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The Capital Stock of Irish Industry

by

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By Edward Nevin[*]

PART I : THE CAPITAL STOCK, 1958

1. The C.S.O. Questionnaire

In order to examine the cost structure and productivity of Irish manufacturing industry it is necessary to make estimates of the total factor input at the cost of which output was secured. This study is concerned with the manufacturing enterprises included in the annual Census of Production. To a large extent, therefore, the problem of measuring labour inputs—in value or quantum terms—is taken care of.

The measurement of capital inputs, however, is a much more troublesome problem. Fortunately, an inquiry carried out recently by the C.S.O. provides a reasonably firm base from which a set of estimates can be hazarded for the capital stock of Irish manufacturing industry in 1958.[1] The main object of the inquiry was to determine the capital structure of Irish industry in the financial sense, and it was therefore primarily concerned with balance-sheet data. Supplementary questions were also asked about the valuation of capital assets for insurance purposes, however, and it is with the response to these that the present estimates are concerned. Some general features of the inquiry may be noted :

(a) It related to the position of companies at some time during the twelve-month period 1st July, 1958 to 30th June, 1959. In what follows, therefore, it is assumed that the results are indicative of the position at 31st December, 1958.

(b) Forms were sent to corporate enterprises employing 20 or more persons. Of the replies, 679 related to manufacturing industry.

(c) Disclosure considerations necessitated an industrial classification which was less detailed than might have been desired ; in particular, the drink and tobacco industries had to be amalgamated.

(d) Since firms often overlap industries, about 1·5 per cent of the persons employed by the respondent firms were in fact engaged in industries other than those in which the firm was classified. Of necessity, this over-lapping has been ignored in what follows—in other words, the capital stock of firms and their total employment have been attributed to the industry into which the firm was primarily classified.

2. The Basis of Valuation

The present estimates are concerned with the questionnaire's findings on the matter of the valuation of assets for insurance purposes, and it has to be emphasised that these findings were very much an incidental part of the C.S.O. inquiry ; no explanations were sought, or discussions held, concerning the way in which the values returned by respondents under this heading were arrived at. Naturally this raises a number of difficulties.[2] For example, how far can it be assumed that all assets employed in an enterprise are in fact insured ? Over-valuation is unlikely, since the premium is increased thereby but the insured cannot benefit from it. Under-valuation is more likely, perhaps, but in view of the smallness of premiums in relation to total costs, on the one hand, and the risk involved in under-valuation, on the other, it does not seem probable that this will reach significant proportions. This would seem to be so, even allowing for the fact that assets (e.g., those regarded as indestructible) are occasionally uninsured.[3]

[*]The author of this paper was a Senior Research Officer of The Economic Research Institute. The paper has been accepted for publication by the Institute. The author is responsible for the contents of the paper including the views expressed therein.

[1]E. W. Henry and L. J. Heelan, "Capital in Irish industry", a paper presented to the Statistical and Social Inquiry Society of Ireland, 31 May 1963.

[2]On all this see T. Barna, "The replacement cost of fixed assets in British manufacturing industry in 1955", *Journal of the Royal Statistical Society*, Series A (General) Vol. 120, Part 1, 1957, especially pp. 5-10. See also the same author's contribution, "Alternative methods of measuring capital" and "A note on fire insurance", in *The measurement of national wealth*, Eds., R. Goldsmith and C. Saunders, Income and Wealth Series VIII, Bowes and Bowes, London 1959.

[3]Such assets raise a nice theoretical point. Strictly speaking a piece of capital which is indestructible, once built, cannot be said to enter into cost at all; any return attributable to it can only be pure economic rent. The exclusion of indestructible assets from the capital stock for purposes of cost analysis might therefore be held to be necessary in any case.

A much more difficult question is that of the basis on which an asset is valued, assuming that it is to be insured at all. Broadly speaking, industrial assets are generally insured under one of two types of arrangement—a policy of indemnity, in which the cover is defined as a specific sum (which may be changed from year to year) or a policy for reinstatement, under which the cost of replacing the asset is insured. Insofar as generalisation is possible—and there are certainly finite limits to this—most industrial insurance policies are probably of the reinstatement type. That is to say, they are nominally for the replacement cost new of the assets concerned. At first sight it would appear that valuations on this basis would yield what an economist would call the gross replacement cost at current prices. In fact, however, the typical procedure appears to be that assets are insured at full cost in the first instance but this valuation is seldom adjusted in succeeding years; hence the insurance expression " replacement cost new " is often really equivalent to the economist's concept of undepreciated historical cost.[4] The assumption on both sides appears to be that the depreciation of assets in real terms is just about offset by the general rise in the price-level of capital goods.

Insurance valuations are therefore a hybrid entity, but without some special adjustment it seems reasonable to assume that they are likely to approach written-down replacement values at current prices, the rate of writing-down having been determined—conveniently but illogically—by the rate of increase in the level of prices. How closely they can be regarded as approaching the concept of net value at current prices depends on how closely the rate of increase in prices is believed to approximate to the rate of depreciation of capital goods in real terms. The Irish capital-stock data used in the following sections are based on such unadjusted insurance valuations—i.e., it is being assumed that they reflect something approaching written-down values at current prices.

The position with Barna's estimates for the United Kingdom is rather different. While based on insurance valuations in the first instance, they were subject to special treatment in order to bring them on to a " replacement-cost-new " basis,[5] although from what has been said above it does not necessarily follow that this expression in insurance usage can be regarded as synonymous with its

meaning for the economist. It seems likely, however, that they would approach gross value at current replacement cost more closely than net (i.e., written-down) value.

3. The Questionnaire Respondents

The data emerging from the C.S.O. inquiry fall, for present purposes, into two categories :

(a) Those relating to balance-sheet data—679 firms in manufacturing industry employing 89,161 persons in 1958. Balance-sheet data given by these firms included :—

    (i) Land and buildings

    (ii) Plant and machinery

    (iii) Vehicles

    (iv) Fixtures and fittings

    (v) Other fixed assets.

(b) Those relating to firms which gave *both* balance-sheet *and* insurance valuations for

    (i) Land and buildings

    (ii) Plant and machinery.

The number of firms responding here is not known, but the balance-sheet valuation of all the assets involved amounted to £50·9 million compared with £54·9 million for the corresponding assets included in (a) above.[6]

The construction of the present estimates, therefore, involved two separate steps :—

(a) The tying-up, so to speak, of (a) and (b) above, so as to get an insurance valuation of all fixed assets for the 679 balance-sheet companies.

(b) The grossing-up of these totals so as to get an estimate for all enterprises for the benchmark date of end-1958.

The first problem was therefore the treatment of fixed assets included in the balance-sheet data for which no corresponding insurance valuation was asked—i.e., items (iii), (iv) and (v) above. The two groups " fixtures and fittings " and " other fixed assets " were treated as being related to the balance-sheet item " land and buildings " so far as relative size is concerned, although it was assumed that the ratio between their balance-sheet and insurance

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[4] This is the broad impression left by inquiries amongst leading Irish insurers of industrial capital—although there are plenty of exceptions, of course. Barna records the same procedure in British industry—see " The replacement cost of fixed assets in British manufacturing industry, in 1955", para. 2.25, p. 9, and *The measurement of national wealth*, p. 58.

[5] See Barna, "The replacement cost of fixed assets in British manufacturing industry in 1955", pp. 14-15, para. 3.23.

[6] A few firms responded to the questions on insurance valuations, however, which did *not* give balance-sheet data, so that the coverage of the two groups was somewhat more different than the similarity of the two totals quoted above might suggest. It should perhaps be added that these figures refer to tangible fixed assets only; the C.S.O. inquiry obtained data on stocks and financial assets also.

valuations would be closer to that of plant and machinery. The process of estimation is most easily set out symbolically:

Let B, P, V and F represent the balance-sheet valuations of land and buildings, plant and machinery, vehicles and "other fixed assets"[7] respectively.

Let the subscript x denote firms making returns on an insurance valuation basis and y those making a return on a balance-sheet basis.

Let IB, IP, IV and IF represent the insurance valuation of land and buildings, plant and machinery, vehicles and "other fixed assets" respectively.

Then F_x was assumed to be

$$F_y (B_x/B_y)$$

and IF was assumed to be

$$F_x (IP_x/P_x)$$

For vehicles, however, this procedure did not seem justifiable. As is well known, vehicles are replaced relatively frequently and, furthermore, a regular and active second-hand market exists for them. It is thus unlikely that the divergence between the balance-sheet valuation and the insurance valuation would be as marked for vehicles as for plant. On the other hand, the prevalence of conservative accounting practices makes it likely that *some* divergence exists. Arbitrarily, therefore, the insurance valuation for vehicles, IV_x, was taken to be 1·5 times the estimated balance-sheet value (V_x).

Having obtained an estimate for the total fixed assets of enterprises making a return of insurance valuations, the second problem remained—how to gross up from this group of enterprises to a total for manufacturing industry as a whole. The most appropriate indicator for this purpose seems to be " remainder of net output "—i.e., net output *less* wages and salaries—since this is the Census of Production item most closely corresponding to the fund from which the reward to capital is paid. Through the courtesy of the Central Statistics Office this total for each industrial group making returns on the insurance valuation basis was made available; by grossing-up with the corresponding total for all Census returns in 1958, it was possible to arrive at estimates for the total assets of all enterprises. The details of these estimates are shown in Tables A and B of the Statistical Appendix.

[7]i.e., categories (iv) and (v) above.

4. Rented Assets

An examination of the preliminary results suggested that in one particular case—the clothing industry—something was seriously wrong with the basic data from which the final estimates were made. Although the former covered something over 50 per cent. of the industry in terms of " remainder of net output ", the results implied that the *per capita* value of fixed assets in the industry amounted to only £266 for buildings and £167 for plant and machinery, which are clearly unrealistic in comparison with averages of around £750 for either type of asset in manufacturing as a whole. From general knowledge it seemed probable that the use of rented assets—which would of course be excluded from the insurance valuations stated in the questionnaire—is of particular importance in this industry, and especially the boots and shoes component of it. The whole question of rented assets had therefore to be investigated.

So far as plant and machinery are concerned, it seems likely that the rented element is likely to be of significance only in the case of the boots and shoes industry. The last year for which Census data on the point are available is 1949 ; in that year the total for all manufacturing under the heading " Rent of plant and machinery and all royalties " was £143,600, of which the boots and shoes trade accounted for £67,100, or 47 per cent.[8] The item was of noticeable magnitude—i.e., exceeded £10,000 —in only two other trades ; metals and chemicals. In both these latter instances it seems probable that the royalty element was more important than that of rented machinery. Hence the clothing trade is probably the only one in which serious omission might arise from the total neglect of rented machinery.

The problem then arises : how to correct the 1958 valuation of total plant and equipment, and the annual totals for gross investment during 1947-59, since it is clear that rented machinery would not be included in either. Turning to the first problem, the starting point must be the total payments of rent of machinery and royalties during 1945-49. It is known that nowadays the rent includes an element which is reduced by 10 per cent a year, the rate of decline being taken to represent the working life of the machinery[9]. It is also known that the current rents paid for machines over a period of eight years are generally equivalent

[8]*Irish Trade Journal and Statistical Bulletin*, Vol. XXVI, No. 2, June 1951, Table 2, p. 95.

[9]"Agreed note of information given . . . by . . . British United Shoe Machinery Co. Ltd. . . .", Committee on Industrial Organisation, *Report on the Leather Footwear Industry*, (Pr. 6727), Stationery Office, Dublin 1962, Appx. VII, p. 267, para. 11.

to their original purchase price.[10] In the earlier post-war years, however, most leases were based on a system (now abandoned) under which a lessor was required to install *only* British United Shoe Machinery Co. equipment (" full-line forcing ") and the annual charges were consequently lower in relation to the cost of machinery. It would seem that a rough approximation to the total value (at written-down historical cost) of rented machinery in 1949 would be obtained by multiplying machinery rents by, say, twelve. This can then be related to the balance-sheet valuation (as returned in the Census of Production) for plant and machinery in the boot and shoe industry, which can also be assumed to approximate to the written-down historical cost of the machinery actually owned by firms in the industry.[11] For the years 1945–49 the figures would be as follows :

	1945	1946	1947	1948	1949
Rents paid (£000)	56·3	60·6	64·5	66·2	67·1
Estimated rented machinery (£000)	676	727	774	794	805
Balance-sheet plant and machinery (£000)	119	130	179	240	266
TOTAL ...	795	857	953	1,034	1,071
Balance-sheet %	15·0	15·2	18·8	23·2	24·8

To translate all this to the 1958 balance-sheets for clothing and footwear as a whole is not easy. One procedure would be to assume that own-assets in boots and shoes accounted for the same proportion of total plant and machinery in 1958 as in 1949, and amend the group total accordingly. The evidence suggests, however, that the relative importance of own-assets and rented machinery has not remained constant since 1949 ; the data shown above for 1945–59 clearly indicate a rising trend for the proportion of own-assets.

Arbitrarily, therefore, it has been assumed that the proportion of capital employed accounted for by own-assets rose from 25 to 33⅓ per cent between 1949 and 1958. In the former year, the balance-sheet valuation of plant and machinery (i.e., as returned in the Census of Production) in the boot and shoe trade accounted for 17 per cent of the total for clothing as a whole. Applying this ratio to the estimated total value of plant in the clothing industry in 1958 (i.e., on an insurance valuation basis) would give a value of about £590,000 for

[10]*Ibid.*, p. 268, para. 14.

[11]There are a good many rough edges to all this, of course—especially the assumption that machines will be depreciated on more or less the same basis in both balance-sheets and rental arrangements. However, the correction cannot hope to be other than very rough in any case because of the lack of data more recent than 1949.

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user-owned plant and machinery in the boots and shoes trade. Assuming that this represented one-third of the plant in use, the addition for rented machinery would amount to £1,180,000.

All this is concerned with rented plant and machinery. The industrial use of rented buildings is certainly more widespread than that of rented machinery. Furthermore, its magnitude is unlikely to be spread evenly over all industries, so that the omission of rented buildings from calculations of the capital stock could lead to serious distortions in industrial comparisons.

Once again the latest year for which relevant data are available is 1949. The payments in respect of rent of industrial buildings in manufacturing industry during that year are set out in Table 1. From the comparison with balance-sheet valuations of buildings in Col. 3—these figures being taken as at least an approximation to the value of owner-occupied industrial buildings in each industry—it is clear that the relative importance of this type of capital varies considerably, being of greatest importance in the clothing, wood-working and metal products groups.

How can allowance be made for this ? There is no really satisfactory method, but a rough approximation would appear to be given by assuming that rents constitute a return of 10 per cent on the depreciated value of industrial buildings—the figure of 10 per cent being admittedly a completely arbitrary one. For manufacturing as a whole this would imply that in 1949 the value of buildings actually in use was some 14 per cent higher than that shown in balance-sheet figures. For the three industries mentioned above—and especially clothing and woodworking—the difference was considerably more than this.

TABLE 1: RENT AND INDUSTRIAL BUILDINGS, 1949

Industry	Rent of industrial buildings £000	Balance-sheet value of buildings £000	2 × 10 as % of 3
1	2	3	4
Food ...	47·8	6,134	7·7
Drink & tobacco	13·9	2,422	5·7
Textiles ...	6·6	836	7·8
Clothing ...	70·2	1,649	42·5
Wood ...	19·6	582	33·6
Paper ...	20·1	1,460	13·7
Chemicals ...	13·2	1,064	12·4
Minerals ...	7·0	1,015	6·8
Metal products	47·3	2,304	20·5
Miscellaneous ...	17·9	927	19·3
TOTAL ...	263·6	18,392	14·3

Source: Col. 2, *Irish Trade Journal and Statistical Bulletin*, Vol. XXVI, No. 2, June 1951, Table 2, pp. 93–5; col. 3, *ibid.*, Table 3, pp. 96–7.

Unfortunately there are no data to indicate whether this element in industrial buildings increased or diminished in importance during the period 1947–59. The Census totals for rent and balance-sheet value of buildings in manufacturing as a whole for the five years available were as follows :—

	1945	1946	1947	1948	1949
Buildings, £000	11,951	12,653	14,941	16,270	18,392
Rent, £000 ...	185	199	211	233	264
Rent as % of buildings	1·5	1·6	1·4	1·4	1·4

No trend is suggested here. Nor is this a matter in which, in the nature of the case, one would expect changes to be rapid. The ratios implied by Col. 5 of Table 1 were therefore applied to the 1958 balance-sheet totals.

5. The Capital Stock, 1958

Before proceeding further, it may be helpful to examine the 1958 estimates briefly in order to verify their *a priori* plausibility. They are therefore shown in summary form in Table 2, and also placed in relation to what would appear to be cognate series—i.e., the numbers engaged and *per capita* levels of net output in 1958. The variation in the *per capita* stock of capital between industries —from about 40 per cent of the average in the clothing industry to nearly 100 per cent above it in the highly capitalistic drink and tobacco industries —is not in itself surprising. Indeed, the results as a whole are very much as might have been expected on *a priori* grounds.

This impression is confirmed by the comparison of *per capita* capital stock with net output per head, in which one would expect a fairly close relation-ship to emerge. As will be seen from columns 4 and 5 of Table 2, such a relationship is in fact

TABLE 2: CAPITAL STOCK, END-1958 (a)

Industry	Capital Stock			Net output per person engaged
	Total	Per employee		
	£ mn.	£	Index	1958 Index
1	2	3	4	5
Food	62·3	1,837	115	104
Drink & tobacco	30·8	3,140	196	214
Textiles ...	30·3	1,613	101	77
Clothing ...	12·5	604	38	60
Wood ...	6·6	899	56	67
Paper	26·6	1,945	122	101
Chemicals ...	12·8	2,712	170	130
Minerals ...	13·1	2,612	163	118
Metals ...	21·5	1,019	64	96
Other manufacturing	10·6	1,564	98	109
ALL MANUFACTURING	227·1	1,600	100	100

(a) In what follows the following industrial groupings are used: Clothing includes Footwear and Leather, Wood includes Furniture, Paper includes Printing, Minerals refers to the manufacture of non-metalliferous mining products and Metals refers to Metal Manufacture and Metal Products.

visible for all of the groups shown except textiles. That *per capita* net output in textiles should be low in relation to its capital stock (i.e., that the rate of return on capital should be below average) accords with common knowledge of the industry. This industry apart, it is true to say of the results shown in Table 2 that a high *per capita* net output tends to be associated with a high capital-employee ratio, and vice versa. Obviously the two index numbers in columns 4 and 5 could not be expected to differ from the average in similar *proportions*, since the relationship between capital input and *per capita* output could hardly be a linear one.

PART II : CAPITAL FORMATION AND CAPITAL CONSUMPTION 1947-59

I. Gross Capital Formation

The available data on gross capital formation in Irish manufacturing industry are, it must be admitted, something short of wholly satisfactory. There are two separate sources. The annual census gives (in effect) net purchases, at current prices, industry by industry, of

(a) Land and buildings and other assets (here-after called " Buildings ") : and

(b) Plant, machinery and vehicles (hereafter called " Plant ").

These form the main basis for what follows.[12]

Unfortunately, the totals from this source would *not* include expenditures by new enterprises not yet in production (and hence not making a census return) or by very small enterprises not included in the census. The former is probably a more significant omission than the latter, although there is no real evidence on the point.

To obtain a total for all manufacturing, therefore, it is necessary to turn to the national income total for GFCF(M)[13] prepared for, and published in, the U.N. Yearbook of National Accounts Statistics. This total is estimated from the production end, so to speak, and includes the capital installed in enterprises excluded from the census. As a result,

[12]Until 1949, however, decreases in assets were not shown for plant and buildings separately. For these years, therefore, only figures for increases could be used in this study.

[13]Hereinafter the abbreviation for gross fixed capital formation in manufacturing industry.

this total is invariably larger than the census totals just referred to—see Statistical Appendix, Table C, series 1 and 2. The Central Statistics Office was good enough to provide figures for GFCF(M) for the whole period 1947–59; these are shown as series 2 in Table C.

The problem is, of course, to move from one series to another—that is, to allocate the difference between the Census total and the national income total for GFCF(M). In truth, there is no wholly satisfactory way of doing this. One possibility explored, for example, was the use of annual returns of paid-up company capital to discover the net growth of capital in different industries. Such data might at first sight be expected to give an indication, in monetary terms, of new enterprises entering each industry. An analysis showed that this avenue was an unrewarding one. It is clear that random, "financial" factors—e.g., the transfer of an existing enterprise from non-corporate status, or the registration of an enterprise previously operating as a branch of a foreign firm—are too dominant.[14] Similarly, neither changes in net output nor changes in employment could be used for the purpose; increased net output or employment by existing enterprises could easily exceed the increases due to entirely new enterprises. A further complication is that there is in any case no way of estimating how much of the gap is due to new enterprises and how much to small enterprises.

The only practicable procedure is therefore to allocate the difference between the national income and Census totals for GFCF(M) in the same proportion as the capital expenditure recorded in the Census. In other words, the procedure was:

(a) The national income total GFCF(M) was divided between buildings and plant in the same proportion as that revealed in the Census for the year concerned: see series 3 (a) and (b) of Table C of the Statistical Appendix.

(b) The total for buildings so obtained was distributed industrially by grossing-up the annual Census totals for building in each group.

(c) A similar procedure was adopted for plant and machinery.

The grossing-up involved was generally larger for earlier years than for recent years. As may be seen from series 1 (c) and 2 of Table G the ratios were of the order of 1·66 for both buildings and plant during

1947–52, but only 1·28 for buildings and 1·23 for plant during 1953–59.

Exceptional treatment was required for 1958. Apart from this year, the gap between U.N. and Census totals for GFCF(M) varied between £1·4 and £2·5 million during 1953–59. For 1958, however, it amounted to £4·3 million. It appears that this rise was due to the construction of the Whitegate oil refinery in 1958; a rise of £1·1 million in imports of capital equipment of the "container" type during that year, for example, is apparently attributable solely to this factor. Arbitrarily, therefore, a sum of £1·5 million was added to the Census total for expenditure on plant in the "other manufacturing" group in that year; using the proportions revealed in the capital estimates for this industry in 1958, a corresponding sum of £1·3 million was added to the expenditure on buildings in this industry. The gap requiring distribution amongst the remaining industries was thus reduced from £4·3 million to £1·5 million.

It will be seen that the final series of GFCF(M) emerging for 1947–59 was the outcome of a fair amount of statistical adjustment, some of it of a rather arbitrary kind. However, it is worth stressing that the grossing-up was limited in extent—the basic Census series still represents over 70 per cent of the final totals.

One last step was to eliminate price changes. This was done by using the official price indices for capital goods. From 1953 onwards, these distinguish between plant and buildings; the series used for plant was that of "Transportable capital goods for use in industry", while the totals for buildings were deflated by the index "Capital goods: building and construction".[15] For the years prior to 1953, both index numbers had to be carried back with the aid of the single wholesale price index "capital equipment"[16]; the broad similarity of the behaviour of the separate index numbers after 1953 suggests that no serious violence is done by taking them back with a common index in this way. The price indices used (adjusted to 1958=100) are shown as series 4 (a) and (b) of Table C of the Statistical Appendix. The final estimates of gross investment at 1958 prices in buildings and plant are shown in Tables D and E of the same Appendix.

2. The Working Life of Assets

Having derived annual totals for GFCF(M), the crucial question is: how much of any particular total represents mere *replacement* of existing capital,

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[14]For example, in 1955 the paid-up capital of companies in manufacturing as a whole rose by £1·1 million but for the drink industry it *fell* by £2 million.

[15]See e.g. *Statistical Abstract of Ireland* 1961, (Pr. 5984), Stationery Office, Dublin 1961, Table 341, p. 319.

[16]See e.g. *Statistical Abstract of Ireland* 1952, (Pr. 1212), Stationery Office, Dublin 1953, Table 285, p. 265.

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and how much represents *net* capital formation, positive or negative? In order to answer this question, it is necessary to know, at least approximately, the period of years over which the value of particular assets is entirely used up—the working life of capital equipment, in other words. It has been customary, for many years, for this life to be arbitrarily identified with the period of years over which the Revenue authorities permit enterprises to write off their assets for the purpose of computing current tax liability. The unsatisfactory nature of this procedure is manifest.

Given a realistic valuation of the capital stock at a particular moment of time, and reliable totals for gross investment in the assets concerned for the years preceding that date, however, it must follow that there can only be one average life of assets which makes these two sets of data consistent with one another. Furthermore, it can be shown[17] that this average life, m, is given by the expression :—

$$mK_t = (m-1)k_t + (m-2)k_{t-1} + \ldots \ldots +$$
$$\{m-(m-2)\}k_{t-m+3} + \{m-(m-1)\}.k_{t-m+2}$$

where K_t represents the net valuation of the capital stock at the end of year t and k_i $(i=t \ldots \ldots t-m+2)$ represent gross investment in each of the $(m-1)$ years from t backwards.

Similarly, it can be shown that where the k_i are known only for n years, such that $o < n < m$, m is given by the expression :—

$$2k^l.m = (2n+1)k^l + 2(K-A) + \{k^{l2} + 4(K-A)^2 + 4k^l[(2n+1)(K-A) + 2B]\}^{\frac{1}{2}}$$

where k^l is an estimated representative figure for the k_i during the " unknown " years from $(t-n+1)$ to $(t-m+2)$, A is the sum of all the k_i (excluding k^l) and

$$B = k_t + 2k_{t-1} + \ldots \ldots .n.k_{t-n+1}.$$

In order to apply this formula to the Irish data, therefore, it was necessary to attempt some estimate of the rate of gross investment in Irish manufacturing industry during the years prior to 1947. In order to avoid a digression into the problems involved in this, the details of the calculations have been relegated to Appendix A. It is only necessary to record here the fact that the estimates which follow are dependent on this inevitably uncertain investigation into some inadequately documented historical territory.

Because the k^l is not *known*, but merely estimated, the resulting calculation of m will of course be subject to error. This may not be serious, however, since the importance attached to each k_i diminishes the further back the calculation proceeds. For example, using the Irish data, suppose that K_t is known for the year 1958, but the k_i are known only for the years 1947–58 (i.e., for 12 years, which is presumed to be less than the average asset life). Of necessity, the estimated m will vary according to the value k_i is assumed to have during the years prior to 1947. For plant and machinery in all manufacturing, the average k_i during 1947–58 (in 1958 prices) amounted to £9·4 million. The estimated average life of plant, m, with various postulated levels of average k_i during the years before 1947, k^l, would be as follows :—

k^l/k_i	m (years)
1·0	31
0·75	36
0·50	46
0·25	74

These give some indication of the range of error introduced in this case by the need to use an assumed k. If the true k^l had been 0·75 of the average for 1947–58, for example, an assumed k^l/k_i of 1·00 would have resulted in a 14 per cent understatement of m, while an assumed k^l/k_i of 0·50 would have resulted in a 28 per cent. overstatement of m. These errors are not overwhelming in relation to the postulated errors in the assumed k^l, but it should be observed that the error in the resulting m increases directly with m itself. It follows that the range of error is likely to be substantially greater for buildings than for plant.

This should be borne in mind in considering the average working lives suggested by the data for buildings and plant in the various industrial groups. They are as follows (lives given to the nearest whole year) :—

	Buildings	Plant
Food	91	23
Drink and tobacco	99	15
Textiles	208	63
Clothing	67	13
Wood	92	24
Paper	125	36
Chemicals	92	33
Minerals	126	31
Metals	89	61
Other manufacturing	74	62
TOTAL (ex. clothing)	99	43

[17]For details, see my paper, "The life of capital assets: an empirical approach" to be published in *Oxford Economic Papers*, February 1964.

3. Net Capital Formation 1947—59

Given the average working lives of assets, it is a comparatively simple matter to estimate the proportion of annual gross capital formation attributable to depreciation and thus to arrive at estimates of net capital formation in each year.[18] Using the notation set out in the previous section, depreciation, D, is given by

$$D = \sum_{i=t}^{t-m+1} k_i \Big| m$$

If all the k_i are known ($i=t \ldots t-m+1$), no difficulty arises. If the k_i are known for only n years, however, ($0<n<m$), then an average k^1 must be used for the " unknown " years and D becomes

$$\sum_{i=t}^{t-n+1} .k_i + (m-n)k^1 | m$$

[18] Comparatively simple, that is, if the analysis is working backwards (as this is) from the known capital stock. To move *forwards* in time would involve the assumption that the working life of assets, as emerging from historical experience, will remain constant (or has remained constant) after the date on which the capital stock was valued. There might be difficulties in this.

Here again the range of possible error will depend on the relative sizes of m and n as well as on any error involved in estimating k^1.

Having calculated depreciation in this way, the capital stock can be taken back year by year. The details of the final totals resulting from this process, in 1958 prices, are shown in the Statistical Appendix Table F. In Table G of the same Appendix the data have been re-converted to current prices. Detailed application of these figures is a matter for separate exercises, but two or three points about the capital stock estimates themselves may not be out of place here. It should perhaps be noted that the final estimates shown in Tables F and G include an allowance for rented assets throughout. For buildings the same percentage allowance as in 1958 was made throughout. For rented machinery in the clothing industry a procedure similar to that described earlier for 1958 was adopted. For 1947–49 the percentage of balance-sheet values to total plant (shown in the text above) were used ; for 1957–59 a straight $33\frac{1}{3}$ per cent was assumed ; for 1950–56 the adjustment was derived by interpolation between 1949 and 1958.

PART III : SOME PRELIMINARY APPLICATIONS

In the first place, the results suggest a wide range of capital per head in different sectors of Irish manufacturing industry. The comparison was made in Table 2 for end-1958, but it is natural to enquire how the capital-per-head in Irish industry compares with that in other countries, and inevitably the comparison turns to the United Kingdom. Barna's estimates for mid-1955 are on a broadly similar basis to that of the present estimates except that, on the one hand, vehicles and " other fixed assets " are excluded, while, on the other hand, the basic sample data were adjusted so as to bring them closer to a gross than a net (i.e. written-down) basis. How far these two sets of differences will offset one another it is impossible to say. Further, it will be realised that the actual content of any given industrial category may vary widely between the two countries, and this fact can undoubtedly account for immense differences in industries such as chemicals, engineering and the processing of non-metalliferous mining products. This is obviously likely to be the explanation of the apparently superior *per capita* stock in the very heterogeneous group " other manufacturing " in Ireland. A similar superiority in mineral products is probably accounted for by the predominance in this group of highly capitalistic trades such as cement and bricks in Ireland and the much greater

relative importance in the corresponding British category of less capitalistic trades such as slate or pottery. The comparison—shown in Table 3— can therefore be of only very limited validity. The overall average, however, may provide a representative enough figure, and it suggests a level of capital per employee some 25 per cent below the U.K. average.

Another point of interest here is the relationship between gross and net capital formation over the post-war years as a whole. The estimates are summarised in Table 4, where all items are expressed in 1958 prices so as to eliminate the effects of the rise in the overall price level during the period.

TABLE 3: CAPITAL STOCK PER EMPLOYEE MID-1955*

	Ireland £	U.K. £	Ireland %
Food	1,542	1,801	86
Drink & Tobacco ...	2,654	3,497	76
Textiles	2,099	2,790	75
Clothing	390	700	56
Wood	683	900	76
Paper	1,877	2,210	85
Chemicals	2,332	4,330	54
Minerals	1,841	1,370	134
Metals	799	1,530	52
Other manufacturing ...	2,093	1,550	135
ALL MANUFACTURING ...	1,347	1,830	74

*U.K. data from Barna *op. cit.*, Table 3, pp. 16-17.

The main feature of the table is the suggestion that although gross capital formation totalled some £175 million at constant prices over these thirteen years, the net growth in the real capital stock was only some £67 million. The data suggest, however, that the growth of the capital stock was unevenly spread over the decade. In the earlier years, from 1947 to 1952, the rate of net investment rose sharply, keeping over £7 million a year in 1949–52 and reaching £9·4 million in 1951. During 1953–55 the rate of net capital formation fell back substantially to one of £4–£5 million annually, and then fell even further to the extraordinarily limited range of £2·5 to £2·9 million in each of the four years 1956 to 1959.[19] Of the overall growth of some 44 per cent in the total capital stock between

TABLE 4: GROSS AND NET CAPITAL FORMATION, 1947-59
£ million at 1958 prices

Industry	Capital stock end–1946	Gross Capital formation 1947-59	Estimated depreciation	Net capital formation	Capital stock end–1959
Food	42·3	53·2	34·7	18·5	60·7
Drink & Tobacco ..	24·6	23·6	18·5	5·1	29·6
Textiles ..	23·0	14·6	7·5	7·1	30·0
Clothing ..	4·8	12·5	8·2	4·3	9·0
Wood	4·7	4·2	3·4	0·8	5·5
Paper ..	22·8	14·7	12·5	2·2	25·0
Chemicals ..	8·6	9·5	5·7	3·8	12·4
Minerals ..	6·7	11·1	5·1	5·9	12·6
Metals ..	8·4	19·3	6·7	12·6	21·0
Other ..	6·9	12·0	5·3	6·7	13·6
All Manufacturing ' ..	152·6	174·7	107·7	67·0	219·6

1946 and 1959, therefore, 28 per cent had occurred by the end of 1952 ; a further growth of only some 12 per cent took place in the seven years between 1952 and the end of 1959.

Finally, it is pertinent to enquire whether the availability of a series of capital stock estimates significantly modifies the picture of productivity growth in Irish manufacturing emerging from the conventional procedure of dividing output by labour input only.[20] The problem is not an easy one from a statistical point of view, since consistent series are difficult to construct for output and labour input themselves over a period as long as 1947–59. The

[19]Had it not been for the Whitegate refinery, indeed, estimated net investment would have been zero in 1958.

[20]The fact that this conventional technique of measuring productivity changes—the "ratio method"—is discussed here does not necessarily imply a belief in its usefulness. As has recently been shown with inpressive clarity, if the assumption of a linear production function—which underlines the method —does not hold, the technique can yield results which are wrong not only in magnitude but even in direction—see S. Clemhout, "The ratio method of productivity measurement", Economic Journal, Vol. LXXIII, No. 290, June 1963, pp. 358-60.

outcome of a provisional attempt at this, shown in Table 5, can therefore be regarded as no more than a rough approximation.[21]

Even apart from this there is the conceptual problem of how weights are to be attached to labour and capital inputs respectively, industry by industry. The obvious answer is to use the annual charges represented by each, and so far as labour is concerned this clearly indicates the total wage and salary bill in some suitable year. What is the equivalent for capital ? On the one hand, obviously, the using-up of the capital stock embodied in depreciation. The appropriate allowance for this can be deduced from the data shown in Table 4. In manufacturing as a whole, for example, depreciation, at constant prices, averaged £8·3 million a year on an average capital stock of £186 million, giving an annual rate of 4·4 per cent. This rate varies between industries, of course, but the range of variation is not in fact very great.

TABLE 5: PRODUCTIVITY, 1947-59
(1947=100)

Industry	Volume of output, 1959	Labour input 1959	Productivity index, 1959	
			Labour	All factors
1	2	3	4	5
Food	227·1	130·8	174	134
Drink & Tobacco ...	128·3	99·4	129	107
Textiles	199·2	158·3	126	145
Clothing	146·8	112·1	131	118
Wood	116·3	92·9	125	97
Paper	196·9	129·8	152	123
Chemicals	221·9	171·6	129	160
Minerals	245·6	157·0	156	165
Metals	266·3	138·2	193	154
Other	432·6	171·8	252	178
All manufacturing ...	176·3	127·1	139	131

On the other hand there is the running cost, so to speak, of the capital stock—the interest charge, whether actually paid by firms or imputed in the case of retained profits.[22] This is more difficult to

[21]Two problems were involved for the output indices. First, the official production indices were re-cast in 1953, so that the period 1947-59 involved two separate series, one based on 1936=100 and the other on 1953=100. The former had therefore to be recalculated to 1953=100 and then linked with the current series.
Secondly, the official indices refer to individual Census trades and not the industrial groups used in the present study. In aggregating them, the early series (1936=100, applicable to 1947-53) were weighted according to net output in 1953, while the latter series (1953=100, applicable to 1953-59) were weighted by net outputs in 1959.
A series for labour inputs was built up from Census data of numbers engaged. One series was constructed for 1947-53 and a second for 1953-59; the two were then linked through 1953.

[22]It should perhaps be emphasised that account is being taken here only of fixed capital stock. The cost of inventories or purely financial items such as trade credit is not being included.

measure, since no data appear to exist on the average rates at which Irish industry borrows capital. To assume that the rate prevailing in the United Kingdom is applicable in Ireland would be open to objection unless some evidence was produced to support it. An investigation was therefore carried out into the relative levels of interest rates in Ireland and Britain since 1927. For closeness of comparison, the investigation was confined to the yield on government bonds of similar maturity, the gilt-edged rate being generally accepted as the nearest approach to the "pure" rate of interest in an economy—i.e. the interest rate leaving aside complications introduced by varying degrees of credit risk.

Since the investigation was of a specialised kind, the details have been relegated to Appendix B. It is sufficient to record here that during the period 1947–59 the average long-term bond rate in Ireland was almost exactly 20 per cent above the corresponding rate in the United Kingdom. It seems reasonable to assume, therefore, that the rate applicable to industrial loan capital in Ireland will be about 20 per cent above the corresponding British rate. Over 1947–59, the average yield on industrial debentures amounted to 4·92 per cent[23]; the corresponding Irish rate has therefore been assumed to be 5·90 per cent.

In averaging the labour and capital input index numbers, then, the former was weighted by the total wages bill in 1953 and the latter by a capital

[23] *Annual Abstract of Statistics*, No. 95, 1958, H.M.S.O., London 1958, Table 328, p. 285, and *ibid.*, No. 99, 1962, H.M.S.O., London 1962, Table 338, p. 282. The reader is referred to the discussion of interest rates in Appendix B and particularly to the possibility mentioned there that the use of flat yields as the basis of comparison may overstate somewhat the interest gap between Ireland and the United Kingdom.

charge calculated as the depreciation rate appropriate to the industry *plus* 5·9 per cent, this being related to the average capital stock over 1947–59 as a whole. The result of dividing the index of production by such a combined labour-capital input index may be seen from column 5 of Table 5. For manufacturing as a whole there is relatively little difference between the resulting productivity index and the corresponding index of labour productivity. This is not true of particular groups, however, with the possible exception of mineral products. In the highly capitalistic industries of the food, drink, tobacco group and in miscellaneous manufacturing (which includes oil refining) however, the rise in productivity is significantly reduced by the inclusion of capital, as one might expect; rather more surprisingly, the same is true of wood manufactures and metal products. Conversely, in the textile industry the indicated productivity change is significantly increased when allowance is made for capital inputs, although it is again rather surprising to find that the same is true of chemicals. All in all, it is striking that there appears to be no very close relationship between the effects of allowing for capital inputs and the intensity of capital usage in particular industries.

Like the other applications attempted here however, this calculation is no more than a first approximation requiring to be strengthened by more detailed estimates. The primary object of this study has been to present estimates of the capital stock of Irish industry, rather than to utilise them. This is a long way from saying, of course, that the mere compilation of such estimates can be a useful end in itself. On the contrary, so far from ending with the setting out of the estimates, the really important stage is merely beginning.

STATISTICAL   APPENDIX

TABLE A: FIXED ASSETS OF RESPONDENT ENTERPRISES, 1958*

£000

INDUSTRY	By	Fy	Bx/By	Est. Fx (3)×(4)	IPx/Px	Est. IFx (5)×(6)	IBx	TOTAL Blds., etc. (7)+(8)	Vy	Px/Py	Est. Vx (10)×(11)	Est. IVx (12)×(1·5)	IPx	TOTAL Plant, etc. (13)+(14)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1. Food	7,425	687	·978	· 672	2·47	1,660	15,145	16,805	816	·910	743	1,115	14,351	15,466
2. Drink & Tobacco(a)	5,365	2,279	1·066	2,429	1·94	4,005	14,815	18,820	709	1·079	765	819	8,888	9,707
3. Textiles	3,672	282	·985	278	3·08	856	8,713	9,569	125	·995	124	186	14,133	14,319
4. Clothing...	1,005	104	·892	93	3·66	340	2,501	2,841	99	·943	93	140	1,982	2,122
5. Wood	374	24	·893	21	2·16	45	839	884	97	·941	91	137	620	757
6. Paper	2,408	315	1·065	317	2·76	875	5,758	6,633	131	·933	122	183	9,659	9,842
7. Chemicals	1,761	94	·975	92	3·20	294	3,504	3,798	110	·911	100	150	3,996	4,146
8. Minerals	2,239	84	·509	43	3·11	134	2,139	2,273	241	·328	79	119	2,265	2,384
9. Metal Products	3,792	263	·947	249	2·79	695	6,577	7,272	155	·830	129	194	5,998	6,192
10. Other Manufacturing	(a)	(a)	(a)	(a)		707	2,609	3,316	(a)	(a)	(a)	329	3,568	3,897
TOTAL	28,041	4,131		4,194		9,611	62,600	72,211	2,484		2,246	3,372	65,460	68,832

*See notation set out in Part I, Sec. 3.
(a) Other manufacturing included with drink and tobacco. Final estimates allocated in same proportion as insurance valuations of B and P respectively.

(1)	Own-Assets Grossing-up ratio (a) Blds. (2)	Plant (3)	Total assets (£000) Blds. (4)	Plant (5)	Rented Assets (£000) Blds. (6)	Plant (7)	All Assets £000 Blds. (8)	Plant (9)	Total (10)	Nos. engaged 1958 000 (11)	Assets per Head (£) Blds. (12)	Plant (13)	Total (14)
1. Food ...	1·86	1·85	31,257	28,612	2,407	—	33,664	28,612	62,276	33·9	993	844	1,837
2. Drink & Tobacco	1·04	1·04	19,573	10,095	1,116	—	20,689	10,095	30,784	9·8	2,110	1,030	3,140
3. Textiles	1·26	1·21	12,057	17,326	940	—	12,997	17,326	30,323	18·8	691	922	1,613
4. Clothing	1·95	1·63	5,540	3,459	2,355	1,200	7,895	4,659	12,554	20·8	380	224	604
5. Wood	3·52	3·18	3,112	2,407	1,046	—	4,158	2,407	6,565	7·3	569	330	899
6. Paper ...	1·55	1·52	10,281	14,960	1,408	—	11,689	14,960	26,649	13·7	853	1,092	1,945
7. Chemicals	1·54	1·49	5,849	6,178	725	—	6,574	6,178	12,752	4·7	1,398	1,314	2,712
8. Minerals	2·70	2·73	6,137	6,508	417	—	6,554	6,508	13,062	5·0	1,311	1,302	2,612
9. Metal Products	1·45	1·42	10,544	8,793	2,162	—	12,706	8,793	21,499	21·1	602	417	1,019
10. Other manufacturing	1·36	1·35	4,510	5,261	870	—	5,380	5,261	10,641	6·8	791	773	1,564
TOTAL ...			108,860	103,599	13,446	1,200	122,306	104,799	227,105	141·9	862	739	1,600

(a) Remainder of net output of all firms divided by comparable total for firms giving insurance valuation.

TABLE C: GROSS FIXED CAPITAL FORMATION IN MANUFACTURING INDUSTRY, 1947-59

£ million at current prices

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1. C.I.P. Totals: (a)													
(a) Buildings ...	1·5	1·7	1·8	2·4	2·9	3·0	2·1	2·6	2·9	2·1	2·7	3·1(b)	2·7
(b) Plant ...	2·7	3·8	4·5	4·6	5·0	5·7	7·0	7·0	7·0	6·7	7·4	7·6(c)	7·9
(c) Total	4·2	5·5	6·3	7·0	7·9	8·7	9·1	9·6	9·9	8·8	10·1	10·7	10·6
2. U.N. Total ...	7·4	9·7	10·2	11·3	13·7	13·6	11·0	11·5	12·2	11·3	11·5	12·2	12·1
3. Estimated division													
(a) Buildings ...	2·6	3·0	2·9	3·9	5·0	4·7	2·5	3·1	3·6	2·7	3·1	3·5	3·1
(b) Plant ...	4·8	6·7	7·3	7·4	8·7	8·9	8·5	8·4	8·6	8·6	8·4	8·7	9·0
4. Price indices													
(a) Buildings ...	64·8	70·3	70·6	73·2	78·5	87·3	88·0	86·3	88·3	94·0	98·2	100·0	98·0
(b) Plant ...	65·3	70·8	71·1	73·8	79·1	87·9	88·7	88·3	92·5	96·4	99·7	100·0	100·4

(a) Gross purchases for 1947-49; purchases *less* sales for 1950 onwards.
(b) Includes £1·3 million attributed to the Whitegate refinery.
(c) Includes £1·5 million, as for (b).

TABLE D: ESTIMATED GROSS INVESTMENT IN BUILDINGS, 1947-59

£000 at 1958 prices

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1. Food	977	1,199	1,402	1,671	1,403	1,593	890	973	1,224	1,052	1,283	744	885
2. Drink & Tobacco ...	131	316	280	855	990	488	125	687	402	219	265	119	283
3. Textiles ...	697	490	340	396	281	405	205	236	334	130	256	176	320
4. Clothing	438	367	114	340	572	387	274	195	286	156	181	217	121
5. Wood	123	156	36	84	130	139	57	55	120	121	75	51	64
6. Paper	224	225	214	309	526	193	305	291	196	230	92	71	164
7. Chemicals ...	222	298	344	135	480	356	74	186	316	177	557	212	255
8. Minerals	251	288	173	197	283	508	318	280	344	236	238	164	108
9. Metal Products ...	326	847	830	1,021	944	1,129	394	614	684	422	226	251	791
10. Other manufacturing	627	91	269	327	833	252	149	69	168	192	93	1,495(a)	234
TOTAL ...	4,016	4,277	4,002	5,335	6,442	5,450	2,791	3,586	4,074	2,935	3,266	3,500(a)	3,225

(a) Includes an estimated allowance of £1·3 million in respect of the Whitegate refinery.

TABLE E: ESTIMATED GROSS INVESTMENT IN PLANT AND MACHINERY, 1947-59

£000 at 1958 prices

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1. Food	2,228	3,198	3,250	3,416	3,186	3,763	2,932	2,406	2,769	2,820	3,005	2,319	2,600
2. Drink & Tobacco	570	877	1,493	2,150	1,507	1,104	1,771	1,892	2,002	1,358	1,342	1,155	1,265
3. Textiles	1,033	1,085	1,099	538	911	883	782	620	677	593	700	562	868
4. Clothing	595	825	632	994	924	607	647	732	545	694	446	554	620
5. Wood	271	255	279	254	350	253	173	235	262	180	137	137	173
6. Paper	638	945	1,250	922	1,001	736	978	947	1,052	1,040	1,036	575	510
7. Chemicals	334	463	513	356	686	396	266	487	444	524	567	319	566
8. Minerals	762	468	506	404	579	485	1,041	1,287	448	610	448	383	270
9. Metal Products	685	1,045	1,012	714	631	1,060	775	698	871	789	470	722	1,374
10. Other manufacturing	293	328	355	247	1,115	781	256	243	295	263	238	1,952(a)	813
TOTAL	7,409	9,489	10,389	9,995	10,890	10,068	9,621	9,547	9,365	8,871	8,389	8,678(a)	9,059

(a) Includes an estimated allowance of £1·5 million in respect of the Whitegate refinery.

TABLE F: MID-YEAR CAPITAL STOCK OF IRISH INDUSTRY*

£ million at 1958 prices

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1. Food	44·6	46·2	48·4	50·9	53·3	55·7	57·6	58·5	59·5	60·6	61·8	62·6	62·9
2. Drink & Tobacco	25·4	25·3	25·6	26·8	28·3	29·0	29·4	30·1	31·1	31·5	31·4	31·2	29·8
3. Textiles	24·3	25·4	26·5	27·2	27·7	28·4	28·9	29·3	29·6	29·9	30·1	30·4	30·7
4. Clothing	7·8	9·6	9·2	9·9	11·1	12·0	12·4	12·6	12·8	12·9	12·8	12·7	12·6
5. Wood	5·8	5·9	6·1	6·1	6·3	6·5	6·6	6·5	6·7	6·7	6·7	6·6	6·6
6. Paper	24·1	24·2	24·6	25·0	25·4	25·7	25·9	26·2	26·5	26·8	27·0	26·9	26·6
7. Chemicals	9·1	9·4	9·8	10·1	10·6	11·1	11·8	11·9	11·6	11·9	12·4	12·8	13·0
8. Minerals	7·3	7·9	8·3	8·6	9·0	9·6	10·4	11·4	12·2	12·6	12·9	13·1	13·1
9. Metal Products	9·6	10·8	12·3	13·8	15·2	16·7	18·0	18·8	19·8	20·7	21·1	21·4	22·5
10. Other manufacturing	7·7	8·1	8·2	8·5	9·5	10·6	10·9	10·9	10·9	10·9	10·9	12·5	14·4
TOTAL	165·7	172·7	179·0	186·9	196·3	205·3	211·9	216·4	220·6	224·5	227·3	230·1	232·1

*Including rented assets. The total shown for mid-1958 in this table and in Table 6 is higher than the total shown for end-1958 in Table B because of the estimated allowance—£4·3 million in 1958—for firms not included in the Census of Industrial Production. See the text, Part II, Sec. I.

TABLE G: MID-YEAR CAPITAL STOCK OF IRISH INDUSTRY*

£ million at current prices

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1. Food	29·0	32·5	34·3	37·4	42·0	48·8	50·9	51·1	53·7	57·7	61·2	62·6	62·3
2. Drink & Tobacco	16·5	17·8	18·1	19·7	22·2	25·4	25·9	26·2	27·9	29·8	31·0	31·2	29·4
3. Textiles	15·8	18·0	18·8	20·0	21·9	24·9	25·6	25·6	26·9	28·5	29·8	30·4	30·5
4. Clothing	5·1	6·8	6·5	7·3	8·8	10·5	10·9	11·0	11·5	12·3	12·7	12·7	12·5
5. Wood	3·7	4·2	4·3	4·5	4·9	5·7	5·8	5·7	5·9	6·4	6·6	6·6	6·5
6. Paper	15·7	17·1	17·4	18·4	20·1	22·6	22·9	22·9	24·0	25·6	26·8	26·9	26·4
7. Chemicals	5·9	6·6	7·0	7·4	8·3	9·7	10·4	10·4	10·5	11·3	12·3	12·8	12·9
8. Minerals	4·7	5·5	5·9	6·3	7·1	8·4	9·2	10·0	11·0	12·0	12·8	13·1	13·0
9. Metal Products	6·3	7·6	8·7	10·2	11·9	14·7	15·9	16·4	17·8	19·7	20·9	21·4	22·2
10. Other manufacturing	5·0	5·7	5·8	6·2	7·4	9·3	9·7	9·5	9·8	10·4	10·8	12·5	14·3
TOTAL	107·7	121·8	126·8	137·4	154·6	179·8	187·2	188·7	199·1	213·6	224·8	230·1	230·1

*Including rented assets.

APPENDIX A : Capital Formation, 1926-47

1. Buildings

The Census of Production contains information on changes in the value of capital assets only from 1945 onwards. The estimate of an appropriate k^l for gross investment in buildings during the period prior to 1945 was therefore based on census of production data of building output. Ideally, data should have drawn from the whole period over which the lives of assets extend—i.e. a first approximation that the working life of, say, buildings was 100 years should be followed by a recalculation with a k^l based on data for the 1840's onwards. In practice this is not possible. Of necessity it must be assumed that the available data are representative of the pre-1945 era as a whole. The process fell into two separate parts:—

(a) The estimate of aggregate gross investment in industrial buildings relative to that of 1947–59: and

(b) the allocation of this aggregate amongst the industrial categories being used in the present study.

The first step was to extract the values for the output of "New factory buildings and workshops" from the census of production reports for the building industry. The years for which the data were extracted were determined, on the one hand, by the fact that the building industry was not included in every census and, on the other hand, by the need to achieve a more or less balanced representation of each of the periods of the 1920's, and 1930's and the 1940's up to 1947. The years finally used, and the totals for new factory building are shown in Table A1.[24]

[24]There is a problem, of course, that the coverage achieved by the Census is neither complete nor constant for the building industry, a notoriously difficult customer for such purposes. The difficulty mainly arises with the small jobbing builder, however, and an act of faith has been made that factory building will not be much affected by this.

The next step was to construct a price index in order to arrive at a series in real terms. Labour costs were expressed as an index of average wages and salaries paid in the building industry (total wage and salary payments divided by average numbers engaged). Material costs were represented by the average prices of bricks and cement—i.e. value divided by quantity.[25] These materials were selected partly because of their relative importance in total purchases of materials and partly because their homogeneity makes an average-value series reasonably meaningful. The results of those calculations are shown in lines 2–4 of Table A1.

In general, bricks and cement have been of roughly equal importance in total materials purchased by the building industry during the period under review. Similarly, labour cost and material costs have also been of roughly equal importance. An index of total costs was therefore derived by giving a weight of 2 to labour costs and 1 to each of the materials; this is shown in line 5 of the table. With its aid, the value of factory building was translated to a 1950 price level. The 1926–29 average of £352,000 was taken to typify the 1920's, the 1931–38 average of £617,000 the 1930's, and the 1943–47 average of £611,000 the 1940's up to 1947. An arithmetic average of these three, £527,000, was equivalent to 37 per cent of the corresponding 1950–59 average derived from the five years 1950, 1953, 1955, 1957 and 1959. The aggregate k^l for 1926–46 was therefore assumed to be 40 per cent of the 1947–59 average at constant prices. As was said at the outset, this has necessarily been assumed to reflect the overall relationship between post-war

[25]For 1926-47, from reports on the building industry—total purchases in money terms divided by quantity purchased. For the 1950's these data are no longer shown in the published reports, so a similar calculation was carried out from the data provided in the census reports for the bricks, pottery, glass group. Both sets of calculations were carried out for 1947 in order to link the 1926-47 and, 1950-59 price series into one consistent index-number series.

TABLE A1 : GROSS INVESTMENT IN FACTORY BUILDING, 1926–59

		1926	1929	1931	1938	1943	1945	1947	Average 1949–59
1. New Factory building £000		192·1	132·2	74·4	498·9	189·1	349·3	978·8	1,799
2. Average wages ... ... 1950=100		44	48	45	46	51	57	76	118
3. Average price: cement ... „		59	48	49	57	101	102	98	132
4. Average price: bricks ... „		39	34	33	37	79	74	110	134
5. Average costs ... ... „		47	45	43	47	79	73	90	126
6. Factory building at 1950 prices ... £000		409	294	173	1,061	266	478	1,088	1,425

Sources : Based on data given in annual Census of Industrial Production reports, 1926, p. No. 844, Dublin, 1933 ; 1931, p. 1243, Dublin, 1934 ; 1938–44, p. 7707 and 1945–47, Pr. 123. Data for 1950–59 from *Irish Trade Journal and Statistical Bulletin.*

gross investment in industrial building and comparable investment in *all* the preceding decades.

The problem then arose of the distribution of this aggregate k^l (£1·655 million at 1958 prices) amongst the various industrial groups. In default of any more satisfactory alternative, this was done on the basis of (*a*) numbers employed and (*b*) the relative sizes of buildings-per-worker as revealed by the 1958 estimates.[26] The details are shown in Table A2. The assumptions underlying the process are obviously open to question—i.e. that the values of buildings per worker in 1958 are representative of the period 1926–46, at least in relative terms, and that this in turn is a reliable indicator of gross investment in buildings. All that can be hoped for is that the order of magnitude of the values emerging for k^l in column 6 is about right.

2. Plant and Machinery

For gross investment in plant and machinery during 1926–46 an essentially similar procedure was adopted. The indicator used for aggregate gross investment was imports of what appeared to be

[24]Excluding rented buildings, of course.

representative capital goods—i.e. a list of 28 types of industrial machinery—as shown in the Trade and Shipping accounts for the same years as those involved in the estimate for buildings[27]. The totals are shown in line 1 of Table A3. Because of the development of the engineering industry in Ireland since the war, it did not seem advisable to assume that the same relationship as existed during 1926–47 between machinery imports and total gross investment in plant and machinery would hold throughout 1947–59. Hence the 1926–47 results were linked directly to the total for estimated gross investment in 1947 only, and not to an average for 1950–59 as was done for buildings.

The problem of correcting the 1926–47 figures for price changes was more difficult than for building. Because of their nature, the division of the current value of the imports involved by their

[27]Machinery described as bread and biscuit, boot and shoe, brewing and distilling, dairy, grainmilling, printing and bookbinding, cardboard box, newspaper, bag and envelope-making, other paper-making, sweet-making, hosiery, other textile, tobacco and wood-working; boilers and boilerhouse plant; cranes, hoists etc; churns; generators; electric motors; other electric machinery; hydraulic machinery; machine tools; oil prime-movers; petrol prime-movers; pumps; machinery re-imported after repair; machinery not elsewhere specified.

TABLE A2 : ALLOCATION OF TOTAL GROSS INVESTMENT IN BUILDINGS, 1926–46

Industry	Average numbers employed 1926–47 000s	Buildings per head, 1958 £	Average buildings 1926–47 (2×3) £ mn.	Average buildings 1926–47 (2×3) %	Estimated k^l £000 at 1958 prices
1	2	3	4	5	6
Food	22·3	922	20·6	31·7	525
Drink and Tobacco	7·9	1,997	15·8	24·2	401
Textiles	5·5	642	3·5	5·4	89
Clothing	16·3	266	4·3	6·6	109
Wood	5·9	425	2·5	3·8	63
Paper	7·9	752	5·9	9·0	149
Chemicals	2·7	1,239	3·3	5·1	84
Minerals	1·9	1,232	2·3	3·5	58
Metal Products	8·1	500	4·1	6·3	104
Miscellaneous	4·3	665	2·9	4·4	73
TOTAL ...	82·8		65·2	100·0	1,655

Sources : Col. 2, as for Table A1.
Col. 3, Statistical Appendix, Table B.

TABLE A3 : GROSS INVESTMENT IN PLANT AND MACHINERY, 1926–47

			1926	1929	1931	1938	1943	1945	1947
1. Machinery imports ...	£000		1,287	1,575*	943	1,603	292	735	4,191
Average values :									
2. Iron bars	1947=100		27	25	22	34	81	123	100
3. Steel bars	,,		46	40	32	43	85	101	100
4. Castings	,,		25	25	23	36	38	57	100
5. Total	,,		39	35	29	40	81	105	100
6. Machinery imports at 1947 prices	£000		3,300	4,500*	3,252	4,007	360	700	4,191

*Because of small differences in the categories distinguished in the Trade Accounts between 1926 and 1929, these figures are not comparable with those shown for 1926. On the 1926 classification, the corresponding total for 1929 would be £1,640,000 at current prices and £4,685,000 at 1947 prices. This has been taken into account in the averages referred to in the text.

physical weight or quantity would have little meaning. Instead, the average value of reasonably simple and homogeneous iron and steel products—iron bars and rods, steel bars and rods, and castings and forgings in the rough—was used as a price index. They were combined into a single index by using as weights the total value of imports in the seven years shown in the table.[28] By a process of averaging similar to that described for buildings, estimated investment in plant and machinery at constant prices over 1926-46 was put at 73.2 per cent of the 1947 figure. For industry as a whole therefore, k' was assumed to be 70 per cent of the 1947 total—i.e. £5.19 million at 1958 prices.

The allocation of this total was carried out in a way exactly comparable with that adopted for

[28]The resulting weights were: iron bars, 28; steel bars, 66; castings and forgings, 6.

buildings. The details are shown in Table A4 and need not be further described here.

TABLE A4: ALLOCATION OF TOTAL GROSS INVESTMENT IN PLANT, 1926-46

Industry	Average numbers employed 1926-47 000	Plant per head, 1958, £000	Average plant 1926-47 (2×3)		Estimated k' at 1958 prices £000
			£ mn	%	
1	2	3	4	5	6
Food	22.3	0.85	19.0	32.6	1,691
Drink & Tobacco	7.9	1.02	8.1	13.8	716
Textiles ...	5.5	0.92	5.1	8.7	451
Clothing ...	16.3	0.17	2.8	4.8	249
Wood ...	5.9	0.33	1.9	3.2	166
Paper	7.9	1.10	8.7	14.9	773
Chemicals ...	2.7	1.31	3.5	6.0	311
Minerals ...	1.9	1.44	2.7	4.6	239
Metal products	8.1	0.42	3.4	5.8	301
Miscellaneous...	4.3	0.77	3.3	5.6	290
TOTAL ...	82.8		58.5	100.0	5,187

APPENDIX B : Irish Interest Rates, 1927-61

The yield on government securities is commonly regarded as the closest possible approximation to the "pure" rate of interest—that is to say, the rate of interest uncomplicated by considerations of commercial risk or the entrepreneurial element of equities. It is surprising, therefore, that there appears to be no systematic calculation of the average rate of interest on Irish government stocks at current market prices—the *yield*—or of an index of their price level. This Appendix seeks to throw a little light on this dark corner. It is concerned primarily with the question: what has happened to the relative prices and yields of government securities in Ireland and the United Kingdom since the creation of the State?

In making such a comparison three major types of difficulty are encountered:—

(a) the "yield" on a security can be defined in a number of ways. In particular, three types are often distinguished:—

(i) *The flat yield*—i.e. the coupon interest rate expressed as a return on the current market quotation;

(ii) *The redemption yield*—i.e. the yield plus or minus the discounted annual value of the capital gain or loss implied by the difference between the current quotation and the security's redemption value (usually par);

(iii) *The net yield*, being either (i) or (ii) reduced by the appropriate standard rate of income tax and, where applicable, any capital taxes or offsets arising from the purchase of the security. In a comparative analysis this concept may be important because of differences in tax rates in the countries or periods being compared. Even in an analysis confined to a single country and period it may be important if (as occasionally happens) certain government stocks are exempt from taxation or carry tax privileges—e.g. acceptance at par for death duty purposes.

Ideally, a combination of (ii) and (iii) should be adopted in a study of interest rates over time and between countries—i.e. the net redemption yield. The calculation of this, however, involves considerably greater labour than (i), and this was frankly considered as unjustified in a comparison as broad as this. Hence the study has been based on flat yields throughout, not because this is the most desirable procedure but because the immense addition to the calculations which any alternative would involve does not seem justifiable in view of the general similarity of tax systems in the two countries. It must be admitted, however, that one result of this procedure may be that the interest differential between Ireland and the United Kingdom will be somewhat overstated. This result is

made possible by the fact that a much greater proportion of the British national debt was issued during the cheap money era (1932–51) than was the case in Ireland; a greater proportion of Irish securities was issued during the post-1951 period of relatively high coupon rates. Precisely how important this consideration will be in quantitative terms is a matter of opinion, but it does not seem likely to be sufficient to invalidate the comparison attempted here.

The second difficulty is that there is no *single* yield (of any kind) on government securities; for well-known reasons, the yield of a security varies with its life—usually directly. This difficulty is usually solved by taking groups of securities— short-term, medium-term and long-term—and arriving at an average for each group. This was not possible for the present study, because for the greater part of the period surveyed the number of separate securities quoted was far too small to allow of a sub-division into separate groups. Comparability between the two countries was therefore secured by including for the United Kingdom, year by year, securities whose maturity dates were as similar as possible to those of the Irish securities included in the year concerned.

It follows, therefore, that comparability between the two countries was secured at the expense of strict comparability through time for either country. That is to say, although the maturity-mixture of the selected securities would be roughly the same for both countries in any year, it would vary through time for either country. This is especially the case for the post-war period. For the years 1927–44 the same four securities were used throughout for Ireland and two of the four used for the United Kingdom were also constant.[29] The only major variation over the period therefore took the form of a shortening of the average maturity to earliest redemption date.[30] In 1927, the weighted average life to maturity of the Irish stocks was 31 years; by 1944 this had fallen to 11 years.

For the post-war period, the changes in the pattern of maturity were rather more complicated, since in all 18 securities were involved for each country. These are also listed in Table B1. Thus, the average period to the latest redemption date for the Irish securities was 19 years in 1955 and 15 years in 1961, with a good deal of variation in between.

The third type of difficulty is connected with the entry and exit of government securities into and out

of the list of current quotations. In compiling a price index this can be a very serious difficulty indeed. Since securities are bound to approach closer to par as their maturity date draws nearer, and are normally replaced by securities which begin their lives, at any rate, at par, there is a strong bias towards par in any index of government securities which is not confined to irredeemable stocks. The indices of prices shown in Table B2A and B2B can

TABLE B1: SECURITIES INCLUDED IN THE COMPARISONS

	Years included	Weight
Ireland		
A. 1927–1944		
1. Second National Loan, 5%, 1950–60	1927–44	1
2. Third National Loan, 4½%, 1950–70	1930–44	1
3. Fourth National Loan, 3½%, 1950–70	1933–44	1
4. 4½% Land Bonds (1962–90) ...	1927–44	2
B. 1944–1961		
1. 3% Exchequer Bonds, 1965–70 ...	1948–61	24
2. 3½% Exchequer Bonds, 1965–70 ...	1950–61	31
3. 4% Exchequer Bonds, 1950–60 ...	1944–49	7
4. 5½% Exchequer Stock, 1971–74 ...	1958–61	14
5. 6% Exchequer Stock, 1980–85 ...	1960–61	39
6. Second National Loan, 5%, 1950–60	1944–49	5
7. Third National Loan, 4½%, 1950–70	1944–49	5
8. Fourth National Loan, 3½%, 1950–70	1944–61	5
9. 4¼% National Loan, 1975–78 ...	1957–61	17
10. 4½% National Loan, 1973–78 ...	1953–61	25
11. 5% National Loan, 1962–72 ...	1952–61	20
12. 5½% National Loan, 1966	1956–61	6
13. 6% National Loan, 1967	1957–61	19
14. 4% Conversion Loan, 1950–70 ...	1944–49	6
15. 3¾% Financial Agreement Loan, 1953–58	1944–57	9
16. 3¾% National Security Loan, 1956–61	1944–58	7
17. 5¼% National Development Loan, 1979–84	1959–61	18
18. 5% National Savings Bonds, 1971–81	1956–61	18
United Kingdom		
A. 1927–1944		
1. 5% War Loan, 1929–47	1927–29	1
2. 5% Conversion Loan, 1944–64 ...	1930–32	1
3. 2½% Conversion Loan, 1944–49 ...	1933–36	1
4. 2¾% Funding Loan, 1952–57 ...	1937–40	1
5. 2½% National War Bonds, 1949–51	1941–44	1
6. 4½% Conversion Loan, 1940–44 ...	1927–32	1
7. 3% Conversion Loan, 1938–53 ...	1933–44	1
8. 4% Funding Loan, 1960–90 ...	1927–44	1
9. 4% Victory Bonds	1927–44	2
B. 1944–61		
1. 2½% Savings Bonds, 1964–67 ...	1950–61	31
2. 3% Savings Bonds, 1955–65 ...	1957–61	6
3. 3% Savings Bonds, 1960–70 ...	1944–49	6
4. 3% Savings Bonds, 1965–75 ...	1948–61	24
5. 2½% National War Bonds, 1949–51	1944–49	31
6. 2½% National War Bonds, 1951–53	1944–49	5
7. 4% Victory Bonds	1958–61	14
8. 2½% Funding Loan, 1956–61 ...	1944–58	7
9. 3% Funding Loan, 1966–68 ...	1952–61	20
10. 3% Funding Loan, 1959–69 ...	1944–61	5
11. 3½% Funding Stock, 1999–2004 ...	1960–61	39
12. 4% Funding Loan, 1960–90 ...	1957–61	18
13. 5½% Funding Loan, 1982–84 ...	1959–61	18
14. 3% Conversion Loan, 1948–53 ...	1944–47	5
15. 3½% Conversion Loan, 1969 ...	1957–61	19
16. 3% National Defence Loan, 1954–58	1944–53	9
17. 3½% Treasury Stock, 1977–80 ...	1953–61	25
18. 3½% Treasury Stock, 1979–81 ...	1957–61	17

[29]For details, see Table B1.

[30]Throughout this Appendix, the usual convention has been followed for deciding the maturity of a security having a range of dates at which repayment may occur—i.e. redemption at the earliest date has been assumed if the security stands above par and at the latest date if it stands below par.

TABLE B2A: YIELDS AND PRICES, 1927-1944

		YIELDS %		PRICES 1938=100	
		Ireland	U.K.	Ireland	U.K.
1927	...	4·97	4·56	89·1	92·3
1928	...	4·92	4·48	90·0	93·9
1929	...	4·99	4·45	88·8	94·4
1930	...	4·78	4·45	91·9	94·4
1931	...	4·73	4·48	92·9	93·8
1932	...	4·59	4·22	95·7	99·5
1933	...	4·09	3·33	101·9	102·1
1934	...	4·06	3·18	102·6	107·1
1935	...	4·07	3·15	102·3	108·0
1936	...	3·96	3·13	105·1	107·7
1937	...	4·04	3·34	103·2	103·5
1938	...	4·17	3·46	100·0	100·0
1939	...	4·23	3·52	98·6	98·2
1940	...	4·15	3·39	100·5	101·9
1941	...	4·00	3·21	104·4	106·0
1942	...	3·87	3·18	107·1	107·1
1943	...	3·85	3·18	108·4	107·1
1944	...	3·89	3·21	107·0	106·2

have only very limited meaning over any great period of time in themselves, therefore. Their only usefulness lies in their ability to measure *comparative* shifts between the two countries in the short run.

These are the peculiar difficulties involved in measuring trends in government security prices and yields. There are two general problems attached to all averaging exercises:—

(a) *Average taken*—For ease of computation, the average price used was the mean of the highest and lowest quotation recorded each year. If a security reached its lowest point only for a brief period of the year and was close to its highest point for the greater part of the year (or *vice versa*), of course, this would result in an unrepresentative average. For the very limited purposes of this inquiry however, the error involved is not likely to be important.

For the Irish securities prices were taken from the *Handbook of Irish Securities* (Butler and Briscoe, Dublin) for the years 1944-61. For 1927-44, recourse was had to the Stock Exchange ten-year record issued annually by the same firm. For the British stocks, prices were taken from Pember and Boyle's publication *British Government Securities in the Twentieth Century* (2nd edition, London, June 1950) and Supplements thereto.

(b) *Weighting*—Since securities can be of widely different importance in the market, some system of weighting is necessary. Here, securities have been weighted by the nominal amount outstanding at the time of their first inclusion in the calculations. This, too, is open to criticism, but its merit lies in its

computational simplicity and its draw-backs are unlikely to be of great significance in the present context.

1927-1944

The results are shown in Table B2A and visually, so far as the yields are concerned, in Chart 1. The main feature of this is the distinct widening of the yield gap (i.e. between Ireland and the U.K.) after 1932. During 1927-32, the Irish yield was about 8–9 per cent above the British, and the gap widened to as much as 29 per cent in 1935. With the rise of interest rates in the U.K. after 1936, the gap fell back to around 20 per cent but remained remarkably stable in view of the different experience of the two countries after 1939.

The dividing-point in this period was obviously the introduction of the cheap money policy in the U.K. in 1932. Naturally some of the effects of this spilled over into the market for Irish government stocks, but by no means all. One presumes that the enormous impact on the British market of the switch from a 5 per cent to a 3½ per cent basis of what had been easily the most important stock in the gilt-edged list—5 per cent War Loan—was not parallel-ed by anything comparable in Ireland. The narrow-ness of the gap before 1932, in other words, was partly a reflection of this fact that a single, enormous stock was dragging the British list down; the width of the gap thereafter, on the other hand, is a reflec-tion that this enormous issue was tending to push the British list up.

The 1927-44 experience illustrates, in other words, the closeness with which the two markets move together, but it also suggests that large, special factors can influence one and not the other —or, precisely, can influence the one very much more than the other. The factors in question must be closely related to the financial sphere; as the Chart shows, War Loan could shake the Irish-U.K. relationship but a small matter like World War II could not.

1944-1961

The data are set out in Table B2B and the yield data also in Chart 2. There is nothing here of the dimensions of War Loan—no sudden shift in the relationship of the curves. Clearly there has been some tendency for the gap between them to narrow, but this needs care in interpretation. Between 1944 and 1947 the gap was of the order of 34–35 per cent but since this period covers the exuberance of the Daltonian ultra-cheap money campaign, this probably indicates no more than a more marked scepticism amongst Irish investors about the out-
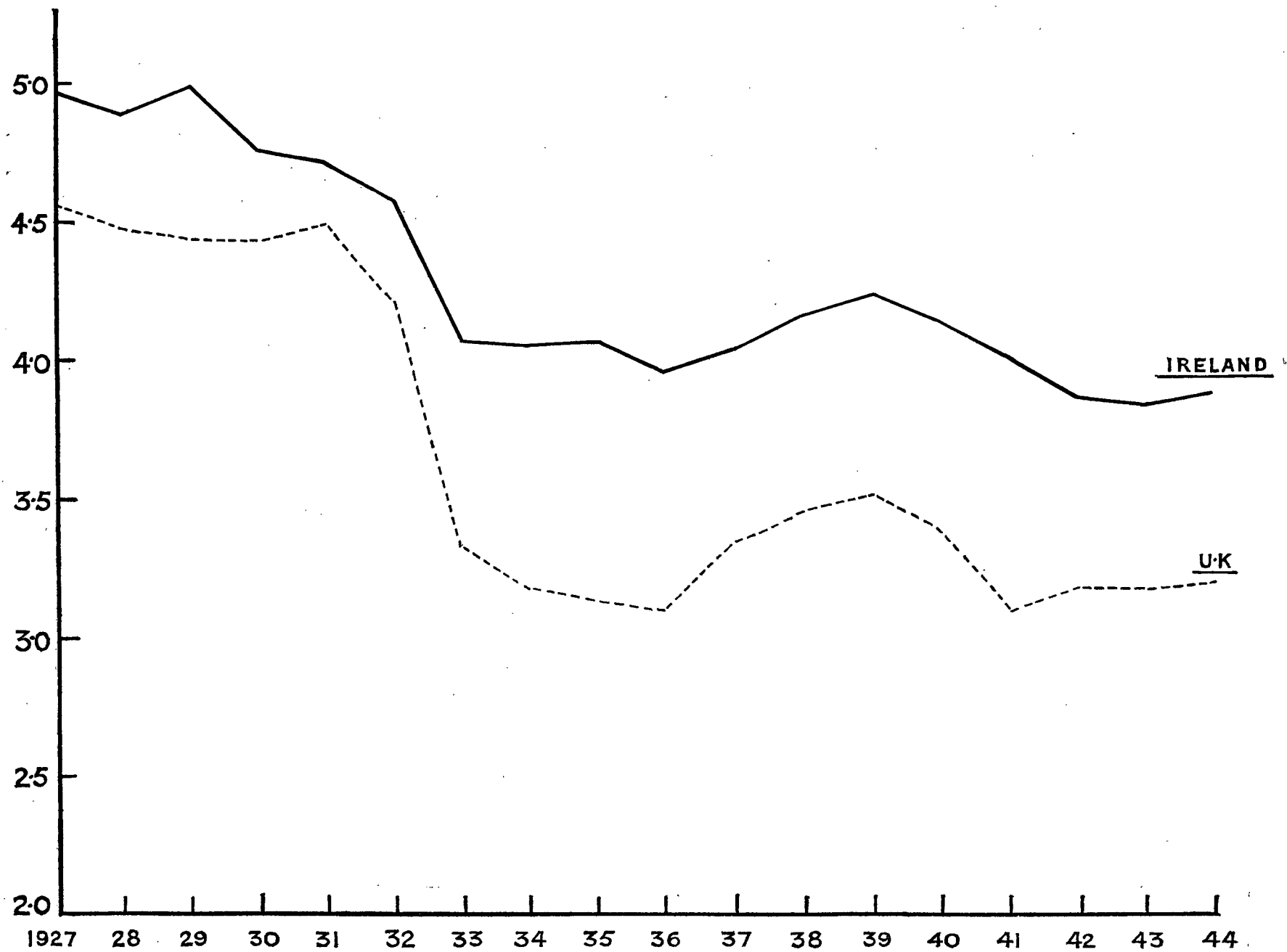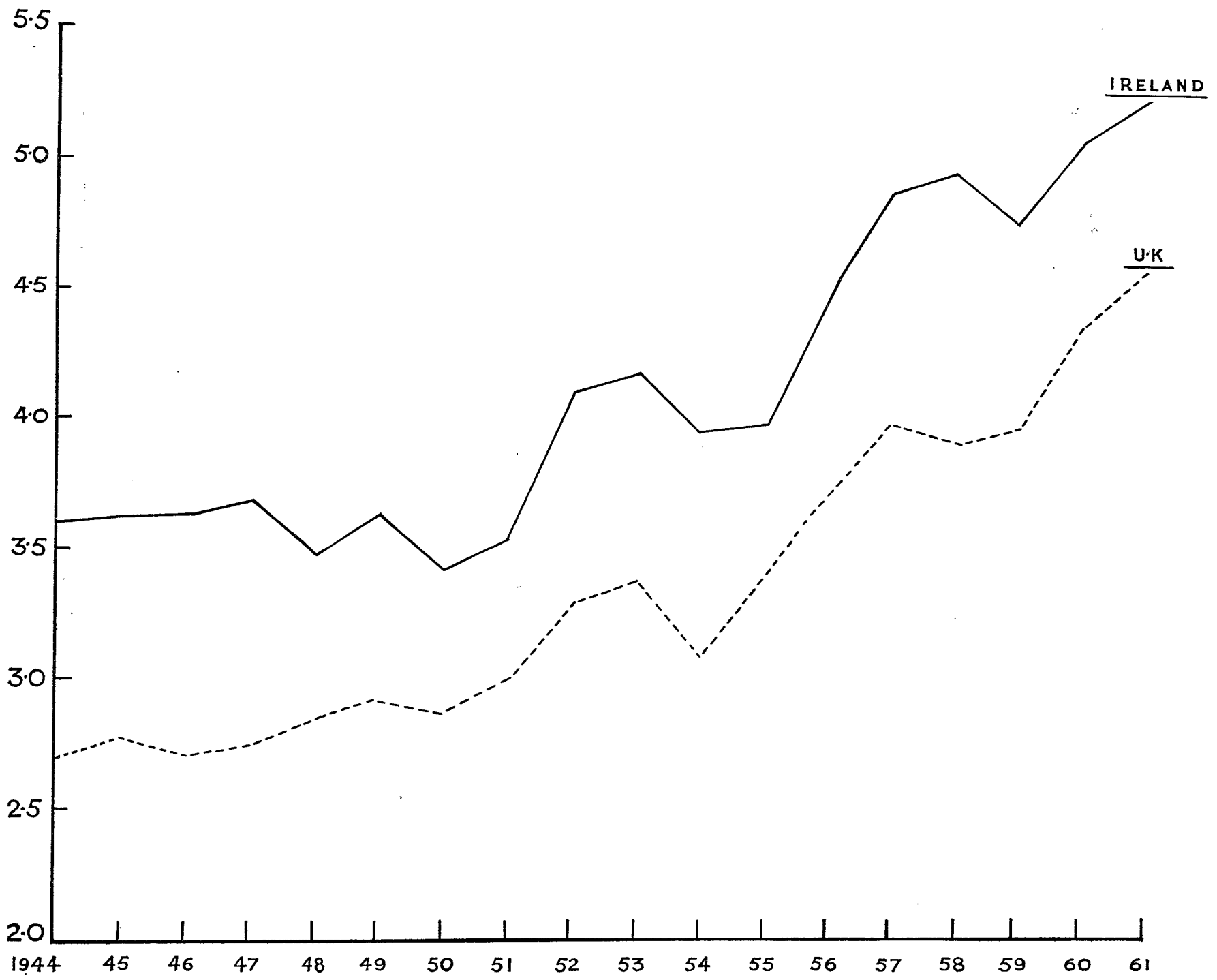
CHART 1

CHART 2

come of that campaign than was displayed, overall, in Britain.

From 1948 to 1959 the gap returned to the 20–25 per cent dimension which was established in 1933 and which persistently survived the 30's and 40's. In 1960–61 it showed a slight tendency to decline further, but it is unlikely that this will prove to be a significant turning-point—in the sense that either

TABLE B2B: YIELDS AND PRICES, 1944-1961

		YIELDS %		PRICES 1953 = 100	
		Ireland	U.K.	Ireland	U.K.
1944	...	3·59	2·69	103·2	111·5
1945	...	3·61	2·75	102·5	112·3
1946	...	3·61	2·69	102·8	114·9
1947	...	3·67	2·71	101·1	113·8
1948	...	3·48	2·82	97·5	112·0
1949	...	3·63	2·90	94·7	109·5
1950	...	3·43	2·87	93·0	106·4
1951	...	3·53	2·99	90·8	102·0
1952	...	4·10	3·29	84·9	95·0
1953	...	4·17	3·37	100·0	100·0
1954	...	3·95	3·09	88·9	105·2
1955	...	3·99	3·38	86·0	96·5
1956	...	4·49	3·71	82·2	88·0
1957	...	4·87	3·99	82·5	88·7
1958	...	4·95	3·93	83·3	90·0
1959	...	4·76	3·98	88·5	95·6
1960	...	5·07	4·37	87·4	89·0
1961	...	5·24	4·58	84·8	85·6

War Loan or Dalton could claim to be. In 1960 the gap had fallen to 16 per cent; in 1961, to about 14 per cent. To a large extent, however, this was due to the inclusion in those years of a long-term security whose maturity was significantly longer for the U.K. than for Ireland—43 years to final redemption date compared with 24 years.[31] Without this stock included, the gap would have been about 18½ per cent in 1960 and 18 per cent in 1961.

Generally, therefore, the conclusion seems to be that a differential of about 20–25 per cent exists on government securities of comparable maturity in Ireland and the United Kingdom. Furthermore, the evidence seems to indicate that this gap has retained an astonishing constancy for over a quarter of a century. It is *possible* that the gap is now showing signs of reduction, but as yet the signs are too slight, and too recent, to do more than postulate the possibility. What exactly does this gap reflect? Primarily, one imagines, the more limited marketability, and thus diminished liquidity, of Irish securities in comparison with British gilt-edged. It is difficult to believe that it is due to any substantial degree to differing assessments of the credit risks associated with the separate governments.

[31]This was the nearest comparison practical with the stocks available, unfortunately.

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