COMPETITIVE PERFORMANCE IN IRISH INDUSTRY*

Eoin O'Malley

1. Introduction

It would no doubt be widely agreed that competitiveness is very important for the development and sustainability of a successful economy in Ireland. While such a view may seem straightforward, competitiveness is actually quite a complex concept and the word "competitiveness" can appear to take on different meanings in different contexts.

Thus, at one level, it is probably generally understood that competitiveness means the ability of an economy (or an enterprise) to compete effectively in open markets. At the same time, however, it is common in certain contexts to find the term competitiveness being used in a narrower sense to refer only to some factors that would have an *effect* or an *influence* on an economy's ability to compete. For example, the OECD publishes "competitiveness" indicators that are based on each country's unit labour costs or prices relative to other countries. The Central Bank of Ireland also publishes competitiveness indicators of this type. As another example, a recent article by Cerra, Soikkeli and Saxena (2003) provides an analysis of the competitiveness of manufacturing in Ireland, in which "competitiveness" is measured by various indicators based on relative unit labour costs and exchange rates. However, although such indicators may provide information about significant influences on a country's ability to compete, it seems clear that they do not fully represent the whole story about the country's competitiveness.

In order to clarify what is meant by competitiveness, it has been suggested by Buckley, Pass and Prescott (1988) that it is useful to distinguish between "competitive potential", "competitive performance" and "competitive process". Each of these three refer to different phases or aspects of competitiveness. Competitive *potential* refers to factors that could have an input or an influence on the ability to compete successfully. For example, reductions in

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production costs such as labour costs, or improvements in productivity brought about by capital investment or innovation, should strengthen the potential or ability of an economy or an enterprise to compete effectively. Competitive *performance* refers to the outcome of competition between economies or enterprises. Thus, the competitive performance of a particular country might be measured by comparing the growth of its production, the growth of its individual sectors, or the growth of its exports to the performance of other countries with which it competes. Competitive *process* refers to the nature and quality of management processes in enterprises and to relevant aspects of government policy such as industrial policy, education and training. (O'Donnell and Kenny, 1993, provide further discussion of these three dimensions of competitiveness).

The use of this three-way distinction helps to highlight the fact that each of the three aspects is of some importance for an understanding of competitiveness, while each of them on its own also has limitations. It is clearly important to pay some attention to competitive performance, because the basic reason for being interested in competitiveness arises from a desire to achieve a good competitive performance. But focusing on the record of competitive performance alone would mean neglecting the sustainability and regeneration of competitiveness. Indicators of competitive potential or competitive process do provide guidance about the likelihood of such sustainability and regeneration. But on their own they give no indication whether apparent strengths in competitive potential or competitive process actually result in a good competitive performance.

The three-way classification put forward by Buckley, Pass and Prescott (1988) is one way of setting out the various aspects of competitiveness, but it is not the only way. In Ireland, the National Competitiveness Council (2003) has outlined its framework for understanding competitiveness, which has some similarities and some differences. The Council's basic starting point is that "competitiveness is the ability to achieve success in markets leading to better standards of living for all". The approach then sets out a range of relevant factors, ranging from the "inputs" into competitiveness through to the "outputs" of competitiveness, with "intermediates" in between. The "inputs" into competitiveness include the business and work environment, the economic and technological infrastructure, education and skills, entrepreneurship and enterprise development, and innovation. These inputs can influence "intermediate" variables such as labour costs, other business costs, productivity and prices. Ultimately, the inputs and intermediate variables generate the results or "outputs" of competitiveness – such as growth of production, employment and exports, and a number of social indicators pertaining to quality of life.

The two frameworks for understanding competitiveness that are outlined above obviously have their differences.[1] But they share a recognition (a) that competitiveness means the ability to compete, (b) that there is quite a wide range of factors that directly or indirectly act as inputs or influences on that ability to compete, and (c) that the results or outcomes of competitiveness are seen in competitive performance – or economic performance relative to competitors. Thus, an assessment of the results of competitiveness means analysing competitive performance, and this is quite distinct from studying the factors that act as inputs or influences on competitiveness.

In the Irish context, assessment of the inputs or influences on competitiveness has received a considerably greater amount of attention than assessment of competitive performance. This has generally been the case, for example, in the *Annual Competitiveness Reports* from the National Competitiveness Council, which review a wide range of influences on competitiveness in considerable detail. By comparison, a smaller part of these reports is concerned with reviewing competitive performance. The performance indicators that are examined in the relevant sections have mostly been macro-level indicators such as GDP per head, employment growth, and trends in total exports, although the report for 2004 has some more detail such as cross-national comparisons of productivity by sector. Some other reports from other sources have also referred to aspects of competitive performance, such as Ireland's market share or productivity relative to other countries (e.g. NESC, 1999 and 2003; Forfás, 2000). But it would still be true to say that competitive performance has not been reviewed very comprehensively in recent years in Ireland.

This article aims to provide some new information on this topic by reviewing the competitive performance of industry at the level of individual sectors. An assessment at the sectoral level can provide insights that cannot be obtained by examining only macro-level indicators such as total production or exports. For example, it is clear that there has been a relatively high rate of overall growth in Ireland for much of the time since the early 1990s. But there are also indications that a good deal of that growth came from a small number of "modern" or "high-tech" industrial sectors that are quite largely composed of foreign-owned multinational enterprises (MNEs). This has sometimes given rise to concerns that many industries in Ireland may be rather weak, and that their poor performance has been masked by strong growth among the foreign MNEs (see, for example, Enterprise Strategy Group, 2004, Ch. 1). However, while most industries in Ireland may have grown more slowly than the MNEs in the modern or high-tech sectors, this does

[1] These two frameworks are basically taxonomies that identify and categorise various aspects of competitiveness. Apart from them, there are also other frameworks that can be used as tools to analyse what makes particular industries or economies competitive (see Bradley, 2001/2002).

not necessarily mean that they are weak or uncompetitive. It might be that they have grown faster than the corresponding industries in many other countries, suggesting that they have been able to compete successfully. Thus, in order to develop a better understanding of such issues, it is necessary to begin by examining competitive performance in the different sectors.

This article focuses on a few key indicators of competitive performance, namely trends in production, employment and exports – at the sectoral level – in Ireland compared to trends in the EU. It is not claimed that this constitutes a fully comprehensive review of competitive performance since it would be possible in principle to examine matters in considerably more detail. For example, there may be a good case for reviewing performance at the enterprise level in some instances, or for considering the performance of regions or districts within Ireland. However, such a level of disaggregation is beyond the scope of the present article.

Since we compare trends in Ireland with trends in the EU, it may be useful to mention how the EU compares to the rest of the world. The EU accounts for a substantial part of the world's industry, although its share of the total has tended to decline somewhat in recent times. For example, EU countries accounted for 48 per cent of all countries' exports of manufactured products in 1991, declining to 42 per cent in 2000. This reduction in their share of total manufactured exports was almost exactly matched by the increase in share for the developing economies, which accounted for 20 per cent of all countries' exports of manufactured products in 1991 rising to 26 per cent in 2000.[2] Thus, when comparing Irish and EU trends it should be borne in mind that the EU's share of world industry has been slipping gradually, mainly because of the rising share of developing countries with very much lower labour costs.

This article focuses on manufacturing industry and does not include internationally traded services. This is because of data constraints in making the types of comparisons that are presented here. In a different context, it would be possible to make a somewhat different and less detailed assessment of the competitive performance of internationally traded services.

2. Output Trends

It is well known that there has been a relatively high rate of economic growth in Ireland for much of the time since the early 1990s. Furthermore, industrial production in Ireland has tended to grow faster than the economy as a whole. Hence industrial production in Ireland has generally grown quite rapidly by international standards.

Table A1 in the Appendix presents data, by sector, on Ireland's industrial output as a percentage of production in the EU. In this

[2] These figures are derived from the United Nations *Statistical Yearbook*. Exports are valued in current US dollars. "All countries" here does not include Eastern Europe and the former USSR.

table the EU is represented by 9 of the 15 member states, due to limitations of data availability. However, since the 9 countries concerned include all of the largest national economies, these 9 account for about 90 per cent of total EU industrial production.[3]

Table A1 shows that the value of Ireland's total manufacturing output amounted to 0.879 per cent of the value of production in the EU-9 in 1991, rising very substantially to 2.142 per cent in 2001. This large increase at the level of total manufacturing is not particularly surprising, but there are some points worth noting about the more detailed trends.

First, it would probably be generally expected that much or all of the overall increase would be attributable to the minority of "high-tech" or "modern" sectors that consist predominantly of foreign-owned MNEs. Table A1 does show in fact that these sectors in Ireland generally increased their share of EU production very substantially. To simplify matters, Table 1 is derived from the more detailed Table A1 and it presents, for each sector, the ratio of Ireland's share of EU-9 production in 2001 to Ireland's share of

Table 1: Ratio of Ireland's Share of EU-9 Production in 2001 to Ireland's Share in 1991

Code		
15-16	Food, drink & tobacco	1.34
17	Textiles	0.75
18	Clothing	0.74
19	Leather & footwear	0.73
20	Wood & wood products	1.87
21	Paper & paper products	1.27
22	Printing & publishing	3.78
24	Chemicals	4.98
25	Rubber & plastics	1.13
26	Non-metallic mineral products	1.41
27	Basic metals	1.20
28	Fabricated metal products	1.27
29	Machinery & equipment nec	1.31
30	Office machinery, computers	5.20
31	Electrical machinery (not elsewhere classified (n.e.c))	3.12
32	Communications equipment	5.22
33	Medical & precision equipment	3.48
34-35	Transport equipment	1.11
23,36,37	Furniture & miscellaneous	1.01
	TOTAL MANUFACTURING	2.44

[3] The data in Table A1 show Ireland's "gross output" as a percentage of the EU countries' "production". There are slight differences between these two accounting concepts, gross output and production, but they are so similar that the results in the tables would not give a misleading impression of trends. Both gross output and production are measures of the final value of output, as opposed to value-added or net output. See the Appendix on Data Issues.

EU-9 production in 1991. Thus Table 1 shows, for example, that Ireland's share of total EU-9 manufacturing production in 2001 was 2.44 times greater than its share of total EU-9 manufacturing production in 1991. As regards the high-tech or modern sectors, the share of Ireland's Chemicals sector in EU-9 Chemicals production was 4.98 times higher in 2001 than it had been in 1991, while the corresponding ratios were 5.2 for Office machinery and computers, 3.12 for Electrical machinery, 5.22 for Communications equipment, and 3.48 for Medical & precision equipment. In addition, the Printing & publishing sector – in which reproduction of software is a major component in Ireland – had a ratio of 3.78.

It can also be seen, however, that these were by no means the only sectors in Ireland that increased their share of EU production. In fact in every sector in Table 1 – except for Textiles, Clothing, and Leather & footwear – Ireland's share of EU production increased to some extent between 1991 and 2001.

A second point of interest in Table A1 in the Appendix is the timing of the increases in Ireland's share of EU production. There is by now quite a substantial literature on the phenomenon of the "Celtic Tiger", or the period of exceptionally rapid economic growth in Ireland since the early 1990s. In that literature, the period concerned is often (although not always) said to have begun after 1993; in the few years up to 1993 GNP increased by modest rates of just 2-3 per cent per year, but after that there was sustained high growth at rates ranging from at least 7 per cent to over 10 per cent per year. It is therefore of interest to note that Table A1 shows that Ireland's share of EU industrial production was already increasing in the period 1991-93. This was true not only at the level of total manufacturing but it was also true in about three-quarters of the sectors in the table. However, in a context of weak international growth at that time, this relatively strong competitive performance did not result in high rates of growth in Ireland.

Table A2 shows the value of the increases or decreases in Ireland's share of EU production since the base year 1991. For example, Table A1 showed that the Food, drink & tobacco industry in Ireland increased its share of EU production from 2.076 per cent in 1991 to 2.153 per cent in 1992. Table A2 shows that as a result the Food, drink & tobacco industry in 1992 had output worth $501 million more than if it had simply maintained the same share of EU production that it had in 1991. Similarly, Table A1 showed that the Food, drink & tobacco industry in Ireland increased its share of EU production from 2.076 per cent in 1991 to 2.782 per cent by 2001. Table A2 shows that the consequence of this was that the Food, drink & tobacco industry in 2001 had output worth $3,815 million more than if it had simply maintained the same share of EU production that it held in 1991.

Positive numbers in Table A2 mean, therefore, that the industry concerned, in the year concerned, was producing more than it would have done by maintaining the same share of EU production that it held in 1991. Negative numbers mean that the industry was

producing less than it would have done by maintaining its 1991 share of EU production.

It can be seen that most sectors most of the time were making gains as a result of increasing their share of EU production. The greatest exception was the Textiles industry which was in negative territory for most of the period and which had output worth $138 million less by 2001 than it would have had by maintaining its 1991 share of EU production. The Clothing industry made gains until 1996 but it later had a decreasing share of EU production and by 2000 was producing less than if it had its 1991 share of EU production. The Leather & footwear sector was also in negative territory in recent years.

On the other hand most sectors had quite substantial increases in output by 2001 as a result of increasing their share of EU production since 1991. The value of these increases was greatest in some of the "modern" or "high-tech" sectors that were mentioned above, such as Chemicals, Office machinery and computers, Printing & publishing (mainly due to software), and Communications equipment. But most of the other sectors also made quite substantial gains.

As regards Total Manufacturing, Table A1 showed that total manufacturing output in Ireland increased from 0.879 per cent of EU total manufacturing production in 1991 to 2.142 per cent by 2001. The "Total Manufacturing" row of Table A2 shows that the result was that total manufacturing output in Ireland by 2001 was worth $49.9 billion more than it would have been if Irish total manufacturing had maintained the same share of EU total manufacturing production that it held in 1991.

The "sum of sectors" row in Table A2 presents a different way of summarising the overall results which is actually more meaningful for the purpose of assessing competitive performance. The figures in the "sum of sectors" row are simply the sum of the gains and losses in all sectors in the year concerned. The fact that these figures differ somewhat from the figures in the "total manufacturing" row arises because the sectoral composition of industry in Ireland differs from the sectoral composition in the EU, while industries also grow at different rates. Thus, it can be seen in Table A2 that the overall "sum of sectors" gain by 2001 amounted to $51.9 billion, compared to a lower figure of $49.9 billion for the "total manufacturing" gain. This means that industry in Ireland – compared to industry in the EU – was somewhat more highly concentrated in sectors that were growing relatively slowly. Hence the gains that were recorded at the level of the individual sectors were not fully reflected in the "total manufacturing" gain.

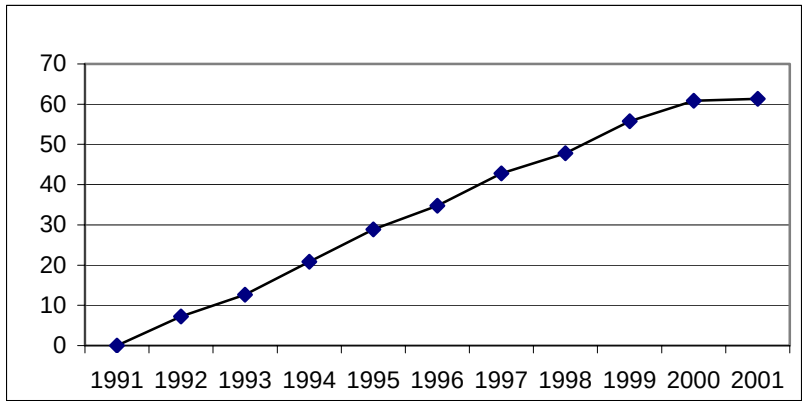
The differences between the "total manufacturing" figures and the "sum of sectors" figures in Table A2 are not very great, so that the sectoral composition effect is not very important in this case. However, this effect can be very significant in other situations as will be seen below.

A final point about Table A2 is that the bottom row of the table, as well as Figure 1, shows the overall "sum of sectors" gain expressed as a percentage of total Irish manufacturing output in the year concerned. Thus by 2001, the overall gains in production in Ireland arising from gains in share of EU production since 1991 amounted to 61 per cent of output in 2001. To put it another way, if each sector in Ireland had simply maintained the share of EU production that it held in 1991, the value of Ireland's industrial output in 2001 would have been 61 per cent less than it actually was.

Although the data are not available to bring this type of analysis more up to date at the sectoral level, it is clear at least that total manufacturing output grew faster in Ireland than in the EU in 2001-2003.

Tables A3 and A4 present a similar type of analysis for Irish indigenous or Irish-owned industry, leaving out foreign-owned multinational companies. These tables show that most sectors of indigenous industry were increasing their share of EU production at most times since 1991. About three-quarters of the sectors increased their share from the start – in 1991-92 (before what is commonly identified as the "Celtic Tiger" period) – and they mostly tended to build on these gains subsequently.[4] By 2000 all but three of the sectors had increased their share of EU production and, although many of them had a declining share in 2000-2001, all but four of the sectors still had a significantly greater share in 2001 than they held in 1991.

Figure 1: Sum of Ireland's Sectoral Gains and Losses in Production Arising from Changes in Share of EU Production Since 1991, as Percentage of Ireland's Total Manufacturing Output



[4] An earlier article by O'Malley (1998) indicates that total Irish indigenous manufacturing was actually growing faster than EU or OECD industry since about 1987.

A point worth noting is that some of the largest gains in share were recorded in the "modern" or "high-tech" sectors which would generally be thought of as largely foreign owned. Table 2 is derived from the more detailed Table A3 and it presents, for each sector, the ratio of Irish indigenous industry's share of EU production in 2001 to its share of EU production in 1991. As regards the high-tech or modern sectors, the share of the Irish indigenous Office machinery & computers sector in EU Office machinery & computers production was 5.37 times higher in 2001 than it had been in 1991, while the corresponding ratios were 1.84 for Electrical machinery, 4.27 for Communications equipment, and 4.15 for Medical and precision equipment. It can also be seen in Table 2, however, that these were by no means the only sectors of indigenous industry that increased their share of EU production between 1991 and 2001.

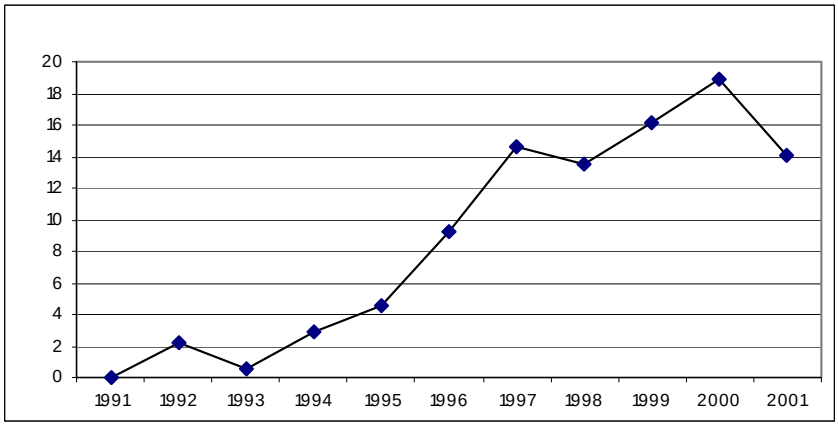
Table 2: Ratio of Irish Indigenous Industry's Share of EU-9 Production in 2001 to Its Share in 1991

Code		
15-16	Food, drink & tobacco	1.05
17	Textiles	1.12
18	Clothing	0.70
19	Leather & footwear	0.42
20	Wood & wood products	1.79
21	Paper & paper products	1.05
22	Printing & publishing	1.30
24	Chemicals	1.10
25	Rubber & plastics	1.47
26	Non-metallic mineral products	1.37
27,28	Metals & metal products	1.33
29	Machinery & equipment n.e.c	1.69
30	Office machinery, computers	5.37
31	Electrical machinery nec	1.84
32	Communications equipment	4.27
33	Medical & precision equipment	4.15
34-35	Transport equipment	0.44
23,36,37	Furniture & miscellaneous	0.89
	TOTAL MANUFACTURING	1.08

Turning to the summary measures in Table A4, it can be seen that the "total manufacturing" and the "sum of sectors" measures were rising most of the time since 1991, but there were interruptions to the general rising trends in 1993 and 1998 (the "sum of sectors" measure is presented graphically in Figure 2). These interruptions would have been largely an effect of exchange rate changes. In 1993 and 1998 the Irish pound declined in value relative to the main EU currencies, so that the value of a given quantity of Irish output would have fallen relative to a given quantity of EU output when measured in a common currency. Of course, such devaluations might be expected, other things being equal, to increase Irish competitiveness and hence production subsequently, but the short-term effect of Irish currency decline – in the year when it occurred – seems to have been to reduce the Irish share of the value of EU

production below what it would be otherwise. It is also noticeable that the summary measures in Table A4 turned downwards in 2001 but that would not have been due to exchange rate changes.

Figure 2: Sum of Irish Indigenous Industry's Sectoral Gains and Losses in Production Arising from Changes in Share of EU Production Since 1991, as Percentage of Irish Indigenous Industry's Total Output



Another point worth noting about the summary measures in Table A4 is that there is a large divergence between the two types of measure. The "sum of sectors" gain by 2001, at $2.5 billion, was about twice as large as the gain of $1.2 billion in "total manufacturing". This means that individual sectors of indigenous industry were increasing their shares of EU production to an extent that was not well reflected in the "total manufacturing" gain. This would have occurred because Irish indigenous industry – compared to EU industry – was a good deal more highly concentrated in relatively slow-growing sectors. However, this feature was probably changing as the more modern sectors in indigenous industry were increasing their share of EU production rapidly.

As a measure of the overall growth performance of Irish indigenous industry relative to the EU, the third last row of Table A4 shows that the "sum of sectors" overall gain in share of EU production amounted to 14.1 per cent of the output of Irish indigenous industry by 2001. To add some further information, it may be noted that Food, drink & tobacco has been a particularly large component of Irish indigenous industry, and its share of EU production increased quite slowly in 1991-2001 as shown in Table 2. Leaving out the Food, drink & tobacco sector, the last two rows of Table A4 show that the rest of Irish indigenous industry had a "sum of sectors" overall gain in share of EU production amounting to $2.1 billion by 2001, which was equivalent to 22.7 per cent of the output of the rest of Irish indigenous industry in that year.

3. Employment Trends

This section examines trends in industrial employment compared to trends in the EU. It must be acknowledged that such relative employment trends are not quite a measure of competitive performance in the same way as output trends or export trends. This is because companies do aim to produce and sell products, but they do not aim to generate employment as such.

However, employment trends are of interest for two types of reason. First, it is of interest for public policy to know what is happening to employment, since it is often a policy objective to generate employment. Second, there can be doubts at times in Ireland about the real significance of trends in output or exports. This applies particularly in the case of industries that are mainly composed of foreign-owned multinational companies. The value of these companies' output in Ireland can owe a great deal to their activities outside Ireland such as research & development, and it may be artificially boosted by transfer-pricing, giving rise to some doubts about what the value of their output really means for the Irish economy. More generally, movements in exchange rates can give rise to quite sharp changes in a country's share of the value of EU production or exports, at least in the short term. But such short-term changes may not correspond to real changes in actual production. For these reasons, employment trends can sometimes provide a more solid or dependable indication of what is happening, or at least they can provide an additional perspective that helps to give a more rounded picture.

Table A5 in the Appendix shows employment in each sector in Ireland as a percentage of employment in the EU, while Table A6 shows the increases or decreases in employment arising from gains or losses in Ireland's share of EU employment since 1991. Table 3 is derived from the more detailed Table A5 and it presents, for each sector, the ratio of Ireland's share of EU employment in 2001 to its share of EU employment in 1991. In many respects these tables reflect and confirm the trends in Ireland's share of EU production that were discussed above in connection with Tables 1, A1 and A2, with the notable qualification that the gains in Ireland's share of EU employment are often not as large as the gains in share of EU production.

Thus, Table 3 shows that Ireland's share of EU total manufacturing employment was 1.45 times higher in 2001 than it had been in 1991, which was a large increase but not as large as the increase in share of total manufacturing production seen in Table 1. Similarly, between 1991 and 2001 Ireland's share of EU employment increased very substantially in the "modern" or "high-tech" sectors – Chemicals, Office machinery & computers, Electrical machinery, Communications equipment, Medical & precision equipment, and Printing & publishing. But none of these increases was as large as the increases in their share of EU production seen in Table 1. In each of these cases, and in total manufacturing, Ireland had a

Table 3: Ratio of Ireland's Share of EU-15 Employment in 2001 to its Share in 1991

Code		
15-16	Food, drink & tobacco	1.17
17	Textiles	0.79
18	Clothing	0.50
19	Leather & footwear	0.75
20	Wood & wood products	1.52
21	Paper & paper products	1.32
22	Printing & publishing	1.70
24	Chemicals	2.01
25	Rubber & plastics	1.13
26	Non-metallic mineral products	1.14
27	Basic metals	1.29
28	Fabricated metal products	1.30
29	Machinery & equipment nec	1.36
30	Office machinery, computers	3.52
31	Electrical machinery nec	1.42
32	Communications equipment	3.00
33	Medical & precision equipment	2.34
34-35	Transport equipment	1.18
23,36,37	Furniture & miscellaneous	1.31
	TOTAL MANUFACTURING	1.45

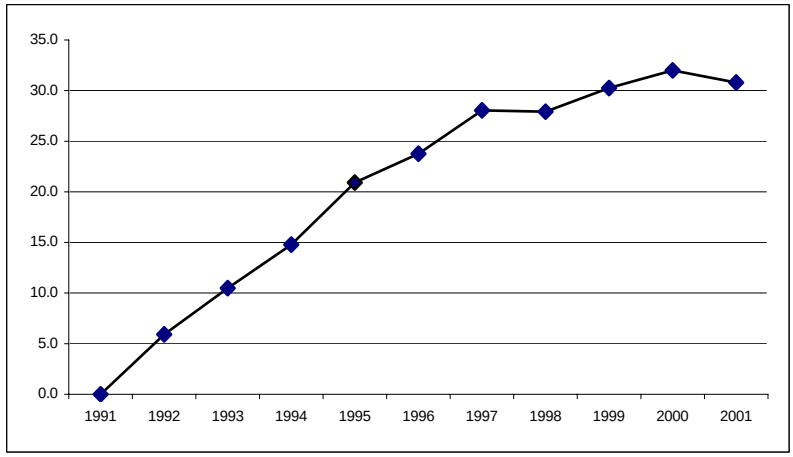
relatively high and rapidly rising value of output per employee compared to the EU. Consequently, Ireland's share of EU production was rising faster than its share of EU employment – primarily owing to the high and rising levels of recorded value of output per employee in foreign-owned multinational companies in Ireland. However, although Ireland's share of EU employment was rising more slowly than its share of EU output in the cases mentioned above, this should not obscure the fact that Ireland's share of EU employment really was rising substantially in all these cases.

The analysis of trends in Ireland's share of EU employment in Tables 3, A5 and A6 also confirms the trends in Ireland's share of EU output in other respects. First, Ireland's share of EU employment increased in 1991-2001, not only in the "high-tech" sectors, but also in every other sector apart from Textiles, Clothing, and Leather & footwear. Second, Ireland's share of EU employment was already increasing substantially in the period 1991-93 (before what is often identified as the "Celtic Tiger" period), in nearly all sectors. Third, the greatest employment gains arising from gains in share of EU employment generally occurred in the "high-tech" sectors, as seen in Table 3, but most of the other sectors also recorded significant gains.

The last two rows in Table A6, and Figure 3, show that the total employment gains arising from increases in Ireland's share of EU industrial employment since 1991 amounted to 77,138 by 2001,

which was 30.8 per cent of total Irish manufacturing employment in that year. These figures were down a little from the peak reached in 2000.

Figure 3: Sum of Ireland's Sectoral Gains and Losses in Employment Arising From Changes in Share of EU Employment Since 1991, as Percentage of Ireland's Total Manufacturing Employment



Tables A7 and A8 in the Appendix, and Table 4, present a similar type of analysis for Irish indigenous or Irish-owned industry. These tables indicate that the trends in Irish indigenous industry's share of EU employment were generally similar to the trends in Irish indigenous industry's share of EU production that were discussed above in connection with Tables 2, A3 and A4. Thus, most sectors

Table 4: Ratio of Irish Indigenous Industry's Share of EU-15 Employment in 2001 to its Share in 1991

Code		
15-16	Food, drink & tobacco	1.22
17-18	Textiles & clothing	0.77
19	Leather & footwear	0.65
20	Wood & wood products	1.41
21	Paper & paper products	1.30
22	Printing & publishing	1.44
24	Chemicals	1.79
25	Rubber & plastics	1.48
26	Non-metallic mineral products	1.16
27-28	Metals & metal products	1.43
29	Machinery & equipment nec	1.67
30	Office machinery, computers	2.40
31	Electrical machinery nec	1.94
32	Communications equipment	2.62
33	Medical & precision equipment	3.78
34-35	Transport equipment	0.60
23,36,37	Furniture & miscellaneous	1.48
	TOTAL MANUFACTURING	1.32

of indigenous industry were increasing their share of EU employment at most times since 1991. Nearly all of the sectors were already increasing their share in the early years of the 1990s, before the rapid macroeconomic growth that occurred after 1993. By 2000, all but three sectors had increased their share of EU employment since 1991 and, although many of them had a declining share in 2000-2001, all but three of the sectors still had a significantly greater share in 2001 than they held in 1991.

A point worth mentioning here is that the indigenous Transport equipment sector was one of the exceptions that had a declining share of EU employment, with a particularly large decline occurring between 1998 and 1999. That particular decline would have been largely caused by the sale by Aer Lingus of its aircraft maintenance subsidiary to a foreign company in 1998. In other words there was a change in nationality of ownership in that instance rather than a real decline. Thus, changes in nationality of ownership can affect the trends shown by this type of data, although the effects would usually be much less significant than the example mentioned here. The net effect of such changes would mostly be to make the performance of Irish indigenous industry seem somewhat weaker than the underlying reality.

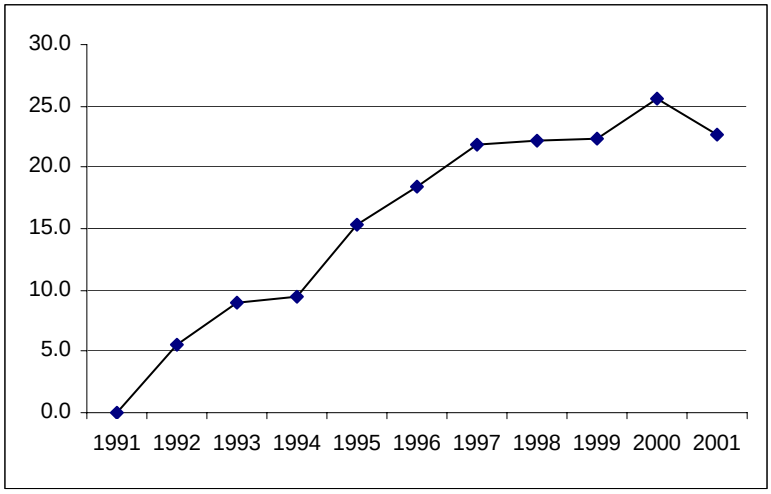
It can be seen in Table 4 that some of the largest gains in EU employment share by Irish indigenous industry occurred in the "high-tech" sectors, as was also noted above with respect to shares of EU production. Irish indigenous industry's share of EU employment in Chemicals was 1.79 times higher by 2001 than it had been in 1991, while the corresponding ratios were 2.4 for Office machinery & computers, 1.94 for Electrical machinery, 2.62 for Communications equipment and 3.78 for Medical & precision equipment.

It was noted above, in referring to Table A4, that the general overall rise in Irish indigenous industry's share of the value of EU production was interrupted by temporary declines in 1993 and 1998. It was pointed out that these interruptions would have been largely an effect of declines in the value of the Irish pound, rather than real declines in production relative to the EU. This suggestion is supported by Table A8, where it can be seen that Irish indigenous industry's share of EU employment continued to rise through 1993 and 1998. It was also noted in discussing Table A4 that indigenous industry's share of EU production turned downwards in 2001, for reasons that would not have been connected to exchange rate changes. Reflecting this, Table A8 shows that many indigenous sectors did have a decline in their share of EU employment in 2001.

The last two rows of Table A8 show that the total employment gains arising from increases in Irish indigenous industry's share of EU industrial employment since 1991 amounted to 28,886 by 2001, which was 22.7 per cent of total Irish indigenous manufacturing employment in that year (see also Figure 4). This was somewhat larger than the corresponding gain in Irish indigenous industry's

share of EU production by 2001, which amounted to 14.1 per cent of indigenous manufacturing production in that year.

Figure 4: Sum of Irish Indigenous Industry's Sectoral Gains and Losses in Employment Arising from Changes in Share in EU Employment Since 1991, as Percentage of Irish Indigenous Industry's Total Manufacturing Employment



4. Export Trends

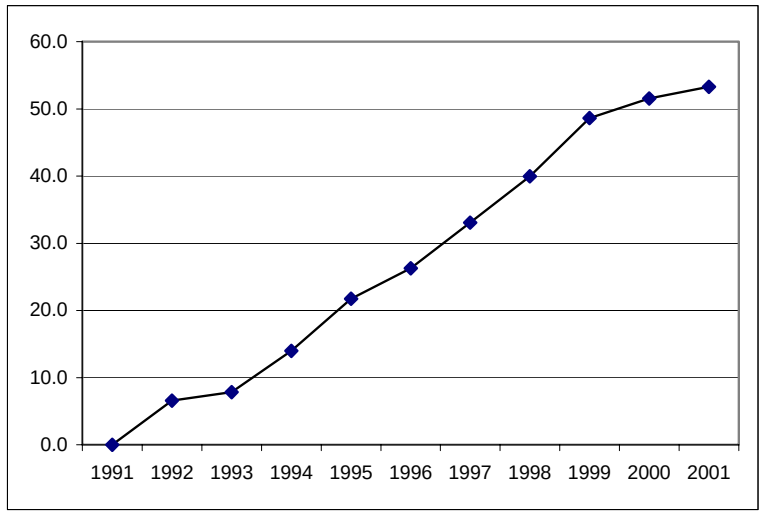
This section examines trends in exports from Ireland compared to EU exports. EU exports in this context means all exports from each of the EU member countries concerned, including exports that are sold in other EU member countries.

Table A9 shows exports from each sector in Ireland as a percentage of EU exports, while Table A10 shows the increases or decreases in Ireland's exports arising from gains or losses in Ireland's share of EU exports since 1991. It is clear that the overall picture here is very positive from Ireland's perspective. Ireland's total manufacturing exports increased from 1.56 to 3.456 per cent of the EU total between 1991 and 2001, and the Irish percentage rose in every year in that period (Table A9). In addition, the value of the overall gain in Ireland's exports, arising from increases in shares of EU exports since 1991, amounted to $36.8 billion by 2001. This represented 53.3 per cent of Ireland's total manufacturing exports in that year (Table A10 and Figure 5).

At the sectoral level, the major gains in share of EU exports occurred in the "modern" or "high-tech" sectors – Chemicals, Electrical & optical equipment and Paper & printing – while there were also gains in three other sectors. On the other hand, six sectors in these tables had some decline in their share of EU exports between 1991 and 2001. Of these six sectors, Textiles & clothing is perhaps not surprising since its share of EU production was also falling, as was seen in Table A2. But in the case of the other five sectors – Rubber & plastic products, Non-metallic mineral products, Metals & metal products, Machinery & equipment n.e.c., and Other

manufacturing – Ireland's share of EU production increased while its share of EU exports decreased over the period.

Figure 5: Sum of Ireland's Sectoral Gains and Losses in Exports Arising from Changes in Share of EU Exports since 1991, as Percentage of Ireland's Total Manufacturing Exports



By way of background to this situation, it is worth noting that the EU countries in general were experiencing particularly rapid growth in international trade as both their exports and imports grew much faster than their GDP in the period after 1993 (Kennedy, 2000/2001). The EU's GDP, exports and imports had all been growing at about 1.5-2.5 per cent per year in the few years before 1993, and its GDP continued growing at a rate of 2.5 per cent per year in 1993-2000, but the rate of export growth in 1993-2000 accelerated to 8.0 per cent per year and import growth accelerated to 8.1 per cent per year, all measured in terms of volume. Thus, after 1993 exports and imports were generally growing much faster than production in EU countries. It seems that this may be largely attributable to the completion of the "Single European Market" by 1992, which was expected to encourage significant growth in trade between EU countries.

In this context, it is not very surprising that a number of sectors in Ireland could have production growth rates that were higher than in the corresponding sectors in the EU, while their export growth rates were lower than the EU rates. The growth rates of EU exports for most sectors were exceptionally high in the period under review.

Table A11 shows exports from each sector of Irish indigenous or Irish-owned industry as a percentage of EU exports, while Table A12 shows the increases or decreases in Irish indigenous exports arising from gains or losses in Irish indigenous industry's share of EU exports since 1991. At first sight the results here may seem rather poor, but more careful examination shows that there was actually not a bad export performance by indigenous industry.

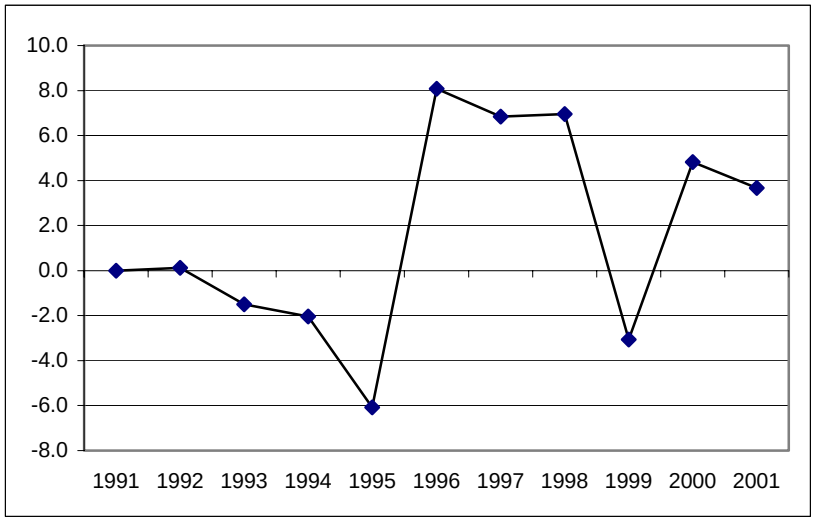
On the negative side, total exports from Irish indigenous industry declined from 0.407 per cent of total EU manufacturing exports in 1991 to 0.324 per cent by 2001 (Table A11). The value of the loss of Irish indigenous exports arising from this loss in share of total EU exports amounted to $1,643 million by 2001, as measured by the "total manufacturing" row of Table A12. However, this view of the matter is too simple and rather misleading for two main reasons.

First, looking at the "sum of sectors" row of Table A12, it can be seen that the combined gains and losses of all the individual sectors, arising from gains or losses of shares of EU exports, amounted to a considerably smaller loss of $637 million by 2001. The fact that there was quite a large difference between this figure and the figure in the "total manufacturing" row indicates that Irish indigenous exports had an unfavourable sectoral composition, meaning that – compared to EU exports – they were relatively highly concentrated in sectors which had relatively slow growth.

Second, in presenting the data on industrial exports in the *Census of Industrial Production*, the Central Statistics Office warns each year that one should be cautious about using export data on the food industry. This is because respondents to the Census may vary in the extent to which they interpret sales into EU intervention and to the Irish Dairy Board as exports. This point is particularly important for Irish indigenous exports, because exports of food – and especially meat and dairy products which are the major products affected – are a large component of indigenous exports. If we take it that the indigenous food export data are unreliable and therefore leave the Food, drink and tobacco sector out of the calculations, as shown in the last two rows of Table A12, the results for Irish indigenous "non-food" exports are reasonably positive overall.[5] There were some overall losses arising from losses in shares of EU exports up to 1995, but there were generally net gains arising from gains in shares of EU exports after that (see also Figure 6). The one exceptional year after 1995 when the overall result turned negative was 1999. The figure for that year would have been adversely affected by a change in nationality of ownership of a large company since Aer Lingus sold its aircraft maintenance subsidiary to a foreign company in 1998, as was mentioned above.

[5] Another reason for focusing on "non-food" exports is because production (and hence exports) of dairy products have been greatly influenced by the Common Agricultural Policy. Thus, trends in dairy products – which account for about one-third of Irish indigenous Food, drink and tobacco output – could be influenced by policy constraints more than competitiveness.

Figure 6: Sum of Irish Indigenous Non-Food Industry's Sectoral Gains and Losses in Exports Arising from Changes in Share of EU Exports since 1991, as Percentage of Total Irish Indigenous Non-Food Manufacturing Exports



At the sectoral level within Irish indigenous industry, it is noticeable that two sectors increased their share of EU exports very substantially between 1991 and 2001, namely Electrical & optical equipment which more than doubled its share of EU exports and Machinery & equipment n.e.c. which increased its share by almost 60 per cent. This must rate as a strong performance by two sectors that would not have been counted as traditional areas of strength in Irish indigenous industry. In fact, in 1991 these two sectors accounted for only 6 per cent of Irish indigenous exports, but by 2001 this figure rose to 19 per cent. In addition, Wood & wood products and Paper & printing increased their share of EU exports by 25-30 per cent between 1991 and 2001.

On the other hand, the other six sectors of Irish indigenous industry in Tables A11 and A12 experienced some decline in their share of EU exports between 1991 and 2001. These reductions happened despite the fact that four of the six increased their share of EU production over the same period, as was seen in Table 2. As was outlined above, it was quite feasible for a number of industries in Ireland to have declining shares of EU exports together with rising shares of EU production in a context where EU exports were mostly growing much faster than EU production.

In order for the exports of an Irish indigenous industry to grow more slowly than EU exports while production of that indigenous industry grew faster than EU production, it was necessary for the domestic sales of that industry in the Irish market to grow faster than the domestic sales of the corresponding EU industry. That, in turn, meant either that Irish domestic demand had to be growing faster than domestic demand in the EU, or that the Irish industry concerned had to be more successful than the EU industry in

winning and retaining domestic market share, or some combination of both of these factors.

In fact real total domestic demand did grow considerably faster in Ireland than in the EU from 1994 on, as the Irish economy was growing a good deal faster. That would have made it possible for some Irish indigenous industries to have faster production growth than their EU counterparts even if they did not have a good competitive performance in terms of market share. However, it is also worth noting that in the few years before 1994 Irish domestic demand did not grow faster than EU domestic demand (Gray, 1997, Table 3). Despite that, a large majority of sectors in Irish indigenous industry did have faster production growth than their EU counterparts at that time. This indicates that, in the early 1990s at least (and possibly later), most sectors of indigenous industry, including some that did not have a good competitive performance in export markets, must have had a relatively strong performance in terms of domestic market share.

Box 1: Competitive Performance in Northern Ireland*

A similar type of analysis shows that manufacturing output grew faster in Northern Ireland than in the EU, although not by as great a margin as in the South. Northern Ireland's share of total EU manufacturing output increased from 0.3 per cent in 1991 to 0.4 per cent in 2000. Most individual sectors in Northern Ireland also increased their share of EU production. The most striking gain in share of EU production was in Electrical & optical equipment (which includes electronics). The output of industry in Northern Ireland by 2000 was worth $4.6 billion more than it would have been if each sector had just maintained the share of EU production that it held in 1991. This amount was equivalent to 29.1 per cent of the total output of Northern Ireland's industry in 2000.

All sectors of the North's industry increased their share of EU employment between 1991 and 2000 with the exception of Textiles, clothing & leather. The most important gain in share of EU employment occurred in Electrical & optical equipment, as was also the case with respect to shares of EU production. Total manufacturing employment in Northern Ireland by 2000 was 14,600 higher than it would have been if all sectors had simply maintained the share of EU employment that they held in 1991. This figure amounted to 14 per cent of total manufacturing employment in the North in 2000.

Northern Ireland's manufacturing exports by 2000 were worth 6.8 per cent more than they would have been if each sector had simply maintained the share of EU exports that it held in 1991. The North had increasing shares of both EU production and EU exports in most sectors over the period 1991-2000.

(*With acknowledgements to Michael Anyadike-Danes and Karen Bonner)

5. Conclusions

This review of competitive performance includes findings that are reasonably encouraging. It might have been thought that the unusually rapid industrial growth that occurred in Ireland after the early 1990s was only an effect of the growth of foreign-owned multinational companies in a few high-tech sectors. However, the findings here indicate that, when compared with the international context of the EU, there have also been broader areas of successful competitive performance, both extending into other sectors and including at least substantial parts of Irish indigenous industry. Furthermore, the relatively good competitive performance of industry in Ireland was already happening at the start of the 1990s and before the rapid macroeconomic growth of the "Celtic Tiger" period.

At the level of all industry, meaning Irish-owned plus foreign-owned together, all industrial sectors in Ireland except for Textiles, Clothing and Leather & footwear had faster growth of both output and employment than corresponding sectors in the EU in 1991-2001. As regards exports, the record of Ireland's growth compared to the EU was also overwhelmingly positive on balance, although a number of other sectors besides Textiles, Clothing and Leather & footwear had slower export growth than their EU counterparts.

In Irish indigenous industry, the large majority of sectors again had faster growth of both output and employment than corresponding sectors in the EU, with the principal exceptions being Textiles, Clothing and Leather & footwear. A number of sectors of indigenous industry also had relatively rapid growth of exports compared to the EU, namely Electrical & optical equipment (which includes electronics), Machinery & equipment, Wood & wood products and Paper & printing. Thus, these indigenous sectors had a good competitive performance in all three respects. At the other end of the spectrum, Textiles & clothing had a relatively weak record in terms of export growth, as well as output and employment.

In between these two groups were the remaining indigenous sectors, which had relatively fast growth compared to the EU in terms of output and employment but relatively slow growth in terms of exports. A pessimistic interpretation of this outcome could be that these industries sold mainly to the Irish domestic market and that their growth was driven mainly by exceptionally rapid growth in domestic demand, despite the fact that they were not truly competitive as shown by their relatively slow export growth. On the other hand, a more favourable interpretation could be that, faced with one of the world's most rapidly growing domestic markets, they had much less need than industries in other EU countries to increase their exports rapidly. In that case, their export performance does not necessarily show that they were uncompetitive. Before concluding that they were uncompetitive, it would be necessary to examine their competitive performance in terms of market share in the Irish domestic market. As noted above, there is evidence from the early 1990s that suggests that most indigenous sectors did have a relatively

good competitive performance in the domestic market at that time at least.

Finally, the findings of this analysis may seem to be in some conflict with the recent report of the Enterprise Strategy Group (2004, pp. 8,9), which made some quite negative comments about indigenous industry. Specifically, that report said that over the period 1990-2002, "when inflation is taken into account, the real growth in both sales and exports [of indigenous industry] was negligible". It might be asked how can that view be compatible with the finding in this article that most sectors of indigenous industry had faster growth than corresponding sectors in the EU.

Part of the answer is that when the Enterprise Strategy Group described the indigenous industrial growth rate as negligible, it seems from the context that they had in mind, at least implicitly, a comparison with the exceptionally high rate of growth of foreign-owned industry in Ireland. That would be a very demanding standard for comparison relative to international experience. This article, on the other hand, makes comparisons with growth rates in the EU. Apart from that difference in perspective, our analysis shows that, when taken sector by sector, the growth of Irish indigenous industries relative to the EU looks substantially better than it does at the aggregate level, and the Enterprise Strategy Group report does not go into that type of detail.

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APPENDIX: DATA ISSUES AND DETAILED TABLES

There can be small differences between the data sets that were used for Ireland and the other EU countries, but this should not affect the results to the extent that they would give a misleading impression of the trends.

OUTPUT AND EXPORTS

As regards measures of industrial output, the basic choice – in principle – would be between final or gross measures such as gross output, turnover or sales on the one hand, and measures of value-added on the other hand. There could be arguments in favour of either type for the purpose of assessing competitive performance, but in practice the choice was constrained by data availability. Specifically, the suitable data that were available for Irish indigenous industry over a sufficient period did not include value-added. (There are data on "net output" in indigenous industry, but this is a significantly different concept from value-added in international data sets). Therefore, the measures of output that were chosen for comparative purposes were final or gross measures, namely gross output for Ireland and "production" for the EU.

The "gross output" and "production" measures are very similar, although a difference that affects a few sectors such as drink and tobacco is that excise duty is not included in the value of gross output but is included in the value of production; (VAT is not included in either concept).

As regards the data sources, gross output and exports data for Ireland were taken from the "Census of Industrial Local Units" section of the *Census of Industrial Production* (CIP). The OECD's STAN database was used as the source for data on EU countries' production and exports. The advantages of this source include the fact that it provides consistent data over a long period with detailed sectoral breakdown that can be matched to the data for Ireland. More specifically, and more unusually, this source provides export data that are classified by sector using the same classification system that is used for production and employment data. This feature is important for the purpose of matching EU countries' export data to the export data that are available for Irish indigenous industry from the CIP.

EMPLOYMENT

The employment data for Ireland again come from the "Census of Industrial Local Units" section of the annual CIP. The employment data for the EU were taken from the Groningen Growth and Development Centre's 60-Industry Database. The advantage of this source is that it provides a consistent series over a long period with the required sectoral breakdown and with combined figures for the EU-15 already calculated. There may be small differences in the definitions used in these data sources but it is unlikely that such differences would significantly affect the trends in how the employment shares change over time.

Table A1: Ireland's Gross Output as a Percentage of Production in EU (9)*

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	2.076	2.153	2.128	2.219	2.307	2.355	2.443	2.406	2.589	2.734	2.782
17	Textiles	0.566	0.549	0.551	0.579	0.555	0.543	0.505	0.434	0.420	0.422	0.423
18	Clothing	0.530	0.547	0.551	0.603	0.624	0.658	0.670	0.642	0.559	0.433	0.390
19	Leather & footwear	0.206	0.221	0.220	0.289	0.260	0.157	0.179	0.184	0.168	0.187	0.150
20	Wood & wood products	0.504	0.520	0.501	0.544	0.551	0.614	0.773	0.781	0.854	0.950	0.943
21	Paper & paper products	0.474	0.500	0.493	0.493	0.521	0.573	0.600	0.580	0.583	0.555	0.602
22	Printing & publishing	1.174	1.335	1.418	1.850	1.972	2.356	2.783	3.117	3.975	4.399	4.436
24	Chemicals	1.188	1.444	1.600	1.868	1.962	2.320	2.953	4.075	4.854	5.700	5.916
25	Rubber & plastics	0.581	0.607	0.592	0.639	0.662	0.712	0.699	0.697	0.698	0.734	0.657
26	Non-metallic mineral products	0.614	0.579	0.579	0.628	0.646	0.704	0.831	0.824	0.867	0.911	0.868
27	Basic metals	0.239	0.203	0.234	0.232	0.212	0.239	0.256	0.275	0.280	0.313	0.286
28	Fabricated metal products	0.343	0.345	0.338	0.356	0.344	0.390	0.425	0.417	0.434	0.466	0.435
29	Machinery & equipment n.e.c.	0.315	0.334	0.337	0.396	0.400	0.409	0.433	0.408	0.412	0.416	0.414
30	Office machinery, computers	6.008	7.233	9.822	10.742	16.198	18.305	18.116	20.414	26.843	33.606	31.235
31	Electrical machinery n.e.c.	0.523	0.559	0.544	0.591	0.834	0.929	1.034	0.987	0.971	1.291	1.632
32	Communications equipment	0.794	0.862	1.142	1.438	1.512	1.502	2.907	2.675	3.914	3.518	4.144
33	Medical & precision equipment	1.330	1.387	1.588	1.744	1.834	2.088	2.306	2.410	2.868	3.475	4.623
34-35	Transport equipment	0.154	0.152	0.158	0.161	0.167	0.177	0.193	0.186	0.179	0.187	0.171
23,36,37	Furniture & miscellaneous	0.463	0.489	0.471	0.477	0.498	0.533	0.655	0.645	0.600	0.525	0.467
	TOTAL MANUFACTURING	0.879	0.949	1.017	1.108	1.214	1.319	1.505	1.620	1.888	2.119	2.142

Source: Irish gross ouput from *Census of Industrial Production.* EU production derived from OECD's STAN database.
**Note:* EU-9 in this context means Austria, Denmark, Finland, France, Germany, Italy, Netherlands, Spain and the UK.

Table A2: Gain, or Loss, in Ireland's Gross Output Arising from Gain, or Loss, in Share of EU Production since 1991 (million US dollars)

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	0	501	314	864	1,577	1,886	2,296	2,034	3,005	3,516	3,815
17	Textiles	0	-22	-16	15	-14	-29	-72	-157	-163	-145	-138
18	Clothing	0	16	17	58	81	108	108	88	22	-63	-90
19	Leather & footwear	0	7	6	38	28	-26	-13	-10	-16	-7	-21
20	Wood & wood products	0	12	-2	31	44	99	224	237	300	352	333
21	Paper & paper products	0	31	20	21	68	130	156	132	134	98	147
22	Printing & publishing	0	307	432	1,222	1,668	2,515	3,198	4,021	5,797	6,216	6,096
24	Chemicals	0	973	1,436	2,515	3,444	4,942	7,310	11,868	14,929	17,664	18,290
25	Rubber & plastics	0	39	15	86	144	228	198	202	201	241	117
26	Non-metallic mineral products	0	-57	-52	22	57	155	340	334	412	440	375
27	Basic metals	0	-66	-8	-12	-61	1	35	74	75	133	82
28	Fabricated metal products	0	5	-13	33	2	150	244	228	279	344	255
29	Machinery & equipment n.e.c.	0	71	73	281	365	405	471	387	388	378	370
30	Office machinery, computers	0	713	1,784	2,350	6,047	6,938	7,159	8,579	11,742	14,584	12,757
31	Electrical machinery n.e.c.	0	65	35	117	605	773	936	880	857	1,313	1,924
32	Communications equipment	0	66	329	656	877	913	2,673	2,517	4,404	4,312	4,474
33	Medical & precision equipment	0	48	199	322	443	689	837	964	1,375	1,928	2,973
34-35	Transport equipment	0	-11	14	30	63	120	203	184	147	185	94
23,36,37	Furniture & miscellaneous	0	70	20	36	101	212	537	487	375	193	13
	TOTAL MANUFACTURING	0	2,809	4,968	8,613	14,878	19,400	26,096	31,657	42,457	49,685	49,896
	Sum of sectors	0	2,768	4,602	8,686	15,537	20,210	26,839	33,048	44,264	51,682	51,866
	Sum of sectors as % of output	0.0	7.3	12.6	20.9	28.8	34.8	42.8	47.8	55.7	60.9	61.3

Table A3: Irish Indigenous Gross Output as a Percentage of Production in EU-9*

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	1.445	1.463	1.420	1.424	1.475	1.458	1.489	1.452	1.515	1.504	1.513
17	Textiles	0.195	0.214	0.191	0.208	0.225	0.213	0.254	0.226	0.223	0.224	0.219
18	Clothing	0.312	0.323	0.302	0.324	0.316	0.340	0.366	0.323	0.277	0.224	0.220
19	Leather & footwear	0.189	0.208	0.208	0.247	0.186	0.100	0.102	0.111	0.102	0.092	0.079
20	Wood & wood products	0.381	0.394	0.382	0.395	0.393	0.449	0.530	0.518	0.573	0.686	0.683
21	Paper & paper products	0.347	0.364	0.394	0.360	0.365	0.392	0.411	0.436	0.431	0.422	0.366
22	Printing & publishing	0.477	0.533	0.578	0.605	0.543	0.555	0.627	0.637	0.678	0.602	0.622
24	Chemicals	0.202	0.197	0.188	0.191	0.188	0.231	0.205	0.190	0.208	0.231	0.221
25	Rubber & plastics	0.247	0.257	0.253	0.269	0.283	0.343	0.356	0.350	0.383	0.432	0.364
26	Non-metallic mineral products	0.486	0.465	0.475	0.558	0.545	0.597	0.702	0.675	0.718	0.748	0.664
27,28	Metals & metal products	0.170	0.168	0.166	0.177	0.174	0.206	0.206	0.204	0.230	0.273	0.226
29	Machinery & equipment n.e.c.	0.102	0.113	0.120	0.143	0.136	0.164	0.186	0.177	0.184	0.193	0.172
30	Office machinery, computers	0.220	0.253	0.308	0.352	0.394	0.506	0.708	0.853	0.624	0.921	1.179
31	Electrical machinery n.e.c.	0.102	0.118	0.116	0.135	0.148	0.163	0.225	0.196	0.197	0.289	0.188
32	Communications equipment	0.062	0.097	0.065	0.054	0.056	0.125	0.158	0.256	0.186	0.198	0.266
33	Medical & precision equipment	0.065	0.085	0.111	0.133	0.137	0.177	0.234	0.250	0.278	0.347	0.268
34-35	Transport equipment	0.119	0.110	0.105	0.095	0.103	0.113	0.081	0.079	0.061	0.061	0.053
23,36,37	Furniture & miscellaneous	0.316	0.326	0.304	0.291	0.317	0.341	0.437	0.436	0.439	0.396	0.281
	TOTAL MANUFACTURING	0.409	0.422	0.424	0.425	0.422	0.443	0.464	0.448	0.454	0.462	0.440

Source: Irish indigenous gross output from *Census of Industrial Production.* EU production derived from OECD's STAN database.
**Note:* EU-9 in this context means Austria, Denmark, Finland, France, Germany, Italy, Netherlands, Spain and the UK. This table includes a few estimates

Table A4: Gain, or Loss, in Irish Indigenous Gross Output Arising from Gain, or Loss, in Share of EU Production since 1991 (million US dollars)

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	0	116	-154	-130	199	83	274	39	405	312	363
17	Textiles	0	25	-4	15	39	24	71	37	31	29	23
18	Clothing	0	10	-8	10	4	23	41	9	-26	-57	-60
19	Leather & footwear	0	9	8	26	-2	-46	-43	-36	-37	-37	-42
20	Wood & wood products	0	10	1	11	11	60	123	117	164	241	229
21	Paper & paper products	0	20	49	15	26	59	78	110	103	91	21
22	Printing & publishing	0	107	180	233	138	167	298	331	417	242	271
24	Chemicals	0	-17	-47	-37	-61	129	13	-48	26	117	77
25	Rubber & plastics	0	15	7	31	63	167	182	179	233	292	182
26	Non-metallic mineral products	0	-35	-17	112	104	189	339	300	377	387	263
27-28	Metals & metal products	0	-12	-15	30	19	188	179	175	292	472	251
29	Machinery & equipment n.e.c.	0	43	59	145	146	268	336	314	331	340	264
30	Office machinery, computers	0	20	41	66	103	161	288	377	228	371	485
31	Electrical machinery n.e.c.	0	28	23	57	88	115	225	178	180	319	149
32	Communications equipment	0	33	3	-8	-7	81	121	259	174	215	272
33	Medical & precision equipment	0	18	36	53	63	102	145	166	191	254	183
34-35	Transport equipment	0	-43	-55	-102	-82	-34	-199	-234	-347	-328	-377
23,36,37	Furniture & miscellaneous	0	29	-28	-64	3	75	341	322	337	249	-103
	TOTAL MANUFACTURING	0	520	528	601	590	1,486	2,278	1,675	1,902	2,115	1,225
	Sum of sectors	0	376	79	463	855	1,809	2,815	2,595	3,080	3,509	2,452
	Sum of sectors as % of output	0.0	2.2	0.5	2.9	4.6	9.3	14.6	13.6	16.1	19.0	14.1
	Sum of non-food sectors	0	260	233	593	655	1,727	2,540	2,556	2,675	3,197	2,088
	Non-food sectors as % of output	0	3.5	3.5	8.0	7.5	17.9	25.3	25.1	26.1	30.5	22.7

Table A5: Employment in Ireland as a Percentage of Employment in EU-15

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	1.085	1.112	1.127	1.131	1.175	1.207	1.191	1.173	1.204	1.217	1.273
17	Textiles	0.575	0.586	0.596	0.599	0.588	0.583	0.562	0.490	0.476	0.481	0.456
18	Clothing	0.679	0.744	0.739	0.804	0.834	0.793	0.749	0.653	0.482	0.394	0.339
19	Leather and footwear	0.177	0.179	0.187	0.201	0.211	0.171	0.184	0.190	0.170	0.142	0.133
20	Wood & wood products	0.415	0.424	0.420	0.421	0.459	0.477	0.549	0.536	0.594	0.654	0.631
21	Paper & paper products	0.549	0.550	0.562	0.580	0.609	0.633	0.668	0.666	0.667	0.698	0.724
22	Printing & publishing	0.623	0.674	0.746	0.797	0.851	0.876	0.972	0.995	1.081	1.044	1.056
24	Chemicals	0.708	0.771	0.860	0.962	1.016	1.111	1.202	1.225	1.325	1.348	1.422
25	Rubber & plastics	0.594	0.633	0.660	0.677	0.713	0.771	0.735	0.748	0.755	0.761	0.673
26	Non-metallic mineral products	0.662	0.658	0.659	0.670	0.682	0.700	0.746	0.730	0.758	0.801	0.755
27	Basic metals	0.186	0.195	0.216	0.222	0.214	0.211	0.236	0.248	0.268	0.305	0.240
28	Fabricated metal products	0.315	0.320	0.322	0.339	0.346	0.377	0.384	0.396	0.409	0.438	0.410
29	Machinery & equipment n.e.c	0.327	0.359	0.385	0.436	0.457	0.464	0.489	0.458	0.464	0.459	0.445
30	Office machinery, computers	2.740	3.151	4.206	5.021	6.866	7.468	7.594	7.958	9.774	10.019	9.656
31	Electrical machinery n.e.c.	0.647	0.719	0.736	0.734	0.881	0.866	0.979	1.016	1.029	1.060	0.920
32	Communications equipment	0.511	0.598	0.764	0.906	0.910	1.028	1.707	1.703	1.682	1.807	1.534
33	Medical & precision equipment	0.945	1.038	1.113	1.222	1.372	1.494	1.643	1.781	1.887	2.054	2.214
34-35	Transport equipment	0.297	0.338	0.329	0.300	0.374	0.363	0.355	0.339	0.345	0.341	0.352
36-37,23	Furniture & miscellaneous	0.458	0.477	0.495	0.511	0.545	0.567	0.627	0.648	0.584	0.609	0.598
	TOTAL MANUFACTURING	0.575	0.612	0.645	0.680	0.732	0.757	0.803	0.801	0.827	0.848	0.833

Source: Irish data from *Census of Industrial Production.* EU-15 from Groningen Growth and Development Centre website, based on OECD's STAN database.

Table A6: Gain, or Loss, in Employment in Ireland Arising from Gain, or Loss, in Share of EU Employment Since 1991

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	0	1,099	1,669	1,832	3,513	4,697	4,128	3,474	4,706	5,244	7,407
17	Textiles	0	174	300	333	181	118	-162	-1,105	-1,234	-1,153	-1,433
18	Clothing	0	1,036	901	1,781	2,095	1,478	895	-316	-2,301	-3,133	-3,596
19	Leather and footwear	0	9	63	145	197	-37	39	71	-36	-178	-219
20	Wood & wood products	0	90	54	67	433	598	1,268	1,152	1703	2,288	2,085
21	Paper & paper products	0	14	101	222	434	602	851	839	845	1,057	1,228
22	Printing & publishing	0	1,000	2,318	3,252	4,209	4,677	6,433	6,943	8,214	7,618	7,826
24	Chemicals	0	1,259	2,886	4,613	5,514	7,071	8,641	9,054	10,708	11,020	12,353
25	Rubber & plastics	0	519	850	1,083	1,593	2,383	1,934	2,169	2,254	2,387	1,122
26	Non-metallic mineral products	0	-49	-39	116	276	521	1,145	929	1,330	1,937	1,315
27	Basic metals	0	101	326	371	287	253	487	610	789	1,137	513
28	Fabricated metal products	0	156	231	713	951	1,922	2,127	2,542	2,996	3,918	3,028
29	Machinery & equipment n.e.c	0	1,114	1,872	3,376	4,043	4,229	4,970	4,107	4,281	4,122	3,735
30	Office machinery, computers	0	1,37	3,097	4,653	8,665	9,648	9,698	10,523	14,338	15,056	13,925
31	Electrical machinery n.e.c.	0	1,052	1,230	1,189	3,287	3,034	4,647	5,296	5,402	5,892	3,861
32	Communications equipment	0	763	2,020	3,137	3,174	4,159	9,476	9,371	9,303	10,757	8,481
33	Medical & precision equipment	0	864	1,534	2,406	3,677	4,739	6,176	7,410	8,294	9,775	1,1342
34-35	Transport equipment	0	1,172	845	75	1,973	1,742	1,554	1,146	1,346	1,248	1,553
36-37,23	Furniture & miscellaneous	0	370	698	993	1,618	2,027	3,125	3,565	2,373	2,823	2,610
	TOTAL MANUFACTURING	0	12,023	21,767	31,581	47,159	54,416	68,314	68,449	75,903	82,346	77,431
Sum of sectors		0	11,779	20,954	30,358	46,120	53,857	67,432	67,780	75,309	81,813	77,138
Sum of sectors as % of employment		0.0	5.9	10.5	14.8	20.9	23.8	28.0	27.9	30.2	32.0	30.8

Table A7: Irish Indigenous Employment as a Percentage of Employment in EU-15

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	0.777	0.815	0.824	0.805	0.852	0.877	0.873	0.871	0.885	0.884	0.950
17-18	Textiles & clothing	0.342	0.362	0.355	0.362	0.377	0.371	0.383	0.348	0.306	0.288	0.262
19	Leather & footwear	0.155	0.159	0.168	0.168	0.175	0.138	0.151	0.158	0.137	0.111	0.101
20	Wood & wood products	0.368	0.376	0.375	0.362	0.396	0.413	0.434	0.427	0.479	0.538	0.518
21	Paper & paper products	0.405	0.413	0.468	0.455	0.469	0.484	0.523	0.546	0.542	0.571	0.524
22	Printing & publishing	0.512	0.551	0.616	0.614	0.606	0.602	0.655	0.688	0.709	0.682	0.737
24	Chemicals	0.160	0.166	0.204	0.202	0.211	0.223	0.257	0.246	0.260	0.309	0.287
25	Rubber & plastics	0.274	0.297	0.308	0.318	0.349	0.393	0.398	0.416	0.450	0.484	0.406
26	Non-metallic mineral products	0.541	0.538	0.548	0.599	0.580	0.593	0.633	0.611	0.646	0.687	0.630
27-28	Metals & metal products	0.200	0.208	0.214	0.226	0.233	0.255	0.256	0.265	0.284	0.321	0.286
29	Machinery & equipment n.e.c.	0.142	0.161	0.183	0.203	0.222	0.234	0.259	0.248	0.252	0.254	0.237
30	Office machinery, computers	0.428	0.504	0.663	0.805	0.972	0.961	1.307	1.498	1.139	1.170	1.029
31	Electrical machinery n.e.c.	0.155	0.192	0.208	0.221	0.239	0.268	0.326	0.314	0.313	0.399	0.301
32	Communications equipment	0.079	0.131	0.105	0.107	0.135	0.191	0.221	0.224	0.189	0.266	0.208
33	Medical & precision equipment	0.076	0.088	0.100	0.136	0.148	0.205	0.210	0.244	0.284	0.315	0.287
34-35	Transport equipment	0.244	0.252	0.234	0.190	0.284	0.270	0.218	0.212	0.160	0.151	0.147
23,36,37	Furniture & miscellaneous	0.280	0.286	0.300	0.297	0.316	0.348	0.400	0.432	0.427	0.453	0.413
	TOTAL MANUFACTURING	0.321	0.343	0.359	0.363	0.387	0.401	0.419	0.421	0.422	0.440	0.423

Source: Irish data from *Census of Industrial Production.* EU-15 from Groningen Growth and Development Centre website, based on OECD's STAN database.

Table A8: Gain, or Loss, in Irish Indigenous Employment Arising from Gain, or Loss, in Share of EU Employment since 1991

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	0	1,503	1,867	1,076	2,920	3,840	3,733	3,705	4,259	4,221	6,781
17-18	Textiles & clothing	0	622	373	561	948	744	1,054	140	-878	-1,262	-1,815
19	Leather & footwear	0	31	84	79	115	-100	-20	19	-93	-221	-268
20	Wood & wood products	0	76	63	-57	273	429	619	561	1,050	1,620	1,441
21	Paper & paper products	0	62	460	360	464	568	843	1,008	979	1,174	838
22	Printing & publishing	0	752	1,959	1,903	1,737	1,651	2,634	3,274	3,530	3,060	4,054
24	Chemicals	0	114	833	757	903	1,096	1,696	1,506	1,730	2,566	2,194
25	Rubber & plastics	0	307	437	567	993	1,598	1,687	1,994	2,458	2,986	1,871
26	Non-metallic mineral products	0	-45	107	812	548	717	1,247	955	1,455	2,041	1,255
27-28	Metals & metal products	0	389	623	1,088	1,386	2,261	2,320	2,708	3,530	5,051	3,575
29	Machinery & equipment n.e.c.	0	657	1,337	1,907	2,467	2,839	3,608	3,299	3,441	3,496	3,007
30	Office machinery, computers	0	193	496	769	1,144	1,089	1,756	2,159	1,449	1,535	1,210
31	Electrical machinery n.e.c.	0	537	728	907	1,178	1,560	2,382	2,274	2,227	3,483	2,066
32	Communications equipment	0	453	209	221	443	896	1,122	1,139	872	1,550	1,066
33	Medical & precision equipment	0	113	220	521	622	1,112	1,184	1,489	1,837	2,107	1,885
34-35	Transport equipment	0	225	-276	-1,384	1,037	669	-684	-868	-2,335	-2,629	-2,764
23,36,37	Furniture & miscellaneous	0	121	378	326	679	1,272	2,223	2,850	2,759	3,259	2,491
	TOTAL MANUFACTURING	0	6,931	11,575	12,570	19,813	23,994	29,312	30,123	30,135	35,833	30,569
Sum of sectors		0	6,111	9,897	10,412	17,858	22,240	27,403	28,212	28,270	34,038	28,886
Sum of sectors as % of employment		0.0	5.5	8.9	9.5	15.3	18.5	21.8	22.1	22.3	25.7	22.7

Table A9: Ireland's Exports as a Percentage of Exports of EU-13*

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	5.020	5.034	4.980	5.013	5.287	5.023	5.136	4.962	5.409	5.841	6.118
17-18	Textiles & clothing	0.901	0.879	0.880	0.903	0.855	0.792	0.734	0.654	0.586	0.478	0.485
20	Wood & wood products	0.712	0.729	0.681	0.732	0.819	0.923	1.008	1.086	1.143	1.017	1.147
21-22	Paper & printing	2.390	2.765	3.080	3.908	3.782	5.105	5.804	6.624	8.822	9.355	9.666
24	Chemicals	2.221	2.660	2.855	3.151	3.264	3.765	4.504	6.303	7.381	8.164	7.904
25	Rubber & plastics	1.097	1.181	1.134	1.127	1.145	1.149	1.040	1.015	0.918	0.863	0.778
26	Non-metallic mineral products	0.940	0.813	0.804	0.753	0.737	0.842	0.906	0.766	0.868	0.893	0.921
27-28	Metals & metal products	0.630	0.603	0.602	0.574	0.529	0.591	0.597	0.612	0.583	0.556	0.557
29	Machinery & equipment n.e.c.	0.491	0.500	0.476	0.542	0.555	0.525	0.515	0.481	0.491	0.469	0.475
30-33	Electrical & optical equipment	3.175	3.433	3.470	3.632	4.576	4.716	5.190	5.322	6.373	6.504	7.135
34-35	Transport equipment	0.134	0.147	0.153	0.164	0.176	0.197	0.214	0.205	0.196	0.200	0.182
19,23,36-37	Other manufacturing**	0.681	0.737	0.592	0.730	0.754	0.719	0.824	0.819	0.667	0.517	0.554
	TOTAL MANUFACTURING	1.560	1.682	1.763	1.889	2.086	2.203	2.437	2.693	3.172	3.376	3.456

Source: Irish exports from *Census of Industrial Production*. EU exports derived from OECD's STAN database.
Notes: * EU-13 here means the 15 EU member states (prior to May 2004) except Ireland and Luxembourg.
** Other manufacturing here includes (19) Leather & footwear, (23) Oil refining and (36-37) Furniture & miscellaneous.

Table A10: Gain, or Loss, in Exports from Ireland Arising from Gain, or Loss, in Share of EU Exports since 1991 (million US dollars).

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink & tobacco	0	18	-49	-8	405	5	173	-85	560	1,104	1,517
17-18	Textiles & clothing	0	-21	-18	2	-49	-118	-178	-268	-323	-408	-402
20	Wood & wood products	0	2	-4	3	21	39	57	73	85	59	81
21-22	Paper & printing	0	233	391	977	1,169	2,137	2,605	3,334	5,021	5,548	5,598
24	Chemicals	0	778	1,090	1,821	2,529	3,774	5,635	10,380	13,271	15,636	15,875
25	Rubber & plastics	0	41	17	15	30	32	-35	-53	-115	-146	-200
26	Non-metallic mineral products	0	-41	-41	-62	-80	-39	-13	-67	-27	-17	-7
27-28	Metals & metal products	0	-35	-34	-74	-171	-63	-52	-29	-70	-116	-111
29	Machinery & equipment n.e.c.	0	18	-27	99	153	87	60	-24	1	-51	-38
30-33	Electrical & optical equipment	0	496	575	1,025	4,038	4,686	6,420	7,296	11,303	12,937	14,470
34-35	Transport equipment	0	34	44	77	130	202	263	256	228	244	188
19,23,36-37	Other manufacturing*	0	57	-90	52	85	49	182	163	-17	-235	-179
	TOTAL MANUFACTURING	0	1,740	2,716	4,880	9,573	11,995	16,445	2,2073	31,273	36,066	37,871
Sum of sectors		0	1,581	1,854	3,925	8,260	10,791	15,117	20976	29,917	34,555	36,793
Sum of sectors as % of exports		0.0	6.6	7.9	14.0	21.8	26.3	33.1	40.0	48.6	51.5	53.3

Note: * Other manufacturing here includes (19) Leather & footwear, (23) Oil refining and (36-37) Furniture & miscellaneous.

Table A11: Irish Indigenous Exports as a Percentage of Exports of EU (13)*

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink& tobacco	2.967	2.704	2.744	2.616	2.699	2.322	2.387	2.257	2.171	2.220	2.422
17-18	Textiles & clothing	0.252	0.269	0.228	0.244	0.246	0.230	0.264	0.239	0.209	0.162	0.195
20	Wood & wood products	0.304	0.294	0.323	0.278	0.289	0.379	0.315	0.255	0.233	0.238	0.383
21-22	Paper & printing	0.319	0.334	0.414	0.374	0.295	0.321	0.336	0.330	0.327	0.313	0.415
24	Chemicals	0.158	0.106	0.100	0.097	0.102	0.134	0.099	0.105	0.142	0.144	0.133
26	Non-metallic mineral products	0.553	0.448	0.464	0.500	0.403	0.509	0.552	0.424	0.506	0.485	0.497
27-28	Metals & metal products	0.217	0.212	0.196	0.195	0.199	0.224	0.184	0.173	0.155	0.212	0.158
29	Machinery & equipment n.e.c.	0.077	0.079	0.091	0.109	0.097	0.131	0.135	0.123	0.136	0.139	0.121
30-33	Electrical & optical equipment	0.117	0.153	0.132	0.137	0.131	0.145	0.191	0.238	0.155	0.219	0.259
	"Other" manufacturing**	0.150	0.159	0.159	0.148	0.151	0.171	0.150	0.143	0.121	0.112	0.089
	TOTAL MANUFACTURING	0.407	0.392	0.401	0.378	0.370	0.355	0.354	0.335	0.308	0.309	0.324

Source: Irish indigenous exports from Census of Industrial Production. EU exports derived from OECD's STAN database
Notes: * EU (13) here means the 15 EU member states (prior to May 2004) except Ireland and Luxembourg.
** "Other" manufacturing here includes (19) Leather & footwear, (23) Oil refining, (25) Rubber & plastics, (34-35) Transport equipment, and (36-37) Furniture & miscellaneous.

Table A12: Gain, or Loss, in Irish Indigenous Exports Arising from Gain, or Loss, in Share of EU Exports since 1991 (million US dollars)

Code		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-16	Food, drink& tobacco	0	-330	-272	-453	-406	-981	-868	-1,049	-1146	-1004	-752
17-18	Textiles & clothing	0	16	-21	-7	-7	-24	13	-14	-44	-87	-55
20	Wood & wood products	0	-1	3	-4	-3	14	2	-9	-14	-13	15
21-22	Paper & printing	0	10	54	36	-20	2	13	9	7	-4	74
24	Chemicals	0	-92	-100	-120	-136	-60	-145	-134	-41	-36	-71
26	Non-metallic mineral products	0	-34	-27	-18	-59	-17	0	-50	-18	-24	-20
27-28	Metals & metal products	0	-6	-25	-29	-30	11	-52	-71	-93	-8	-89
29	Machinery & equipment n.e.c.	0	4	25	61	48	136	142	118	142	146	105
30-33	Electrical & optical equipment	0	68	29	43	40	84	235	409	134	394	518
	"Other" manufacturing*	0	38	32	-8	6	105	2	-36	-161	-216	-362
	TOTAL MANUFACTURING	0	-205	-78	-427	-673	-961	-991	-1,405	-1913	-1932	-1,643
Sum of sectors		0	-327	-302	-498	-566	-731	-659	-828	-1233	-851	-637
Sum of sectors as % of exports		0.0	-5.8	-5.6	-8.9	-8.4	-11.0	-9.9	-12.7	-20.6	-13.9	-9.8
Sum of non-food sectors		0	3	-30	-45	-161	250	209	222	-88	152	115
Non-food sectors as % of exports		0	0.1	-1.5	-2.0	-6.1	8.1	6.8	7.0	-3.1	4.8	3.7

Note: * "Other" manufacturing here includes (19) Leather & footwear, (23) Oil refining, (25) Rubber & plastics, (34-35) Transport equipment, and (36-37) Furniture & miscellaneous.