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The Cost of Capital to Irish Industry: Revised Estimates

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Précis: Cost of capital indices, based on those of Geary, Walsh and Copeland (1975), are revised and updated to 1975. The revisions involve the use of different series for the price of new capital goods and the borrowing rate of interest to firms, a more extensive discussion of the cost of capital in cases where the change in the price of capital goods is included, a different treatment of depreciation, and some allowance is made for the effect of IDA grants. An index of the cost of labour inclusive of employers' social welfare contributions is also presented and it is compared to the different measures of the cost of capital. It is concluded that government policies have raised the cost of labour relative to capital.

I INTRODUCTION

Indices of the cost of capital to Irish manufacturing industry for the period 1953 to 1969, based on the concept of the rental price of capital, were presented by Geary, Walsh and Copeland (1975). The theoretical framework was provided by the neoclassical theory of investment behaviour as developed by Jorgensen (1963 and 1967), Coen (1971) and others, in which a competitive firm maximises present value over an infinite horizon.

In this paper the cost of capital indices are revised and updated to 1975. The revisions involve the use of different series for the price of investment goods and the borrowing rate of interest, an amended formulation of the cost of capital in the cases where the change in the price of investment goods is included, and alternative assumptions about depreciation.

The structure of the paper is as follows. Section II provides a discussion of the formulations of the cost of capital to be calculated. In Section III the calculation of the indices is described and the indices are presented together

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with ratios of the cost of labour to the cost of capital. Conclusions are drawn in Section IV.

II THE COST OF CAPITAL

The concept of the "user cost" or "rental price" of capital has its theoretical basis in the inter-temporal theory of the firm. In the neo-classical theory of Jorgensen and others, a firm maximises present value over an infinite horizon subject to the constraints of a smooth production function and geometric depreciation – that is,

$$\text{Max} \sum_{t=1}^{\infty} (P_t X_t - W_t L_t - Q_t I_t)\,(1+r)^{-t} \tag{1}$$

subject to $X_t = F(L_t, K_{t-1})$

$K_t = I_t + (1-d)K_{t-1}$

where X is output, L is labour, I is investment goods, K is the capital stock, P, W and Q are the prices of output, labour and investment goods, respectively, d is the depreciation rate and r is the rate of interest at which the firm is assumed able to borrow or lend freely at any date.

Maximisation yields the conditions

$$\frac{\partial X_t}{\partial L_t} = \frac{W_t}{P_t} \text{ and} \tag{2}$$

$$\frac{\partial X_t}{\partial K_{t-1}} = \frac{Q_t}{P_t}\left[(r_t+d) - (1+r_t)\frac{\dot{Q}}{Q_t}\right] = \frac{C_t}{P_t} \tag{3}$$

where $\dot{Q} = Q_t - Q_{t-1}$. When the assumption of constant expected prices of investment goods is made, the denominator of (3), denoted the "rental price" or "user cost" of capital, reduces to the familiar form

$$C_t = Q_t(r_t+d). \tag{4}$$

These definitions of the user cost of capital must be modified to take account of the system of corporate taxation. This topic is discussed in Geary *et al.* (1975) and in the references cited there. With initial allowances on investment expenditures and interest and true economic depreciation fully allowable for tax purposes, it can be shown that (4) should be amended as follows:

$$C_t = Q_t[r_t(1-u_t k_t)+d] \tag{5}$$

where u is the rate of tax on profits and k is the proportion of an investment expenditure which can be written off against tax. If the effect of changes in the price of investment goods is ignored for tax purposes, the appropriate definition of the cost of capital is approximately

$$C_t = Q_t[(r_t(1-u_tk_t)+d) - (1+r_t(1-u_tk_t))\frac{\dot{Q}}{Q_t}]. \quad (6)$$

As noted above, these costs of capital definitions are based on the assumption of geometric (in continuous time, exponential) depreciation. Empirical estimates of the capital stock are frequently based on alternative depreciation formulations to facilitate computation. Vaughan (1978), for example, uses the "sudden death" method (an investment good is assumed to provide a constant annual flow of services for a fixed number of years, after which it becomes useless).

The theoretical inconsistency of using capital stock estimates computed on the basis of one type of depreciation in the measurement of a cost of capital concept derived on the basis of a different depreciation function was pointed out by Vaughan (1979b); Geary *et al.* (1975) is subject to this criticism. A number of points arise here. First, in empirical studies of economic relationships it may be the case that the cost of capital is a relevant variable, but not the quantity of capital. Examples would include certain neo-classical investment functions. If the computation of the appropriate cost of capital measure could be undertaken without reference to whatever capital stock estimates happened to be available, as would be the case with (3) and (4), there would be no particular reason for using the depreciation function implicit in the available capital stock estimates. Second, the cost of capital definitions which include the effects of tax allowances are dependent on capital stock estimates in that the allowances vary according to the *composition* of the capital stock. The use of geometric depreciation in conjunction with a tax rate computed from weights in Vaughan's (1979a) capital stock series, for example, would imply that the measured shares of different assets in the capital stock are not sensitive to the precise depreciation method used. Third, as noted by Haavelmo (1960), it may be possible to calculate a geometric depreciation rate which approximates a different depreciation function, such as sudden death. If investment grows at a constant rate, g, then it can be shown that the depreciation rate is given by $d = g/(\exp ng-1)$ where n is the number of periods in the life of an investment good. If g is measured by the actual average annual growth rate of investment in Irish manufacturing and the value of n is set at 20 years (the average life of an investment good in Vaughan's estimates), d is approximately 2.6 per cent.

None of these points disputes the basic proposition that cost of capital

measures used in conjunction with empirical capital stock estimates should ideally be based on the same depreciation assumptions. The derivation of expressions for the cost of capital under different assumptions about depreciation is undertaken in Vaughan (1979a). If the expectation of constant prices is assumed and if the capital stock is treated as the firm's choice variable, the cost of capital under sudden death depreciation is of the form

$$C_t = Q_t[r_t + r_t(1+r_t)^{-n}] \quad (7)$$

The implications of changes in the price of investment goods are now considered in more detail. Cost of capital definitions such as (4), (5) and (7) involve the assumption of a constant expected price of investment goods, an expectation which will usually prove to be erroneous. The inclusion of the actual change in the price of investment goods in cost of capital measures implies that the firm has static expectations about price changes. Neither assumption is especially satisfactory. The former was rationalised by Jorgensen (1963) on the grounds of firms regarding changes in investment good prices as purely transitory and hence irrelevant to the long-run demand for capital, but this is not convincing in a period of inflation. It is sometimes argued that gains to a firm from increases in the price of investment goods are purely notional because replacement cost has risen and hence the $\dot{Q}/Q$ term should be ignored. However, this overlooks the basic point that when the price is rising, ownership of a capital stock allows the firm to sell its capital services to itself at a lower price than it could obtain in the market by hiring; there is a real gain to the firm. Thus the cost of capital to the firm is understated if the rate of increase of the price of investment goods is ignored; if the price is falling, the cost of capital would be overstated.

The alternative of including the actual changes in the price of investment goods also has its drawbacks. To the extent that they have transitory components, they are appropriately regarded as irrelevant to the firm's demand for capital, but this raises the question of precisely how the firm's expectations are formed. In addition, the issue of whether the firm has a speculative demand for capital arises; under some circumstances the firm might become a leasing company (or even sell capital in secondhand markets). A related question concerns the desirability of the firm's capital: if the firm can choose its depreciation rate, this choice will be affected by expectations about investment good prices.

The theoretical framework adopted here does not confront most of these issues; a brief discussion of some of them appears in Haavelmo (1960). In the next section the calculation of indices of the cost of capital in Irish manufacturing industry is described; in interpreting them, their shortcomings should be borne in mind.

III THE COST OF CAPITAL TO IRISH MANUFACTURING INDUSTRY

In order to calculate indices of the cost of capital based on definitions (4)-(6), it is necessary to obtain series for the variables u and k, the effective tax rate on profits and the initial capital allowance which can be written off against tax, respectively. The tax rate on profits is a combination of Corporation Profits Tax and Schedule D Income Tax; it is also affected by the proportion of profits attributable to exports. For all years except tax years 1970-71 and 1971-72, Corporation Profits Tax was deductible from total taxable income in computing income tax liability. The effective tax rate on the taxable profits of a firm which exported none of its output is presented in Column (1) of Table 1.

Table 1: *Effective tax rate on profits in Irish manufacturing industry*

Year	*(1) Percentage tax rate with no output exported*	*(2) Percentage of output exported*	*(3) Percentage effective tax rate on profits (u)*
1953	43.75		43.75
1954	43.75		43.75
1955	43.75		43.75
1956	43.75	13.59	40.36
1957	43.75	16.60	40.12
1958	42.063	17.34	34.77
1959	41.50	16.90	34.49
1960	41.50	19.31	33.49
1961	39.25	19.97	31.41
1962	38.50	19.37	31.04
1963	38.50	20.31	30.68
1964	41.917	20.53	33.31
1965	41.917	20.83	33.19
1966	47.992	22.08	37.40
1967	49.95	25.64	37.14
1968	49.95	25.64	37.14
1969	49.95	26.37	36.78
1970	55.988	27.45	40.62
1971	58.0	28.26	41.61
1972	51.963	30.74	36.04
1973	49.95	34.23	32.85
1974	49.95	40.14*	29.90*
1975	49.95	44.05*	27.95*

* Estimated; see notes (b) and (c) below.

Notes:

(a) Column (1) is the marginal tax rate on profits in excess of £2,500. A lower rate has

applied to profits up to £2,500. When changes in tax rates occurred within a year, the rate for that year is a weighted average of the rates which obtained during the year.

Source: Kelly and Carmichael, various issues.

(b) Column (2) is the ratio of the exports of manufacturing industry to gross output of manufacturing industry, as given by the Census of Industrial Production (CIP). For the years 1960-1971 comparable export and gross output data may be found in the Appendix to the Review of 1973 and Outlook for 1974. For the years 1956-59 and 1972-75 exports of manufacturing industry were defined as the sum of the Standard International Trade Classification (SITC) groups 5-8, 1 and 0, excluding subgroups 00 and 08. The CIP for 1974 and 1975 have not yet been published, so that it was necessary to estimate gross output for those years. This was done by assuming that gross output of manufacturing industry grew at the same rate as that of the industrial sector in the National Accounts.

Sources: Review of 1973 and Outlook for 1974; Trade Statistics of Ireland (various issues); *Irish Statistical Bulletin* (various issues); *National Income and Expenditure*, 1975.

(c) Since 1956 profits attributable to exports have been subject to export tax relief. In 1956 and 1957, 50 per cent of tax remission on profits earned on an increase in exports over their 1956 or 1955 level was granted. From 1958 onwards, 100 per cent remission was granted. It was assumed in calculating Column (3) that *all* exports were subject to this relief, which involves some understatement of the effective tax rate; this would clearly diminish over time. The alternative of using exports net of their 1955 level would probably have led to some understatement of the tax rate, given the changing structure of Irish industry over the period. As is noted later in the text, the estimated cost of capital is not very sensitive to this assumption.

A feature of company taxation in Ireland since 1956 has been the zero rate of tax applied to profits attributable to exports. The scheme introduced in 1956 provided for a zero tax rate on 50 per cent of profits arising from increases in exports above their 1956 level; in 1958 the zero rate was applied to 100 per cent of such profits. In the calculations reported below these provisions are applied to profits arising from all exports. It is assumed that the share of profits attributable to exports for Irish manufacturing industry is equal to the proportion of output exported, which may involve some overstatement. This proportion is given in Column (2) of Table 1; the third column contains the value of t used in subsequent calculations. It should be emphasised that the tax rate refers to manufacturing industry as a whole; the tax rate paid by each firm depends on the proportion of its profits attributable to exports so that some firms will pay no profits tax.

Initial capital allowances were introduced in 1956 and they vary according to the type of asset purchased. The allowance for plant and machinery has always exceeded that for industrial buildings, as Columns (1) and (2) of Table 2 show. To compute k, which is a weighted average of Columns (1) and (2), the shares of plant and machinery and buildings in Vaughan's (1979a) estimates of the gross capital stock valued at current prices were used to compute weights. Vaughan's data make no distinction between buildings

and land, but the earlier capital stock estimates of Henry (1974) suggest that buildings constitute about 90 per cent of buildings and land. The weights calculated on the basis of Vaughan's data were scaled accordingly, so that k is given by

$$k = S_p k_p + 0.9 S_b k_b \quad (8)$$

where k_p and k_b are given in Columns (1) and (2) of Table 2, S_p is the share of plant and machinery in the gross capital stock and S_b is the share of buildings and land.

Table 2: *Percentage initial allowances on capital goods*

Year	*(1) Plant and machinery*	*(2) Buildings*	*(3) k*
1953	0.0	0.0	0.0
1954	0.0	0.0	0.0
1955	0.0	0.0	0.0
1956	15.0	7.5	10.3
1957	20.0	10.0	13.8
1958	20.0	10.0	13.9
1959	20.0	10.0	14.1
1960	20.0	10.0	14.1
1961	20.0	10.0	14.2
1962	40.0	20.0	28.3
1963	40.0	20.0	28.6
1964	40.0	20.0	28.6
1965	40.0	20.0	28.7
1966	40.0	20.0	28.9
1967	47.5	20.0	32.9
1968	57.5	20.0	38.7
1969	60.0	20.0	39.5
1970	60.0	20.0	39.3
1971	60.0	20.0	39.3
1972	60.0	20.0	39.3
1973	60.0	20.0	39.0
1974	100.0	20.0	60.0 *
1975	100.0	20.0	60.0 *

*Estimated; see note (a).

Notes:

(a) The weights used in computing the k values of Column (3) up to 1973 are taken from Vaughan (1979a). For the years 1974 and 1975 it was assumed that the proportions of plant and machinery and buildings and land in the capital stock were the same as those obtaining in 1973.

Sources: Kelly and Carmichael, various issues; Vaughan (1979a).

The remaining variables required to compute the cost of capital indices are the price of investment goods and the borrowing rate of interest to firms. The former is measured by the implicit deflator of the sum of the items "other building and construction" and "other machinery" which appear in the National Accounts breakdown of capital formation; this is an approximate measure of the price of industrial investment.

Two measures of the borrowing rate of interest to firms were employed. One was the Irish Prime Lending Rate. Before 1971 this was the ordinary overdraft rate and since then it has been a weighted average of the spread of the rate of interest on overdrafts and loans of one year. The other measure was the average redemption yield on industrial debentures in the United Kingdom, weighted to give an average time to maturity of twenty years. Unfortunately, a comparable Irish interest rate is not available for the time period of this study; if it were, it would be preferable to the prime lending rate. However, given the degree of integration of the Irish and British financial markets (see Browne and O'Connell (1978)), the use of the British rate is unlikely to have generated any distortions, particularly given that annual data were used. Sources for these data are given in the footnotes to Table 3.

The calculations of the cost of capital based on definitions (4)-(7) are presented in Table 3. The first two columns show the cost of capital measures which make no allowance for taxation and which assume geometric depreciation. Column (3) contains the measure based on sudden death depreciation, which corresponds to that in Column (1) (i.e., the interest rate is the UK rate described above). The similarity between Columns (1) and (3) is marked, suggesting that for the data used in this study the assumption of geometric depreciation generates only minor distortions. In Columns (4) and (5) the effect of initial allowances on investment expenditure is included in the cost of capital, geometric depreciation being assumed. The exact modification required to account for tax allowances in the case of sudden death depreciation has not been calculated. However, it seems reasonable to assume that the resulting measure would be close to those in Columns (4) and (5).

These measures have all been based on the assumption of a constant expected price of investment goods. The inclusion of the actual change in the price of investment goods in the formulation of the cost of capital has a striking effect on the measured cost of capital, as may be seen in Column (6) of Table 3; in two years, 1974 and 1975, the measure is actually *negative* because the rate of increase of the price of investment goods dominated the interest rate and the depreciation rate. In interpreting these measures, the points discussed in Section II should be emphasised.

One major influence on the cost of capital to Irish industry which has not been mentioned is the capital grant system of the Industrial Development

Table 3: *Measures of the cost of capital, indexed to 1953 = 1.0*

Year	*(1)* *C1*	*(2)* *C2*	*(3)* *C3*	*(4)* *C4*	*(5)* *C5*	*(6)* *C6*
1953	1.0	1.0	1.0	1.0	1.0	1.0
1954	0.940	0.945	0.934	0.940	0.945	1.113
1955	1.030	0.962	1.032	1.030	0.962	0.569
1956	1.185	1.113	1.197	1.152	1.080	0.306
1957	1.302	1.193	1.318	1.251	1.146	0.579
1958	1.325	1.208	1.343	1.280	1.166	1.016
1959	1.287	1.100	1.303	1.244	1.064	1.315
1960	1.359	1.209	1.378	1.314	1.168	0.981
1961	1.536	1.279	1.559	1.486	1.239	0.795
1962	1.581	1.269	1.604	1.479	1.190	0.857
1963	1.442	1.219	1.460	1.353	1.146	1.114
1964	1.593	1.357	1.615	1.484	1.266	0.533
1965	1.734	1.551	1.760	1.613	1.442	1.085
1966	1.912	1.650	1.939	1.758	1.518	1.032
1967	1.942	1.721	1.970	1.765	1.564	1.127
1968	2.153	1.915	2.181	1.918	1.705	1.066
1969	2.779	2.183	2.799	2.456	1.938	0.599
1970	3.072	2.492	3.092	2.679	2.180	0.577
1971	3.204	2.589	3.229	2.788	2.260	0.718
1972	3.394	2.531	3.425	3.015	2.262	0.577
1973	4.324	3.543	4.344	3.873	3.179	0.195
1974	7.337	5.300	7.340	6.201	4.507	− 2.367
1975	8.521	6.062	8.522	7.293	5.222	− 1.379

Definitions

$C1 = Q(r_1+d)$

$C2 = Q(r_2+d)$

$C3 = Q(r_1+r_1(1+r_1)^{-20})$

$C4 = Q((1-uk)r_1+d)$

$C5 = Q((1-uk)r_2+d)$

$C6 = Q[(1-uk)r_1+d-(1+(1-uk)r_1\dot{Q}/Q)]$

Variables

Q: the implicit deflator of the sum of the items, "other building and construction" and "other machinery", which appear in the National Accounts breakdown of Gross Domestic Fixed Capital Formation.

Source: National Income and Expenditure, various issues.

r_1: average redemption on industrial debentures in the UK. It is based on 15 redeemable debentures, weighted to give average time to maturity of 20 years.
Source: Bank of England Quarterly Bulletin, various issues; annualised rates are published in Annual Abstract of Statistics (HMSO).

r_2: Irish Prime Lending Rate; for details, see source.
Source: Data Bank of Annual Economic Time-Series 1977. Research Department, Central Bank of Ireland.

uk: see Tables 1 and 2.

d: has the value 0.026; see text.

$\dot{Q}$: $Q-Q_{-1}$

Authority (IDA). The effect of IDA cash grants towards the cost of fixed assets is to lower the price of investment goods to the firm. An indication of the impact of IDA grants on the cost of capital measures presented in Table 3 may be obtained from a recent paper by McAleese (1977) which included data on IDA capital grants and fixed asset expenditures. Table 4 shows adjustments of cost of capital measures, C1, C2 and C4, to allow for the IDA grants. The adjustment involves lowering the price of investment goods by the ratio of IDA capital grants to fixed asset expenditures in *total* manufacturing; this obviously understates the impact of IDA grants on the cost of capital to the particular firms receiving the grants. Even at the aggregate level, however, the grants clearly had a significant effect on the cost of capital.

Table 4: *Cost of capital adjusted for IDA grants, 1959-73*

Year	*C1**	*C2**	*C4**
1959	1.202	1.028	1.162
1960	1.313	1.168	1.270
1961	1.434	1.194	1.387
1962	1.467	1.177	1.372
1963	1.329	1.123	1.246
1964	1.473	1.255	1.372
1965	1.638	1.465	1.524
1966	1.804	1.556	1.659
1967	1.780	1.578	1.618
1968	1.948	1.733	1.735
1969	2.377	1.868	2.101
1970	2.491	2.020	2.172
1971	2.578	2.083	2.243
1972	3.021	2.253	2.684
1973	3.913	3.206	3.504

Notes:
C1*, C2* and C4* are cost of capital measures C1, C2 and C4 adjusted by allowing for the effect of the IDA capital grants on the effective price of investment goods. The adjustment uses the ratio of IDA capital grants to fixed asset expenditure in total manufacturing industry. The value of the indices in 1953 is approximately 1.0 because of the small amount of grants.

Sources: Computed from McAleese (1977), Tables 7.1, 7.2, as well as Table 3 above.

It is of interest to compare the behaviour of these measures with that of the cost of labour. The first column of Table 5 contains an index of the cost of labour, defined as the sum of average weekly earnings of industrial workers in manufacturing industry and the social welfare contributions of employers. The remaining columns show the ratio of the cost of labour to the cost of capital, using some of the cost of capital measures presented above.

Table 5: *Ratio of labour costs to cost of capital*

Year	(1) W	(2) $\frac{W}{C1}$	(3) $\frac{W}{C2}$	(4) $\frac{W}{C3}$	(5) $\frac{W}{C4}$	(6) $\frac{W}{C4^*}$
1953	1.0	1.0	1.0	1.0	1.0	
1954	1.027	1.092	1.087	1.099	1.092	
1955	1.077	1.046	1.119	1.044	1.046	
1956	1.127	0.950	1.013	0.941	0.979	
1957	1.180	0.906	0.989	0.895	0.943	
1958	1.233	0.931	1.021	0.919	0.963	
1959	1.294	1.005	1.176	0.994	1.041	1.114
1960	1.375	1.012	1.138	0.998	1.047	1.083
1961	1.453	0.946	1.136	0.932	0.978	1.048
1962	1.640	1.037	1.293	1.022	1.109	1.195
1963	1.697	1.178	1.392	1.163	1.255	1.362
1964	1.917	1.203	1.412	1.187	1.291	1.397
1965	1.979	1.142	1.276	1.125	1.227	1.299
1966	2.222	1.162	1.347	1.146	1.264	1.339
1967	2.327	1.198	1.352	1.181	1.318	1.438
1968	2.581	1.199	1.348	1.183	1.346	1.488
1969	2.896	1.042	1.326	1.035	1.179	1.378
1970	3.388	1.103	1.360	1.096	1.265	1.560
1971	3.894	1.216	1.504	1.206	1.397	1.736
1972	4.458	1.313	1.761	1.302	1.479	1.661
1973	5.568	1.288	1.572	1.282	1.438	1.589
1974	6.612	0.901	1.247	0.901	1.066	
1975	8.785	1.031	1.449	1.031	1.204	

Notes:

(a) Column (1) is the sum of average weekly earnings of all industrial workers in manufacturing industry and employers' social insurance contributions for male workers, indexed to 1953 = 1.0. There is a small, diminishing overstatement of labour costs implicit in using contributions for male employees, which were marginally higher than those for female employees over the period.

Sources: Irish Statistical Bulletin, various issues; *Reports of Department of Social Welfare.*

(b) C1-C4 are defined in Table 3 and C4* is taken from Table 4.

Columns (2)-(4) show the behaviour of labour costs relative to cost of capital measures which exclude the effects of taxation and changes in the price of investment goods. The interest rate used in computing C1 and C3 is the UK redemption yield on industrial debentures while C2 uses the Irish prime lending rate. All ratios show a gradual, if uneven, increase through the 1960s and a peak in 1972; a sharp decline in 1974, due to large increases in

both the price of investment goods and the interest rates, was followed by an increase in 1975. It is clear that the choice of interest rate has a considerable effect on the level of the cost of capital (see Table 3) and hence on the ratios. When the effects of the taxation system on the cost of capital are allowed for in the manner described above, the cost of capital is lowered and the ratio of labour to capital costs increases; this is clear from a comparison of Columns (2) and (5). By 1972 the ratio of labour to capital costs had risen by 48 per cent, as opposed to 31 per cent when the effects of taxation are ignored. It is to be noted that Column (5) understates the relative increase in labour costs to the extent that the effects of changes in the price of investment goods are not adequately allowed for and, of course, IDA grants are also omitted. The latter omission is to some extent dealt with in Column (6), which shows that the ratio of labour costs to the cost of capital measure, C4*, had arisen by about 66 per cent by 1972. The ratio declined in 1973, as it did with other cost of capital measures, but its subsequent values are not available.

The ratios in Table 5 take no account of grants for the training of workers provided by IDA and AnCO, although part of the latter's costs are borne directly by industry, nor of the effects on labour costs of such legislation as the Unfair Dismissals Act. In addition, the many assumptions underlying the construction of the cost of capital indices must be emphasised. There seems little doubt, however, that the overall effect of government policies has been to raise the cost of labour relative to the cost of capital.

IV CONCLUSION

This paper has presented revised estimates of the cost of capital to Irish manufacturing industry in the aggregate. The cost of capital concept employed is based on the neo-classical theory of investment behaviour and thus on the many strong assumptions associated with that theory. The measures presented differ from those of Geary, Walsh and Copeland (1975) with respect to the interest rates and the price index of investment goods used in their calculation; more attention is paid to the appropriate formulation of depreciation and to the consequences of changes in the price of investment goods. An indication of the effects of IDA capital grants at the aggregate level is also provided.

A comparision of the cost of capital measures with an index of the cost of labour showed that the effect of the government tax and grant policies considered has been to raise the cost of labour relative to capital. The obvious question which follows from this is whether investment in Irish manufacturing has been influenced by these policies. An adequate answer to this question would require a thorough study of investment behaviour,

but preliminary estimates of an investment function based on cost-minimising behaviour by firms (see Coen (1971)) proved suggestive. Further work along these and related lines is being pursued.

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