29 per cent) and of capital diminished (by 14 per cent), supporting M. P. Fogarty's recent remark* "there is more reason to

*Talk to a trade union audience on 11 March, 1970.

think that profits in Irish firms are too low than that they are too high”.

2. As labour is becoming expensive, capital intensity is deepening. Thus the ratio of gross domestic fixed capital formation to GNP, both at constant prices, was 0.13 in 1958, 0.20 in 1965 and 0.23 in 1969. This tendency, with many features which might be regarded as “good” from the purely economic point of view, cannot be regarded as socially desirable in Ireland’s endemic condition of surplus manpower.
3. Ireland’s most important asset for economic development in the past was a plentiful supply of trainable, relatively cheap, labour. The recent steep rise in cost of labour renders Ireland the less attractive for investors, as tending to drive home savings abroad and discouraging foreign investment.
4. Ireland’s actions and attitudes about wages have always been strongly influenced by those of Britain (a point discussed at some length in [3]). During the past twelve months, however, there was the fundamental difference between the economic condition in the two countries that wage claims in U.K. were made against the background of a relatively favourable balance of payments situation, in Ireland just the contrary.

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