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IRISH INDUSTRIAL STRUCTURE, 1979-1985
A LONGITUDINAL ANALYSIS

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1. INTRODUCTION

Background

The *manufacturing* sector of the economy is vital in that it is the engine of economic growth. Despite developments in other areas of the economy, it still carries much of the potential for job creation, either directly or indirectly, in the years ahead. For this reason and also because of the considerable level of state expenditure on industrial development, good statistics on the performance of this sector are essential in order to have a full understanding of the factors underlying changes in output and employment, in particular. Developments in Irish manufacturing industry in the 1980's have been the subject of much debate. This has centered to a considerable extent on the rapid increase in productivity which has been a function of output growth, quite substantial in comparison to that of our European partners, and declining employment. The authors hope that this paper can be a contribution to this debate by looking at some of the structural changes which have taken place in the last decade and identifying at least some of the factors which have influenced these changes.

The paper uses a newly developed Central Statistics Office (CSO) longitudinal micro data base containing information on all establishments with 3 or more persons engaged covered by the *Census of Industrial Production (CIP)* from 1979 to 1985, to analyse some of the major changes in the structure of manufacturing industry over that period. The latest year for which a complete file was available when the data base was prepared for purposes of this paper was 1985; this will be extended to include details from the 1986 Census, which has now been published, and later Censuses as they become available some two years after the end of the relevant Census year.

At the outset some background details on the CIP and on the development of the longitudinal file are given. The major definitional aspects which have a bearing on interpretation of the results are outlined with special regard to the factors identifying a unique establishment. Some summary tables on the structure of Irish manufacturing industry in recent decades are presented as background to the more detailed examination of the 1979-1985 period. The changes in structure since 1979 are then examined in greater detail by looking initially at the patterns of change for various size groups.

Particular emphasis is placed in this study on the structure in terms of employment size of establishment and on changes in employment during that period. Changes in employment are examined in some detail by first decomposing employment change into its constituent parts. Establishments are classified according to their employment change pattern and the development of employment in each type of establishment is charted. The overall pattern of employment change for establishments with different output change profiles is illustrated and the output/employment relationship is explored at a micro-level. Employment change is also analysed in relation to factors such as nationality of ownership and IDA grant-status.

The paper has two principal aims - firstly to present some initial data which will hopefully throw further light on the underlying trends influencing changes in industry over the period concerned and secondly to show the type of analysis which is now possible. Because of confidentiality constraints, the CSO cannot give outside access to the micro data base. However, it will facilitate insofar as resources permit running of programs written by others subject, of course, to the normal constraints of the absolute confidentiality of the data relating to individual firms. This arrangement already operates in the case, for example, of the Household Budget Survey.

Annual Census of Industrial Establishments

The *Census of Industrial Production* covering establishments with 3 or more persons engaged has a long history. The Census has traditionally used the *establishment* as the reporting and analytical unit in order to focus as closely as possible on the production process. The first Census was undertaken in 1926 and Censuses have been taken on an annual basis, with various levels of coverage, since 1932. Long time-series derived from these Censuses have provided the basic data for studies of the development of Irish industry through the decades although necessary developments (especially the introduction of the EC NACE classification) introduced at various stages have given rise to unavoidable discontinuities given the manual nature of the processing system at that time. Special reports were also prepared at intervals analysing establishments in various size categories and at different locations. The Census also has the valuable function of providing the weighting basis for the various short-term inquiries and the annual benchmark measures which ensure the consistency of all the industrial series. Processing of the Census was computerised for the 1979 Census. This development made possible the production of a regular series of reports analysing in detail the structure of Irish industry and has helped in making the reports of successive Censuses more timely.

Definition of an Establishment

Some important definitions are necessary for an understanding of the analyses which follow. The *unit* used is the *establishment.* This is defined as a single economic activity conducted at a particular location. The majority of the individual establishments covered are individual factories, bakeries, etc. However, where two or more distinct activities (i.e., classified to different 3-digit NACE industrial categories or other sectors such as distribution) are conducted at the same location, each is distinguished in principle as a separate establishment. Ancillary units such as administration, warehouses and depots at separate locations are also defined as establishments classified to the activity of the production unit which they serve.

A separate annual Census return is sought for each industrial establishment with 3 or more persons engaged. The extent to which separate returns are obtained in practice, however, depends on the scale of the different activities involved and the availability of separate records in the business for the different establishments. In a small number of cases where one return was received in respect of a number of establishments, this has been counted as one establishment of that total size for purposes of this paper whereas in the official CIP results it was counted as the appropriate number of establishments (not attributable to region or size group).

The establishment is the most appropriate unit to use for the purpose of this study because it concentrates on the unit engaged in the production process and is not as subject to structural changes arising from events such as mergers and takeovers and the changing extent of non-industrial activity as is possible in the case of the alternative unit, the enterprise. However, it must be added here that some developments of an equivalent type affect the establishment. This is particularly evident where a support activity is no longer carried on within the establishment but is either bought in from an outside concern or from a new company formed within the overall group of enterprises to cater for the particular service (e.g. transport services, computer services).

Start-ups and Closures

In relation to a longitudinal study such as this it is also necessary to clearly delineate the circumstances in which an establishment is considered to have been created and is included as a *start-up* or is considered to have ceased operations and is treated as a *closure.* The situations giving rise to changes of unit are:

1. The start-up of a *new operation* at a particular location by a *new company;*

2. A small establishment *increasing* in size to reach the CIP lower cut off point of three or more persons engaged;

3. A *complete takeover* of an existing company controlling an existing establishment resulting in the formation of a *new company* to control the same establishment;

4. Formation of a *new company* in place of an existing company for other than cosmetic reasons (generally closure followed by re-opening) controlling existing establishment(s);

5. Setting-up of a *new* manufacturing establishment at a *separate location* by an existing company which retains its existing location for manufacturing also;

6. Manufacture, of a substantive nature, by an existing establishment of *new products* in a *different NACE group* in addition to the existing products (i.e. creation of an additional establishment at the same location);

7. Substantial *restructuring arising from reorganisation* of the *reporting units* of a multi-establishment enterprise in situations where the reporting unit is accepted as the establishment (i.e. creation of a different set of establishments);

8. The *cessation* of industrial operations at a particular location.

9. An establishment *declining* in size below the lower CIP cut-off point of three or more to one or two persons engaged.

The changes arising in each of the above situations fall into five distinct categories, namely:

1. & 2. Start-up of an establishment;

3. & 4. Start-up of a new establishment and closure of the former establishment;

5. & 6. Start-up of a new establishment while the original establishment is retained;

7. A new set of establishments is created and the former set cease (this situation is quite rare and the arrangement is not suitable for this type of analysis but is necessary for practical reasons);

8. & 9. Closure of an establishment.

The following situations result only in a change to the characteristics recorded for the establishment but do not result in a change of unit:

(a) internal changes in share ownership in the controlling company;

(b) cosmetic changes in name;

(c) changes of location of existing activity;

(d) change in industrial activity (i.e. different products are manufactured which are classified to a different industrial sector).

The analyses in this paper, therefore, which are concerned with establishments existing over the entire 1979–1985 period include establishments which did not undergo any change in ownership (or major reorganisation resulting in a new set of establishments). Situations where the only changes were ones which could be classified under cases (a), (b), (c) or (d) above are, therefore, included.

It could be argued that the conditions outlined above provide for the formation of new entities and closures in too many circumstances. In particular, there is a case for regarding an establishment as still being essentially the same unit even if a new company is set up in the circumstances outlined at (3) and (4) above. However, the criteria applied attempt to reflect the effect of new factors which could influence the performance of the company and were designed primarily to facilitate the practical operation of the Census processing system. These will be reassessed in the context of moves at EC level to develop uniform standards for registers of this kind.

However, examination of the 150 or so establishments with 100 or more persons engaged which this study classifies as closures over the period 1979–1985 has shown that the vast majority were, in fact, "genuine" closures i.e. cessation of activity which may, in some instances, have been followed later by re-opening under different ownership.

Development of the CSO Industrial Longitudinal Data Base

Computerisation of the processing of the CIP has, in addition to the other developments mentioned earlier, provided the opportunity to develop a longitudinal data base which, at this stage, covers the period 1979–1985. This data base enables us to examine in detail the changes which have occurred in the different activity sectors over this period and is the main basis for the analyses provided in this paper. It contains the information collected for each establishment in the Censuses for each of the years 1979 - 1985. A unique reference number identifies each of these establishments and this remains on file while the establishment remains in operation. The circumstances which result in a new establishment being created for purposes of this data base were outlined earlier. It should be noted in particular that changes in the characteristics of an establishment (e.g. new county code in the event of the physical location being changed, new activity code if the major product being manufactured changes) do **not** result in a change of establishment and so the unique identifier is still left on file.

The variables used for this analysis for each of the years 1979 - 1985 are:

- unique reference number
- NACE activity classification
- total gross output
- industrial inputs
- net output
- total persons engaged at September of each year (excluding outside piece workers), total males and total females
- nationality of ownership
- IDA grant-status

Definitions of the variables are given in Appendix 1.

2. INDUSTRIAL STRUCTURE

Overall Changes in Industrial Structure

An overall picture of the structure of Irish industry over the past 30 years is given as a background to the detailed analysis of developments over the period 1979-'85.

The total number of establishments in the various size groups in different years is given in Table 1. In using this table, allowance must be made for the expansion in scope and coverage which commenced with the 1979 Census and resulted in the addition of some 700 establishments. The bulk of these are in the smallest size categories. The effect on the 1979 totals is illustrated in the table. The introduction of the EC NACE activity classification for the 1973 Census also resulted in some extension of coverage which is reflected in the 1975 totals. The total number of extra establishments concerned in 1973 was only 67 and those were distributed throughout the size groups.

Table 1: Number of Establishments in Manufacturing Industry Classified by Number of Persons Engaged in Various Years(1)

Year	Number of Persons Engaged									
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100-499	500 and over	Total
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1958	480	681	395	252	320	383	291	273	31	3,106
1963	423	572	383	271	343	374	336	330	45	3,077
1968	386	519	366	241	368	425	353	365	51	3,074
1975(2)	352	604	438	299	361	410	411	393	52	3,320
1979(3)	380	726	504	402	400	476	458	470	53	3,869
1979(4)	504	994	608	475	440	513	476	479	53	4,542
1980	616	1,075	662	525	463	508	478	450	57	4,834
1981	668	1,205	647	572	462	518	464	437	58	5,031
1982	685	1,234	704	538	496	480	469	421	48	5,075
1983	713	1,271	720	486	448	474	449	399	42	5,002
1984	638	1,191	708	459	436	468	429	396	42	4,767
1985	599	1,156	673	421	430	468	427	396	33	4,603

(1) Final totals used in this paper differ marginally from CIP reports because of allocation of CIP 'non-attributable' cases from 1979 onwards to the size-group of the overall reporting unit (as in earlier years) and other minor revisions following publication

(2) Minor increase in coverage following introduction of NACE classification

(3) Coverage prior to extended 1979 CIP

(4) Extended CIP coverage

It can be seen that there was only a relatively minor increase between 1968 and 1980 in the number of establishments in the 500 and over category. This was followed by a significant reduction in the 1980's, which was particularly noticeable in 1981-'82 and 1984-'85.

A major factor in the increase in the number of establishments in the smaller size groups is the increased coverage of the 1979 CIP. However, growth in establishments with less than 15 persons engaged is still obvious in the early 1980's, reaching a peak in 1983 followed by some decline between 1983 and 1985. Conversely, the number in all other size groups declined between 1980 and 1985. As will be seen later (Table 4 and Appendix 11), some of this increase in the number in the smaller size groups results from reductions in size in existing establishments.

The overall size structure for 1975, 1980 and 1985 is given in Appendix 2 where the proportion of Gross Output, Net Output and Persons engaged in five major size groups is shown. The effect of the extended coverage from 1980 is shown by giving, for 1980, an analysis of industry on both bases.

The most striking change throughout this period is the reduction in importance in terms of employment and net output of the largest size group (i.e. establishments with 500 or more persons engaged). In the case of employment, the proportion accounted for by all smaller size groups increased in the 1980's but establishments in the 100-499 category took over the increased share of gross and net output.

Overall Trends, 1979-1985

With the availability of data on this comprehensive basis for seven years, it seemed to be timely to produce analyses for the period 1979-'85 which, as mentioned earlier, were essentially years of declining employment combined with increasing output. It is important, therefore, to see if major output gains in individual establishments or particular groups of establishments result in increased employment and to examine the constituents of employment change in as great a level of detail as possible. The overall trends in output and employment from 1979 to date together with the resulting changes in productivity are illustrated by Table 2.

Table 2: Trends† In Volume of Production and Total Employment of Establishments In Manufacturing Industries, 1979–1985

Year	Index of volume of production (1980 = 100)	Total employment (annual average) (000's)	Index of employment (1980 = 100)	Index of Output per person (1980 = 100)
1979	100.9	226.7	99.7	101.2
1980	100.0	227.4	100.0	100.0
1981	106.0	222.5	97.8	108.4
1982	104.9	215.1	94.6	110.9
1983	113.7	202.2	88.9	127.9
1984	125.0	195.6	86.0	145.3
1985	130.6	187.1	82.3	158.7
1986	134.4	185.8	81.7	164.5
1987	149.8	182.8	80.4	186.3
1988	168.6	180.3	79.3	212.6

† These calendar year indices are derived from the corresponding short-term series; they are not, therefore, fully comparable with indices based on the CIP aggregates used in this paper obtained from annual accounts which are not based on calendar year returns for all establishments.

It must, of course, be recognised that an element of this measure of increased productivity arises from the effect of structural change i.e., the increasing importance of sectors with very high output per person. An approximate measure of this effect using a simple methodology is outlined in Appendix 3.

Another influence in labour productivity growth has been the trend towards buying in of non-industrial services. This has obviously resulted in output being maintained while direct employment in industry has fallen. There is a little direct evidence of this trend from CIP results up to 1985 as the cost of non-industrial services increased marginally from 10.9 per cent of purchases of other materials and industrial services in 1979 to 13.1 per cent in 1985.

Overall Structural Changes, 1979-1985

The preceding section focused on the effect on output and employment of all changes over the period 1979-'85. The various changes in establishment size which occurred over this period and which influenced the changes in structure are now examined in greater detail. Table 3 provides a summary picture of the net change in the number of establishments between 1979 and 1985 and also shows the situation when all establishments which were included in the CIP at any time during the period are included, i.e. the effect of gross changes.

Table 3: Changes in Number of Establishments, 1979-1985

	Number of establishments
Net Changes	
Total 1979 CIP	**4,542**
In 1985 CIP	
but started after 1979	1,652
In 1979 CIP	
but ceased before 1985	1,591
Total 1985 CIP	**4,603**
Gross Changes	
Total 1979 CIP	**4,542**
All starts after 1979	**2,450**
of which:	
in 1985 CIP	1,652
ceased before 1985	631
restarts having ceased earlier †	167
All closures before 1985	**2,389**
of which:	
in 1979 CIP	1,591
started after 1979	631
ceased and restarted †	167
Total 1985 CIP	**4,603**

† The 167 establishments which restarted following closure are classified either as belonging to the 1979 CIP or as starts in their first year of operation only, as appropriate, except in Tables which are concerned with year-on-year changes (i.e. Tables 5 and 6 and Appendices 5-11) where they are treated as starts in each year in which they restart.

Table 3 shows that there was quite a large turnover of establishments during the period. Of the total of 4,542 included in the 1979 Census, 1,591 had closed before 1985 leaving 2,951 survivors while 1,652 of the total of 4,603 existing in 1985 had started since 1979. In addition, there were 631 establishments which started-up and closed again during the period in question. There were, therefore, a total of 6,825 establishments in operation at some stage in the period in question; this is, of course, in addition to those who were not covered by the Census at any stage because they had less than 3 persons engaged or operated for only a very brief period.

In Table 4, establishments are classified according to their size (in terms of number of persons engaged) in 1979 and in 1985, showing also the number of firms which (a) closed and (b) started-up over the period. In this and all later tables (except Appendices 2 and 12), all cases classified as non-attributable in the CIP (i.e., one return covering several establishments) have been counted as one establishment in the size category appropriate to the overall total number of persons engaged in the combined establishments concerned. In 1985, the total number of such cases in Manufacturing Industry was nine and their total employment amounted to 1,326.

Table 4: Establishments In Manufacturing Industry Classified by Number of Persons Engaged In 1979 and 1985

Number of persons engaged, Sept. 1979	Number of persons engaged, September 1985									Total 1985 CIP	Closed pre-1985	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	96	88	20	2	1	-	-	-	-	207	297	504
5 - 9	131	324	132	15	10	3	-	-	-	615	379	994
10 - 19	34	158	381	100	40	13	3	-	-	729	354	1,083
20 - 29	5	14	102	105	62	13	5	1	-	307	133	440
30 - 49	7	13	50	81	145	60	11	-	-	367	146	513
50 - 99	5	-	10	16	89	179	43	2	-	344	132	476
100 - 199	8	-	2	3	4	68	115	15	2	217	95	312
200 - 499	3	-	1	1	-	5	34	72	3	119	48	167
500+	2	-	-	-	-	-	1	18	25	46	7	53
Total 1979 CIP	291	597	698	323	351	341	212	108	30	2,951	1,591	4,542
Started Post 1979	308	559	396	107	117	86	49	27	3	1,652	631	2,283
Total	599	1,156	1,094	430	468	427	261	135	33	4,603	2,222	6,825

It is evident from Table 4 that, among all but the very smallest establishments, far more of those which survived from 1979 to 1985 contracted in size rather than expanded. The closure rate was highest for the small establishments, being 59 per cent for those with under 5 persons in 1979 and 38 per cent for those with 5-9 persons while the overall closure rate was 35 per cent. O'Farrells (1985) study based on IDA files, identified some 1,000 closures in the 1973 - 1981 period but this excluded establishments in the Dublin region responsible for some 8,350 job losses which could have added approximately 500 further establishments to his figures. The levels found are, therefore, broadly similar and no implication can be drawn from the somewhat greater average number of closures shown by the present study as the definition of a closure is not identical.

The summary provided in Table 4 is, of course, influenced by the choice of size-groups. In Appendix 4, therefore, establishments in each size-group in

1979 which survived to 1985 are classified in terms of the size of the absolute level of their employment change. This shows that of the 4,542 establishments included in the 1979 CIP, some 1,591 had closed by 1985, 1,518 had contracted in size and 1,433 had expanded or remained unchanged. Thus, 68 per cent of the total had either ceased or contracted over the period and this proportion increased with the size of firm. This is explained to some extent of course by the fact that the 1979 CIP includes some establishments which planned to increase but which were included at an early stage of their development.

The year-on-year changes in the number of establishments can also be looked at in a very simplified manner by examining the "births" and "deaths" in each year as is done in Table 5.

Table 5: Change In Number of Establishments In Manufacturing Industry in Each Year, 1979-1985

Number of Establishments	Year					
	1980	1981	1982	1983	1984	1985
Previous year	4,542	4,834	5,031	5,075	5,002	4,767
Start-ups †	592	495	418	374	272	299
Closures †	300	298	374	447	507	463
Current year	4,834	5,031	5,075	5,002	4,767	4,603

† See footnote to Table 3.

This table shows that start-ups were at a much higher level in 1980 than in any following year whereas closures were more prevalent in the later years. It also shows that the relatively static overall number of establishments included in the Census each year masks considerably volatility. A more detailed analysis of these changes, incorporating changes within size-groups, is given in Appendices 5-10 for each of the periods in question. The overall picture which emerges from these tables is summarised in Appendix 11.

One of the features of Appendix 11 is the stability of many of the constituent figures. For example:

- about 100 establishments in the under 20 size group move to a higher group each year;
- about 50 establishments in the 20-49 size-group move to a higher group annually;
- the number of start-ups in the 100 and over size-group total about 9 each year.

Other interesting features are:

(a) the vast majority of start-ups are in the under-20 size-group and it is a fall-off in start-ups of this size which has affected overall levels of start-up; the numbers starting in other size groups levelled off in 1982 (for the 10-49 size-group) and in 1981 (for the 50-99 size-group);

(b) 1983 was a particularly bad year in terms of the numbers of establishments declining in size whereas closures in all size-groups reached a peak in 1984.

Sectoral Structure Changes, 1975-1985

The broad sectoral employment structure of industry is given in Appendix 12 for the years 1975, 1980 and 1985. The proportion of employment, gross output and net output accounted for by establishments in four broad size groups are distinguished. Allowance must again be made here for the effect of the extended coverage of the 1980 and 1985 Censuses. This has greatest effect in the smaller size groups (especially the under 20 persons engaged group) and in the *Metals and Engineering, Food, Clothing, Timber and Miscellaneous* sectors.

Among the more interesting features of Appendix 12 are:

(a) The decline in relative importance of larger establishments in terms of employment is particularly apparent in the more traditional sectors but especially in *Food, Clothing*, etc., *Timber* and *Paper and Printing.* The *Chemicals* sector went against this trend with employment in the 200 and over size group accounting for just over half of all employment in 1985 as compared with 45 per cent in 1975.

(b) The proportion of gross output and net output accounted for by large establishments generally declined roughly in line with the proportion of employment in those size group. However, the larger groupings became relatively more important in *Chemicals, Metals and Engineering* and *Non-Metallic Mineral Products.*

3. EMPLOYMENT CHANGES

Employment change, 1979-1985

The preceding sections have outlined the main features of industrial structure over recent years and have shown some of the changes in establishment size, as measured by total employment, underlying those structures. The following section illustrates in more detail the changes which have occurred.

Gross employment change between any two periods is made up of:

- expansion in employment in existing establishments;
- contraction in employment in existing establishments;
- start-ups and closures.

These are, of course, further effects which are masked by the Census measures at September each year, e.g., lay-offs followed by re-employment within a year, replacement of persons retiring, etc. However, it is still possible to see the factors underlying the net changes at an aggregate level. The situation for Manufacturing Industry as a whole is shown in Table 6.

Table 6: Employment Change in Manufacturing Industry in Each Year, 1979-1985

Components of Change	1980	1981	1982	1983	1984	1985
Total Previous September	**228,199**	**226,800**	**223,393**	**214,424**	**202,637**	**195,992**
Additions						
+ new establishments	7,706	6,709	5,683	5,977	5,411	5,050
+ expansions in existing establishments	13,938	12,711	11,224	11,108	12,731	11,043
Reductions						
- closures	5,303	5,663	5,889	7,769	9,270	8,762
- contractions in existing establishments	17,740	17,164	19,987	21,103	15,517	16,024
Total Current September	**226,800**	**223,393**	**214,424**	**202,637**	**195,992**	**187,299**

The most striking aspect of this table is the contribution to the overall decline in employment levels of decreases in existing establishments. In each of the years 1979 to 1985 this figure was in excess of 15,000 and was particularly high in 1982 and 1983 at 20,000 and 21,100, respectively. In these years, in particular, jobs lost in such establishments considerably exceeded those gained in expanding establishments.

The impact of closures was more pronounced in 1984 and 1985 than earlier in the period while jobs in new establishments fell slightly from over 7,000 in 1980 to be in the range 5,000-6,000 in 1982-'85. As a result, therefore, jobs in new establishments exceeded losses caused by closures in both 1980 and 1981 but the reverse situation obtained in each of the following years.

As many of the establishments with contracting employment on an annual basis would later have closed, it is of interest to look at the figures for the overall 6-year span to eliminate the effect of year-on-year changes. The 1979-'85 change is summarised in Table 7.

Table 7: Employment Change in Manufacturing Industry, 1979-1985

Components of Change	Persons Engaged
Total Employment - September 1979	**228,199**
Additions	
+ new establishments (1985 employment)	38,974
+ expansions in existing establishments	20,284
Reductions	
- closures (1979 employment)	60,022
- contractions in existing establishments	40,136
Total Employment - September 1985	**187,299**

Comparison with O'Farrell, (1985) data for the 1973-1981 period shows that, while closures and contractions (at 60,000 and 40,000 over a six-year period as compared with 45,000 and 36,000 over an eight-year period) were more significant over the period of this study, new firms and increases did not make as important a contribution to employment growth (39,000 and 20,000, respectively, in the period under review as compared with 58,000 and 35,000 in the earlier longer period). Each of these factors contributed, therefore, to a decline in manufacturing employment over the period studied as compared with an increase in the 1973-'81 period.

It is also interesting to examine the effect of these changes on male and female employment levels. Table 8 below summarises the situation:

Table 8: Employment Change For Males And Females In Manufacturing Industry 1979-1985

Components of Change	Persons Engaged	
	Males	Females
Total Employment - September 1979	**161,800**	**66,399**
Additions		
+ new establishments (1985 employment)	25,366	13,608
+ expansions in existing establishments	12,092	8,192
Reductions		
- closures (1979 employment)	42,384	17,638
- contractions in existing establishments	27,290	12,846
Total Employment - September 1985	**129,584**	**57,715**

It is clear from this table that, relative to 1979 levels, female employment benefited proportionately more from the opening of new establishments and especially from increased employment in expanding ones. The effect of closures and of losses in contracting establishments relative to 1979 levels was roughly similar for males and females but this, of course, means that more than twice as many male jobs were lost over the period.

Employment Change Categories

To analyse the situation further, the establishments existing in 1979 have been divided into four broad categories based on the change in their overall employment levels between 1979 and 1985. The categories used are:

(i) **Expanded Employment:** These are establishments where employment increased by 13% or more 1979–1985 (i.e. approx. 2% p.a. on average);

(ii) **Contracted Employment:** These are establishments where employment decreased by 13% or more 1979–1985 (i.e. approx. 2% p.a. on average);

(iii) **Stable Employment:** All other establishments.

The breakdown of four size groups in 1979 into these categories and the resulting employment totals for each category in the following years are shown in Table 9.

Some of the interesting features of this table are:

(i) 970 establishments out of a total of 4,542 included in 1979 are classified in the 'expanded' category and contributed almost 20,000 extra jobs over the period 1979–1985;

(ii) 625 (or 24 per cent of the 1979 total) establishments in the under 20 persons engaged size-group were in the 'expanded' category and accounted for 5,000 extra jobs as compared with 204 (21 per cent of the 1979 total) establishments in the 20–49 size-group accounting for 4,800 extra jobs, 78 (or 16 per cent) in the 50–99 size group (3,000 extra jobs) and 63 (12 per cent) in the 100+ size group (6,500 extra jobs);

(iii) the vast majority of jobs lost over the period were in establishments with 100 or more persons engaged in 1979 with 150 of those which closed in the period having had employment of 33,500 in 1979 and a further 219 which are classified to the 'declining' category showing a reduction of 27,300 in employment;

(iv) closures in other size-groups resulted in the loss of 1,030 establishments in the under 20 size group (employment of 8,500 in 1979), 279 in the 20–49 group (8,700 jobs) and 132 in the 50–99 group (9,300 jobs);

(v) there is a consistent pattern of new firms which remain in existence for some years continuing to grow for at least their first four years with growth being particularly strong, as would be expected, in the first year.

Table 9: Employment in Manufacturing Industry in Establishments Classified by Employment Change and Size Group, 1979-1985

Size category in Sept. 1979	Employment change category	Number of estabs.	Total employment (September)						
			1979	1980	1981	1982	1983	1984	1985
Under 20	Expanded	625	5,404	6,661	7,511	8,221	8,981	9,827	10,401
	Stable	361	3,652	3,773	3,845	3,809	3,726	3,683	3,642
	Contracted	565	6,104	5,811	5,611	5,263	4,821	4,265	3,725
	Closed pre-1985	1,030	8,490	7,030	5,690	4,126	2,561	1,116	-
20 - 49	Expanded	204	6,293	7,307	8,282	8,735	9,377	10,327	11,115
	Stable	158	4,961	4,987	4,971	4,937	4,851	4,922	4,911
	Contracted	312	10,102	9,413	8,952	8,531	7,557	6,728	5,864
	Closed pre-1985	279	8,676	7,179	5,673	3,596	1,844	605	-
50 - 99	Expanded	78	5,300	6,048	6,572	6,986	7,623	8,145	8,317
	Stable	102	7,247	7,360	7,297	7,178	6,993	6,883	7,215
	Contracted	164	11,721	10,755	10,257	9,435	8,725	7,908	7,001
	Closed pre-1985	132	9,316	7,829	5,594	3,775	2,237	573	-
100 +	Expanded	63	11,823	13,126	14,361	15,529	16,402	17,445	18,293
	Stable	100	29,887	30,850	31,153	31,007	30,129	30,110	29,426
	Contracted	219	65,683	62,483	58,152	52,702	46,926	44,210	38,415
	Closed pre-1985	150	33,540	28,482	23,656	17,852	11,381	4,186	-
Total 1979	Expanded	970	28,820	33,142	36,726	39,471	42,383	45,744	48,126
	Stable	721	45,747	46,970	47,266	46,931	45,699	45,598	45,194
	Contracted	1,260	93,610	88,462	82,972	75,931	68,029	63,111	55,005
	Closed pre-1985	1,591	60,022	50,520	40,613	29,349	18,023	6,480	-
Started post-1979 and still in 1985									
	1980 starts	360	-	5,187	6,523	7,564	8,330	8,831	8,734
	1981 starts	297	-	-	4,697	6,065	6,671	7,436	7,632
	1982 starts	277	-	-	-	3,989	4,611	5,547	5,813
	1983 starts	260	-	-	-	-	5,118	6,240	6,647
	1984 starts	204	-	-	-	-	-	4,723	5,649
	1985 starts	254	-	-	-	-	-	-	4,499
Started post-1979 and ceased pre-1985		631	-	2,519	4,596	5,124	3,773	2,282	-

4. OUTPUT AND EMPLOYMENT

Output Change, 1979–1985

In this section some of the components of output change and, in particular, the relationship between output and employment, are examined. In the first instance, it is of interest to examine the elements which made up the increase in output in value terms over the period. Between 1979 and 1985, the value of gross output increased from £6,896.8m. to £14,434.9m., i.e. an increase of 109.3 per cent. An overall picture of the contribution of various types of firms to this change is given in Table 10.

Table 10: Contribution of Establishments in Various Size Groups to Output Change, 1979–1985

Type of Establishment	Value of gross output		Change 1979–1985	
	1979	1985	Amount	Percent
	£m.	£m.	£m.	%
Establishments existing in 1979 and 1985:				
Size in 1979:				
Under 20	354.4	884.0	+ 529.6	+ 149.4
0 – 49	595.0	1,288.8	+ 693.8	+ 116.6
50 – 99	849.6	1,882.6	+ 1,033.0	+ 121.6
100+	3,699.9	7,346.5	+ 3,646.6	+ 98.6
Total	5,498.9	11,401.9	+ 5,903.0	+ 107.3
Ceased pre–1985	1,397.9	–	– 1,397.9	
Total in establishments existing in 1979	**6,896.8**	**11,401.9**	**+ 4,505.1**	**+ 65.3**
Start–up post 1979	–	3,033.1	+ 3,033.1	
All establishments	**6,896.8**	**14,434.9**	**7,538.1**	**+ 109.3**

The increase in output was particularly impressive for establishments which were in the under 20 size group in 1979. These increased the value of their output by almost 150 per cent as compared with an overall increase of 107 per cent for those establishments which existed throughout the 1979–'85 period. Establishments in the 100 and over size group in 1979 had the lowest growth rate; the value of their output in 1985 being just under twice the 1979 level.

Output Change Categories

To look more closely at output change and its relationship to employment change, output change for each establishment must be expressed in volume terms to eliminate the effect of price changes. The facility to derive individual measures of change in the volume of output for each establishment was not available. For each NACE 3-digit sector, therefore, the change in the value of gross output for each establishment in that sector was deflated by the price change obtained for the sector as a whole which is available from of the calculation process used in deriving annual volume of production indices from the CIP. Essentially, this uses the information on the value and volume of each product manufactured to derive a Fisher-type price index for successive years.

In this manner, a deflator applied to the gross output of each establishment in each year (except the first) for which it is on the data base. A measure of volume change was obtained in this manner and establishments have been classified to the following output performance categories using that measure:

(i) **Increased Production**: These are establishments where the volume of output increased by 13% or more over the period (i.e. approx. 2% p.a. on average);

(ii) **Reduced Production**: These are establishments where the volume of output declined by 13% or more over the period (i.e. approx. 2% p.a. on average);

(iii) **Stable Production**: All other establishments.

This method of applying a general sectoral deflator to each establishment within the sector must inevitably lead to a small number of establishments being incorrectly classified because the trend in the price of their products differs markedly from the norm for the industry. However, examination of the results for larger firms has shown few serious problems in this regard.

In Table 11, establishments in various size groups are classified according to their output performance and their contribution to total output.

Table 11 illustrates the impact on overall gross output levels of establishments classified to the different growth categories identified. A total of 1,252 establishments which existed in 1979 are classified to the "increasing output" category and these account for almost £5,000m. of the overall increase of £7,500m. in gross output over the 1979-'85 period. Within this category, the 138 establishments who were in the 100+ size group in 1979 were responsible for £2,850m. of the increased output. Establishments which ceased before 1985 contributed £1,400m. (or 20 per cent of the total) to gross output in 1979.

Table 11: Value of Gross Output in Establishments in Manufacturing Industry Classified by Size Group in 1979 and Output Performance Category

Size category in 1979	Output Performance category (constant prices	Number of estabs.	Value of gross output (at current prices £m) 1979	1980	1981	1982	1983	1984	1985
Under 20	Increased	715	166.8	228.9	307.8	386.6	470.1	576.3	657.4
	Stable	253	54.3	59.0	70.7	72.8	87.7	90.1	91.3
	Reduced	583	133.2	140.0	153.6	159.1	151.5	153.4	135.3
	Ceased pre-1985	1,030	162.6	142.3	123.2	93.9	62.8	30.3	-
20 - 49	Increased	266	254.1	348.1	440.6	521.0	617.7	750.3	868.8
	Stable	134	123.1	132.6	152.2	166.5	185.6	192.2	199.8
	Reduced	274	217.9	225.6	245.2	243.3	241.3	232.2	220.2
	Ceased pre-1985	279	185.4	162.1	143.3	95.0	55.8	18.3	-
50 - 99	Increased	133	411.9	535.5	638.7	746.3	943.3	1,069.0	1,328.7
	Stable	70	159.9	169.7	194.8	209.6	233.0	255.9	256.0
	Reduced	141	277.8	292.1	308.2	319.1	309.3	309.9	297.8
	Ceased pre-1985	132	222.2	189.7	190.6	156.3	103.0	32.3	-
100+	Increased	138	1,412.9	1,678.7	2,058.2	2,459.4	3,223.2	4,016.0	4,273.2
	Stable	88	902.3	929.6	1,037.2	1,161.2	1,225.1	1,482.0	1,538.3
	Reduced	156	1,384.7	1,493.6	1,524.1	1,517.3	1,608.0	1,689.0	1,535.0
	Ceased pre-1985	150	827.5	812.6	782.3	644.2	513.9	220.3	-
Total 1979	Increased	1,252	2,245.7	2,791.2	3,445.2	4,113.4	5,254.3	6,411.6	7,128.2
	Stable	545	1,239.5	1,290.9	1,454.9	1,610.1	1,731.3	2,020.2	2,085.4
	Reduced	1,154	2,013.7	2,151.3	2,231.1	2,238.8	2,310.0	2,384.6	2,188.3
	Ceased pre-1985	1,591	1,397.9	1,306.6	1,239.4	989.5	735.4	301.1	-
Started post-1979 and still in 1985									
	1980 starts	360	-	141.8	284.0	423.4	593.9	762.9	790.4
	1981 starts	297	-	-	194.1	327.3	519.4	646.6	739.0
	1982 starts	277	-	-	-	178.8	307.3	411.1	460.8
	1983 starts	260	-	-	-	-	167.6	362.1	396.2
	1984 starts	204	-	-	-	-	-	243.0	403.3
	1985 starts	254	-	-	-	-	-	-	243.4
Started post-1979 and ceased pre-1985		631	-	52.1	151.4	189.8	179.5	88.9	-

Inter-Relationship of Output and Employment Changes

The most interesting feature of these different growth categories of establishments is their inter-relationship with employment changes. To analyse this, output performance and employment performance are cross-classified in Table 12 for these establishments which were in production over the whole of the period 1979-1985.

This table has quite a number of interesting features. It should be noted initially that, of the 100 establishments who surprisingly fall into the 'reduced output/employment expanded' category, only 5 are in the 100+ size group and the vast majority are very small establishments whose employment growth in aggregate only amounts to a few hundred. This grouping is therefore, insignificant. Many may be in this category here either because of the inappropriate use of a general deflator or because of some special feature affecting the years in question.

Table 12: Employment Trends in Establishments in Manufacturing Industry Classified by Size Category and Output Performance 1979-1985

Size Group 1979	Output Performance category[1]	Employment Performance[1]								
		Expanded			Stable			Contracted		
		No. of Estabs.	1979 emp.	1985 emp.	No. of Estabs.	1979 emp.	1985 emp.	No. of Estabs.	1979 emp.	1985 emp.
Under 20	Increased	465	4,036	8,452	136	1,421	1,418	114	1,185	859
	Stable	87	768	1,106	79	791	796	87	908	627
	Reduced	73	600	843	146	1,440	1,428	364	4,011	2,239
20 - 49	Increased	149	4,680	8,772	70	2,237	2,246	47	1,572	1,045
	Stable	40	1,168	1,663	49	1,542	1,506	45	1,439	960
	Reduced	15	445	680	39	1,182	1,159	220	7,091	3,859
50 - 99	Increased	60	4,033	6,621	39	2,850	2,909	34	2,527	1,784
	Stable	11	738	992	35	2,569	2,521	24	1,718	1,179
	Reduced	7	529	704	.28	1,828	1,785	106	7,476	4,038
100+	Increased	53	10,160	16,032	47	12,820	12,704	38	11,627	8,049
	Stable	5	695	927	34	13,694	13,393	49	16,259	11,435
	Reduced	5	968	1,334	19	3,373	3,329	132	37,797	18,931
Total	Increased	727	22,909	39,877	292	19,328	19,277	233	16,911	11,737
	Stable	143	3,369	4,688	197	18,596	18,216	205	20,324	14,201
	Reduced	100	2,542	3,561	232	7,823	7,701	822	56,375	29,067

(1) See definitions

The most interesting feature to note is that there were 727 establishments who were classified as showing increased output and expanded employment. These establishments contributed 17,000 extra jobs over the period. The 53 establishments of this type in the 100+ size group were responsible for 5,900 of these jobs.

There were also, however, a total of 233 establishments in the increased output/contracted employment category and these showed an aggregate decline in employment over the period of 5,200. In particular, 38 of these establishments in the 100+ size group showed a fall in employment of 3,600. A further 205 establishments, whose employment fell by 6,100 over the period, maintained stable output in conjunction with that decline in employment.

Table 13 shows, for establishments classified in the same manner as in Table 12, the contribution of these various categories of firms to overall gross output using current output values and also converting 1985 output values to 1979 levels (converted using the deflation methodology outlined earlier).

It is clear from Table 13 that the establishments in the increased output category which produced the greatest increases in their level of output were those in the expanded and stable employment groupings. The value of output of the 727 establishments in the increasing output/expanded employment category increased by £2,671m. in current values from £1,005m. while the 292 establishments with increasing output and stable employment added £1,415m. to their 1979 output level of £666m. In each case, the increase at constant prices was just over 100 per cent.

In the case of the 233 establishments which showed declines in employment in comparison to increasing output, the real increase in output was, as one would expect, a more modest 50 per cent.

Table 13: Gross Output Trends in Establishments in Manufacturing Industry Classified by Size Category and Output Performance, 1979–1985

Size Group 1979	Output Performance category	Employment Performance: Expanded Estabs.	Expanded 1979 GO	Expanded 1985 GO[1]	Stable Estabs.	Stable 1979 GO	Stable 1985 GO[1]	Contracted Estabs.	Contracted 1979 GO	Contracted 1985 GO[1]
		No.	£m.	£m.	No.	£m.	£m.	No.	£m.	£m.
Under 20	Increased	465	112.64	518.37 (311.89)	136	24.45	66.34 (40.51)	114	29.61	72.71 (45.56)
	Stable	87	20.88	35.84 (20.92)	79	18.51	30.98 (19.03)	87	14.89	24.50 (14.30)
	Reduced	73	30.94	33.38 (18.13)	146	33.31	40.67 (22.43)	364	68.99	61.22 (33.99)
20-49	Increased	149	149.02	608.02 (358.34	70	57.48	139.17 (83.94)	47	47.57	121.64 (73.87)
	Stable	40	40.73	66.47 (40.24	49	34.00	57.71 (33.51)	45	48.34	75.57 (47.36)
	Reduced	15	16.57	18.25 (11.13)	30	40.21	43.63 (24.34)	220	161.11	158.34 (87.30)
50-99	Increased	60	223.10	853.88 (504.34)	39	94.85	247.11 (150.32)	34	93.96	227.74 (142.02)
	Stable	11	50.61	73.28 (46.56)	35	69.45	116.24 (68.94)	24	39.80	66.53 (38.96)
	Reduced	7	29.75	34.31 (16.91)	28	49.53	56.99 (31.94)	106	198.55	206.52 (121.19)
100+	Increased	53	520.30	1,696.18 (1,025.14)	47	488.80	1,627.47 (1,088.38)	38	403.81	949.53 (591.06)
	Stable	5	63.99	93.37 (63.22)	34	307.58	574.52 (316.52)	49	530.73	870.40 (516.50)
	Reduced	5	117.86	126.35 (65.98)	19	295.19	436.69 (206.10)	132	971.68	971.96 (562.50)
Total	Increased	727	1,005.06	3,676.45 (2,199.71)	292	665.57	2,080.09 (1,363.14)	233	547.94	1,371.62 (852.50)
	Stable	143	176.21	268.96 (173.94)	197	429.54	779.45 (437.99)	205	633.76	1,037.00 (617.12)
	Reduced	100	195.12	212.29 (112.15)	232	418.24	577.97 (284.82)	822	1,400.33	1,398.05 (804.98)

[1] At constant 1979 values in brackets

5. OTHER FACTORS

Sectoral Trends

The developments in employment and output at the overall level outlined in the preceding sections are now examined with regard to their effect in different industrial sectors. The change in employment in these sectors is shown in Table 14. The establishments which were in existence in 1979 have in all cases been classified to their NACE sector in that year. For this reason, the 1985 employment totals for sectors differ slightly from the published results for 1985 which are based on 1985 activity classifications.

Table 14: Employment Change in Major Industrial Sectors, 1979–1985

Industrial Sector	Employment					
	Total Sept. 1979	Additions		Reductions		Total Sept. 1985
		New Estabs. (1985 employment)	Expansions in existing estabs.	Closure (1979 employment)	Contractions in existing estabs.	
Non-Metallic Mineral Products	15,749	2,219	795	2,889	3,302	12,572
Chemicals	11,793	3,145	1,351	1,781	2,791	11,717
of which:						
Pharmaceuticals	2,851	753	1,019	145	200	4,278
Other	8,942	2,392	332	1,636	2,591	7,439
Metals and Engineering	63,380	17,239	7,384	19,046	10,598	58,359
of which:						
Office and DP, Electrical and Instrument Engineering	23,238	9,929	4,962	4,003	4,609	29,517
Other	40,142	7,310	2,422	15,043	5,989	28,842
Food	49,273	4,144	4,494	10,673	7,991	39,247
Drink and Tobacco	10,228	383	501	622	2,636	7,854
Textile Industry	18,416	1,165	825	5,028	4,293	11,085
Clothing, etc.	21,755	4,171	1,875	9,775	2,903	15,123
Timber	9,797	2,362	965	3,218	1,944	7,962
Paper and Printing	16,600	1,240	1,013	3,385	2,246	13,222
Miscellaneous	11,208	2,906	1,018	3,605	1,432	10,158
Manufacturing Industries	228,199	38,974	20,284	60,022	40,136	187,299

As would be expected, the contribution of new establishments to employment growth is particularly strong in the *Office and DP, Electrical and Instrument Engineering* sector (9,900 from a 1979 base of 23,200) and in *Chemicals* (3,100 from 11,800 in 1979). There is also a more surprising contribution from new establishments in the *Clothing* and *Timber* sectors as well as 2,900 new jobs in *Miscellaneous Industries* from a 1979 base of 11,200. Increases in employment in existing establishments are particularly obvious in *Pharmaceuticals* as well as in the *Office and DP,* etc. sector.

On the other hand, closures have had a particularly strong effect on employment in the *Other Metals and Engineering Sector* (15,000 out of 40,100 in 1979) and in *Clothing* (9,800 out of 21,800) while decreases in existing establishments have had a major influence on declines in *Chemicals* (excl. *Pharmaceuticals*) (2,600 from a 1979 level of 8,900), *Drink and Tobacco* (2,600 from 10,200) and *Textiles* (2,600 from 10,200).

In the context of employment and output change, it is of particular interest to look at establishments which fall into the category of increasing output with variable employment effects. These are classified by sector in Table 15.

Table 15 shows that, of the 17,000 jobs added by establishments classified to this increasing output category, 4,800 came from the *Office and DP, Electrical and Instrument Engineering* sector while 3,500 were added in the *Food* sector and 1,500 in *Clothing,* etc.

Of the 233 establishments who were classified to this category but who accounted for an overall loss of 5,200 jobs, the most significant sector involved was Food where 74 such firms lost 2,200 jobs. This suggests that this is an area where there have been particularly severe cutbacks in employment due to rationalisation accompanied by continued output growth.

Table 15: Employment Trends in Major Industrial Sectors of Establishments Classified to the 'increased Production' Category(1)

Industrial Sector	Employment Performance								
	Expanded			Stable			Contracted		
	No. of Estabs.	1979 emp.	1985 emp.	No. of Estabs.	1979 emp.	1985 emp.	No. of Estabs.	1979 emp.	1985 emp.
Non-Metallic Mineral Products	39	1,072	1,578	14	921	937	16	895	583
Chemicals	35	1,409	2,557	13	1,613	1,655	13	1,536	779
of which:									
Pharmaceuticals	19	1,072	2,011	4	420	444	3	434	320
Other	16	337	546	9	1,193	1,211	10	1,102	459
Metals and Engineering	197	7,898	14,647	48	6,020	5,911	52	3,060	2,202
of which:									
Office and DP, Electrical and Instrument Engineering	56	5,187	10,002	18	3,735	3,681	12	767	580
Other	141	2,711	4,645	30	2,285	2,230	40	2,293	1,622
Food	144	4,911	8,397	67	4,512	4,495	74	7,619	5,375
Drink and Tobacco	10	510	884	9	929	924	10	635	415
Textile Industry	38	1,293	1,983	17	1,090	1,093	8	680	502
Clothing, etc.	69	2,046	3,596	30	1,808	1,820	15	605	464
Timber	75	859	1,659	28	309	303	18	317	250
Paper and Printing	74	1,377	2,204	40	1,349	1,356	18	1,172	879
Miscellaneous	46	1,534	2,372	26	777	783	9	392	288
Manufacturing Industries	**727**	**22,909**	**39,877**	**292**	**19,328**	**19,277**	**233**	**16,911**	**11,737**

(1) See definitions

Nationality of Ownership

In view of the interest in the contribution of foreign owned industrial firms to the economy, analyses by ownership are of particular interest. For purposes of this section of the paper, the following nationality categories are distinguished:

- Irish (incl. establishments not classified);
- Total Foreign;
- United Kingdom;
- Other EC Countries;
- United States;
- Other Non-EC Countries.

The classification used is that relating to the latest year for which an establishment appears. For establishments which ceased in 1982 or earlier, the classification is that recorded in 1988 on the IDA's records. Information from CSO inquiries was also used in some instances.

Employment changes in each of these categories are shown in Appendix 13. The overall situation is summarised in Table 16.

Table 16: Employment Change in Manufacturing Industry, 1979 - 1985, Classified by Nationality of Ownership

Components of Change	Irish (incl. not classified)	Foreign
Total Employment - September 1979	**148,458**	**79,741**
Additions		
+ new establishments (1985 employment)	19,128	19,846
+ expansions in existing establishments	10,974	9,310
Reductions		
- closures (1979 employment)	43,251	16,771
- contractions in existing establishments	24,299	15,837
Total Employment - September 1985	111,010	**76,289**

Some of the principal points illustrated by this table are:

(i) the proportion of total employment in Irish-owned establishments fell from 65 per cent in 1979 to 59 per cent in 1985; this was a consequence of a net decrease of 37,400 (25 per cent) in the Irish owned sector as compared with a decrease of only 3,500 (4 per cent) for foreign owned establishments;

(ii) Irish owned establishments accounted for a slightly greater proportion of the increase in employment generated by expanding establishments while the reverse situation obtained in the case of new establishments;

(iii) losses due to closures were much more significant over the 1979-1985 period in the case of Irish owned establishments (these accounted for a loss of 43,300 jobs as compared with 16,800 in the case of foreign owned establishments);

(iv) losses in contracting Irish establishments were also greater over the period (24,300 as compared with 15,800).

The more detailed figures given in Appendix 13 show that the contribution of US owned establishments in terms of increased jobs was particularly strong, running at 12,200 from start-ups and at 4,700 from expansions, although the latter was more than offset by losses of 6,300 jobs in contracting establishments. The effect of contractions in UK firms, at 5,300, was not offset to the same extent by expansions, which contributed only 800 jobs. The effect of closures was also very significant in the case of ownership in other EC Countries.

It is also of interest, in this instance, to examine the employment performance of establishments in the various output growth category distinguished earlier. This is done for each nationality of ownership category in Table 17.

It is of particular interest to note that there were 587 Irish owned establishments classified to the 'increased output/expanded employment' category and that these contributed 8,600 jobs over the period. The contribution of foreign owned establishments in the same category was broadly similar at 8,400 but the number of establishments involved, at 140, was much less.

On the other hand, establishments which were classified as 'reduced output/contracted employment' showed a loss of 16,700 jobs in the case of the 692 which were Irish owned as compared with 10,700 in the case of the 130 which were foreign owned.

Table 17: Employment Trends in Establishments in Manufacturing Industry Classified by Nationality of Ownership and Output Performance, 1979–1985

Output Performance category	Nationality of Ownership	Employment Performance: Expanded			Stable			Contracted		
		No. of Estabs.	1979 emp.	1985 emp.	No. of Estabs.	1979 emp.	1985 emp.	No. of Estabs.	1979 emp.	1985 emp.
Increased	Irish	587	11,698	20,311	243	11,402	11,387	195	10,104	7,000
	Foreign	140	11,211	19,566	49	7,926	7,890	38	6,807	4,737
	UK	25	962	1,636	5	434	420	18	3,595	2,614
	Other EC	34	2,971	5,283	15	862	868	6	418	220
	USA	59	5,304	9,440	20	5,048	5,051	11	2,483	1,695
	Other non-EC	22	1,974	3,207	9	1,582	1,551	3	311	208
	Total	727	22,909	39,877	292	19,328	19,277	233	16,911	11,737
Stable	Irish	131	2,974	4,149	166	13,975	13,674	177	11,969	8,516
	Foreign	12	395	539	31	4,621	4,542	28	8,355	5,685
	UK	5	232	313	11	1,344	1,313	7	4,126	2,690
	Other EC	3	92	122	6	1,350	1,291	6	1,526	1,045
	USA	4	71	104	7	1,056	1,062	12	2,260	1,669
	Other non-EC	–	–	–	7	871	876	3	443	281
	Total	143	3,369	4,688	197	18,596	18,216	205	20,324	14,201
Reduced	Irish	86	1,245	1,775	199	5,458	5,342	692	36,382	19,728
	Foreign	14	1,297	1,786	33	2,365	2,359	130	19,993	9,339
	UK	3	112	133	11	706	712	52	6,303	3,566
	Other EC	4	356	480	11	528	509	33	2,755	1,122
	USA	7	829	1,173	9	981	1,002	30	7,944	3,151
	Other non-EC	–	–	–	2	150	136	15	2,991	1,500
	Total	100	2,542	3,561	232	7,823	7,701	822	56,375	29,067
Total	Irish	804	15,917	26,235	608	30,835	30,403	1,064	58,455	35,244
	Foreign	166	12,903	21,891	113	14,912	14,791	196	35,155	19,761
	UK	33	1,306	2,082	27	2,484	2,445	77	14,024	8,870
	Other EC	41	3,419	5,885	32	2,740	2,668	45	4,699	2,387
	USA	70	6,204	10,717	36	7,085	7,115	53	12,687	6,515
	Other non-EC	22	1,974	3,207	18	2,603	2,563	21	3,745	1,989
	Total	970	28,820	48,126	721	45,747	45,194	1,260	93,610	55,005

IDA Grant Status

Information is also available on the data base on the IDA grant-status of each establishment. For the purposes of this paper, establishments are divided with IDA grant-aided, not IDA grant-aided and not classified. The classification used is that relating to the latest year for which an establishment appears. For establishments which ceased in 1982 or earlier, the classification is that recorded in 1988 on the IDA's records. Employment changes on this basis are shown in Table 18; for this purpose establishments which are not classified are excluded.

Table 18: Employment Change in Manufacturing Industry 1979-1985, Classified by Ida Grant-aided Status

Components of Change	IDA Grant-aided	Not Grant-aided
Total Employment - September 1979	**184,624**	**20,260**
Additions		
+ new establishments (1985 employment)	31,699	3,064
+ expansions in existing establishments	18,351	1,316
Reductions		
- closures (1979 employment)	37,177	8,026
- contraction in existing establishments	36,148	2,355
Total Employment - September 1985	**187,299**	**14,259**

As the vast majority of employment is accounted for by IDA grant-aided establishments analyses on this basis have not been pursued further in this paper.

Future Work

This paper has provided some initial analyses which have been made possible by the development of a new micro data base. It is hoped that, as a result, users of the information have been given a greater insight into the potential of this approach. It is the intention of the CSO to include some of these analyses, particularly those dealing with the components of year-on-year flows (i.e., start-ups, closures, etc.), in the annual detailed report on the Census of Industrial Production. It is also intended, of course, to expand the data base to include the CIP results for 1986, which has now been published, and later years as they become available. The possibility will also be explored of including estimates for the latest years by using information from the short-term industrial inquiries to update the last definitive annual estimates. This will only be possible for the major variables collected on a short-term basis, which, in particular, are employment and turnover.

There are a number of variables collected in the Census which have not been used in this paper. It might be of interest, for example, to examine employment flows on a regional basis or to look at the differing trends in establishments with different earnings levels.

Finally, the authors wish to acknowledge the contribution of CSO staff at all levels who have been involved in working on the Census of Industrial Production. It is they who deserve most of the credit for the substantial improvement in the timeliness of Census results which has been achieved during the past five years. We also want to take this opportunity to acknowledge the contribution made to this process by firms which co-operated on a timely basis with the Census and to thank the IDA for their assistance with information on nationality of ownership and grant-aided status.

Footnote

(1) 1985 is the latest year for which CIP results were available when preparation of this paper was undertaken; the results for 1986 are also now available.

References

Central Statistics Office annual, *Census of Industrial Production,* Dublin Stationery Office.

O'Farrell, P. 1985, *Entrepreneurs and Industrial Change : the Process of Change in Irish Manufacturing,* Dublin Irish Management Institute.

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Appendix 1: Definition of Variables

(i) **Gross Output**

Gross output represents the selling value of all goods manufactured in the year, whether sold or not, and the value of work done. Operating subsidies related to the production or sales of the output are included in the value of gross output while excise duties and VAT are excluded.

(ii) **Industrial Input**

This consists of the industrial materials, industrial services and fuel and power used in the production of the output.

(iii) **Net Output**

Net output is the difference between gross output and industrial input. It is a more appropriate measure than gross output of the relative economic importance of different firms or industrial sectors.

(iv) **Persons Engaged (in September each year)**

This total includes all employees, proprietors, etc., including persons temporarily absent because of illness, holidays, strikes, etc. Outside piece workers are excluded. The industrial establishment is defined so that the employment figures relate only to the industrial activity concerned i.e. persons directly engaged in the particular activity (i.e. operatives, apprentices, supervisors) and those providing support activity (i.e. managerial, clerical, transport, sales, etc. staff). Persons engaged in other business activities conducted by the enterprise at the same location (e.g. wholesaling of products not manufactured by the firm) and any own account workers employed on a contract or fee basis are excluded.

(v) **Classification by nationality of ownership and by type of IDA grant**

These classification variables are based on information provided to the CSO by the Industrial Development Authority (IDA). The classification by nationality is determined by the nationality of the owners of 50 per cent or more of the share capital. A number of small establishments, which were not classified in the earlier years covered in this paper, are included in the Irish owned category. Information from CSO inquiries has also been used in some instances for this classification. The classification by IDA grant type is determined by the IDA on the basis of the most recent major grant approval at the time of the relevant Census.

The classification used here for both of the above variables is that relating to the latest year for which the establishment is on file. For establishments which ceased before 1983, the classification is that recorded in 1988 for those establishments on the IDA's records. A special exercise was carried out, with the co-operation of the IDA, to determine the information for the latter establishments as they were not included in the 1983 CIP, which was the year for which these new classification were introduced in the CIP reports.

Appendix 2: Percentage Structure of Manufacturing Industry in 1975, 1980 and 1985

Size Group	Percentage Structure in 1975, 1980 and 1985			
No. of Persons Engaged	1975 [1]	1980 [2]	1980	1985
	Gross Output			
	%	%	%	%
Under 20	5.7	7.5	8.3	7.7
20 - 49	10.0	11.2	11.8	12.7
50 - 99	14.0	15.2	14.9	14.5
100 - 499	47.1	45.5	45.2	49.5
500 and over	23.2	19.6	18.9	15.1
Non-attributable	-(1)	1.0	1.0	0.5
Total	100.0	100.0	100.0	100.0
	Net Output			
Under 20	6.1	7.3	8.3	7.0
20 - 49	10.8	11.5	12.0	11.7
50 - 99	13.2	16.0	15.8	14.6
100 - 499	42.7	42.3	41.8	49.8
500 and over	27.1	21.7	20.9	16.4
Non-attributable	- (1)	1.2	1.2	0.5
Total	10.0	100.0	100.0	100.0
	Persons Engaged			
Under 20	7.9	10.0	11.5	13.2
20 - 49	12.5	12.9	13.4	15.1
50 - 99	14.9	14.8	14.7	15.7
100 - 499	40.0	38.9	38.3	40.0
500 and over	24.7	22.7	21.5	15.3
Non-attributable	- (1)	0.8	0.7	0.7
Total	100.0	100.0	100.0	100.0

(1) establishments classified as non-attributable in later years included in 1975 on basis of size of reporting group of establishments (all in larger size groups).

(2) on former basis i.e. comparable coverage with 1975.

Appendix 3: Effect of Structural Change on Productivity – Methodology

Let $e^i{}_y$ be the proportion of total employment in activity sector i in year y and let $o^i{}_y$ be gross output per employee in that year.

Then $\Sigma e_{85}{}^i\ o_{85}{}^i$ = gross output per employee in Manufacturing industry in 1985.

Thus the ratio of gross output per employee in 1985 to that in 1979 is

$$\frac{\Sigma e_{85}{}^i\ o_{85}{}^i}{\Sigma e_{79}{}^i\ o_{79}{}^i} \quad \text{and this can be expressed as} \quad \frac{\Sigma e_{79}{}^i\ o_{85}{}^i}{\Sigma e_{79}{}^i\ o_{79}{}^i} \cdot \frac{\Sigma e_{85}{}^i\ o_{85}{}^i}{\Sigma e_{79}{}^i\ o_{85}{}^i}.$$

$\dfrac{\Sigma e_{79}{}^i\ o_{85}{}^i}{\Sigma e_{79}{}^i\ o_{79}{}^i}$ is the ratio of gross output per employee if the employment structure of 1979 has remained fixed over the period. The structural change effect is, therefore given by $\dfrac{\Sigma e_{85}{}^i\ o_{85}{}^i}{\Sigma e_{79}{}^i\ o_{85}{}^i}$

In value terms, the overall increase in gross output between 1979 and 1985 was 109%, which was composed of an increase in output per person of 155% and a decrease of 18% in employment. On the basis of the crude methodology used, the structural element accounted for an increase of 9% with the underlying value change in output per person, therefore, being 134%. When reduced to volume terms, the structural element and the overall employment decrease will remain unchanged (as they are basically not affected by price changes) so that the overall increase in the volume of production of 30% can be seen to be made out of (i) an employment fall of 18%, (ii) an underlying increase in output per person of 45 per cent and (iii) a structural effect of 9 per cent. A more refined methodology which would introduce Net Output weights and use the "Fisher-ideal" approach actually used in the calculation of the annual volume indices derived from the CIP would undoubtedly give a somewhat different result but the above indicates the order of magnitude involved.

Appendix 4: Establishments in Manufacturing Industry Classified by Number of Persons Engaged in 1979 and by Change in Employment, 1979-1985

Increasing[1]

Size Category 1979	Magnitude of Increase (no. of persons)								
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100+	Total
Under 5	151	26	5	2	1	1	-	-	186
5 - 9	252	56	20	11	7	7	-	-	353
10 - 19	200	78	37	13	21	15	4	1	369
20 - 29	55	28	18	17	10	6	3	5	142
30 - 49	42	35	17	14	18	12	11	2	151
50 - 99	27	27	14	9	16	11	19	4	127
100 - 199	5	7	12	5	7	10	10	11	67
200 - 499	3	4	-	3	3	6	7	6	32
500+	-	1	-	-	1	-	1	3	6
Total	735	262	123	74	84	68	55	32	1,433

Decreasing

Size Category 1979	Magnitude of Increase (no. of persons)								
	Under 5	5-9	10-14	15-19	20-29	30-49	50-99	100+	Total
Under 5	21	-	-	-	-	-	-	-	21
5 - 9	243	19	-	-	-	-	-	-	262
10 - 19	185	128	44	3	-	-	-	-	360
20 - 29	52	60	27	20	6	-	-	-	165
30 - 49	32	48	52	27	37	20	-	-	216
50 - 99	30	29	22	27	44	48	17	-	217
100 - 199	8	12	10	7	27	30	37	19	150
200 - 499	2	3	3	1	7	4	30	37	87
500+	-	1	-	-	-	-	8	31	40
Total	573	300	158	85	121	102	92	87	1,518

[1] Includes unchanged

Appendix 5: Establishments in Manufacturing Industry Classified by Number of Persons Engaged in 1979 And 1980

Number of persons engaged, 1979	Number of persons engaged, 1980									Total 1980 CIP	Ceased pre-1980	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	2.93	06	83	5	-	2	-	-	-	396	108	504
5 - 9	88	698	111	5	-	-	-	-	-	902	92	994
10 - 19	14	89	839	73	19	2	-	-	-	1,036	47	1,083
20 - 29	-	4	81	291	48	3	-	-	-	427	13	440
30 - 49	6	3	10	65	365	45	1	-	-	495	18	513
50 - 99	5	1	4	4	53	362	34	-	-	463	13	476
100 - 199	9	-	-	-	1	43	239	13	-	305	7	312
200 - 499	2	-	1	-	2	1	21	130	8	165	2	167
500+	-	-	-	-	-	-	-	4	49	53	-	53
Total 1979 CIP	430	878	1,051	438	490	456	295	147	57	4,242	300	4,542
Started Post 1979	186	197	136	25	18	22	7	1	-	592		
Total	616	1,075	1,187	463	508	478	302	148	57	4,834		

Appendix 6: Establishments in Manufacturing Industry Classified by Number Of Persons Engaged in 1980 and 1981

Number of persons engaged, 1980	Number of persons engaged, 1981									Total 1981 CIP	Ceased pre-1981	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	394	100	14	2	1	2	3	-	-	**516**	100	**616**
5 - 9	69	815	117	3	-	1	-	-	-	**1,005**	70	**1,075**
10 - 19	9	112	898	83	13	1	-	-	-	**1,116**	71	**1,187**
20 - 29	4	7	82	288	63	5	-	-	-	**449**	14	**463**
30 - 49	7	-	19	51	366	48	2	-	-	**493**	15	**508**
50 - 99	11	1	1	8	51	353	35	-	-	**460**	18	**478**
100 - 199	8	-	-	-	1	39	233	12	-	**293**	9	**302**
200 - 499	3	-	-	-	-	-	16	125	3	**147**	1	**148**
500+	-	-	-	-	-	-	-	2	55	**57**	-	**57**
Total 1980 CIP	**505**	**1,035**	**1,131**	**435**	**495**	**449**	**289**	**139**	**58**	**4,536**	**298**	**4,834**
Started Post 1980	163	170	88	27	23	15	9	-	-	**495**		
Total	**668**	**1,205**	**1,219**	**462**	**518**	**464**	**298**	**139**	**58**	**5,031**		

Appendix 7: Establishments in Manufacturing Industry Classified by Number of Persons Engaged in 1981 and 1982

Number of persons engaged, 1981	Number of persons engaged, 1982									Total 1982 CIP	Ceased pre-1982	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	407	92	11	2	1	2	1	-	-	516	152	668
5 - 9	99	889	125	6	-	-	-	-	-	1,119	86	1,205
10 - 19	21	107	921	79	12	2	-	-	-	1,142	77	1,219
20 - 29	7	2	67	318	52	3	-	-	-	449	13	462
30 - 49	7	4	16	71	349	47	2	-	-	496	22	518
50 - 99	4	-	3	7	52	365	19	1	-	451	13	464
100 - 199	6	-	2	-	-	34	230	16	-	288	10	298
200 - 499	1	-	-	-	1	-	15	120	1	138	1	139
500+	-	-	-	-	1	-	-	10	47	58	-	58
Total 1981 CIP	**552**	**1,094**	**1,145**	**483**	**468**	**453**	**267**	**147**	**48**	**4,657**	**374**	**5,031**
Started Post 1981	133	140	97	13	12	16	6	1	-	418		
Total	**685**	**1,234**	**1,242**	**496**	**480**	**469**	**273**	**148**	**48**	**5,075**		

Appendix 8: Establishments in Manufacturing Industry Classified by Number of Persons Engaged in 1982 and 1983

Number of persons engaged, 1982	Number of persons engaged, 1983									Total 1983 CIP	Ceased pre-1983	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	419	104	11	-	3	-	-	-	-	537	148	685
5 - 9	95	899	117	1	-	1	-	-	-	1,113	121	1,234
10 - 19	20	144	886	75	19	4	1	-	-	1,149	93	1,242
20 - 29	14	6	95	287	66	2	-	-	-	470	26	496
30 - 49	14	4	21	59	310	43	2	-	-	453	27	480
50 - 99	8	2	2	6	61	348	23	1	-	451	18	469
100 - 199	3	2	-	1	2	38	208	9	-	263	10	273
200 - 499	2	-	1	-	-	1	24	113	3	144	4	148
500+	-	-	-	-	-	-	-	10	38	48	-	48
Total 1982 CIP	**575**	**1,161**	**1,133**	**429**	**461**	**437**	**258**	**133**	**41**	**4,628**	**447**	**5,075**
Started Post 1982	138	110	73	19	13	12	6	2	1	374		
Total	**713**	**1,271**	**1,206**	**448**	**474**	**449**	**264**	**135**	**42**	**5,002**		

Appendix 9: Establishments in Manufacturing Industry Classified by Number of Persons Engaged in 1983 and 1984

Number of persons engaged, 1983	Number of persons engaged, 1984									Total 1984 CIP	Ceased pre-1984	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	400	97	7	1	-	1	3	-	-	509	204	713
5 - 9	106	887	132	7	2	-	-	-	-	1,134	137	1,271
10 - 19	20	128	886	59	19	4	-	-	-	1,116	90	1,206
20 - 29	5	3	66	288	63	4	-	-	-	429	19	448
30 - 49	8	3	8	56	332	49	1	-	-	457	17	474
50 - 99	5	-	5	7	40	335	34	-	-	426	23	449
100 - 199	10	-	1	1	-	22	207	14	-	255	9	264
200 - 499	2	-	-	-	-	-	8	112	6	128	7	135
500+	-	-	-	-	-	-	-	5	36	41	1	42
Total 1983 CIP	556	1,118	1,105	419	456	415	253	131	42	4,495	507	5,002
Started Post 1983	82	73	62	17	12	14	8	4	-	272		
Total	638	1,191	1,167	436	468	429	261	135	42	4,767		

Appendix 10: Establishments In Manufacturing Industry Classified by Number of Persons Engaged In 1984 and 1985

Number of persons engaged, 1984	Number of persons engaged, 1985									Total 1985 CIP	Ceased pre-1985	Total
	Under 5	5-9	10-19	20-29	30-49	50-99	100-199	200-499	500+			
Under 5	357	94	11	-	1	1	-	-	-	464	174	638
5 - 9	104	839	97	4	1	-	-	-	-	1,045	146	1,191
10 - 19	19	115	866	64	13	2	-	-	-	1,079	88	1,167
20 - 29	10	3	52	292	67	-	-	-	-	424	12	436
30 - 49	5	-	9	51	335	56	-	-	-	456	12	468
50 - 99	8	-	4	4	34	330	32	-	-	412	17	429
100 - 199	6	-	-	-	1	26	209	14	-	256	5	261
200 - 499	2	-	-	1	-	-	13	110	1	127	8	135
500+	-	-	-	-	-	-	-	9	32	41	1	42
Total 1984 CIP	511	1,051	1,039	416	452	415	254	133	33	4,304	463	4,767
Started Post 1984	88	105	55	14	16	12	7	2	-	299		
Total	599	1,156	1,094	430	468	427	261	135	33	4,603		

Appendix 11: Change in Number of Establishments in Each Size Group in Manufacturing Industry in Each Year, 1979–1985

Size Group	Number of Establishments	Period 1980	1981	1982	1983	1984	1985
Under 20	**Previous year**	**2,581**	**2,878**	**3,092**	**3,161**	**3,190**	**2,996**
	Additions						
	+ start-ups	519	421	370	321	217	248
	+ from higher size group	126	143	119	174	116	99
	Reductions						
	- closures	247	241	315	362	431	408
	- to higher size group	101	109	105	104	96	86
	Current year	**2,878**	**3,092**	**3,161**	**3,190**	**2,996**	**2,849**
20–49	**Previous year**	**953**	**971**	**980**	**976**	**922**	**904**
	Additions						
	+ start-ups	43	50	25	32	29	30
	+ from higher size group	60	60	61	70	48	40
	+ from lower size group	99	102	100	98	88	83
	Reductions						
	- closures	31	29	35	53	36	24
	- to higher size group	49	55	52	47	54	56
	- to lower size group	104	119	103	154	93	79
	Current year	**971**	**980**	**976**	**922**	**904**	**898**
50–99	**Previous year**	**476**	**478**	**464**	**469**	**449**	**429**
	Additions						
	+ start-ups	22	15	16	12	14	12
	+ from higher size group	44	39	34	39	22	26
	+ from lower size group	50	57	54	50	58	59
	Reductions						
	- closures	13	18	13	18	23	17
	- to higher size group	34	35	20	24	34	32
	- to lower size group	67	72	66	79	57	50
	Current year	**478**	**464**	**469**	**449**	**429**	**427**
100+	**Previous year**	**532**	**507**	**495**	**469**	**441**	**438**
	Additions						
	+ start-ups	8	9	7	9	12	9
	+ from lower size group	35	40	23	27	38	32
	Reductions						
	- closures	9	10	11	14	17	14
	- to lower size group	59	51	45	50	36	36
	Current year	**507**	**495**	**469**	**441**	**438**	**429**
Total	Previous year	4,542	4,834	5,031	5,075	5,002	4,767
	- to higher size group	184	199	177	175	184	174
	- to lower size group	230	242	214	283	186	165
	- same size group	3.828	4,095	4,266	4,170	4,125	3,965
	start-ups	592	495	418	374	272	299
	closures	300	298	374	447	507	463
	Current year	4,834	5,031	5,075	5,002	4,767	4,603

Appendix 12: Percentage of Employment, Gross Output and Net Output in 10 Major Industrial Sectors, 1975, 1980 and 1985

No. of Persons Engaged	Persons Engaged			Gross Output			Net Output		
	1975 %	1980 %	1985 %	1975 %	1980 %	1985 %	1975 %	1980 %	1985 %
Non-Metallic mineral products - NACE 24									
Under 20	5.0	9.8	12.1	2.4	7.6	7.8	2.3	7.2	7.1
20-99	23.0	18.5	20.0	20.2	14.2	13.8	21.2	15.6	13.8
100-199	9.0	13.0	6.4	9.8	12.6	6.4	9.0	12.2	5.4
200 +	63.0	48.0	51.0	67.6	49.4	62.4	67.5	49.9	66.1
Non-attributable	-	10.7	10.6	-	16.2	9.7	-	15.1	7.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chemicals (incl. man-made fibres) - NACE 25-26									
Under 20	6.8	6.6	7.1	5.0	3.8	4.3	5.2	2.9	2.5
20-99	31.2	28.7	30.0	20.6	26.6	30.3	19.5	19.8	27.0
100-199	17.0	9.4	11.2	30.0	13.3	6.2	32.1	17.9	4.3
200 +	45.0	55.3	51.7	44.6	56.4	59.2	43.2	59.4	66.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Metals and Engineering - NACE 22, 31 - 37									
Under 20	7.0	11.3	13.8	5.9	8.0	7.1	6.2	8.4	6.9
20-99	23.8	24.9	26.8	24.2	24.7	20.4	24.2	26.1	21.6
100-199	18.2	18.6	13.6	17.9	21.6	16.7	16.9	22.6	14.9
200 +	51.0	45.2	45.7	52.0	45.7	55.8	52.6	42.9	56.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food - NACE 411 - 423									
Under 20	7.9	9.4	10.3	6.2	8.5	6.9	7.2	8.8	6.5
20-99	23.5	25.8	29.5	25.8	28.6	31.6	24.6	35.5	32.5
100-199	17.9	22.0	27.0	22.2	24.3	32.9	18.5	19.3	33.3
200 +	50.7	42.8	33.2	45.8	38.6	28.5	49.6	36.4	27.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Drink and Tobacco - NACE 424 - 429									
Under 20	4.6	4.5	4.8	4.5	5.2	4.8	3.5	3.4	3.0
20-99	9.4	13.1	14.4	8.3	15.7	16.4	7.7	11.2	11.8
100-199	12.8	8.3)	80.0	9.8	16.3)	78.8	12.8	12.0)	85.3
200 +	73.1	74.1)		77.4	62.8)		76.1	73.4)	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

No. of Persons Engaged	Persons Engaged			Gross Output			Net Output		
	1975 %	1980 %	1985 %	1975 %	1980 %	1985 %	1975 %	1980 %	1985 %
Textiles - NACE 43									
Under 20	4.8	5.6	7.7	3.9	5.6	9.8	4.5	5.7	8.6
20-99	26.1	23.9	38.2	27.1	23.5	34.4	26.3	25.4	40.2
100-199	22.5	25.5	20.6	24.4	23.9	19.6	22.1	26.7	21.3
200 +	46.6	45.0	33.5	44.5	46.9	36.2	47.0	42.2	29.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Clothing, Footwear and Leather - NACE 44 - 45									
Under 20	6.7	11.6	11.2	5.0	11.7	15.9	5.4	11.8	13.6
20-99	40.9	46.4	43.6	37.8	46.1	44.9	36.9	47.8	42.2
100-199	24.8	25.3	36.1	23.2	24.9	31.6	22.9	22.4	38.0
200 +	27.6	16.8	9.1	34.0	17.3	7.6	34.9	18.0	6.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Timber and Wooden Furniture - NACE 46									
Under 20	25.6	41.7	47.1	19.7	37.0	38.3	21.5	35.7	40.7
20-99	45.2	46.9	42.3	45.4	50.4	42.6	43.3	51.4	43.3
100-199	17.5)	11.4	10.6	20.2)	12.6	19.0	22.7)	12.9	16.0
200 +	11.6)			14.9)			12.1)		
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Paper and Printing - NACE 47									
Under 20	10.3	14.1	15.3	6.0	11.2	12.2	6.8	10.6	11.7
20-99	30.6	29.2	37.8	25.6	27.5	36.7	27.7	26.8	33.5
100-199	13.9	18.8	21.1	13.2	18.5	26.4	12.4	16.5	21.4
200 +	45.2	38.0	25.9	55.2	42.8	24.7	53.1	46.2	33.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Miscellaneous Industries - NACE 14, 48 - 49									
Under 20	11.3	13.2	15.9	4.4	6.0	8.5	8.9	10.3	12.6
20-99	38.0	37.1	40.2	18.7	25.9	28.3	38.5	44.2	39.0
100-199	17.3	17.1	22.0	61.4	50.6	49.0	17.3	19.6	23.8
200 +	33.4	32.5	21.8	15.5	17.6	14.2	35.2	25.9	24.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Appendix 13: Employment Changes Classified by Nationality of Ownership

Nationality	Employment					
	Total Sept. 1979	Additions		Reductions		Total Sept. 1985
		New Estabs. (1985 employment)	Expansions in existing estabs.	Closures (1979 employment)	Contractions in existing estabs.	
Irish (incl. not classified)	148,458	19,128	10,974	43,251	24,299	111,010
UK	23,505	946	834	5,691	5,251	14,343
Other EC Countries	15,890	3,409	2,516	5,032	2,434	14,349
US	30,511	12,244	4,686	4,535	6,315	36,591
Other non-EC Countries	9,835	3,247	1,274	1,513	1,837	11,006

DISCUSSION

J. Blackwell: I am glad to be able to propose a vote of thanks to Bill Keating and Tom Keane.

This paper breaks new ground and does an extremely careful and thorough job of an area of central importance to industrial policy. Up to now, work has had to rely on calculations and analyses of net employment change. At the outset, one should remark on the marked improvement that has occurred in the Census of Industrial Production (CIP) with reference to timeliness and also with reference to the addition of new variables. At the same time, as is evident from this paper, there are possibilities of access to micro data on the CIP through a somewhat circuitous route. Up to now the CIP has been under-utilised as a data source and one hopes that tonight's paper can lead the way towards fuller utilisation in future and towards further work in this general area.

One can begin the approach to tonight's paper by setting out some *a priori* hypotheses. Since the mid 1970's, firms in Ireland have been adversely affected by a number of different elements:

(a) long-term structural change, including the impact of the rise in competition from the newly-industrialising countries, impacts of trade liberalisation, of technical change, of changes in competitiveness;

(b) cyclical elements in the form of changes in foreign demand and declines in real domestic demand.

One will expect that the year-to-year changes over time in industrial activity and employment will reflect the way in which these variables affected individual sectors. On top of this year-to-year aspect is the longitudinal aspect which is provided by the rich vein of these CIP data.

Some features of the data, which are presented in this paper, stand out as follows:

1. There is a very skewed size distribution in industry, with 38 per cent of establishments having less than 10 persons engaged (Table 1), especially when one considers that the data cover only those establishments with 3 or more persons engaged. Only 0.7 per cent of establishments have 500 or more persons engaged (the cut-off point used by the EC Commission to delineate small and medium-term enterprises from others).

2. There is a good deal of turnover, occurring through start-ups and failures, respectively. This accords with one's *a priori* expectations of relatively high failure rates among firms in the early stages of their life cycle.

3. One sectoral point of interest concerns the relative performance of indigenous and other firms. The comparative performance of indigenous firms is not bad: this confirms earlier work, that poor performance can be found both within the group of indigenous firms and the group of foreign firms.

4. Two sectors as dissimilar *a priori* as office and Data Processing, electronics, etc. on the one hand, and clothing on the other, yield similar results in the sense of quite an amount of additions to employment and reductions to employment in each. Of course, the former sector is heterogeneous to an extent and it would be interesting to see it disaggregated: in part because competition from newly industrialising countries has had differing impacts across the sub-sectors of this broad sector. It may be that the definition of closure and of new establishment has affected the numbers under the clothing sector, with closures being followed by re-opening in certain cases: it would be interesting to see that identified. There are interesting differences between textiles and clothing with regard to the additions to employment in new establishments – this accords with the *a priori* expectations that the case in textiles where start-ups occurred in recent years have been relatively capital-intensive.

There are a number of issues, related to policy, which arise from the paper or which could be examined with this longitudinal data set.

1. There are some indications that employment in firms rises to a peak, and then begins to decline after a few years: this accords with the fragmentary evidence from earlier work and confirms the existence of a product cycle. Table 9 suggests that it takes some 4–5 years before employment reaches a peak.

   In turn, this suggests that it would be worth while adding to the analysis the variable of the date of establishment or how long the establishment has been in existence. In turn, are there certain characteristic patterns of employment over time, and if so, are such patterns related in a regular way to underlying variables?

2. An issue which has arisen repeatedly in industrial policy is that of inter-industry linkages. For instance, even if they are relatively low, do they increase over time? Related to this, a question on the purchases of firms was added in the 1985 CIP. There are, to date, hardly enough years since then in order to examine thoroughly the time series of linkages.

3. There have been changes in the labour market, related to the growth of contractual forms of employment and an increased incidence of contracting out on the part of firms. This means that, in some cases where the same person remains in place performing the same activity as before, the job is picked up in statistical analysis as a private service sector job rather than a manufacturing industry job. There are two related issues: the buying-in of service activity with a consequent rise in service activity; and a

change in employment relations which has implications for industrial relations and for social security. Unfortunately, it is difficult to get a picture of changes in contrast employment from existing (cross-sectional) surveys and it would be almost certainly necessary to probe further in these surveys in order to find out about contract employment.

4. At first sight, there would be interest in correlating outcomes with the recipiency of IDA grants. However, such a large volume of firms receive grants that one might need to probe into the type of grant which is received. One candidate for examination is the small industry grant. Small industry aid leads to start-ups, yet there seem to be many failures, especially in the early stages of the life cycle of the firm. It is worth noting (Table 9) that of the 2,581 establishments employing under 20 people in September 1979, 1,030 had closed by 1985. Admittedly, 65 of these 2,581 establishments had expanded. One would like to know how those cases which expanded differed from those which contracted or closed, and the extent to which failures occur in the first few years of the life cycle. It would be useful if in tabulations such as Table 9, the data in the lowest size group (under 20) were broken down into smaller class intervals.

5. It is not clear to what extent does the existence of transfer pricing affect the trends (growth, decline) within sectors.

6. It would be interesting to know if the skill levels increase over time; perhaps the wage bill could be used as a proxy for this.

7. There is room for more intra-sectoral work. There can be the rise and fall of firms within sectors, with some firms profiting at the expense of others.

8. It would be interesting to try and explore two aspects of performance:

   - the importance of capital-intensity as an independent variable and whether there could be proxy measurements of this variable.
   - the role of intra-firm trade, which may be limited to strong performance of US owned firms.

A final, more technical point, is whether there is room to use double deflation (independently of inputs and of outputs) in order to arrive at net output.

To return to my initial point, this paper shows the way forward towards using fruitful data set and is a credit to this Society.

J. McKeon: I am pleased to second this vote of thanks to the authors on behalf of the members of the Society for their highly innovative, important and comprehensive paper.

The paper provides a range of useful facts and analyses showing the diversity occurring behind the net change figures of employment, output and productivity in the manufacturing sector. This information will be useful to industry researchers, analysts and policy makers.

My comments on the paper focus on two policy issues raised by the authors themselves in the opening paragraph of their paper, namely,

- The potential of the manufacturing sector for future job creation either directly or indirectly, and
- The accuracy and the implications of the output, employment and productivity relationships which have occurred in Ireland's manufacturing base in recent years.

In commenting on these issues it must be stressed that the period reviewed by the authors was an extremely tough and unusual period for the Irish economy and for the manufacturing sector. World demand was depressed and most economic and competitive indicators in Ireland were highly unfavourable for manufacturing. This highly adverse economic environment was particularly severe on all traded activities and must be borne in mind when evaluating the results presented in this paper.

Against this environmental background the authors show that in the period 1979 to 1985:

- Direct manufacturing employment fell by almost 40,000, a 17% drop on the '79 base;
- Gross output in manufacturing grew by £7,540 million in value a significant 110% increase over the '79 base. The volume output increase in the period was 30%;
- The total number of establishments in manufacturing remained fairly constant albeit with substantial changes within this overall figure.

The changes in employment, output the composition of the sector resulted in important shifts in the average manufacturing unit:

- average employment per unit dropped by 20%, and
- average output per unit grew by 107% in value terms

The authors highlighted the great diversity of change which occurred within these broad shifts. The reduction in employment was widespread across industry with 80% of firms showing a decline or remaining stable. The output expansion, however, was much more confined with only 27% of firms increasing the volume of output. The majority of establishments therefore showed declining or stable employment and declining output figures.

The authors show that the casualty rate in industry was high both for new start-up's and for established units. Indeed employment losses were greatest in larger firms and in particular larger Irish firms. Over the entire period some 60% of jobs lost came from closures and the balance from contractions. Of the firms that survived relatively few expanded their employment, most declined or remained stable over the period.

Following this time of intense change the remaining base of manufacturing industry was smaller in terms of employment but larger in terms of output. More recent data for the period up to 1988 show a further slight fall in manufacturing employment and a continuing large scale increase in manufacturing output. Indications from the last quarter of 1988 are that employment has now also begun to increase.

From the data presented in this paper it is clear that over the past decade the result has been significantly less employment, substantially more output and on average smaller manufacturing units, both in output and employment terms, than was the case a decade ago. Given the likely importance of scale in manufacturing operations in order to benefit from 1992 an important issue raised by the author's work is what policies are now needed to bring about a significant increase in the scale of Irish manufacturing units in the run up to 1992.

Employment Potential of Manufacturing

In terms of the direct and indirect potential of the existing manufacturing base for new job creation the authors findings plus the up-to-date data on employment and output which they present would appear to indicate that the direct employment potential is modest. The greatest potential for job gains appear likely to arise indirectly as a result of the large scale expansion now occurring in output.

Direct employment in manufacturing could be increased in future either by an expansion from the existing base of firms or through more start-ups of overseas firms or of new Irish entrepreneurs. With an economic recovery some increase in employment of the existing base of manufacturing could be expected despite the record of the past decade. Indeed the employment pick-up which occurred at the end of 1988 would support this view. Crucial to the scale of any such employment pick up would be the level of output expansion required by firms to sustain existing jobs not alone increase employment. if recent output and employment relationships are sustained in the future then one could not be optimistic about a significant recovery in employment from the existing base of firms.

A major source of direct employment in manufacturing according to this paper arose from new business start-ups from both Irish and overseas sources. During the period of the analysis, however, new start-ups consistently declined as did the new jobs arising from that source. Indications from the IDA are that this downward trend has now been reversed and that new start-ups are increasing to some degree. This should result in an increase in direct manufacturing employment from new start-ups in future.

An important policy issue which arises from this paper is whether some different set of policies or other actions to those now in operation could result is a better direct employment performance from the existing manufacturing base.

On the issue of the indirect employment arising from the massive increase in industrial output of recent years the authors make little comment. Even if this output expansion is somewhat overstate its potential for indirect job creation in Ireland appears to be large with a 70% volume increase in output occurring in the first eight years of this decade.

Interesting data on this topic have been published by the IDA arising from a survey of expenditure patterns by industry in Ireland. The IDA data show that in the year 1986 to 1987 manufacturing output rose by £1,100 million and of that increase £700 million or two thirds of the total was spent in Ireland. Money paid in wages and salaries increased by £100 million in that year while expenditures on Irish raw materials and on Irish services rose by £600 million. These are clearly very positive and important figures which would indicate that the Irish economy is benefiting enormously from the output expansion occurring in manufacturing. They would also suggest that there is a high level of indirect employment in Ireland arising from the increase in manufacturing output.

This indirect employment effect is likely to be an important policy and performance issue for the future and it is one which the authors might consider evaluating more fully in their future work. Giving a better fix on this indirect employment effect would be highly useful to policy makers and to job creation agencies in the future.

Output, Employment and Productivity

The authors provide a lot of details and fascinating work on the relationships among these variables by sectors and by groups of establishments. One issue of importance which needs further explanation and evaluation, however, is the accuracy and reliability of these relationships and in particular of the underlying output measurements which forms the basis for the analyses.

Table 2 of the author's paper shows that despite a recorded volume growth of 68.6% in the years 1980 - 88 employment fell by 20.7% over the same eight years. The combined effect of these two changes is that manufacturing output would need to have expanded by 8% per annum compound over the period to ensure that employment remained stable. In the more recent years, from 1985 - 1988, the corresponding output requirement to maintain employment derived from the data in Table 2 is a 12% compound growth in output.

This latter figure is particularly high by historic Irish figures and also appears to be high by international standards. In the 70's the standard output requirement to maintain employment was generally estimated to be 4% growth annually. With technology change and the pressures of international competitiveness the early 1980's saw an increase in this relationship and the IDA's strategic plan published in the mid 1980's was based on an overall assumption of 7% output growth required to generate any increase in manufacturing employment. At the time of publication of the IDA plan many commentators regarded the relationship used as too high.

By these standards the implication of the figures published in Table 2 are so high as to raise serious questions about the accuracy of the output data presented in this paper. It would be useful and informative, therefore, to hear the authors clarify how the output figures are calculated and their views of the accuracy of these output data. It would also be useful to hear their views on the merits, if any, of preparing alternative figures showing the output and employment relationships which would exist if establishments with exceptionally (by Irish standards) high output growth rates are excluded from the calculations.

With these few comments ladies and gentlemen I would like to conclude by formally seconding the vote of thanks of the Society to both authors on their excellent paper.