

The Structure of Irish Industry

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The development over time of Irish industry is fairly well documented, statistically speaking, in so far as production, employment etc. data are concerned for industry as a whole and for the various industrial subdivisions. The existing mechanisms of the Annual Census of Industrial Production, together with the more up-to-date (sample) inquiry carried out quarterly, are reasonably adequate to enable us to measure, as they occur, the overall developments which it is generally anticipated will follow on expansion in the membership of the Common Market. It is clear, however, that apart from external considerations these developments will be related to the intrinsic structure of Irish industry as it exists today, its size, location, etc. It may well be that the next decade will see substantial changes in the structure. To assess, in due course, the changes referred to it is necessary to have available for a recent year a detailed analysis of the industrial sector in Ireland. Indeed any scientific attempt to assess in advance the possible course of development for individual industries must take due account of size of enterprise, location etc.

Because of the mass of quantitative detail collected on individual schedules and the relatively small number of such schedules the compilations of the Census of Production are carried out by clerical methods rather than by the mechanical methods involving punched cards which are adopted for other statistical inquiries. Consequently analyses of the production statistics, e.g. by size of enterprise, do not form part of the regular corpus of official statistics relating to production. Very detailed information on employment in various industries is of course available from the Censuses of Population, particularly from the aspect of age, sex etc. and location. Population data however derive from returns furnished by individual households and these returns do not contain information on the size of the establishments in which those at work are engaged.

A special analysis has been carried out on the Census of Production results relating to the year 1958. For this purpose summary data in respect of each establishment were transferred to punched cards. The greater part of this paper is concerned with summarising the results of the analysis; the detailed results will appear in due course in the *Irish Trade Journal and Statistical Bulletin*.

As regular users of official production statistics are well aware the activities covered by the Annual Production Census are divided into three main groups (a) Manufacturing Industry, (b) Mining and Quarrying (including Turf Production by Bord na Móna) and (c) Building, Construction and certain services. The present paper deals only with Manufacturing Industry. In what follows Manufacturing Industry needs little further definition than that given in the standard International Classification of All Economic Activities (with which the

Irish Classification is in close conformity) namely "The mechanical or chemical transformation of inorganic or organic substances into new products, together with associated repair work and the assembly of component parts of manufactured products"

For a valid interpretation of the results presented below, however, it is essential to clarify some other points concerning the scope, basis of collection and terminology of the Production Statistics. The basic unit of enumeration and tabulation is the *establishment* which, for Manufacturing Industries, is almost the same thing as the individual factory, bakery, creamery, workshop, etc. Where two or more factories, owned by the same enterprise, are engaged in the same type of production activity each is considered to be a separate establishment if they have separate locations. Where two or more distinct industries are carried on at the same location by the same enterprise each distinct industry is considered to be a separate establishment. Separate returns are required for each establishment but the application of this requirement is in practice determined by the existence of separate records or the possibility of making separate estimates.

Very small establishments are omitted from the Census because of the difficulty of obtaining returns from them. The principle adopted in recent years is to omit establishments which, on the average, have less than three persons engaged. These concerns are principally engaged in repair work. Custom tailoring is also excluded. The smallest size class used in the analysis, "Under 5 persons engaged" does not, therefore, include the very small establishments. A measure of their importance is given by a comparison of total persons at work in manufacturing in 1951 as obtained from the Census of Population with the number covered in the Census of Production for that year. The difference was about 31,000 persons.

The statistical measures for each establishment which were transferred to the punched cards related to 1958, they were (a) value of Gross Output, (b) Value of Materials used, (c) Value of Net Output [(a)-(b)]; (d) Annual Wages and Salaries and (e) average number of persons engaged. In addition the cost of fuel and light (forming part of materials used) was also extracted when available separately. Detailed definitions of the terms are available elsewhere. It may suffice here to say that gross output is the value of production (goods made and work done) valued at factory prices, exclusive of excise duties on finished products; that materials covers the cost of all raw materials, packing, containers, fuel and light used in production; that net output (i.e., gross output *less* materials) is equivalent to value added and must cover all costs other than materials, as well as wages and salaries, interest and profits; that annual wages and salaries is inclusive of any bonuses, overtime, director's fees, etc.

Two alternative bases of size have been used in the detailed tabulation. The first, the more usual one, relates to average number of persons engaged during the year and has been used generally in the paper. The other classifier is net output which represents the gross value of production less the cost of raw materials, fuel and packing used in the process. Net output was selected rather than gross output because it is not affected to the same extent by differences between industries and by indirect taxes. Details for each size group are given in Table A1.

Size structure measured by employment

In the 1958 Census of Production tabulations the total number of establishments included in Manufacturing Industry was 3,106. The ten classes used in the size classification by persons range from under 5 persons to 500 persons and over. It will be seen from the first section of Table A1 and from the following summary that individual establishments in manufacturing industry are generally small

Average No of Persons Engaged per establishment	No of Establishments	Gross Output	Materials used	Net Output	Wages and Salaries	Remainder of net Output	Average no of persons engaged
	Percentage						
Under 15	50.1	7.0	7.4	5.9	5.9	6.0	7.6
15-99	40.1	29.1	29.3	28.5	29.9	26.9	33.4
100-499	8.8	40.5	41.6	37.9	38.8	36.8	38.2
500 and over	1.0	23.4	21.7	27.7	25.4	30.3	20.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In fact one half of them had on average less than 15 persons engaged while only one-tenth topped the century mark. For a mere 31 establishments or 1 per cent. of the total the payroll exceeded the 500 level. In terms of employment, however, these 31 establishments covered almost 21% of average persons engaged in Manufacturing Industry in 1958 while the ten per cent. establishments with at least 100 or more persons on the payroll accounted for well over one-half (59 per cent.) of total employment.

At the other end of the scale establishments with less than 15 persons engaged were responsible for less than one-tenth of total employment although numerically they included 50 per cent. of all establishments.

The use of the various financial characteristics of gross output, etc., instead of persons engaged to assess the relative importance of the establishments of various sizes enhances the position of the larger units, particularly those in the 500 and over group. Thus in terms of net output, which may be considered as the best general purpose measure, establishments with 100 or more persons engaged represented 66% or almost two-thirds of the total for Manufacturing Industry. More than one-quarter (28½%) was contributed by units with between 15 and 100 persons engaged while all the smaller establishments taken together, i.e., those under 15 persons, generated only one-seventeenth of net output.

Size structure measurement by net output

Eleven net output size groups have been used, ranging from under £100 to £500,000 and over. The resultant pattern is of course analogous with that derived from the preceding classification, showing large numbers of small establishments and relatively few large ones. In 1958 there were only 22 establishments in which net output exceeded £½ million (19 of these being in the size group 500 persons and over). For a further 64 units net output lay between £200,000 and £500,000 and 110 more were not below the £100,000 level. More than one-half

had a level of net output of less than £10,000 or £200 per week. Here again the relative importance of the largest establishments varies with the characteristic selected, as illustrated in the following summary.

Net output per establishment	No of Establishments	Gross Output	Materials used	Net Output	Wages and Salaries	Remainder of net Output	Average No of persons engaged
	Percentage						
Under £10,000	56.8	7.2	7.5	6.5	8.2	4.5	11.4
£10,000 and under £100,000	36.9	35.1	35.5	34.0	37.1	30.5	40.8
£100,000 and under £500,000	5.6	34.3	34.7	33.2	33.4	32.9	31.5
£500,000 and over	0.7	23.5	22.3	26.4	21.3	32.2	16.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In fact while the persons engaged in the 22 largest units amounted to 16 per cent. of the total, the contribution to remainder of net output was twice that proportion. It is interesting to note that these 22 establishments have a greater remainder of net output than the 31 in the largest persons engaged size-group.

Classification of establishments by net output is perhaps superior to classification by persons engaged, in so far as net output approximates to value added and, therefore, measures employment in terms of cost rather than numbers of individuals, and because in addition demands for other services and profits are also taken into account. While the detailed results of both classifications will be published for individual industries, the emphasis in this paper is on classification by numbers of persons engaged because it is that most commonly used and enables certain comparisons to be made with data for other countries and for earlier periods for this country.

Establishment and enterprise

At this stage it is perhaps advisable to emphasise the fact that throughout the paper we are dealing with *establishments*, as distinct from *firms* or *enterprises*, and moreover that we have confined ourselves to establishments in manufacturing industry.

It is possible to obtain a size classification of enterprises by grouping together the employment figures for establishments which belong to the same legal entity, i.e. individual proprietorship, partnership, corporation, joint-stock company or other legally recognised organisation which has the right to conduct business in its own name. These legal entities would be equivalent to book-keeping units for which, inter alia, balance sheet and profit and loss statements are compiled. A further consolidation might be considered by taking each "family" of legal entities bound together by ties of ownership or control as one unit, thus reflecting economic reality. Such an approach would provide data useful for studies of the nature and extent of economic concentration and of different forms of integration. The Census of Production records however do not provide any information on financial control and the only grouping which has been attempted is of the legal entity type.

In grouping together establishments belonging to the same legal entity (i.e. under a common business name) enterprises which are only partly industrial present a problem. Here only the industrial activity has been included. Thus certain manufacturing establishments are an intrinsic part of concerns which engage in both production and distribution activities but the non-industrial activity is ignored. The following table compares the resultant size distribution of numbers of enterprises and persons engaged with the corresponding data for establishments as already discussed.

Average No of Persons Engaged	No of Establishments	No of Enterprises	No of Persons Engaged			
			Establishment Basis	Enterprise Basis	Establishment Basis	Enterprise Basis
			Thousands		Percentage	
Under 15	1,556	1,434	10.7	9.8	7.6	6.9
15-99	1,246	1,113	47.3	42.7	33.4	30.0
100-499	273	265	54.2	52.0	38.2	36.5
500-999	28	29	18.1	20.7	12.8	14.5
1,000 and over	6	8	11.5	17.2	8.1	12.1
TOTAL	3,106	2,849	141.8	142.4	100.0	100.0

The consolidation has affected only one-seventh of the 3,106 establishments. The 432 establishments involved, when grouped, yielded 175 enterprises. A further 13 relatively small industrial (non-manufacturing) establishments, with about 600 persons engaged, were also part of the same enterprises and have been included with them in the table.

There are 37 enterprises with 500 or more on the payroll and the importance in terms of employment of this size group is increased to nearly 27 per cent, with slight compensating reductions in the smaller size groups. For this comparison the group 500 and over has been divided into 500-1,000 and 1,000 and over. It will be seen that the grouping to enterprise units has increased the relative importance of the 1,000 and over group by 50 per cent and that the handful of enterprises in the group covers nearly one-eighth of total employment. It is clear, however, that broadly speaking a classification by enterprise does not materially alter the size structure and consequently the results of an analysis on the basis of establishments can be taken as generally applicable to an enterprise analysis. Indeed the establishment basis is more convenient from the statistical point of view for detailed analysis by individual industries and by geographical regions.

Size structure within industrial groups

The average size of establishment varies considerably between industries reflecting substantial differences in the size-structures of these industries. In the most detailed published results of the Censuses of Production forty-five separate industries are usually distinguished within Manufacturing Industry. This industry classification was adhered to in the preparation of the size group analysis but for the

present summary I have restricted the number of divisions to ten broad industry groups. Aggregates for each group have been included in Table A1 while selected particulars cross-classified by size of establishment appear in Table A2. The content of each industry group in terms of individual industries is shown in Table A3 which sets out the frequency distribution by size for each industry.

The food group is the largest individual group no matter what criterion of relative importance is used. Numerically this group is by far the strongest, containing nearly 1,000 establishments, almost one-third of the total. This is nearly equal to the combined figures for the three groups which are numerically next in importance with 350-380 establishments each, i.e. clothing and footwear, wood and furniture, and metals and engineering. There were 120-140 establishments in each of the three smallest groups; clay products, glass, cement, etc., drink and tobacco; and chemicals.

In terms of average size of establishment, the industry groups vary from the very low figure of 20 persons for wood, furniture etc to 94 persons for textiles. The averages are given in the first column below. (Note. here all establishments included in the Census of Production are taken into account—in the section on international comparisons those with less than 10 persons are omitted)

Industry Group	Average Size	Average number of persons engaged			
		Under 15	15-99	100 and over	Total
	Persons	Percentage of establishments			
Textiles	94	24	50	26	100
Drink and tobacco	72	47	41	12	100
Metals and engineering	60	50	37	12	100
Paper and printing	58	40	48	12	100
Clothing and footwear	55	24	63	14	100
Clay products, glass, cement, etc	42	59	31	10	100
Food	35	61	32	7	100
Chemicals, etc	34	44	49	7	100
Other Manufacturing	32	63	32	5	100
Wood and furniture	20	62	35	3	100
TOTAL	46	50	40	10	100

These groups are very broad in coverage and the averages quoted in some cases conceal variations within the groups which are greater than the differences between groups. Thus, the food group covers Bacon curing—average size 106 persons, as well as creameries and independent-separating stations—average size 19 persons. Moreover, the averages of extremely skew distributions of the type involved here are not very useful measures of size. The difference in size structure between the groups is best seen from the righthand side of the table above which shows the percentage of establishments in three broad size groups—under 15 persons; 15-99 persons; 100 persons and over. While the industry groups have been arranged according to average size of establishment (in decreasing order) this order is almost identical with that based on percentage of establishments with 100 or more persons engaged. More than one-quarter of textile establishments were large enough to be included in this class—a proportion twice as large as in the four groups next in size.

The procession is not as evident in the other columns. The fact that the textiles group has in addition to the high proportion of very large units a relatively high proportion (50 per cent) of its establishments in the 15-99 group raises its average size. It is worthy of note that the clothing and footwear group is the most concentrated with 63 per cent. of the establishments in the medium range as compared with the overall figure for manufacturing industry of 40 per cent.

As already mentioned the relatively small numbers of large establishments account for a substantial proportion of total persons engaged. Using the same format as in the preceding table, but considering numbers of persons rather than numbers of establishments we find that, even in the smallest industry group (wood and furniture), establishments of size 100 persons or more cover nearly one-fifth of total persons in the group, the highest figure being 77 per cent. for the drink and tobacco group, while for all except one other group (chemicals) the proportion is at least one-half.

Industry Group	Distribution of Persons Engaged				Establishments with 100 or more persons	
	Average number of persons Engaged				% of Total Gross Output	% of Total Net Output
	Under 15	15-99	100 and over	Total		
	Percentage of total persons					
Textiles .. .	2	24	74	100	74	75
Drink and tobacco	5	17	77	100	92	88
Metals and engineering ..	6	25	69	100	74	70
Paper and printing	5	33	62	100	73	69
Clothing and footwear ..	4	47	49	100	56	56
Clay products, glass, cement, etc. ..	8	26	66	100	75	74
Food	12	32	56	100	53	58
Chemicals etc	9	57	34	100	42	35
Other manufactures	12	33	55	100	58	62
Wood and furniture	19	62	19	100	22	22
Total .	8	33	59	100	64	66

As in the case of all manufacturing industries combined, various financial measures may be used in place of number of persons to assess the relative importance of the various groups. This results in an increase in the coverage by the larger groups. The two final columns in the foregoing Table show the percentage of gross output and net output respectively covered by establishments of size 100 persons or over. In all cases, except gross output for the food group, the percentages shown exceed those for the corresponding measure based on persons. The increase is particularly great in the drink and tobacco group.

From the separate sets of figures for net output and persons engaged given in Table A2 average net output per person engaged can be derived for each size group in each industry group. These are given in

Table A4. Apart from their use in the next section they are of value in showing that by and large the industry groups which as a whole have the lowest net output per head are also lowest in the individual size groups. Thus the variation between industry groups in this criterion is not merely a consequence of different size patterns

Industry Groups also differ greatly in the relationship of net output to gross output, i.e., the extent to which value of production is a measure of value added. The position is shown by the final set of figures in Table A4 which gives net output per £100 gross output. Here again the variation is mainly between industry groups rather than between different sizes of establishments within the one group. This is very evident in the case of the food group where, with the exception of the largest size group (500 and over—covering only six establishments) the ratio was in the range 14–18. For the group covering clay products, glass, cement, etc., the ratio was between 47 and 60. The sudden rise for the largest class in the food industry and the equally sudden fall at the same point for the drink and tobacco group call for some comment. Reference to Table A3 shows that of the 6 largest establishments included in the food group, 3 belong to the sugar and sugar confectionery industry and the balance are in the bread, biscuit and flour confectionery industry. For the second group 4 of the 7 establishments are in the tobacco industry; if customs duty on tobacco is deducted from gross output the ratio is increased to approximately 50 per cent.

Variation with establishment size of net output per head

The fact that the relative importance of the larger establishments is increased when measured by output rather than by persons engaged indicates a tendency towards greater output (net or gross) per head in the larger establishments, a result which prompts a more detailed examination of the relationship of performance with size. As we have seen, net output per head is given in Table A4 for each size group for each industry group. No clear pattern emerges however. In most groups the figures do show output per head increasing with size at the lower end of the scale but subsequently the pattern becomes very ragged. The figures at the upper end of the scale are derived from relatively few establishments and do not, therefore, permit of generalisations.

It has been shown elsewhere¹ that a classification by number of persons engaged such as that used here understates any tendency for productivity per head to increase with size. On the other hand a classification by value of product (here net output) overstates any such tendency. In this connection it is worth referring to the overall pattern derivable from the net output classification results given in Table A1. These show a steep increase in net output per head with increasing size, the upward trend being unbroken over the range. The figures are as follows:

¹R. C. Geary and T. P. Linehan, "Paradoxes in Statistical Classification", a contribution to "Studi in onore di Corrado Gini", issued by Università Degli Studi Di Roma

Net Output				Net Output per head
Under	£1,000	.	.	£143
	£1,000— £2,000	.	.	£315
	£2,000— £3,000	.	.	£367
	£3,000— £5,000	.	.	£403
	£5,000— £10,000	£477
	£10,000— £20,000	.	.	£511
	£20,000— £50,000	.	.	£599
	£50,000—£100,000	.	.	£687
	£100,000—£200,000	£710
	£200,000—£500,000	.	.	£819
	£500,000 and over	.	..	£1,174

The rate of increase shown by these figures is spectacular when compared with the relatively slight variation shown by the overall ratios obtained using classification by number of persons (Table A4). The different patterns provide striking evidence of the danger inherent in the use as an index of performance of a ratio which incorporates the basis of classification. In the paper referred to the use of a neutral classifier was recommended and illustrated by various applications. One example related to manufacturing industry. It may be quoted here :—

“ The aerated and mineral water industry is examined as a typical homogeneous industry. Establishments manufacturing special products which significantly affected the output/labour structure were omitted. The establishments totalled 68 in all. These included five very large concerns with average size 132 persons and output per person of £856 which have been excluded in the following analysis. The remaining 63 concerns were classified by I total number of persons engaged (5 classes), II total value of net output (4 classes) and III expenditure on fuel and light (4 classes). The number in each class was at least 10 except in one case (when eight establishments were covered)

TABLE II — VALUE OF RATIO OF NET OUTPUT (£) TO NUMBER OF PERSONS ENGAGED FOR DIFFERENT SIZES OF SOFT DRINK MANUFACTURING ESTABLISHMENTS, ACCORDING TO THREE CLASSIFICATIONS.

Size of Establishment (Number of persons engaged)	Classification by		
	I. No. of persons engaged	II. Net Output	III. Expenditure on fuel and light
Number	£	£	£
5.0	611	290	—
7.5	560	354	502
10.0	524	412	440
12.5	490	460	540
15.0	445	515	568
17.5	420	583	560
20.0	458	653	552
22.5	495	720	—

Table II was prepared following the procedure outlined in the previous example,* using one auxiliary variable—expenditure on fuel and light. Again the classifications based on the variables involved in the ratio (I and II) give very different results, I indicating decreasing productivity with size up to about 17 persons and subsequently a slight increase, while II indicates a regular increase in productivity with size. Classification by the auxiliary variable (III) indicates declining productivity up to 10 persons, a subsequent sharp increase up to 14 or 15 persons and more or less constant productivity subsequently.”

A similar classification by expenditure on fuel and light can be carried out for each industry for 1958 using the punched cards referred to. The general problem is not considered further in the present context.

It is relevant, however, to refer to the very high degree of variability between individual establishments shown by the productivity measure net output per person engaged. This ratio was calculated for each establishment and Table A5 presents the resultant frequency distribution for each industry group. The range of values is very broad and suggests that there is considerable scope for increase in efficiency. Reference to the table shows that the modal group is £400–£450 and that the median value is about £500 for all manufacturing industries combined.

It may be thought that the wide range is a consequence of the inclusion of a number of dissimilar industries within each group. While this is a contributing factor, an examination of the distribution for individual industries reveals a variation of the same order of magnitude in most instances. A few individual industries have been included in the lower part of Table A5. The selection has no special significance apart from the fact that the bulk of the establishments within each industry would probably have similar types of products. It is clear that, even if the entries at the lower and upper extremes can be attributed to the existence of special features peculiar to some establishments, there still remains a disturbingly high degree of variability. In fact the variability shown here is similar to that obtained for output per acre within size-region groups in the National Farm Survey.

Regional Structure

The concentration of manufacturing industry in the Dublin area and the lack of such industry in the western part of the State were commented on at a recent meeting of this Society. As a byproduct of the present analysis there are available data on the distribution of industry by region and on its size structure within each area for establishments in manufacturing industry covered by the Census of Production (Tables A6 and A7). Here I have distinguished five regions consisting of the Dublin Area (city and county), Rest of Leinster and the other provinces.

*For each class in each classification (1) average persons per establishment and (11) net output per head were calculated. These were graphed for each classification with (1) as abscissa and (11) as ordinate. Consecutive points were joined by straight lines and the values of (11) read off for establishment sizes of 5, 0, 7, 5, 10, 0 etc persons.

In 1958 seventeen of the 31 establishments with 500 or more persons engaged were located in Dublin County and County Borough and for all size groups down to 25 persons approximately one-half of the establishments were in that area. For smaller sizes the proportion declined to a figure of 31 per cent for the under 5 persons group. The average number of persons engaged (all sizes) accounted for almost 51 per cent of the total as compared with 44 per cent. of gross output and 53 per cent of net output. For the various regions the corresponding figures compare as follows:—

Item	Dublin	Rest of Leinster	Munster	Connaught	Ulster (3 Cos)	Total
Persons Engaged %	50.9	17.7	23.7	4.0	3.7	100
Gross Output %	43.9	17.8	30.9	4.0	3.4	100
Net Output %	53.2	16.8	24.0	3.1	2.9	100

Whatever measure of relative importance is used the eight counties of Connaught and Ulster taken together account for less than one-twelfth of the total. In terms of net output or employment Munster covers somewhat less than one-quarter.

The differences in size structure between the regions as set out in Table A6 are evident from the next table in which persons engaged is used as the measure of importance.

Average Size—Persons	Dublin	Rest of Leinster	Munster	Connaught	Ulster (3 Cos)	Total
	Percentage of total persons					
Under 15	5½	6½	10½	16	12	7½
15-49 . . .	17	18	19½	33½	28½	19
50-199 . . .	29	27	32	31	38	30
200 and over . .	48½	48	38	19½	21	43½
Total	100	100	100	100	100	100
Average Size (persons)	56	49	38	24	28	46

The size pattern in the Rest of Leinster is very similar to that pertaining in the Dublin area, the average size being only slightly smaller. For Connaught and Ulster the average size was only one-half that of the metropolitan region, reflecting the fact that in these provinces only one-fifth of the persons were in establishments of size 200 persons or more, as compared with nearly one-half in the Dublin area.

In assessing the regional allocation of industry the distribution of the various industry groups is also of importance (Table A7). As mentioned above, the Dublin area accounts for 51 per cent of persons engaged, but the proportion varies considerably for the different industry groups. Almost three-quarters of the persons engaged in

the paper and printing group are in the Dublin area which also covers about two-thirds of the drink and tobacco and metals etc groups. The industry groups which were relatively weak in this area were textiles, other manufacturing and structural clay products etc For these groups less than one-third of the persons engaged were in the Dublin area. Textiles formed the most dispersed group.

Diversification of industrial employment is very evident in the Dublin area with no industry group accounting for more than one-fifth of total persons in manufacturing industries in the area ; the most important were metals etc (19.7 per cent) and food (19.4 per cent) In the Rest of Leinster the degree of diversification was nearly as great with the substitution of the textiles group for the metals etc group as the most important. For Munster the food group predominated, covering almost 35 per cent. of persons, more than twice the number in the next most important group, textiles. A similar portion obtained in Connaught where those two groups were of even greater relative importance. For the three counties of Ulster the clothing and footwear group headed the list with nearly one-third of the total, followed by food and textiles with nearly one-quarter each.

Change over time

In the twenty year period between 1938 and 1958 the average size of manufacturing establishments included in the Census tabulations has increased from 32 to 46, with an intermediate level of 38 in 1946. Details of the numbers of establishments in each size group are given in Table A8. For 1938 and 1946 the size classes are based on the numbers engaged in October rather than the average during the year. This probably exaggerates the size to a negligible extent. Too much interpretative weight should not be placed on the rapid decline shown by the numbers in the smallest size group as this may be partly due to changes in working arrangements for the exclusion of small concerns. The spectacular increases shown at the other end of the scale however reflect actual changes. The rise from 15 in 1938 to 31 in 1958 in the number of establishments with 500 or more persons engaged is of particular interest. While exact data for the actual numbers of persons engaged in each size group are not available in respect of the year 1938 reasonably accurate estimates can be made. Exact figures are available for the year 1946 and are given with the comparable figures for 1958 in Table A8. The percentage changes given below show the extent to which, in the twenty year period, the expansion was more pronounced in the larger size groups.

Number of Persons Engaged per Establishment	Percentage change in average number of Persons Engaged		
	1938 to 1946	1946 to 1958	1938 to 1958
	Percentage		
Under 15	-15	+ 9	- 7
15-99	+ 8	+25	+36
100-499	+10	+25	+37
500 and over	+34	+56	+109
Total	+10	+29	+42

Changes in average size of establishment over the twenty year period were not uniform for the different industry groups. While there was not a decline in size in any group, increases for the clothing and for the wood and furniture groups were negligible.

Industry Group	Average Persons per Establishment		
	1938	Increase	1958
Textiles	53	41	94
Metals and engineering	34	26	60
Structural clay products etc	21	21	42
Paper and printing	38	20	58
Miscellaneous manufacturing	16	16	32
Chemicals etc.	24	10	34
Food	25	10	35
Drink and tobacco	63	9	72
Wood and furniture	19	1	20
Clothing and footwear	55	—	55

Textiles showed the greatest increase, from average size 53 in 1938 to 94 in 1958 while increases of at least 20 persons also occurred in metals and engineering, structural clay products, and paper and printing.

International comparisons

Finally I come to the interesting subject of industry-size in other countries. It is often said that comparisons are odious. International comparisons, whether odious or not, are frequently hazardous. This is particularly true of statistical data relating to size such as those discussed here which depend to such a large degree on the units of enumeration, the definitions adopted and the coverage achieved. Nevertheless this outline of the structure of Irish industry would be incomplete indeed if it did not at least try to show how the size of Irish industrial units compares with those of some of our European neighbours. This is one of the few comparisons which has not as yet formed part of any international survey in Europe. I am deeply indebted to my colleague, Mr E W Henry, for his painstaking work in searching for and assembling the material shown in Tables A9 and A10. We have done our best to avoid glaring inconsistencies in the comparisons but minor differences have been ignored as the objective is merely to assess the relative orders of magnitude involved.

The data used have been abstracted from various year-books, official reports etc. and relate to the year 1958 except as indicated in Table A9. In making comparisons a cut-off point has been introduced at 10 persons engaged. Establishments with fewer than 10 persons engaged have been omitted*—in some instances establishments with exactly 10 persons have also been omitted because of the national grouping used. This truncation is necessary because of the lack of precise information

* As a consequence the averages quoted for Ireland in this section are greater than those discussed earlier.

on the numbers of the small establishments and the persons engaged in them. The information available does, however, confirm that these very small establishments are relatively most important for the same countries for which the truncated distribution indicates a relatively small size of establishment. In other words the differences between the percentage figures shown in the 10-50 size group for the various countries would be increased if the range were extended downwards to include all small establishments.

Taking then for this Section all establishments with 10 (11) or more persons engaged, the average size for the countries for which we succeeded in locating data are as follows: the figures in parenthesis indicate for each country the smallest sized establishment included—two figures are given for Ireland.

<i>Country</i>	<i>Average Size (Persons)</i>	
	<i>Actual</i>	<i>Adjusted</i>
(11) Six Counties	141	134
(10) Western Germany	134	110
(11) United Kingdom	133½	113
(10) Holland (Enterprise)	102	n a
(11) Italy	77	64
(11) France*	75	64
(11) Sweden† (Wage-Earners only)	73	67
(10) Ireland	70	70
(11) Ireland	73	73
(10) Belgium† (Wage-Earners only)	61	51
(10) Norway	54	52

While averages of extremely skew distributions of this type are not very useful measures in themselves to describe the size of industry within a country they do form one reasonable basis for inter-country comparison as long as the country distributions are similar in form. The order (decreasing size) shown above is not very different from that which would be obtained by using as a criterion the percentage of establishments or the percentage of persons engaged in the largest size group or, alternatively, in reverse order, the corresponding percentages in the smallest size group. This can be seen in the lower portions of Table A9.

Particulars of average size of establishment for each of ten industry groups for most of the countries considered (in the order already used) are presented in Table A10. The relative position of our own country in terms of size of establishment is improved when examined at the group level. In the drink and tobacco group the Irish average of 99 persons was above that for all the other countries except the Six Counties (188) while in the group, structural clay products, glass cement, etc., the Irish average of 79 was second only to U.K. (103). For other industry groups, however, the averages for the U.K. and

* Data are available for France on the number of establishments with exactly 10 persons engaged. The inclusion of these establishments would reduce the average size from 75 to 70 persons.

† The use of figures relating only to average number of wage earners for Sweden and Belgium does not imply as unfair a comparison as might appear at first sight because the establishments to which the averages relate are those with 10 or more wage-earners in Belgium and 11 or more wage-earners in Sweden.

Western Germany exceed those for Ireland by very substantial amounts, particularly in the metals and engineering and in the chemicals groups. The differences in average size of establishment are presented in a clearer form in the second half of Table A10 where the averages have been converted to index numbers, taking the Irish figure as 100 in each industry group.

It is clear from the actual averages given in Table A10 that the size characteristic of the various industry groups follow the same broad pattern in the different countries, increasing substantially from the low averages for wood, furniture, food and clothing groups to the high figures for chemicals, metals and engineering and textiles. The relative importance of the industry groups, however, varies considerably between the countries and it is interesting to see the effect of standardising. One way of doing this is to weight the average size in any group with the number of establishments in that group in Ireland. The adjusted averages obtained in this way have been inserted above beside the actual averages. For each country the exercise yields an average size lower than that already discussed indicating that the industries in this country are more concentrated in the industry groups characterised by small establishments than in the other countries considered.

The general impression conveyed by the figures is that while Irish industrial establishments are relatively small by comparison with the industrial giants U.K. and Western Germany, they are, by and large, of the same order of magnitude as establishments in a number of other European countries. This position might be changed if the basis of comparison were altered from establishment to enterprise, but the data requisite for such a comparison are not available. An interesting feature of the results is the emergence of the Six Counties at the head of the list, a development which suggests an extension of the comparison (at some other time) to regional areas such as Northern and Southern Italy.

A World Census of Industry is being promoted by the Statistical Office of the United Nations Organization in respect of the year 1903 and very many European countries will take a Census of Industry in that year. Recommendations have been adopted covering, amongst other things, units of enumeration and size classifications. In due course the results of the Census will be brought together for the countries participating to form the basis of comprehensive international comparisons of the structure of industry.

In conclusion I would like to express my appreciation of the help given by the staff of the Central Statistics Office who have borne the brunt of the compilation work, particularly Mr. H. J. Keogh.

TABLE A1—STRUCTURE OF MANUFACTURING INDUSTRIES, 1958.

Item	No of Establishments	Gross Output (£)	Materials (£)	Net Output	Wages and Salaries	Remainder of Net Output	Average No of Persons engaged
	Number	£'000				Number	
<i>Persons engaged (average)</i>							
Under 5	480	3,086	2,314	722	340	381	1,477
5-9	681	10,599	8,070	2,528	1,354	1,174	4,615
10-14	395	11,815	8,933	2,882	1,534	1,348	4,658
15-19	251	10,090	7,358	2,732	1,389	1,343	4,220
20-29	321	18,568	13,585	4,983	2,719	2,263	7,756
30-49	383	31,891	22,929	8,962	5,185	3,778	14,746
50-99	291	45,931	33,147	12,785	7,227	5,558	20,624
100-199	161	55,316	40,896	14,420	7,992	6,458	21,732
200-499	112	92,991	68,327	24,663	13,445	11,218	32,435
500 and over	31	85,587	57,004	28,583	14,012	14,571	29,585
Total	3,106	365,822	262,563	103,260	55,168	48,092	141,848
<i>Net output</i>							
Under £1,000	234	596	471	125	168	-43	874
£1,000-£2,000	318	1,924	1,447	477	327	150	1,516
£2,000-£3,000	282	3,050	2,351	699	487	212	1,905
£3,000-£5,000	397	5,921	4,354	1,567	1,073	494	3,892
£5,000-£10,000	532	14,913	11,103	3,804	2,458	1,346	7,976
£10,000-£20,000	475	24,993	18,132	6,811	4,297	2,514	13,340
£20,000-£50,000	482	54,076	39,031	15,045	8,930	6,115	25,128
£50,000-£100,000	190	49,173	35,894	13,280	7,242	6,038	19,341
£100,000-£200,000	110	58,009	42,577	15,432	8,366	7,066	21,746
£200,000-£500,000	64	67,295	48,490	18,805	10,071	8,734	22,954
£500,000 and over	22	85,872	58,658	27,214	11,748	15,466	23,178
Total	3,106	365,822	262,563	103,260	55,168	48,092	141,848
<i>Location</i>							
Dublin Co and Co Boro'	1,291	160,702	105,767	54,935	29,188	25,747	72,164
Rest of Leinster	509	64,975	47,648	17,327	9,351	7,976	25,106
Munster	886	112,943	88,123	24,820	13,103	11,717	33,649
Connacht	234	14,785	11,561	3,224	1,890	1,334	5,680
Ulster (3 Counties)	186	12,418	9,464	2,954	1,635	1,319	5,249
Total	3,106	365,823	262,563	103,260	55,168	48,092	141,848
<i>Industry Group</i>							
Food	972	148,098	122,321	25,777	13,445	12,332	33,902
Drink and tobacco	136	55,470	40,231	15,240	4,936	10,304	9,795
Textiles	199	32,343	21,761	10,582	6,038	4,544	18,784
Clothing and footwear	377	21,320	12,186	9,133	5,974	3,159	20,808
Wood and furniture	363	8,488	4,909	3,579	2,550	1,029	7,334
Paper and printing	237	20,687	10,622	10,065	5,927	4,138	13,667
Chemicals, etc	138	15,000	10,512	4,488	2,042	2,446	4,722
Clay products etc	120	8,398	4,123	4,269	2,073	2,196	4,980
Metals and engineering	354	42,754	27,983	14,771	9,355	5,416	21,074
Other manufacturing industries	210	13,265	7,909	5,356	2,829	2,527	6,782
Total	3,106	365,822	262,563	103,260	55,168	48,092	141,848

(a) The totals which are used throughout the paper for gross output exceed those appearing in official publications by £1,972,000. This amount represents the extent to which inter-establishment sales or transfers have been eliminated from the official figures in two industry groups—Food and Textiles. The figures for materials differ from published data to an identical extent except for an amendment of £78,000 which has been found necessary in the Textile Group.

TABLE A2.—SIZE STRUCTURE OF INDUSTRY GROUPS, 1958.

Industry Group and Code	Average number of persons engaged										Total
	Under 5	5-9	10- 14	15- 19	20- 29	30- 49	50- 99	100- 199	200- 499	500 and over	
	Number of Establishments										
A Food . . .	174	275	145	81	78	86	62	38	27	6	972
B Drink and tobacco . . .	15	23	26	15	21	11	9	9	4	3	136
C Textiles . . .	12	22	13	9	19	37	35	22	23	7	199
D. Clothing and footwear	16	33	40	40	52	75	69	34	16	2	377
E. Wood and furniture	84	97	44	24	43	41	20	9	1	—	363
F. Paper and printing . . .	25	49	21	19	31	36	28	11	13	4	237
G. Chemicals etc	23	23	15	13	17	18	20	5	4	—	138
H Clay products etc.	39	21	11	13	6	11	7	6	4	2	120
J. Metals and engineering	47	76	55	22	31	46	33	22	16	6	354
K Other Manufacturing	45	62	25	15	23	22	8	5	4	1	210
Total . . .	480	681	395	251	321	383	291	161	112	31	3,109

TABLE A2—SIZE STRUCTURE OF INDUSTRY GROUPS, 1958—*continued*

Group Code	Average number of persons engaged										Total
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100-199	200-499	500 and over	
	Number of persons engaged										
A	564	1,868	1,718	1,373	1,920	3,249	4,283	4,993	8,316	5,618	33,902
B	52	153	312	249	500	409	593	1,274	6,313		9,795
C	33	146	149	151	483	1,480	2,519	3,139	6,256 4,478		18,784
D	51	238	465	664	1,248	2,890	4,964	4,492	5,796		20,808
E	226	665	512	392	1,034	1,558	1,534	1,413		—	7,334
F	81	333	242	331	743	1,393	2,085	1,619	3,898	2,942	13,667
G	77	152	174	213	413	716	1,369	607	1,001		4,722
H	119	135	128	224	163	448	471	729	2,563		4,980
J	144	525	658	372	742	1,750	2,307	3,081	4,894	6,601	21,074
K	130	400	300	251	560	853	559	627	3,102		6,782
Total	1,477	4,615	4,658	4,220	7,756	14,746	20,624	21,732	32,435	29,585	141,848
	Gross Output £000										
A.	2,147	7,162	7,534	6,301	9,680	15,832	21,283	28,070	37,636	12,403	148,098
B	57	164	538	357	1,208	1,084	1,115	2,000	48,946		55,470
C	19	179	227	172	759	2,305	4,793	4,921	10,014	8,954	32,343
D.	63	196	369	492	1,060	2,506	4,757	4,922	6,955		21,320
E	150	674	525	537	1,120	1,871	1,741	1,869		—	8,488
F	66	251	246	321	690	1,623	2,305	2,468	6,147	6,569	20,687
G.	172	362	787	579	1,197	1,345	4,287	1,656	4,614	—	15,000
H	79	146	115	190	271	561	730	922	5,384		8,398
J.	140	815	981	715	1,567	3,214	3,574	7,877	12,136	11,734	42,754
K	143	650	491	424	1,014	1,501	1,347	861	6,835		13,265
Total	3,036	10,599	11,815	10,090	18,568	31,891	45,931	55,316	92,991	85,587	365,822
	Net Output £000										
A.	306	1,033	1,180	1,000	1,393	2,300	3,484	4,349	6,598	4,074	25,777
B	24	80	246	165	421	497	456	1,069	12,341		15,240
C	8	65	87	69	243	862	1,290	1,557	3,792	2,604	10,582
D.	28	98	160	231	480	1,114	1,872	2,088	3,064		9,133
E.	84	310	238	217	492	324	640	774		—	3,579
F	36	150	124	205	474	872	1,253	1,062	3,055	2,833	10,065
G	51	118	211	237	371	509	1,419	533	1,033	—	4,488
H	47	82	66	113	141	313	344	453	2,705		4,269
J.	74	342	409	331	537	1,172	1,555	2,373	3,734	4,243	14,771
K	64	195	160	164	420	558	472	302	3,021		5,356
Total	722	2,528	2,882	2,732	4,933	8,962	12,785	14,420	24,663	28,533	103,260

TABLE A3.—NUMBER OF ESTABLISHMENTS IN EACH MANUFACTURING INDUSTRY CLASSIFIED ACCORDING TO NUMBER OF PERSONS ENGAGED.

Industry and Group	Number of persons engaged										Total Estab-lish-ments
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100-199	200-499	500 and over	
<i>Food</i> Total	174	275	145	81	78	86	62	38	27	6	972
Bacon factories	—	2	—	3	4	5	7	9	7	—	37
Slaughtering, etc of meat other than bacon factories	4	5	7	4	3	2	2	1	4	—	32
Creamery butter, cheese, ice cream etc	45	58	36	16	21	20	14	3	1	—	214
Canning of fruit and vegetables, jams, etc	1	3	2	—	—	3	5	3	3	—	20
Grain milling and animal feeding stuffs	48	30	26	15	17	25	12	12	1	—	186
Bread, biscuit and flour confectionery	61	158	66	34	21	22	10	7	3	3	385
Manufacture of sugar, cocoa, chocolate etc	5	6	2	6	7	4	10	2	8	3	53
Canning and preserving of fish	5	3	2	—	1	1	—	—	—	—	12
Butter blending, margarine and compound cooking fat	1	2	2	—	1	2	1	1	—	—	10
Miscellaneous food preparations	4	8	2	3	3	2	1	—	—	—	23
<i>Drink and Tobacco</i> Total	15	23	26	15	21	11	9	9	4	3	196
Distilling .	—	—	1	—	—	2	1	2	1	—	7
Malting	1	3	6	2	10	7	2	—	—	—	31
Brewing .	—	—	—	—	1	—	2	5	—	1	9
Aerated and mineral waters	14	20	18	12	10	1	2	2	1	—	80
Tobacco .. .	—	—	1	1	—	1	2	—	2	2	9
<i>Textiles</i> . Total	12	22	13	9	19	37	35	22	23	7	199
Woolen and worsted .	—	3	1	1	4	3	9	10	8	2	46
Linen and cotton .	—	1	2	1	1	4	7	2	7	1	26
Jute, canvas, rayon nylon, etc	4	6	1	1	7	10	3	3	1	3	39
Hosiery	6	9	6	5	6	12	11	6	7	1	69
Made-up textile goods	2	3	3	1	1	3	5	1	—	—	19
<i>Clothing and Footwear</i> Total	16	33	40	40	52	75	69	34	16	2	377
Boot and shoe ..	1	1	1	1	1	1	6	12	6	2	32
Clothing—Men's and boys' Shirtmaking ..	1	8	5	2	8	16	20	7	6	—	73
Women's and girls' .	5	—	3	1	1	8	14	2	—	—	34
Miscellaneous	5	18	21	25	34	42	26	12	4	—	187
	4	6	10	11	8	8	3	1	—	—	51

TABLE A3—NUMBER OF ESTABLISHMENTS IN EACH MANUFACTURING INDUSTRY CLASSIFIED ACCORDING TO NUMBER OF PERSONS ENGAGED—continued

Industry and Group	Number of persons engaged										Total Establishments
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100-199	200-499	500 and over	
<i>Wood and Furniture</i> Total	84	97	44	24	43	41	20	9	1	—	363
Manufactures of wood and cork	53	55	22	10	22	15	7	6	1	—	191
Furniture and fixtures, Brushes and brooms	31	42	22	14	21	26	18	3	—	—	172
<i>Paper and Printing</i> Total	25	49	21	19	31	36	28	11	13	4	237
Paper and paper products	3	8	6	1	2	12	3	6	5	2	53
Printing, publishing, etc.	22	41	15	18	29	24	20	5	8	2	184
<i>Chemicals etc.</i> Total	23	23	15	13	17	18	20	5	4	—	138
Fertilisers	2	2	3	—	5	3	5	3	1	—	24
Oils, paints, inks and polishes	6	7	3	3	6	4	6	—	2	—	37
Chemicals and drugs	13	12	8	10	5	9	7	2	—	—	66
Soap, detergents and candles	2	2	1	—	1	2	2	—	1	—	11
<i>Clay products etc.</i> Total	39	21	11	13	6	11	7	6	4	2	120
Glass and glassware, pottery, etc	4	2	1	4	—	3	2	2	1	2	21
Structural clay products etc and cement.	35	19	10	9	6	8	5	4	3	—	99
<i>Metal and engineering *</i> Total	47	76	55	22	31	46	33	22	16	6	354
Metal trades	20	34	25	8	13	24	19	11	6	—	160
Manufacture and assembly of machinery etc (except electrical)	4	14	11	6	2	9	4	1	1	—	52
Manufacture of electrical machinery	2	12	11	2	5	6	5	5	3	2	53
Ship and boat building and repairing	5	2	1	2	2	1	—	—	2	—	15
Manufacture of railroad equipment	—	—	—	—	1	—	—	—	—	2	3
Mechanically propelled road and land vehicles	4	13	7	4	7	6	2	4	3	2	25
Other Vehicles	12	1	—	—	1	—	3	1	1	—	19
<i>Other manufacturing</i> Total	45	62	25	15	23	22	8	5	4	1	210
Manufactures of leather	3	10	2	3	5	2	2	2	—	—	29
Fellmongery	3	7	4	1	1	3	3	1	3	—	26
Miscellaneous	39	45	19	11	17	17	3	2	1	1	155
Manufacturing Industries Total	480	681	305	251	321	383	201	161	112	31	3,106

TABLE A4—VARIATION OF CERTAIN CHARACTERISTICS WITH SIZE OF ESTABLISHMENT.

Industrial Group	Average number of persons engaged										Total
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100-199	200-499	500 & over	
	Net Output per person engaged (£)										
Food	543	588	687	728	728	708	813	871	793	725	760
Drink and tobacco	459	523	789	668	842	1,069	855	839	1,955		1,556
Textiles	234	448	586	456	572	583	512	496	606	581	563
Clothing & footwear	558	411	344	347	385	385	377	465	529		439
Wood & furniture	371	466	465	552	476	529	417	547		—	438
Paper & printing	450	452	511	619	638	626	601	656	784	968	736
Chemicals, etc	656	777	1,243	1,115	899	711	1,087	879	1,037	—	950
Clay products, etc	395	605	513	505	864	699	781	629	1,055		857
Metals & engineering	516	651	622	890	723	670	674	770	763	643	701
Other manufacturing	490	488	535	654	751	654	844	481	974		790
TOTAL	489	548	619	647	642	608	620	664	760	966	728
	Net Output per £100 of Gross Output (£)										
Food	14.3	15.2	15.7	15.9	14.4	14.5	16.4	15.5	17.5	32.8	17.4
Drink and tobacco	41.9	48.6	45.7	46.2	34.9	40.3	40.9	53.4	25.3		27.5
Textiles	40.2	36.5	38.5	40.0	32.6	37.4	26.9	31.6	37.9	29.1	32.7
Clothing & footwear	44.5	49.9	43.3	46.9	45.3	44.4	39.4	42.4	44.0		42.8
Wood & furniture	56.0	46.0	45.3	40.3	44.0	44.0	36.7	41.5		—	42.2
Paper & printing	55.2	59.9	50.2	63.8	68.7	53.7	54.4	43.0	49.7	43.1	48.7
Chemicals, etc	29.4	32.6	26.8	41.0	31.0	37.9	33.1	32.2	22.5		29.9
Clay products, etc	59.8	56.0	57.1	59.5	51.9	55.8	47.2	49.7	50.4		50.8
Metals & engineering	52.9	41.9	41.7	46.3	34.2	36.5	43.5	30.1	30.8	36.2	34.5
Other manufacturing	44.6	30.0	32.7	38.7	41.5	37.2	35.0	35.1	44.3		40.4
TOTAL	23.8	23.9	24.4	27.1	26.8	28.1	27.8	26.1	26.5	33.4	28.2

TABLE A5—DISTRIBUTION OF ESTABLISHMENTS BY NET OUTPUT PER HEAD, 1958

Industry Group	Under £100	£100-£200	£200-£250	£250-£300	£300-£350	£350-£400	£400-£450	£450-£500	£500-£550	£550-£600	£600-£650	£650-£700	£700-£750	£750-£800	£800-£850	£850-£900	£900-£950	£950-£1,000	£1,000-£1,100	£1,100-£1,200	£1,200-£1,500	£1,500-£2,000	£2,000 and over	TOTAL
Food	15	38	43	52	50	64	72	76	69	58	58	49	45	32	39	27	22	24	35	22	44	21	17	972
Drink & tobacco	1	6	6	5	6	5	9	5	12	8	6	4	7	7	4	3	3	5	7	8	8	6	5	186
Textiles	4	14	12	14	14	15	24	19	10	16	14	8	9	—	3	6	—	3	3	2	4	3	2	199
Clothing & footwear	6	23	31	58	51	49	55	23	19	16	8	9	7	7	4	1	—	1	2	—	—	2	—	377
Wood & furniture	7	19	18	26	41	48	40	50	23	17	24	13	6	4	3	3	3	3	2	5	3	—	—	363
Paper & printing	—	7	11	14	19	16	18	22	25	13	13	18	7	10	11	7	3	6	3	8	5	1	—	237
Chemicals, etc	—	6	2	4	3	15	7	3	5	7	8	5	7	10	6	6	—	1	7	4	18	7	7	138
Clay products, etc	2	5	5	7	10	18	7	11	11	7	4	2	5	2	3	2	7	—	3	1	3	2	3	120
Metals & engineering	4	6	8	18	19	20	35	27	34	31	22	28	15	16	9	10	8	4	6	6	11	8	9	354
Other manufacturing	6	14	14	12	15	20	21	14	12	12	12	8	9	4	5	—	1	2	8	7	7	4	3	210
TOTAL	45	138	150	210	228	270	288	255	225	185	169	144	117	92	87	65	47	40	76	63	103	54	46	3,106
Bacon factories	—	—	—	—	—	1	1	1	4	2	6	4	2	2	2	1	1	1	5	—	2	2	—	37
Bread, biscuits, etc	4	18	22	32	32	46	41	36	34	24	18	16	15	11	7	4	2	5	1	3	2	1	—	385
Mineral waters	1	6	6	3	6	4	7	3	8	6	4	1	4	6	1	1	1	2	4	2	2	1	1	80
Boots & shoes	—	—	—	3	—	4	6	7	3	6	—	1	1	1	—	—	—	—	—	—	—	—	—	32

TABLE A6.—SIZE STRUCTURE OF MANUFACTURING INDUSTRIES IN REGIONAL AREAS, 1958.

	Average number of persons engaged										Total
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100-199	200-499	500 and over	
Number of Establishments											
Dublin	149	287	147	105	131	190	156	73	56	17	1,291
Rest of Leinster	78	101	60	42	61	62	48	27	21	9	509
Munster	154	216	106	68	85	87	62	46	27	5	886
Connaught	52	59	31	24	23	24	7	10	4	—	234
Ulster (3 Cos)	47	38	21	12	21	20	18	5	4	—	186
TOTAL	480	681	395	251	321	383	291	161	112	31	3,106
Number of persons engaged											
Dublin	472	1,823	1,717	1,751	3,130	7,339	11,052	9,856	16,132	18,892	72,164
Rest of Leinster	252	694	716	704	1,479	2,371	3,392	3,459	6,099	5,940	25,106
Munster	462	1,460	1,603	1,149	2,065	3,321	4,347	6,488	8,001	4,753	35,649
Connaught	153	381	377	409	570	942	498	1,256	1,100	—	5,680
Ulster (3 Cos)	138	257	245	213	512	773	1,335	673	1,103	—	5,249
TOTAL	1,477	4,615	4,658	4,220	7,756	14,746	20,624	21,732	32,435	29,585	141,848
Gross Output (£000)											
Dublin	672	3,131	2,464	3,321	4,761	11,008	18,205	21,614	34,177	61,349	160,702
Rest of Leinster	441	1,423	1,658	1,510	3,812	4,787	7,959	7,695	24,853	10,838	64,975
Munster	1,159	4,579	6,190	3,606	6,277	11,588	15,743	21,177	29,223	13,400	112,943
Connaught	216	801	943	1,130	1,581	2,357	1,587	2,929	3,242	—	14,785
Ulster (3 Cos)	547	664	560	523	2,137	2,151	2,438	1,901	1,496	—	12,418
TOTAL	3,036	10,599	11,815	10,090	18,568	31,891	45,931	55,316	92,991	85,587	365,822
Net Output (£000)											
Dublin	241	1,109	975	1,243	1,934	4,248	6,609	6,582	11,327	20,667	54,935
Rest of Leinster	108	350	451	464	1,066	1,593	2,054	2,578	5,429	3,236	17,327
Munster	236	756	1,032	722	1,352	2,054	2,860	4,139	6,938	4,680	24,820
Connaught	60	180	248	209	317	638	470	632	419	—	3,224
Ulster (3 Cos)	77	133	175	94	314	430	792	339	550	—	2,954
TOTAL	722	2,528	2,882	2,732	4,983	8,962	12,785	14,420	24,663	28,583	103,260

TABLE A.7.—REGIONAL DISTRIBUTION OF INDUSTRY GROUPS 1958

Industry Group	Dublin Co and Co Boro'.	Rest of Lein- ster	Mun- ster	Conn- aught	Ulster (3 Cos)	Total
	Number of Establishments					
Food	170	168	454	94	86	972
Drink and tobacco	22	51	45	9	9	136
Textiles	74	40	51	19	15	199
Clothing and footwear	272	32	34	14	25	377
Wood and furniture	152	76	80	35	20	363
Paper and printing	128	38	51	13	7	237
Chemicals, etc.	92	18	18	8	2	138
Clay products, etc.	48	24	29	11	8	120
Metals and engineering	212	41	71	18	12	354
Other manufacturing	121	21	53	13	2	210
Total	1,291	509	886	234	186	3,106
Number of persons engaged						
Food	14,009	4,649	11,703	2,243	1,298	33,902
Drink and tobacco	6,518	1,740	1,343	88	106	9,795
Textiles	5,261	5,575	5,605	1,120	1,223	18,784
Clothing and footwear	11,538	4,274	2,670	674	1,652	20,808
Wood and furniture	3,849	1,306	1,406	402	371	7,334
Paper and printing	9,937	1,707	1,665	254	104	13,667
Chemicals, etc.	2,953	755	873	114	27	4,722
Clay products, etc.	1,658	1,649	1,358	152	163	4,980
Metals and engineering	14,226	2,788	3,500	328	232	21,074
Other manufacturing	2,215	663	3,526	305	73	6,782
Total	72,164	25,106	33,649	5,680	5,249	141,848
Gross Output £000						
Food	39,474	21,356	69,565	10,370	7,333	148,098
Drink and tobacco	42,006	10,921	2,180	69	293	55,470
Textiles	7,694	10,830	10,550	1,538	1,731	32,343
Clothing and footwear	11,066	5,407	2,685	719	1,443	21,320
Wood and furniture	4,461	1,116	2,039	439	432	8,488
Paper and printing	16,038	2,606	1,735	239	68	20,687
Chemicals, etc.	6,711	4,637	3,067	479	106	15,000
Clay products, etc.	2,486	3,206	2,179	99	429	8,398
Metals and engineering	27,493	3,556	10,826	535	344	42,754
Other manufacturing	3,273	1,340	8,117	297	238	13,265
Total	160,702	64,975	112,943	14,785	12,418	365,822
Net Output £000						
Food	10,887	3,554	9,006	1,428	902	25,777
Drink and tobacco	12,025	2,003	1,050	45	116	15,240
Textiles	2,882	3,075	3,485	560	579	10,582
Clothing and footwear	4,760	2,340	1,037	312	684	9,133
Wood and furniture	1,984	578	640	200	177	3,579
Paper and printing	7,565	1,248	1,037	173	42	10,065
Chemicals, etc.	2,732	781	832	114	28	4,488
Clay products, etc.	1,218	1,588	1,210	58	196	4,269
Metals and engineering	9,479	1,712	3,212	218	150	14,771
Other manufacturing	1,402	449	3,310	116	79	5,356
Total	54,935	17,327	24,820	3,224	2,954	103,260

TABLE A8.—CHANGES IN SIZE STRUCTURE OF MANUFACTURING INDUSTRY 1938-1958

Number of Persons Engaged*	Number of Establishments			Average Number of Persons Engaged		
	1938†	1946†	1958	1938†‡	1946†	1958
	Number			Thousands		
Under 5	771	518	480	2.1	1.4	1.5
5-9	758	631	681	5.1	4.2	4.6
10-14	378	360	395	4.4	4.2	4.7
15-19	228	260	251	3.8	4.3	4.2
20-24	} 581	153	167	} 17.4	3.1	3.7
25-49		} 607	537		} 704	15.3
50-99	215	237	291	13.8	15.2	20.6
100-199	} 210	147	161	} 39.6	19.5	21.7
201-499		} 230	112		} 273	23.9
500 and over.	15	21	31	14.2	18.9	29.6
Total	3,156	2,864	3,106	100.2	110.0	141.8

*October 1938, October 1946 and average 1958.

†Published figures altered to ensure comparability with those for 1958 which relate to manufacturing industries as defined in the 1953 reclassification.

‡Estimated allocation.

TABLE A9.—SIZE STRUCTURE OF MANUFACTURING INDUSTRY IN SOME EUROPEAN COUNTRIES.

(Establishments with 10 (a) or more persons engaged).

NOTE—The data on which this table is based have been derived from various year-books, official reports etc and relate to 1958 except as follows :—U.K. 1954 ; Holland 1957 ; Italy 1951 , Belgium 1947 ; Norway 1960.

Country	Number of persons engaged						Total
	(a) 10-50	50- 100	100- 200	200- 500	500- 1,000	1,000 and over	
	Number of Establishments						
Six Counties	610	235	168	135(c)	29(c)	16(c)	1,193
West							
Germany (b)	28,527	9,095	5,815	4,143	1,304	916	49,800
United Kingdom	31,558	10,826	7,162	5,076	1,534	1,054	57,210
Holland (d)	6,742	1,790	921	517	194	134	10,298
Italy ..	22,293	3,907	3,383		436	274	30,293
France ..	38,829	6,863	4,045	2,554	738	387	53,416
Sweden (e) ..	5,960	1,072	575	379	112	53	8,151
Ireland ..	1,350	291	161	112	26	5	1,945
Belgium (e) .	8,849	1,363	812	511	123	50	11,708
Norway .	4,123	614	290	173	65		5,265
	Percentage Distribution of Number of Establishments						
Six Counties	51.1	19.7	14.1	11.3 (c)	2.4 (c)	1.3 (c)	100
West					2.6	1.8	100
Germany (b)	57.3	18.3	11.7	8.3			
United Kingdom	55.1	18.9	12.5	8.9	2.7	1.8	100
Holland (d) .	65.5	17.4	8.9	5.0	1.9	1.3	100
Italy ..	73.6	12.9	11.2		1.4	0.9	100
France .	72.7	12.8	7.6	4.8	1.4	0.7	100
Sweden (e) .	73.1	13.2	7.1	4.7	1.4	0.7	100
Ireland .	69.4	15.0	8.3	5.8	1.3	0.3	100
Belgium (e) ..	75.6	11.6	6.9	4.4	1.1	0.4	100
Norway	78.3	11.7	5.5	3.3	1.2		100
	Percentage Distribution of Number of Persons Engaged						
Six Counties	9.2	9.8	14.5	24.0 (c)	11.4 (c)	31.2 (c)	100
West							
Germany (b)	10.4	9.5	12.1	19.2	13.4	35.3	100
United Kingdom	10.4	10.0	13.1	20.3	13.7	32.5	100
Holland (d) ..	14.7	11.2	12.1	15.0	12.4	34.7	100
Italy .	20.8	11.8	30.1		13.0	24.4	100
France (f) .	21.4	12.0	14.2	19.4	12.7	20.2	100
Sweden (e) ..	22.6	12.7	13.7	19.4	13.3	18.3	100
Ireland .	23.1	15.2	16.0	23.9	13.4	8.4	100
Belgium (e) ..	25.7	13.3	15.9	21.8	11.7	11.5	100
Norway ..	30.5	15.2	14.1	18.8	21.4		100

(a) 11 persons for Six Counties, United Kingdom, Italy, Sweden and France.

(b) Excluding Saarland and Berlin.

(c) Breakdown between three largest size groups is estimated.

(d) The unit is the enterprise, not the establishment.

(e) Classification is on the basis of number of wage-earners, and total persons shown is number of wage-earners (excluding proprietors and salaried).

(f) Estimated from number of establishments above and from average sizes in each class for other countries.

TABLE A10—AVERAGE SIZE OF MANUFACTURING ESTABLISHMENTS IN SOME EUROPEAN COUNTRIES
(Establishments with 10 (11) or more persons engaged. See Notes to Table A9).

Industry Group	Six Countries 1958	West Germany (b) 1958	United Kingdom 1954	Italy 1951	France (d) 1958	Sweden (e) 1958	Ireland 1958	Belgium (e) 1947	Norway 1960
Average size (number of persons per establishment)									
Metals & engineering	413	222	188	98	99	99	88	77	76
Chemicals, etc	46	225	179	114	92	78	49	88	88
Textiles	140	142	132	132	88	104	113	81	77
Drink and tobacco	188	(c) 97	87	74	62	55	99	51	87
Other manufactur- ing industries	(a) 95	103	116	67	59	102	61	48	42
Paper and printing	59	81	104	55	63	96	81	51	64
Clay products, etc	54	73	103	52	66	51	79	72	51
Clothing and foot- wear	119	92	77	42	48	53	63	34	43
Food ..	94	77	112	45	58	46	60	41	33
Wood & furniture	46	62	58	31	35	36	35	25	24
TOTAL	141	134	133	77	75	73	70	61	54
Average size as percentage of corresponding average size for Irish Manufacturing									
Metals & engineering	467	251	213	111	112	112	100	88	86
Chemicals, etc	95	460	366	233	188	160	100	180	180
Textiles	124	126	117	117	78	92	100	72	69
Drink & tobacco	192	(c) 99	89	75	64	56	100	52	89
Other manufactur- ing industries	(a) 157	171	191	110	97	169	100	80	70
Paper & printing	72	100	128	68	78	118	100	63	79
Clay products, etc	69	93	130	66	84	65	100	92	65
Clothing & foot- wear	190	147	122	67	77	85	100	55	69
Food	157	128	186	74	97	77	100	69	55
Wood & furniture	181	175	163	88	99	100	100	70	68
TOTAL	202	192	191	111	107	104	100	87	77

(a) Includes brushes and brooms and perambulators.

(b) Excluding Saarland and Berlin.

(c) Soft drinks, wines, etc., included with food.

(d) Estimated from number of establishments in each size group.

(e) Figures shown relate to wage-earners only.

DISCUSSION

Dr. E. T. Nevin · I am happy to be asked to second the vote of thanks to Mr. Linehan, since it gives me the opportunity to express our indebtedness to him for having filled in an especially crucial gap in the statistical jigsaw picture of Irish industry and our appreciation of the highly competent manner in which he has done it. It is a measure of his achievement, I think, that I find myself wanting to consider the implications of his findings rather than the statistical *mystiques* which may lie behind them. My own experience at the production end of official statistics has been lamentably small, but such as it was, it left me with the abiding suspicion that the magnitude of the administrative upheavals which their compilation involves is matched, all too often, only by the masterly indifference with which the general public consigns them to utter oblivion while the ink is scarcely dry on the paper. For ordinary mortals the sincerest form of flattery is no doubt imitation; for the official statistician, however, it is surely the application of his statistics. For far too many products of the official statistician's art their inescapable doom seems to be the untimely eternal darkness and magnificent non-fulfillment of poor Miss Havisham's wedding-cake in *Great Expectations*.

This fate is manifestly not that which awaits Mr. Linehan's paper, since as he himself points out, it has a close and direct bearing on the Common Market issue—unquestionably the most far-reaching issue of contemporary political and economic policy in this country. Speaking with the diffidence proper in a stranger on these hospitable shores, I have been struck, as I am sure many others have, by the extremely broad character of the public discussion on this issue so far. Very little concrete evidence has ever been presented on one side or the other; instead, high principles are extolled and expounded, generalisation is piled upon generalisation, the whole being surmounted, as the students of heraldry would say, by optimism rampant before which dangers dwindle and difficulties disappear. Now I would be the last to belittle the value of optimism in the formulation of political policy, since it is, after all, no more than the application to our mundane problems of the theological virtue of hope. But while optimism may make facts tolerable, it cannot make them irrelevant, and such facts as we have on the Common Market issue call for rather more, I would have thought, than a shot from the nearest aerosol of optimism.

Mr. Linehan shows, for example, that in 1958 net output per head in Irish manufacturing as a whole was £728. The comparable figure for the United Kingdom was £1,018. That is to say, per capita net output in Irish industry was 28 per cent lower than in British industry, or, conversely, that it was 40 per cent higher in British industry than in Irish industry, depending on whether you want to make the difference sound as small as possible or as big as possible.

Now a popular generalisation deployed explicitly or implicitly to explain facts such as this is that the only weakness of Irish industry is its small scale; with varying degrees of sophistication it is suggested that given a dose of amalgamations or a shower of take-over bids all will be well. Mr. Linehan's paper, in my view, gives this doctrine a

severe rattling First, he shows that, comparing industry with industry, as we surely must, Irish industry is *not* particularly small in scale. Its scale is small, of course, in comparison with countries like the United Kingdom or West Germany in which industry is long-established and highly developed, and where populations exceed the 50 million level ; one would hardly expect otherwise. But in comparison with European countries of more similar size—Sweden, Belgium, Norway—and even with Italy and France, the generalisation will not stand

Secondly, Mr Linehan's paper enables us to examine critically the assumption in all this that productive efficiency varies directly with size He shows that in terms of net output per head this is probably valid enough. We have, of course, the problem that the trend is over-stated by one type of size-classification and under-stated by the other. In such a situation I find the temptation to strike an average for each of the ten size groups quite irresistible. The procedure is no doubt a mathematical heresy of the first water, but at least a fair amount of cancelling-out is bound to occur between the over-statement of the one classification and the under-statement of the other. I have done a few sums on this, and I find that the trend emerging from the process is that per capita net output in the largest establishments is about three times as high as in the smallest establishments.

So far so good But we all know that per capita net output is not a particularly satisfactory index of efficiency. The most important of its weaknesses, of course, is that it ignores the contribution of capital. Unfortunately there is nothing that we can do about this at the moment in relation to Mr. Linehan's findings Even apart from the capital question, however, output per head is inadequate. As the textbooks tell us, when international competition is in question—as it obviously is when the Common Market is under discussion—it is unit-labour-cost which matters, not physical productivity. This is measured more appropriately by relating the value of output to the amount *paid out* for labour, rather than the number of people employed—by discovering, in other words, how many pounds-worth of output emerges in return for each pound paid out in wages.

I will not inflict the details of this sum, when it is done, on this audience (see Table 1) As with net output per head, the apparent trend depends on the method adopted for measuring size If net output is taken as the criterion, there is a clear upward tendency in output per unit of wages as size increases, although the range from lowest to highest, at about 100 per cent, is very much smaller than that in output per head If size is measured by employment, on the other hand, there is a rather wobbly *downward* movement to the 30-50 size and a rise of modest degree thereafter. If my monstrosity of an average can be accepted as an approximation to the overall position, it reveals a very limited range of movement up to the 500 size—with no more than ten percentage points between lowest and highest—and a clear upward movement, of less than 20 per cent. in range, only for the very largest establishments employing more than 500 people. The relationship between size and efficiency—assuming that we are in fact dealing with efficiency here—is a very obscure one, in other words. Certainly the figures presented by Mr. Linehan do not justify confident conclusions that, in Irish industry at any rate, larger size is the open sesame to higher productivity.

There is a third respect in which Mr. Linehan's paper throws light

on this crucial question of the importance of the scale of Irish industry to its competitive position. By doing some more sums it is possible to make a comparison of output per head and output per unit of wages in manufacturing as a whole, size group by size group, in Ireland and the United Kingdom. Unfortunately, the size analysis of the U.K. Census of Production for 1958 has not yet been published, so that the British figures relate to the year 1954. This is admittedly a somewhat curious comparison—between Ireland in 1958 and Britain in 1954. It does not seem too heroic an assumption, however, that changes in the British figures between 1954 and 1958 will have effected the different size groups to roughly the same degree. The advantage of such a comparison of course is that one is able, to a large degree, to abstract from differences in the size of establishments, just as Mr. Linehan was able to abstract from differences in industrial structure in his adjusted comparison of average establishment sizes in the ten countries shown in Table A10.

What would one expect such a comparison to show? Essentially, if lower values of industrial output per head in Ireland were due primarily to differences in the size structure of its industry, rather than in the productive efficiency of enterprises of a given size, the overall deficiency should emerge in comparing industrial totals, but not at all, or to a much smaller degree, in comparisons between groups of similar size within the industry concerned. For example, in 1958 net output per head in Irish manufacturing as a whole was 9 per cent. below the comparable figure for the U.K. in 1954. If this deficiency was primarily due to size differences, relative net output in any particular size group would not reveal as great a difference. In fact, these differences do not disappear when Irish and British enterprises are compared size by size (see Table 2). In three of the six size groups for which the comparison can be made, net output per head in Irish enterprises was further below the corresponding U.K. averages than in industry as a whole. Similarly, relative net output per unit of wages and salaries was lower in four of the six size groups than for manufacturing as a whole. So far from being responsible for its relatively low average output, in fact, the size structure of Irish industry may have the effect of *raising* the apparent output per head in comparison with the U.K.

I need hardly add that these elementary calculations which I have been able to do with the aid of Mr. Linehan's figures are in no sense exhaustive. For one thing, they refer to only manufacturing as a whole, and there are clearly great differences between different industries within manufacturing. It will also be readily appreciated that, like most economic statistics, Mr. Linehan's results are open to more than one interpretation. A distinguished figure of the English bar once remarked that in his opinion the far bank of the river Styx was crowded with angry legators awaiting the arrival of solicitors who had misinterpreted their testamentary dispositions. If there is any justice in these things, there must also be in that sombre assembly a special enclosure for official statisticians awaiting the arrival of economists who had soured their professional lives by distorting beyond recognition those of their brain-children they failed to murder by wilful neglect.

Nor is this all. It will now doubtless be argued that the scale problem in Irish industry is not so much one of numbers employed or level of net output but of multiplicity of products, or dispersion of financial control, or some such thing. This is another part of the fate of the

official statistician ; having met a demand for one set of figures he is immediately told that what was really wanted was something quite different. Hence he is trapped in the no-mans-land of public controversy, wherein disputants are teetering nervously on that delicate margin which divides efforts to explain something from efforts to explain it away.

Mr. Linehan is no doubt old enough a hand in the business to be able to contemplate all this with due fortitude and resignation. Nevertheless I am sure it will lead this society to endorse all the more strongly the vote of thanks to him which it has been my pleasure to support this evening.

TABLE I SIZE AND PRODUCTIVITY, ALL MANUFACTURING IRELAND, 1958

	Size Group		Net output per person engaged (% of average)			Net output per £100 wages and salaries (% of average).		
	(A) Numbers engaged	(B) Net output (£000)	By (A)	By (B)	Average	By (A)	By (B)	Average
1	—5	—2	67	35	51	133	65	99
2	5—9	2—3	75	50	63	100	77	89
3	10—14	3—5	85	55	70	101	78	90
4	15—19	5—10	89	66	78	105	83	94
5	20—29	10—20	88	70	79	98	85	92
6	30—49	20—30	84	82	83	93	90	92
7	50—99	50—100	85	94	90	95	98	97
8	100—199	100—200	91	98	95	97	98	98
9	200—499	200—500	104	113	109	98	100	99
10	500+	500+	133	161	147	109	124	117
TOTAL			100	100		100	100	

SOURCE —Derived from Table A1 above.

TABLE II. SIZE AND PRODUCTIVITY IN MANUFACTURING—IRELAND 1958 AND U K 1954

Numbers engaged	Net output per head			Net output per £100 wages and salaries		
	Ireland £	U K £	(2) as % of (3)	Ireland £	U K £	(5) as % of (6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
11—29*	637	690	92	188	173	109
30*—49	608	689	88	173	171	101
50—99	620	718	86	177	176	101
100—199	664	743	89	181	179	101
200—499	760	791	96	183	185	99
500+	966	879	110	204	180	113
TOTAL	737	808	91	187	180	104

SOURCES —Cols (2) and (5) from Table A1 above, Cols (3) and (6) *Report on the Census of Production for 1954, Summary Tables, Part II, (H M S O, London 1959) Table 10*

*For U K the dividing point is 24 instead of 29

Mr. J. S. Osizlok : There has in recent years been a great deal of speculation on the economic implications of joining the Common Market, and it has not always been easy to discern how far the varying

views were at issue on matters of substance or what was their bearing on matters of practical economic policy. Mr Linehan's painstaking researches and the present paper, in as much as they supply valuable statistical background to these speculations are, therefore, especially welcome.

The mass of figures is somewhat bewildering on first reading and the comment must necessarily be by way of a general impression which is a rather encouraging one. It appears that, as regards the size of industrial establishments, Ireland compares with other West European countries much better than was generally thought and—what is perhaps more important—there appears little correlation between size and efficiency.

These findings are certainly surprising and I do not know whether the more important thing is not to insist on the severe limitations of the interpretative value of the figures. The country, by and large, is still mentally on the defensive as regards the consequences of membership in the E E C and there is a general temptation to console oneself that it will be sometime before these consequences are felt. Isn't there some risk that we shall tend to approach the problems in an even more escapist manner if we conclude from Mr. Linehan's figures that the consequences are, in any case, less drastic than may have been feared? The experience in countries which have formed the Common Market indicates that, within it, size of production is among the more important determinants of competitive advantage and that, generally, the Common Market favours large-scale efficient production. According to *The Statist* (World Banking, December 1961) "during its (the Market's) first eighteen months of existence something like 9,000 liquidations of small businesses occurred in France whilst the number of amalgamations and consolidations was of equal significance." This does not, of course, mean that the size of establishment decided the fate of industry in the Common Market. Indeed experience in member countries is on the whole surprisingly favourable as regards small establishments. This, however, appears to be the result of a quick adaptation to the possibilities which the enlarged market created by way of specialisation. It would seem that the real necessity created by the Common Market is specialisation (rather than growth in size) at the productive level and large-scale integration at the marketing level.

Dr. C. E. V. Leser The statistics presented in this paper tell an exciting story; in particular I found table A5 quite staggering. One hears there is a lot of variation between the best and the worst firms in other countries too, but the wide range in net output per head, even allowing for various factors, seems surprising. It would seem worth while to follow up this distribution by further studying the establishments with very low and very high net output per head. The figures suggest that there might be insufficient competition even within Ireland; more internal competition might enable the country to withstand international competition better.

Dr. Geary Mr Linehan's paper is of special interest to members of the Economic Research Institute who have embarked on the task of studying the productivity of Irish industry in its various aspects, scale, man-power, capital intensity, etc. It would be hard to over-emphasise the importance of the kind of classifications which Mr.

Linehan has presented for studies of this kind, particularly in their frequency distribution aspect. As a former (I do not say "old") government statistician, may I say that we are aware of the notions of totals and averages but we have not yet quite got to that of frequency distributions, the second chapter in any respectable elementary text book on statistics. Mr. Linehan's analyses have given us a good start in the kind of studies I have mentioned.

At first sight, Mr. Linehan's table A5 is sensational in showing the great range in the statistic net output per head, classified by industrial groups. All industries have this feature. For manufacturing industry as a whole the effective range (i.e. that between the 10% and 90% deciles) appears to be £250 to £1,000, or 1 : 4. Of course, this statistic is faulty as a measure of productivity—added value would be better—and account should be taken of varying degrees of capital intensity between industries. However, the broad inferences from this table would probably not be very materially affected by such corrections. How can industry survive on a net output per head of £250 which is less than even the prevailing wage rate? We are all aware that the accuracy of CIP returns leaves much to be desired, through no fault of the CSO. Still, the fact remains that there is an enormous difference in productivity in Irish industries in every industrial group which must be attributed largely to differences in managerial competence. This is a grave matter in view of this country's impending entry into EEC.

We are, in this country, prone to attribute to ourselves double or triple doses of original sin. I mentioned to a Dutch colleague some years ago the main result of my last Statistical Society paper on variability in Irish agriculture, stating that the effective range on each size of farm was 1 : 3. He stated that he had found the same result in Dutch industry! This phenomenon of great variability in industrial product is not confined to Ireland.

Dr. M. D. McCarthy, in speaking to the paper, expressed his gratitude to the members for the honour which had been done to him in electing him President.

He said that Mr. Linehan's paper was most timely and provided a mine of information about the structure of industry which would be extremely useful in the present circumstances and which, he had no doubt, would be of considerable use in consideration of the current problems of the economy. He did not believe, with some other of the speakers, that the inaccuracies which were inevitably present in an inquiry such as the Census of Industrial Production in any way invalidated the conclusions which could be drawn from the paper. It was true that the data for some of the smaller firms was not individually accurate but he did not believe that it was biased and, in any event, the output of these firms or the employment given by them constituted only a small proportion of the total. The Central Statistics Office could devote only a limited amount of resources to any particular inquiry and it used its best endeavours to ensure by checking internal consistency of the returns by queries and so on that the data was as accurate as could possibly be made within the limit of its resources. No statistics were 100 per cent. accurate and the allocation of resources which extreme accuracy required were beyond the means of any country. He did believe that the results in question were quite accurate.

enough for the conclusions which had to be drawn from them and that questions of accuracy, which were the continual preoccupation of the Central Statistics Office, could safely be left to that organisation

Many of the results in this paper were examples of what happened when, to economic theory, were applied the actual tests of practical statistics. Economists spoke of "the economies of scale" but in many cases these were illusory. Economic theory would also lead one to believe that in a competitive situation the only firms which would continue in existence were those of comparable degrees of efficiency. Table A5 of Mr. Linehan's paper showed that in actual fact this was far from the case and that wide variations of efficiency were found in industry. This also, as had been shown by the Farm Survey, was the case in Agriculture. These were the actual facts of the situation and were quite different from those in which one would be led to believe by the dicta of economic theory

He believed with many other speakers that it was quite invalid to compare overall data such as net output per head in different countries. That this was different was not so much a question of the size of concerns but more a question of the structure of industry and, in any particular industry, of the kind of processing that was carried on in the enterprises. He felt that problems relating to the Common Market could not be dealt with merely by considering such concepts as size of firm or by generalities about individual industries. Questions of survivalship of industrial concerns now or in the future depended primarily on the efficiency of individual concerns and not on any wide generalisations

He welcomed Mr. Linehan's pioneering effort in endeavouring to produce data on the relative size of industrial establishments in different countries. He was tempted to say, as a warning, that "all international comparisons are wrong and most of them are dangerous" but, having given this warning, he believed that with all the reservations Mr. Linehan's results were extremely useful. Irish industrialists going abroad usually visited their larger establishments and enterprises and got quite a wrong impression of the average size of concerns in the countries visited. In all countries there were multitudes of small-sized establishments and the truth was that, though we had only a relatively small industrial arm in this country, our establishments on the average were not so much smaller than those of many countries in Western Europe. He did not believe that small-sized concerns could be used as an excuse for their not being competitive in the conditions of the future.