

Output, Prices and Productivity in Irish Sheltered and Exposed Transportable Goods Industries, 1953-1967

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IN a paper on price and income determination in the Norwegian economy, Aukrust [1] classifies industries as being either sheltered or exposed. He defines exposed industries as "those which market their products abroad, or on the domestic market under strong foreign competition." The exposed group therefore consists of export-oriented and import-competing industries. Sheltered industries are "those industries whose products are marketed at home under conditions such as to leave them relatively free of foreign price competition". He assumes that prices of output of exposed industries are determined on the world market and therefore cost increases cannot be compensated for by price increases but must be absorbed by a reduction in profits (per unit, presumably). Sheltered industries on the other hand "will tend to raise output prices when costs increase". Aukrust also notes that in Norway and Sweden labour productivity in the exposed industries has risen much quicker than labour productivity in the sheltered industries [1, pp. 52-53]. As the classification has been very useful in illuminating the process of price and income determination in the Norwegian economy, it seemed worthwhile to employ this classification in an analysis of industrial production in Ireland.

ALLOCATION OF INDUSTRIES

Aukrust includes building and service-type industries in his analysis and he allocates these to his sheltered group. These industries are excluded from the present analysis as being of their nature sheltered from foreign competition. This study, therefore, deals only with transportable goods industries.

The criteria which Aukrust uses for allocating industries to the sheltered or exposed group are not explicitly stated in his paper. Some industries are singled out and allocated to one or other of the groups because of their special position in the Norwegian economy, e.g., shipping. For the other export-oriented indus-

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tries it appears that exports were approximately 60 per cent of the total flow for the group as a whole, while for the import-competing industries imports were approximately 30 per cent of that groups' total flow. After calculating, from the Irish 92 sector input-output table for 1964 [3], the percentage which exports and imports form of the domestic flow (i.e., domestic production) of each sector, it was clear that under Aukrust's criterion only one or two sectors would be classified as export-oriented. Bearing in mind that the criterion adopted should be the same for both groups, it was decided that the criterion for allocating the sectors to the exposed group should be that any sector whose exports or competing imports were greater than one third of domestic flow would be classified as exposed. The cut-off point ($33\frac{1}{3}$ per cent) is somewhat arbitrary, though unavoidably so, as inclusion or exclusion of marginal cases is a matter of judgement based on knowledge of their particular situation. The remaining industries were allocated to the sheltered group.

The relevant input-output sectors were reconciled with the industrial classification used in the *Census of Industrial Production* (CIP) and the classification of sheltered and exposed industries which emerged is as follows:

EXPOSED INDUSTRIES

<i>Slaughtering</i>	<i>Fellmongery, tanning</i>
<i>Butter, cheese, edible milk products</i>	<i>Paper and paper products</i>
<i>Brewing</i>	<i>Chemicals, drugs</i>
<i>Jute, canvas, rayon</i>	<i>Fertilisers</i>
<i>Hosiery</i>	<i>Oils, paints, inks and polishes</i>
<i>Wood, cork</i>	<i>Metal trades</i>
<i>Linen, cotton</i>	<i>Electrical machinery</i>
<i>Woollen, worsted</i>	<i>Non-electrical machinery</i>
<i>Shirtmaking</i>	<i>Ship and boat building</i>
<i>Women's and girls' clothing</i>	

SHELTERED INDUSTRIES

<i>Coal</i>	<i>Furniture, brushes and brooms</i>
<i>Stone, slate, sand</i>	<i>Made-up textile goods</i>
<i>Other mining</i>	<i>Men's and boys' clothing</i>
<i>Turf production and bog development</i>	<i>Other clothing</i>
<i>Bacon factories</i>	<i>Leather and leather substitutes</i>
<i>Grain milling and animal feeding stuffs</i>	<i>Boots and shoes</i>
<i>Bread, biscuits and flour confectionery</i>	<i>Printing, publishing</i>
<i>Sugar, cocoa, sugar confectionery</i>	<i>Soap, detergents and candles</i>
<i>Canning of fruit and vegetables, Jams</i>	<i>Glassware, pottery</i>
<i>Margarine, butter blending</i>	<i>Structural clay, cement</i>
<i>Other food preparations</i>	<i>Assembly of mechanical vehicles</i>
<i>Malting</i>	<i>Assembly of other vehicles</i>
<i>Distilling</i>	<i>Railroad equipment</i>
<i>Aerated and mineral waters</i>	<i>Other manufacturing</i>
<i>Tobacco</i>	

The sectors of the input-output table, from which this classification is derived, are given in the appendix, together with the percentage which exports, imports, and the sum of the two, form of the domestic flow of each sector. Difficulties arose in the reconciliation of the input-output sectors and the CIP industries, (e.g., the CIP industries, men's and boys' clothing, shirt-making, women's and girls' clothing, and other clothing, were grouped together to form the Clothing sector in the input-output table). It will be seen in the appendix that exports for the Clothing sector as a percentage of domestic flow are 45.1 per cent. The problem therefore arises: which CIP clothing industries should be assigned to the exposed group? Fortunately, some further information on exports of CIP industries is available in the NIEC *Report on the Economic Situation 1965* [9]; and it is possible, on the basis of this information, to assign shirtmaking and women's and girls' clothing to the exposed group.

It may be thought that the criterion used to allocate an industry to the exposed group is too exclusive, since no allowance is made for industries which would appear exposed if the sum of their exports and imports were taken into account (e.g., the sum of the exports and imports of the Shoes and Leather Goods sector is 40.3 per cent of the sector's domestic production; yet this sector is regarded as sheltered). It will however be noted from the appendix that when the input-output sectors percentages exported and imported are added, the total for the exposed sectors is always greater than 47 per cent, with the exception of Pig Slaughtering and Sheep/Horse Slaughtering. Thus if we had adopted this criterion (i.e., the sum of exports *and* imports greater than 47 per cent) only one industry (Slaughtering) which is classified as exposed under the $33\frac{1}{3}$ per cent rule would be excluded from the exposed group; and only one industry, (Glassware and Pottery) which is excluded under the $33\frac{1}{3}$ per cent rule would be included in the exposed group. The criterion used (i.e., exports or competing imports greater than $33\frac{1}{3}$ per cent of domestic production) therefore does not exclude industries which would appear to be exposed if the sum of their imports and exports were taken together.

EXPOSED AND SHELTERED INDUSTRIES

Volume Indexes

Volume indexes for each of the two groups for the years 1953-1967 were calculated. The Ship and Boat Building industry was omitted from the calculations for the exposed group and for all transportable goods industries because, as Kennedy [7, p. 129] has pointed out, "the volume of output is measured in terms of man hours" in this industry, and "such a measure of output seriously underestimates the true rise in volume of output."

The method used to combine the individual industry volume indexes is the same as that used by CSO to obtain volume indexes for the major groups of manufacturing industry. The method is explained in [4, p. 190] as follows:

The volume indexes for the divisions of industry (mining, manufacturing, etc.) for the major groups in manufacturing industry, and for all industries combined, are obtained by weighting the index numbers for the individual industries within the division or group with their respective net outputs (*a*) in the previous year, and (*b*) in the current year. The geometric mean of these two indexes gives the volume index for the division or group to base previous year = 100. All the index numbers (for individual industries, divisions and groups) are transferred to base 1953 = 100.

The volume indexes for the sheltered and exposed groups resulting from these calculations are shown in Table I.

TABLE I: *Volume Indexes for Exposed, Sheltered and All Transportable Goods Industries 1953-1967*

Base 1953 = 100

Year	Industry Group		
	Exposed*	Sheltered	All Transportable*
1953	100.0	100.0	100.0
1954	106.5	101.0	103.3
1955	110.9	105.2	107.5
1956	114.3	98.7	105.1
1957	113.1	98.1	104.2
1958	118.2	97.7	106.0
1959	129.1	108.6	116.9
1960	143.5	113.3	125.4
1961	160.1	121.0	136.5
1962	169.1	129.0	144.9
1963	179.1	135.4	152.7
1964	192.7	145.2	164.0
1965	205.7	149.2	171.4
1966	214.3	157.1	179.6
1967	235.6	168.8	195.1

Basic Sources: September issues of *Irish Trade Journal* and *Statistical Bulletin* (now *Irish Statistical Bulletin*), 1956-1967.

*Excluding Shipbuilding

It will be noted that the volume index for all transportable goods is closer to the volume index for the sheltered group than to the volume index for the exposed group. The reason is that the net output (i.e., the weight) of the sheltered group forms the greater portion of total net output. In 1953 and 1967 the net output figures for each of the groups were:

Year	<i>Exposed</i> (excluding Shipbuilding)	<i>Sheltered</i> £'000	<i>All Transportable</i> (excluding Shipbuilding)
1953	36,989	51,882	88,871
1967	133,983	149,980	283,963

The difference of almost 67 points in the level of the volume indexes of the sheltered and exposed industries is remarkable. Particularly noteworthy is the behaviour of the two indexes since 1958. The increase in the volume of output of exposed industries since 1958 is almost 100 per cent as against 73 per cent for sheltered industries and 84 per cent for all transportable goods industries. While the official policy of promoting foreign firms with export goods potential dates from 1958 when the Industrial Development (Encouragement of External Investment) Act was passed, it is worth noting that the increase in volume of output of exposed industries was in evidence before this. The decline in the volume of output in the sheltered group in the years 1956-1958 together with the slow down in growth of output in the year 1965 indicate that the sheltered group may be affected more by a recession in the economy than the exposed group. The employment figures for the two groups of industries tend to confirm this impression, as will be evident from Table 2.

TABLE 2: *Indexes of Average Numbers Engaged in Exposed, Sheltered and All Transportable Goods Industries, 1953-1967*

Base 1953 = 100

Year	Industry Group		
	<i>Exposed*</i>	<i>Sheltered</i>	<i>All Transportable*</i>
1953	100.0	100.0	100.0
1954	102.5	102.0	102.2
1955	105.0	103.3	104.0
1956	105.2	100.3	102.3
1957	103.5	96.7	99.4
1958	104.7	96.3	99.7
1959	107.1	97.9	101.6
1960	114.3	100.5	106.1
1961	119.7	104.7	110.7
1962	124.5	107.4	114.3
1963	129.0	110.0	117.7
1964	132.4	112.4	120.5
1965	133.6	112.7	121.1
1966	137.1	112.4	122.3
1967	140.6	113.2	124.2

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

The main feature of this table is the very substantial increase in employment in the exposed industries. Again it is worth noting that, since 1958, employment in the exposed industries has increased almost twice as much as employment in the sheltered group. While employment in the exposed group dropped slightly below its 1955 level during the recession of 1956-1957, the major effects of the recession on employment were borne by the sheltered group. Employment in the sheltered group did not recover to the 1955 level until 1961, although the output of this group, as will be seen from Table 1, had surpassed the 1955 level by 1959. Similarly, in the recession of 1965-1966 employment declined slightly in the sheltered group but increased in the exposed group.

Implicit Price Indexes

Having calculated the volume indexes for each group and for all transportable goods industries, we derive the implicit price index for each group by dividing the index of the value of net output for each group by the group volume index. The results are shown in Table 3.

The indexes of value of net output are used in deriving the implicit price indexes for each group, as our interest is in the behaviour of the price of the work done in the two industrial groups. It has been noted by Kennedy [7, pp. 133-134] that:

this price indicator is equivalent to the true implicit price of net output in the individual industries and in total manufacturing *only* if the volume indexes for the individual industries, which are gross output volume indexes, change in the same proportion as a net output volume index for the individual indexes.

This is a rather restrictive assumption, and the justification for making it is, as Geary and Pratschke state [6, p. 17], that "nothing less than a full double deflation process, applied industry-wise to CIP data would suffice."

From Table 3 it will be seen that the price behaviour of the two groups has been significantly different during the whole period. Up to 1963, the increase in the price of exposed industries net output was always less than half that of the increase in the price of the sheltered group. The very large increase in prices for the exposed group which occurred between 1965 and 1966 (9.5 as against 4.2 per cent for the sheltered group) has led to a narrowing of the gap between the two price series in 1967.

Labour Productivity

We have established that there are significant differences in the behaviour of the volume of output and implicit net output prices of the two groups. Are there also differences in the behaviour of labour productivity for the sheltered and exposed industries?

Changes in productivity can occur because of structural and technological change, as Geary [5] has noted. In calculating the indexes of output per person

TABLE 3: *Implicit Net Output Price Indexes for Exposed, Sheltered and All Transportable Goods Industries, 1953-1967*

Base 1953 = 100

Year	Industry Group		
	Exposed*	Sheltered	All Transportable*
1953	100.0	100.0	100.0
1954	99.4	100.2	99.8
1955	100.6	101.9	101.4
1956	102.6	111.0	107.3
1957	102.2	112.1	107.8
1958	107.4	119.0	113.9
1959	108.7	123.1	116.8
1960	107.5	123.8	116.5
1961	110.5	133.7	123.1
1962	117.9	138.8	129.5
1963	123.8	142.3	134.1
1964	127.8	150.4	140.2
1965	132.0	155.1	144.7
1966	144.6	161.6	154.3
1967	153.7	171.2	163.8

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

engaged, for the two groups, we allow for structural change (i.e., a shift of workers from industries with a low net output per head to industries with a high net output per head) by first calculating an employment index. This is done for each group by weighting the ratio of employment in each industry in the current year to employment in the previous year by the current and previous year's value of net output and taking the geometric mean of the two indexes. The resulting index for each group is an index of the change in the volume of output due to changes in the numbers employed, and to changes in the distribution between industries of the numbers employed. The labour productivity index is derived by dividing the index of the volume of output by the employment index. The indexes for exposed, sheltered and all transportable goods industries are presented in Table 4.

The increase in the volume of output per person engaged in the exposed industries is greatly in excess of the increase in output per person engaged in the sheltered industries. The average annual rate of growth was 3.7 per cent in the exposed group and 2.6 per cent in the sheltered group.

TABLE 4: *Indexes of Net Volume of Output Per Person Engaged in Exposed, Sheltered and All Transportable Goods Industries, 1953-1967*

Base 1953 = 100

Year	Industry Group		
	Exposed*	Sheltered	All Transportable*
1953	100.0	100.0	100.0
1954	103.9	99.1	101.1
1955	105.5	102.0	103.4
1956	108.5	98.8	102.8
1957	108.8	101.9	104.7
1958	112.4	102.3	106.2
1959	119.9	108.9	114.6
1960	125.2	110.3	117.6
1961	133.2	113.2	122.7
1962	135.8	117.4	126.2
1963	139.2	120.0	129.2
1964	146.0	125.1	135.1
1965	154.2	127.4	139.7
1966	155.6	134.0	144.3
1967	166.5	143.0	154.1

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

The differences in productivity growth between sheltered and exposed industries can be almost entirely explained by differences in output growth i.e., by the "Verdoorn Law". This "Law", as Kennedy notes [7, p. 122] in his analysis of its applicability to Irish experience, states that :

over the longer term, the growth rates of labour productivity and output will be highly and positively correlated, and that a one percentage point increase in the output growth rate will be accompanied by slightly less than an 0.5 percentage point increase in the growth rate of labour productivity and slightly more than an 0.5 percentage point increase in the employment growth rate.

The appropriate regression equation for the period 1953-1967 is:

$$P = 0.84 + 0.438 Q^*$$

*I am grateful to Dr. Kennedy for supplying me with this result, and for his permission to use it here.

where P and Q are average annual rates of growth of output per head and of output. Using this equation, the following results emerge:

	<i>Exposed (excluding Shipbuilding)</i>	<i>Sheltered</i>	<i>All Transportable Goods (excluding Shipbuilding)</i>
Actual Output Growth (per cent)	6.3	3.8	4.9
Predicted Productivity Growth (per cent)	3.6	2.5	3.0
Actual Productivity Growth (per cent)	3.7	2.6	3.1

The Verdoorn relationship therefore explains most of the differences in productivity growth between the two groups. Aukrust [1, p. 53] found similar differences in the increase in labour productivity between sheltered and exposed Norwegian industries and while commenting that "presumably, the reasons for the differences were largely technological" noted that:

we cannot rule out the possibility that the exposed industries in part had a better productivity record precisely because they were exposed and therefore had to attend more to efficiency in order to stay competitive.

Profits and Costs per Unit of Output

An approximate indication of the relative efficiency of the two groups of industries can be obtained by dividing indexes of the cost of materials, salaries and wages, total costs and remainder of net output, by the indexes of volume of output for the groups. The resulting indexes are measures of changes in costs and profits per unit of output. Results are given in Table 5.

Despite the fairly large difference between the indexes of unit wage and salary costs for each group over the whole period, the differences between the two indexes of total unit costs are not very substantial. This is due to the fact that the bulk of total costs consists of materials costs (approximately 80 per cent of total costs for both groups) and as unit materials costs depend largely on the price of materials, over which purchasing firms generally have no control, the opportunities for cost reductions in this area are limited. The slower rate of increase in unit wage costs in the exposed group is due to the greater productivity of labour in this group. Although the index of total unit costs for the exposed group was less than the index for the sheltered group in all years except 1967, the index of remainder of net output per unit of output for the sheltered group was substantially greater than the same index for the exposed group during the whole period. Thus Aukrust's [1] contention, that cost increases for the exposed group would have to be borne by a reduction in profits (per unit of output), is not correct for Ireland. It does appear, however, that Irish exposed industries, which,

TABLE 5: *Indexes of Cost of Materials, Salaries and Wages, Total Costs and Remainder of Net Output Per Unit of Output, in Exposed, Sheltered and All Transportable Goods Industries, 1953-67*

Base 1953 = 100

Year	Cost of Materials		Salaries and Wages		Total Costs		Remainder of Net Output	
	Exposed*	Sheltered	Exposed*	Sheltered	Exposed*	Sheltered	Exposed*	Sheltered
1953	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1954	96.6	97.1	100.4	103.5	97.3	98.2	98.5	96.0
1955	93.6	95.9	102.5	105.2	95.0	97.4	98.8	97.5
1956	94.7	93.8	106.1	115.5	96.6	97.4	99.5	105.2
1957	99.1	101.8	108.8	117.1	100.7	104.4	96.1	105.7
1958	98.5	107.8	111.2	123.3	100.6	110.3	103.8	113.4
1959	97.1	105.8	109.5	118.2	99.1	107.8	107.7	129.5
1960	100.1	107.6	111.7	122.6	102.7	110.1	103.6	125.4
1961	101.9	106.3	113.0	125.8	103.7	109.4	111.9	139.9
1962	102.4	105.0	121.2	132.2	105.5	109.5	118.9	142.9
1963	102.8	108.1	123.6	137.1	106.2	112.9	124.0	149.0
1964	104.7	109.4	130.8	145.9	109.0	115.4	125.1	156.1
1965	105.0	113.3	131.3	148.0	109.3	119.0	132.8	164.2
1966	107.6	109.1	140.2	152.8	113.0	116.2	148.6	172.9
1967	114.0	110.5	142.4	154.0	118.7	117.6	164.2	193.4

Basic Sources: As for Table I.

*Excluding Shipbuilding.

as we have seen earlier, did not increase their prices as much as the sheltered group, bore the increase in costs through a much slower rate of growth of profits per unit of output. The sheltered group (which were not subject to the same sort of price restraint as the exposed group) increased their prices more than the exposed group in order to compensate for cost increases.

It is of interest to note that the indexes of remainder of net output per unit of output for each group increased more than the unit wage cost indexes for each group. This indicates that the share of profits in net output has increased for both groups. Table 6 and Chart 1 show the behaviour over the period of profits share in net output. The share of profits in the exposed group was at all times greater than the share of profits in the sheltered group. There was a decline in profits share for both groups in the years 1954-1957. In the exposed group, profits share reached its 1955 level in 1961 and remained at around this level until 1966, when it showed an increase. It increased again in 1967 to its present level of 55.7 per cent. There was a very sharp increase in profits share in the sheltered

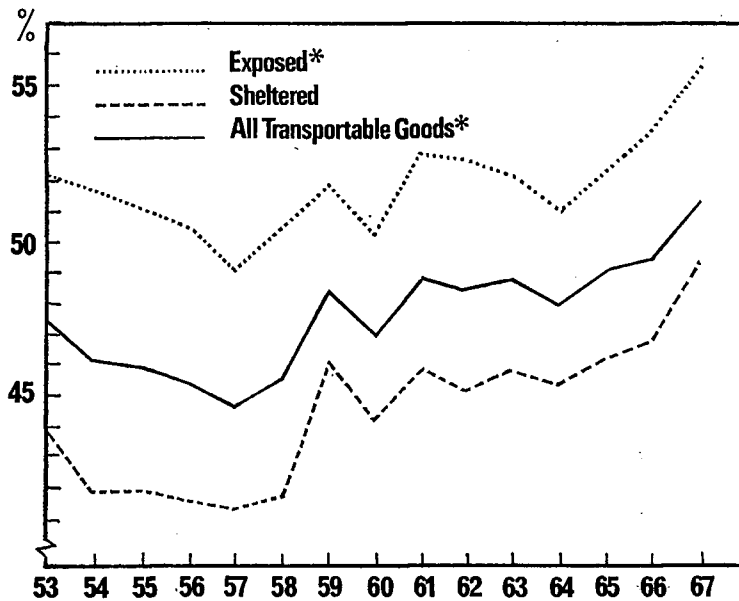
TABLE 6: *Remainder of Net Output as a Percentage of Net Output in Exposed, Sheltered and All Transportable Goods Industries, 1953-1967*

Year	Industry Group		
	Exposed*	Sheltered	All Transportable*
1953	52.1	43.8	47.2
1954	51.7	41.9	46.1
1955	51.2	41.9	45.9
1956	50.5	41.5	45.4
1957	49.0	41.3	44.6
1958	50.4	41.7	45.5
1959	51.7	46.0	48.4
1960	50.2	44.3	46.9
1961	52.8	45.8	48.8
1962	52.6	45.1	48.4
1963	52.2	45.8	48.7
1964	51.0	45.4	47.9
1965	52.4	46.3	49.1
1966	53.6	46.8	50.0
1967	55.7	49.4	52.4

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

Chart 1: *Remainder of Net Output as a Percentage of Net Output of Exposed*, Sheltered and All Transportable Goods Industries* 1953-1967.*



Source: Table 6.

*Excluding Shipbuilding.

group between 1958 and 1959. The new level was maintained until 1967, when there was another strong increase. There has been, therefore, a substantial increase in the share of profits in the net output of transportable goods between 1953 and 1967—the increase in the sheltered group's share being almost twice as great as the increase in the exposed group's share. These increases are surprising in the light of Geary and Pratschke's [6, p. 30] finding of quasi-constancy of factor shares in the non-agricultural sector of the economy. Aukrust [2, p. 199] also found relative constancy in his analysis of income shares in Norway, noting that "this relative constancy is the net effect of strong, but opposite trends in home market industries and export industries". Both these studies, however, covered a wider area of the economy than the present one; and the *quasi*-constancy that they observed may have been the result of countervailing tendencies in different sectors of the economy. It should also be noted that the figures for remainder of net output of transportable goods industries include, as well as gross profit (including depreciation), other expenses such as advertising and rent and rates. Some of the increase in profits share may, therefore, be due to increases in these expenses proportionately larger than the increases in profits.

EXPOSED INDUSTRIES: EXPORT-ORIENTED AND IMPORT-COMPETING

It was noted at the beginning of the paper that the exposed group consists of two groups of industries one of which is subject to foreign competition on the home market while the other is competing by exporting to foreign markets. The industries in these export-oriented and import-competing groups are:

EXPORT-ORIENTED

Slaughtering
Brewing
Jute, canvas, rayon
Hosiery
Butter, cheese, edible milk products
Shirtmaking
Women's and girls' clothing
Fellmongery, tanning
Non-electrical machinery
Ship and boat building

IMPORT-COMPETING

Wood, cork
Linen, cotton
Woollen, worsted
Paper and paper products
Chemicals, drugs
Fertilisers
Oils, paints, inks and polishes
Metal Trades
Electrical machinery

To what extent is the behaviour of these two sub-groups with regard to output, price and productivity different? It is well to keep in mind that productivity and net output price have very little effect on the exports of the Slaughtering and Butter, cheese, edible milk products industries. These industries and some

others, e.g., Grain milling and animal feeding stuffs, are characterised, as McAleese* [8] points out, by

- (a) dependence on domestic agricultural output as raw materials, (b) extremely low (on average eight per cent) net value added share in total output, reflecting the small amount of conversion carried out by these industries and, consequently
- (c) the output price heavily determined by the price of agriculture.

In the calculations in this section for the export-oriented and exposed industries as a whole the Ship and boat building industry is again excluded for reasons given above.

Using the same procedure as for the sheltered and exposed groups, volume indexes for export-oriented and import-competing industries were calculated. These indexes (see Table 7) show that, by 1967, the volume of output in import-competing industries had increased remarkably more than the volume of output of export-oriented industries—the difference in 1967 between the two indexes being more than 110 points.

TABLE 7: *Volume Indexes for Export-Oriented, Import-Competing and Exposed Industries 1953-1967*

Base 1953 = 100

Year	Industry Group		
	Export-Oriented*	Import-Competing	Exposed*
1953	100.0	100.0	100.0
1954	101.3	113.4	106.5
1955	102.3	122.1	110.9
1956	108.1	122.6	114.3
1957	105.5	123.0	113.1
1958	110.4	128.6	118.2
1959	117.3	144.8	129.1
1960	127.8	164.3	143.5
1961	144.0	181.6	160.1
1962	148.2	196.9	169.1
1963	152.9	214.0	179.1
1964	159.8	236.9	192.7
1965	163.8	262.4	205.7
1966	169.5	275.1	214.3
1967	188.3	299.7	235.6

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

*I am indebted to Mr. McAleese for his permission to quote from and use the results of his study on effective protection in Irish industry [8].

The very large increase in the volume of output of the import-competing group started in 1959. In that year and in every other year thereafter except 1961 and 1967 the growth in the output of the import-competing group was almost always twice as great as the growth in output of the export-oriented group. The very large growth in the output of the import-competing group was accompanied by a change in the contribution which this group made to the net output of the exposed group. In 1953 the net output of the import-competing group as a percentage of the net output of the exposed group was 43.7 per cent while in 1967 it had risen to 53.6 per cent.

TABLE 8: *Implicit Net Output Price Indexes for Export Oriented, Import Competing and Exposed Industries 1953-1967*

Base 1953 = 100

Year	Industry Group		
	Export Oriented*	Import Competing	Exposed*
1953	100.0	100.0	100.0
1954	101.1	97.3	99.4
1955	101.9	99.1	100.6
1956	101.8	103.4	102.6
1957	103.3	101.0	102.2
1958	108.6	105.7	107.4
1959	111.2	105.5	108.7
1960	110.9	103.7	107.5
1961	112.8	107.6	110.5
1962	119.0	116.4	117.9
1963	129.9	117.6	123.8
1964	133.3	122.0	127.8
1965	137.5	126.2	132.0
1966	151.1	137.8	144.6
1967	158.7	148.0	153.7

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

The level of the implicit net output price index of the import-competing group was lower over the whole period, with the exception of 1956, than the corresponding index for the export-oriented group, as Table 8 shows. However, the differences between the two indexes were not very substantial at any time.

As one would expect from the behaviour of the volume indexes of the export-oriented and import-competing groups the productivity indexes for the two groups show large differences in their levels over the whole period, see Table 9.

TABLE 9: *Indexes of Volume of Output per Person Engaged in Export-Oriented, Import-Competing and Exposed Industries, 1953-1967*

Base 1953 = 100

Year	Industry Group		
	Export-Oriented*	Import-Competing	Exposed*
1953	100.0	100.0	100.0
1954	101.1	107.6	103.9
1955	100.8	111.3	105.5
1956	106.7	111.2	108.5
1957	106.4	112.0	108.8
1958	109.3	116.6	112.4
1959	114.1	127.3	119.9
1960	119.0	133.0	125.2
1961	128.7	139.3	133.2
1962	128.6	145.0	135.8
1963	130.1	150.3	139.2
1964	134.4	160.1	146.0
1965	135.6	176.3	154.2
1966	137.0	177.8	155.6
1967	146.9	189.9	166.5

Basic Sources: As for Table 1.

*Excluding Shipbuilding.

Using Kennedy's equation to predict productivity growth from output growth, the following results emerge:

	Exported Oriented (excluding Shipbuilding)	Import- Competing	Exposed (excluding Shipbuilding)
Actual Output Growth (per cent)	4.6	8.1	6.3
Predicted Productivity Growth (per cent)	2.8	4.4	3.6
Actual Productivity Growth (per cent)	2.8	4.7	3.7

The Verdoorn relationship again explains almost all of the differences in productivity growth among the two groups. Irish industries competing against foreign producers in their home market have put up a better performance, in terms of the measures used, than Irish exporters competing in foreign markets.

Given the tariff situation, this is not surprising: a considerable bias against exports is created by our tariff structure. McAleese [8], notes that:

export incentives. . . are still small relative to the incentives to import substitution. As tariffs fall and assuming export incentives remain the balance will, of course, begin to be righted.

CONCLUSION

The approach used in the paper of allocating industries to sheltered and exposed groups can be criticised on the ground that the paper has not shown any connection between protection and exports. McAleese [8] has shown that, in fact, in the Irish case there is no relationship between them. A possible explanation, supported by information from the CIO reports, is that only a few firms in an industry are engaged in the export market. For these few firms the degree of protection is not important; but it is very important for the remainder. It would have been preferable, therefore, to have examined the behaviour of *firms* in the export-oriented industries. The necessary basic data are not available to us. It would be a task well worth undertaking, perhaps on a sample basis.

The classification of industries into sheltered and exposed groups is useful in shedding light on the different performance of Irish industries with regard to output, productivity and prices. Industries which have been exposed to foreign competition, whether in the home or export markets, have increased their volume of output and their productivity at a faster rate than sheltered industries, while prices of the products of exposed industries have increased at a slower rate than prices of sheltered industries products. Within the exposed group there has been a larger increase in the output and productivity of import-competing industries than for the export-oriented group, while price increases for the import-competing group have been smaller than for the export-oriented group.

If Ireland joins the EEC there will be a great increase in the number of industries exposed to foreign competition. The performance of exposed industries up to 1967 has been satisfactory, exposure to competition on the whole having led to greater efficiency. While there is justifiable concern as to the probable effects of free trade conditions on Irish industry, the results presented in this study are not discouraging.

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APPENDIX

Exports, Competing Imports and the Sum of Exports and Competing Imports as a Percentage of the Domestic Production of the Transportable Goods Sectors of the 1964 Input-Output Table

<i>IO Sector</i>	<i>Sector Number</i>	$\frac{X}{DP}$	$\frac{M}{DP}$	$\frac{X+M}{DP}$
Peat Process/Coal	16	8.8	8.9	17.7
Stone/Ores, Gravel	17	4.6	2.8	7.4
Cattle Slaughtering	18*	52.1	0.7	52.8
Fats	19	A	A	A
Other Offals	20	A	A	A
Hides/Skins	21	A	A	A
Pig Slaughtering	22*	36.0	—	36.0
Sheep/Horse Slaughtering	23*	35.2	—	35.2
Milk Products/Crumb	24*	48.5	0.2	48.7
Flour Milling	25	0.5	0.5	1.0
Animal Feed	26	3.5	14.3	17.8
Bread/Biscuits	27	3.8	1.2	5.0
Sugar Refining	28	11.4	2.0	13.4
Chocolate/Sweets	29	26.4	10.9	37.3
Marg/Process of Fruit, etc.	30	18.9	22.8	41.7
Drink	31*	40.1	9.3	49.4
Tobacco	32	17.6	3.0	20.6
Wool Cloth	33*	50.2	22.8	73.0
Wool Yarn	34*	21.8	62.8	84.6
Cotton, etc. Cloth	35*	21.7	101.9	123.6
Cotton, etc. Yarn	36*	25.7	117.2	142.9
Ropes/Mats/Sacks	37*	35.1	26.8	61.9
Rugs/Bed Linen	38	25.4	32.6	58.0
Hosiery/Knitting	39*	33.5	13.8	47.3
Shoes/Leather Goods	40	31.5	8.8	40.3

IO Sector	Sector Number	X	M	X+ M
		DP	DP	DP
Clothing	41*	45.1	8.9	54.0
Lumber/Building Wood	42*	21.1	140.8	161.9
Wood Products/Furniture	43	12.1	18.2	30.3
Paper and Products	44*	21.1	56.9	78.0
Printing/Publishing	45	19.0	24.3	43.3
Fellmongery/Tanning	46*	49.5	21.9	71.4
Fertilisers	47*	0.2	67.0	67.2
Paints, etc.	48*	8.3	33.9	42.2
Med/Soap, etc.	49*	31.5	58.2	89.7
Glass/Pottery	50	25.5	29.3	54.8
Clay Products/Cement	51	14.6	7.7	22.3
Metal Products	52*	21.7	47.5	69.2
Non Electrical Machinery	53*	61.1	55.6	116.7
Cables, etc./Plastics	54*	39.3	89.8	129.1
Other Electrical Equipment	55*	37.6	27.1	64.7
Ships, New/Repair	56*	115.4	—	115.4
Road Vehicles, New	57	0.6	0.1	0.7
Rail Vehicles/Vehicle Repairs	58	0.1	0.9	1.0
Petrol/Rubber/Bit.	59	14.2	23.3	37.5

Basic Source: [3].

A = Artificial sector; X = Exports; M = Competing Imports; DP = Domestic production; * = Exposed Sector.