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**MANUFACTURING IN TYNE & WEAR  
1993-1997**

**AN ANALYSIS OF THE CENSUS OF PRODUCTION**

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## MANUFACTURING IN TYNE & WEAR 1993-1997

### MAIN POINTS

During 1993-97 **manufacturing performed very poorly** in relation to the UK. This extends the trend established in 1996, lying in stark contrast to an outperforming trend evident since 1987. Caveat: The Census of Production is evidence, not certain knowledge. The scale of the output falls in Chemicals and Transport Equipment are suspiciously large (§ 2.2). This also depresses the productivity and profitability figures.

In real terms (i.e. after adjusting for inflation) between 1993 and 1997:

- Output fell 5 percentage points; in the UK it rose 16%. Overall output was depressed by about 10% (approximately £300m) due to the huge falls in Transport Equipment (shipbuilding) and Chemicals (§ 2.2)
- Employment increased 3 percentage points both in Tyne & Wear and the UK (§ 3)
- Productivity fell 8 percentage points; UK rose 13% (§4.2)
- Estimated Operating Profits fell by a third; UK operating profits rose 30% (§5.1)
- Estimated Operating Profits Margin fell 12 percentage points; UK rose 4 percentage points (§5.2)

In 1997, **in current prices**, manufacturing output was worth in excess of £2,650m (§2.1), estimated operating profit over £760m (§5.1) and output per employee £30,000 (§4.1).

Between 1993 and 1997, manufacturing **investment** increased by 137%, rising from £213m in 1993 to £505m (at constant 1995 prices) (§ 6). In 1997, investment per employee was 30% higher than the UK average. However, these figures appear to be incomplete given the scale of Siemens' investment.

**Productivity** fell 8% between 1993 and 1997, ending an impressive performance between 1991 and 1993 (§ 4.2). Huge falls were witnessed in the Chemicals (-31%) and Transport Equipment (-23%) industries.

During 1997 **profit margins** fell by 7 percentage points, whereas in the UK margins fell by just 2 points (§ 5.2). Seven major Tyne & Wear industries had profit margins smaller than the UK.

**Establishment size** remains almost 50% larger in Tyne & Wear than the UK (§ 7). Between 1993 and 1997 establishment size fell only slightly, from an average of 42 employees per business to 40.

There was significant **variation between industries** in Tyne & Wear. The **Transport Equipment** industry displaced Electrical & Optical as the biggest manufacturing industry (by output) (§ 2.2); holding a 20% share of total Tyne & Wear manufacturing output in 1997 (a rise of 5 percentage points from 1996). In the year 1996-97 its output rose 33%. This is (partly) attributable to increased production at the Nissan plant in Sunderland following the introduction of new models coupled with a number of major orders gained in the ship repair industry.

In contrast, the **Chemicals** industry showed a very weak performance relative to the UK (§ 2.2); holding only a 7% share of output (down 7 percentage points from 1993) and with productivity 22% below the North East it significantly under-performed the North East.

Between 1993 and 1995, manufacturing output in the **North of England** under-performed the UK by 11%, rising only 5% (UK+16%) but out-performed Tyne & Wear by 14% (TW-9%). **North East** manufacturing trends vary from those of Tyne & Wear (§ 9). In 1997, the **Chemicals** industry was extremely prominent being the largest by output in the North East (19%) and with a high profit margin of 59% (reflecting its high capital-intensity). The Chemicals industry also had the highest investment per employee (around £13,000 per employee).

## **1 INTRODUCTION**

This paper presents information on the characteristics and performance of manufacturing industry in Tyne & Wear between 1993 and 1997 as recorded by the Census of Production. The analysis covers the output, productivity, operating profit, net investment and establishment size of manufacturing firms in the county. The main focus of this paper is on levels in 1997, with levels in 1993 and 1995-97 being used as a frame of reference. Comparisons are drawn between Tyne & Wear and the North East and UK. Overall changes in the indicators between 1979 and 1997 are also charted.

A discrete analysis of the limited available data on manufacturing in the region follows the report on Tyne & Wear. This reports the Northern Standard Statistical Region (SSR) (for 1993 and 1995) and the North East Government Office Region (GOR) (for 1996 and 1997). This has been incorporated to contextualise events in Tyne & Wear. The development of the North East Regional Development Agency (RDA), One North East, adds significance to this section.

There are six earlier reports in this series produced by the TWRI, covering the period since 1979. These reports have been produced on a biennial cycle. The previous report, however, included 1996 data as well as 1995 data, enabling analysis of change at industry level for three years using the Standard Industrial Classification 92.

The Census of Production is an annual survey of the production and construction industries, conducted by the Office for National Statistics (ONS). Coverage includes all UK businesses employing 100 or more workers. Samples of 50% and 20% have been taken of businesses employing between 50-99 workers and 20-49 workers respectively. In addition 10% and 0.2% samples were taken of firms employing 10-19 and 1-9 workers respectively. The results are then grossed up to provide an estimate for all businesses. Since the Census of Production relies on a sample of smaller businesses, results are liable to distortion. Estimates for non-responses and recent changes in corporate ownership may also affect the reliability of the data. For this reason the data reported should be treated with caution.

The Census of Production for 1997 provides data at county-level by industry (SIC92) class. It provides a valuable source of information on manufacturing in Tyne & Wear with:

- financial data which give an insight into the output, productivity and profitability patterns which lie behind employment changes;
- investment data which may suggest the likely directions of industrial change in the future;
- a time-series which allows an insight into the dynamics of change.

The new Annual Business Inquiry (ABI) has replaced the Census of Production (from 1998). The ABI is also now the standard source for employment data (replacing the Annual Employment Survey).

Notes: This is the third manufacturing report to analyse change using Standard Industrial Classification 92 (SIC 92). The Standard Industrial Classification (SIC) was revised in 1992, with SIC92 replacing SIC80. The 1993 Census of Production was the first analysed by TWRI to use SIC92. The new frame allocates manufacturing industries into 14 subsections, instead of 17 (SIC80) classes. Mechanical Engineering is now part of Machinery & Equipment. Electrical Engineering was subsumed into a new Electrical & Optical category. The Motor Industry was amalgamated with Other Transport Equipment (shipbuilding) into a new Transport Equipment sub-section. Re-coded tables of data prior to 1991 are not available at county level. The only analysis of change in this report is consequently for indicators between 1993 and 1997, or for manufacturing as a whole.

To trace changes in real terms, the financial data presented in this paper have, where appropriate, been adjusted to constant 1995 prices. As ONS no longer publish price deflators for each variable provided by the census, the GDP deflator has been used to adjust 1993, 1996 and 1997 data to constant 1995 prices.

## 2 OUTPUT

### 2.1 STRUCTURE OF OUTPUT

In 1997 the value of the output of Tyne & Wear's manufacturing industries was £2,655m (at current prices). The top ten industries accounted for over 95% of this output (see table 1 below). Throughout this paper analysis is focused on these industries. Full statistics on all manufacturing industries are available in the appendices of this report.

**Table 1: Largest Manufacturing Industries in Tyne & Wear Measured by Output, 1997**

SIC (92)	1993 Rank	Industry	Output (Gross Value Added)			Output Location Quotient
			Tyne & Wear (£m)	Tyne & Wear (% of total output)	UK (% of total output)	
DM	1	Transport Equipment	535	20%	11%	1.82
DL	2	Electrical & Optical	311	12%	12%	1.00
DJ	7	Basic Metals	293	11%	11%	1.00
DA	4	Food & Drink	286	11%	14%	0.79
DK	3	Machinery & Equipment	267	10%	9%	1.11
DE	6	Paper & Printing	263	10%	11%	0.91
DG	5	Chemicals	188	7%	10%	0.7
DB	8	Textiles & Clothing	125	5%	5%	1.00
DH	9	Rubber & Plastics	121	5%	5%	1.00
DN	10	Other Manufacturing	111	4%	4%	1.00
<b>Total</b>			<b>2500</b>	<b>95%</b>	<b>92%</b>	
<b>All Manufacturing</b>			<b>2655</b>			

The Transport Equipment industry now holds the largest share of total manufacturing output at 20%, increasing greatly from 15% in 1995 and 1996 although still below the 22% recorded in 1993. The strength of the industry in 1993 was most likely a reflection of strong growth in the motor vehicle industry. It may also have been boosted somewhat by a statistical quirk due to the rundown of Swan Hunter, which was in administrative receivership from May 1993<sup>1</sup>. In 1995 Swan Hunter re-opened as an offshore yard undertaking a £50m conversion of the *Solitaire*, which subsequently leapt in value to between £120m and £140m<sup>2</sup>. In 1997, production at Nissan's Sunderland plant rose 17% to 271,500 Micra and Primera cars exported to 59 overseas markets. Production of the Primera increased by 30% on 1996 with Micra production also rising 10% during 1997<sup>3</sup>. These developments, together with significant conversion/refit projects at A&P Tyne in North Tyneside might have been expected to boost total output in Transport Equipment<sup>4</sup>.

In 1997, the traditional 'core' of manufacturing in Tyne & Wear (Electrical & Optical and Machinery & Equipment) plus the newer Electronics industry had a combined share of total manufacturing output of 22%. This is now only slightly high relative to the North East (20%) and the UK (21%) having fallen from 28% in 1996 - significantly greater than the comparative regional and national figures.

<sup>1</sup> *Economic Progress Report, July 1993, TWRI*

<sup>2</sup> *Economic Review, Spring 1997, TWRI*

<sup>3</sup> *Economic Review, Winter 1997/98, TWRI*

<sup>4</sup> *Economic Review, Autumn 1997, TWRI*

The output share of industries within Tyne & Wear can be compared to the UK by using the 'output location quotient'. This divides the local share of manufacturing output by the corresponding UK share to give a measure of the industry locally, relative to its size in the national economy in 1997. The Transport Equipment industry (1.82) was significantly over-represented in Tyne & Wear, holding almost twice the UK share of manufacturing output, emphasising the strategic importance of Nissan to both the industry and manufacturing in general within Tyne & Wear.

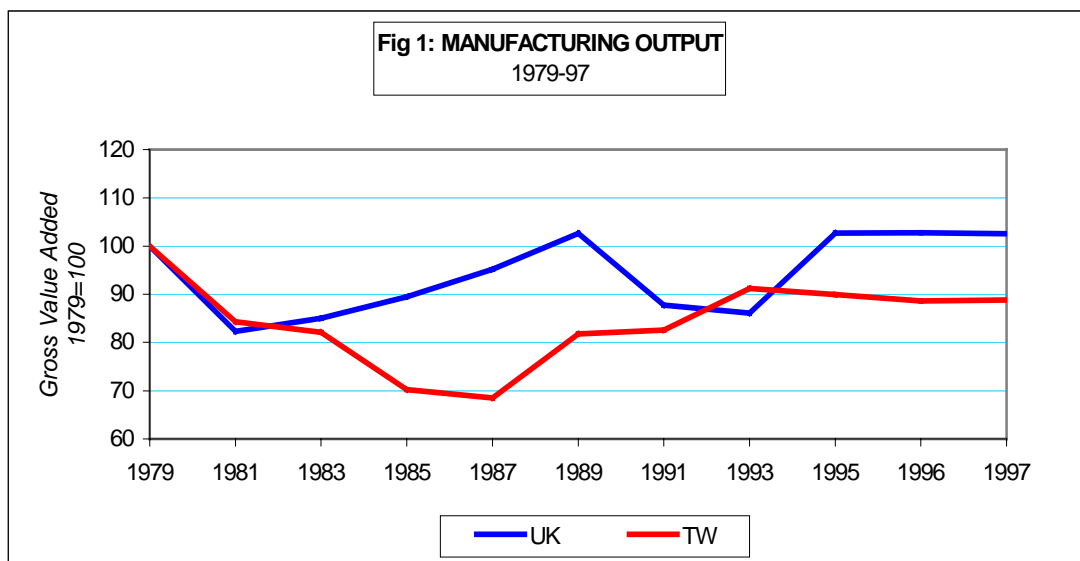
Machinery & Equipment (1.11) was the only other major manufacturing industry to be (moderately) over-represented, although Wood & Wood Products (i.e. Furniture etc.), which does not rank in the top ten industries for Tyne & Wear, had the highest location quotient of all (2.00).

Three major industries in Tyne & Wear were slightly under-represented including Paper & Printing (0.91), Food & Drink (0.79) and Chemicals (0.70). The most under-represented industry, Chemicals, continued to decline significantly from previous years having been over-represented in 1993, with an output location quotient of 1.29 before falling in 1995 (0.94) and 1996 (0.84). It is not clear why this big fall might have occurred. It may be, in large part, a statistical quirk associated with the changes in corporate ownership and thus enterprise reporting. The creation of Chi-Rex in 1994 may mean its output is reported elsewhere in the UK (perhaps in Northumberland). The fall could also be attributed to a decline in a particular industry (e.g. paints). It should be noted, however, that the Chemicals industry had very high output figures prior to 1993.

## 2.2 CHANGE IN OUTPUT, 1979-1997

Manufacturing output in Tyne & Wear fell between 1979 and 1987, followed by a steady rise, which stopped after 1993 (see figure 1). The 1997 figure remains, however, 11% lower than the 1979 average. In contrast, UK output (just) exceeds its 1979 level.

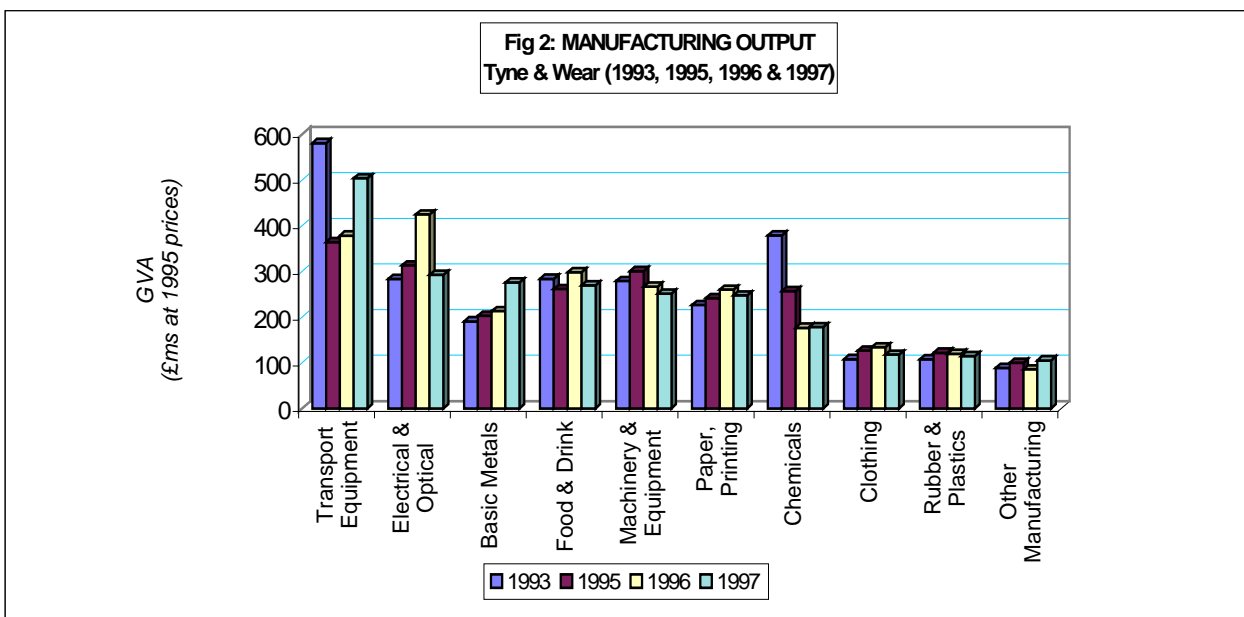
Between 1995 and 1997, Tyne & Wear manufacturing output under-performed the UK by 1%, falling slightly (-1%, UK 0%). UK manufacturing was stimulated in this period by the low exchange rate before the effective exchange rate increased in the latter part of 1997. A low exchange rate would particularly help the Process Industries, in which Tyne & Wear is under-weight. The Tyne & Wear under-performance is a sharp reversal from the previous outperforming trend. Between 1991 and 1993 Tyne & Wear manufacturing output had risen by 12%, compared to a 2% fall in the UK.



In the most recent year, 1996-97, however, Tyne & Wear's manufacturing output rose just 0.3%. Transport Equipment output rose 33% in this year (details in Appendix 1).

The overall under-performance by Tyne & Wear between 1993 and 1997 was accounted for by the Transport Equipment and Chemicals industries, whose output fell by almost £300m (see figure 2). The falls in these two industries alone depressed Tyne & Wear manufacturing output by approximately 10% although a recovery within the Transport Equipment industry in 1997 equating to over £100m alleviated the contractions witnessed throughout Tyne & Wear manufacturing. Swan Hunters being in administrative receivership in 1993 may be a large factor. In terms of output, it was only partly replaced by the boom in the offshore industry in 1996<sup>5</sup>. The reasons for the collapse of Chemicals output, however, are unclear. Three reasons may be speculated: Omission of an enterprise (possibly due to corporate ownership change at Chi-Rex), price collapse and difficulties in a particular industry (possibly paints). The actual reasons are, unfortunately, unknown.

Output changes between 1993-97 varied greatly between manufacturing industries (see Figure 2 below). Output rose hugely in the Electrical & Optical industry (+50%) between 1993-96, a rise of well over £100m, adding about 5% to manufacturing output before slumping in 1997 by an even greater amount, whilst output in Basic Metals increased by over 44%. Other noticeable rises were recorded in the Other Manufacturing (+18%), Textiles & Clothing and Paper & Printing (both +9%) industries. There were very steep declines in the Chemicals (-53%) and Transport Equipment (-13%) industries.

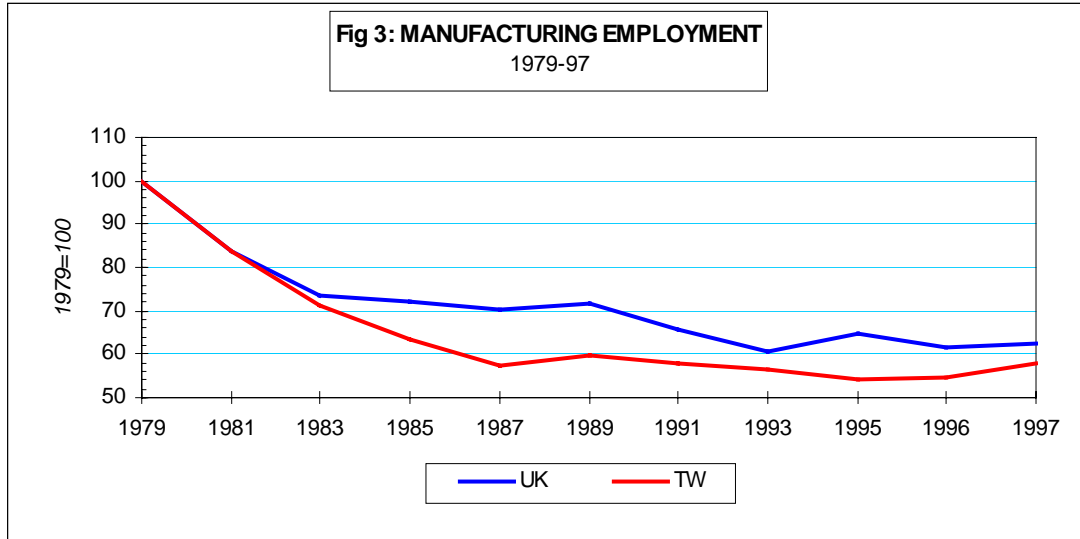


<sup>5</sup> *Economic Progress, July 1993, TWRI*

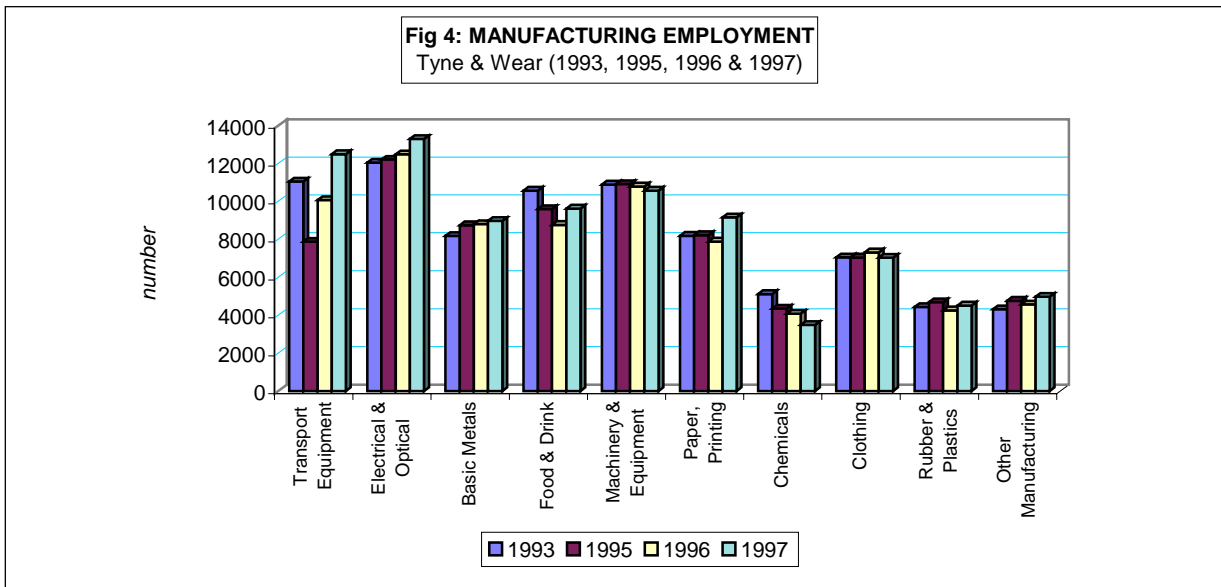


### 3 EMPLOYMENT

Between 1979 and 1997, overall manufacturing employment fell hugely in both Tyne & Wear and the UK (see figure 3); Tyne & Wear employment almost halved. There was a dramatic fall between 1979 and 1987, followed by a more modest decline between 1989 and 1995. Between 1993-97, there was a slight rise (+2%) in Tyne & Wear, matching the overall UK trend.



In 1997, employment was high in the Electrical & Optical (13,300), Transport Equipment (12,500) and Machinery & Equipment (10,600) industries in Tyne & Wear. During 1993-97, notable rises in employment were recorded in Transport Equipment (+1,500) and Electrical & Optical (+1,300), reflecting the development of the Siemens microchip plant in North Tyneside. Significant falls were experienced in Chemicals (-1,600) and Food & Drink (-1,000).



Notes: These data are enterprise-based. The more definitive source for employment data is the Annual Employment Survey (AES). See TWRI reports on employment for details.

## 4 PRODUCTIVITY

### 4.1 PRODUCTIVITY LEVELS

Manufacturing productivity in Tyne & Wear was almost 11% below both the North East and UK in 1997 (see table 2). This is similar to the North East position in 1996 but a sharp deterioration from 1993 when productivity was 8% above the UK average.

Productivity levels are a measure of efficiency in the use of labour. In so far as they indicate strength, productivity levels provide a guide towards future output and employment performance. Productivity in this report is defined as gross value added per employee.

**Table 2: Productivity Levels in Major Tyne & Wear Industries With UK Comparison, 1997**

(SIC 92)	Industry	Tyne & Wear (Current Prices)	Index of North East (North East=100)	Index of UK (UK=100)
DM	Transport Equipment	£42,800	98.6	110.4
DL	Electrical & Optical	£23,300	94.8	70.2
DJ	Basic Metals	£32,600	107.2	112.7
DA	Food & Drink	£29,700	89.0	74.8
DK	Machinery & Equipment	£25,200	76.2	75.3
DE	Paper & Printing	£28,700	93.4	81.9
DG	Chemicals	£54,100	78.1	98.4
DB	Textiles & Clothing	£17,800	103.0	90.8
DH	Rubber & Plastics	£27,000	93.1	93.1
DN	Other Manufacturing	£22,400	96.8	88.3
<b>All Manufacturing</b>		<b>£30,000</b>	<b>89.4</b>	<b>89.2</b>

Productivity levels achieved by the two biggest industries were markedly diverse:

- Transport Equipment was 10% above the UK average and virtually the same as the North East average
- Electrical & Optical was 30% below the UK average, and 5% below North East average

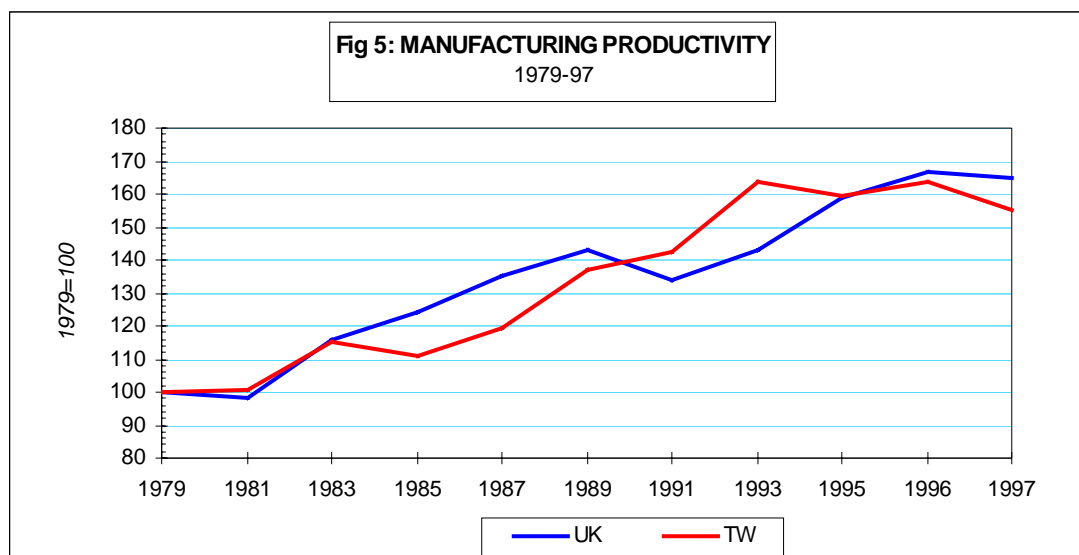
Basic Metals and Textiles & Clothing were the only industries to have productivity levels slightly above the North East averages. The former was 7% above the North East and 12% above the UK; the latter 3% above the regional average, but 9% below the UK.

Eight of Tyne & Wear's top ten industries had productivity below the regional and national averages. The most notable are Machinery & Equipment, Chemicals and Food & Drink at 24%, 22% and 11% below the regional average respectively.

## 4.2 PRODUCTIVITY GROWTH 1979-1997

Figure 5 below, shows strong growth in productivity between 1979 and 1997 in Tyne & Wear and UK manufacturing; recording respective rises of around 55% and 65%.

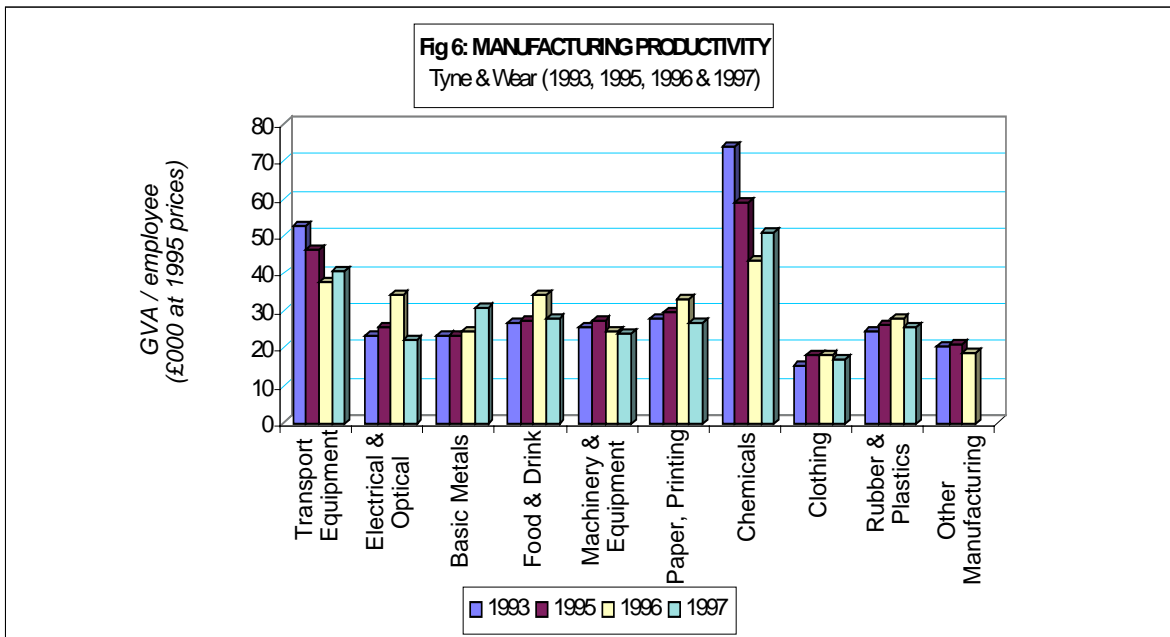
Between 1996 and 1997 Tyne & Wear's manufacturing productivity fell by 5% (at constant 1995 prices), compared to a 1% rise in the UK. This marks the third consecutive year of underperformance in Tyne & Wear productivity growth compared to the UK as a whole.



Between 1993 and 1997 in Tyne & Wear manufacturing productivity fell by 8%, ending an impressive performance between 1991 and 1993.

Productivity rose sharply in Tyne & Wear between 1993 and 1997 in the Basic Metals (+32%) industry, adding to smaller increases in the Textiles & Clothing (+9%) Rubber & Plastics (+5%), Food & Drink (+4%) and Other Manufacturing (+3%) industries. However, productivity fell massively in Chemicals (-31%) and Transport Equipment (-23%) (see figure 6). The fall in average productivity within the Chemicals industry in particular is largely attributable to huge declines in output (down 53%) rather than rising employment although, Transport Equipment recorded a 13% drop in output coupled with a significant rise in employment<sup>6</sup>.

<sup>6</sup> Comments on the downward trend in output can be found on page 4



## 5 ESTIMATED OPERATING PROFIT

One measure of profitability is operating profitability: the reward to capital from value added. A broad indication of operating profits can be obtained from the Census of Production data. Since, in principle, value-added is split between labour and capital and the rewards to labour are known, then the rewards to capital may be calculated. Wages & salaries are known from the Census of Production. Total labour costs are, on average, about 20% higher than the wages and salaries bill and have been estimated on this basis. Subtracting estimated total labour costs from gross value added provides an estimate of operating profit.

Estimated operating profit provides a good guide to financial health. It is not affected by differences in capital structure (the balance between debt and equity, or share, capital.) It is also a wider concept than pre-tax profit, as interest payments and depreciation need to be subtracted from operating profits to obtain pre-tax profits.

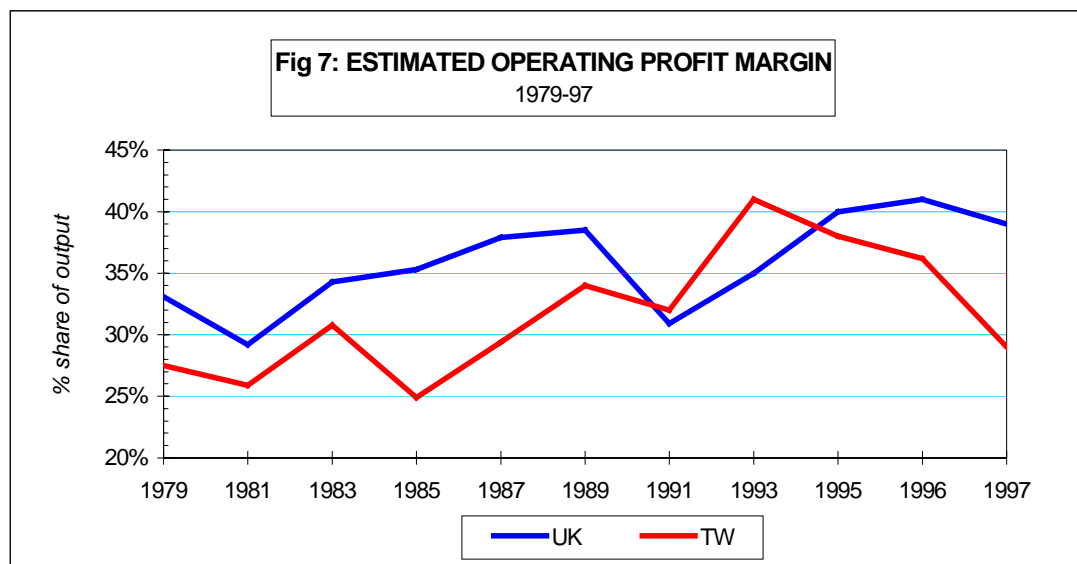
This section considers operating profits in terms of both levels and, particularly, margins. Profit levels are the simpler, and ultimately a more important indicator. In a healthy economy, in the long-run, profit levels will grow as output grows. Profits are, however, sharply cyclical - falling and rising in particular years within the business cycle.

### 5.1 ESTIMATED OPERATING PROFIT LEVELS

In 1997 estimated operating profit was just over £760m in current prices. Between 1993 and 1997, estimated operating profits in Tyne & Wear fell by 33%, from £1,072m to £719m (in 1995 prices). This decline resulted from a 5% fall in output combined with a 12% rise in the labour costs. Operating profits in the UK, in contrast, rose 29% from around £41bn in 1993 to £53bn in 1996 (in 1995 prices). This came from a 14% rise in output and a 9% rise in labour costs.

## 5.2 ESTIMATED OPERATING PROFIT MARGINS

During 1979-97, operating profit margins in Tyne & Wear rose 1 percentage point to 29% compared to a rise of 6 percentage points to 39% in the UK<sup>7</sup> (see figure 7). Between 1993 and 1997, however, profit margins in Tyne & Wear fell by 12 points, whereas in the UK margins rose by 4 points.



In 1997 profit margins fell by 7 percentage points whereas in the UK margins fell by just 2 percentage points.

In 1997 estimated operating profit margins averaged 29% in Tyne & Wear, about a quarter below the UK (39%) (see table 3). Two of the major Tyne & Wear industries had higher profit margins than the UK - Transport Equipment (42%; UK 36%) and Textiles & Clothing (33%; UK 31%).

There is no discernible relationship between the largest industries in Tyne & Wear in terms of output and high profit margins. Although the Transport Equipment and Electrical & Optical industries have the highest output levels, the latter has the second smallest estimated profit margin whilst the former has the second highest. Similarly, whilst the Chemicals industry has the highest estimated profit margin, it ranks only seventh in terms of output.

Three major industries in Tyne & Wear had significantly smaller profit margins than in the North East and UK (see table 3 below). This under-performance points to possible problems in these industries. They were: Machinery & Equipment (a huge 24 percentage points below the North East and 26 points below the UK), Electrical & Optical (10 points below the North East but 28 points below the UK) and Basic Metals (9 points below the North East and 17 points below the UK).

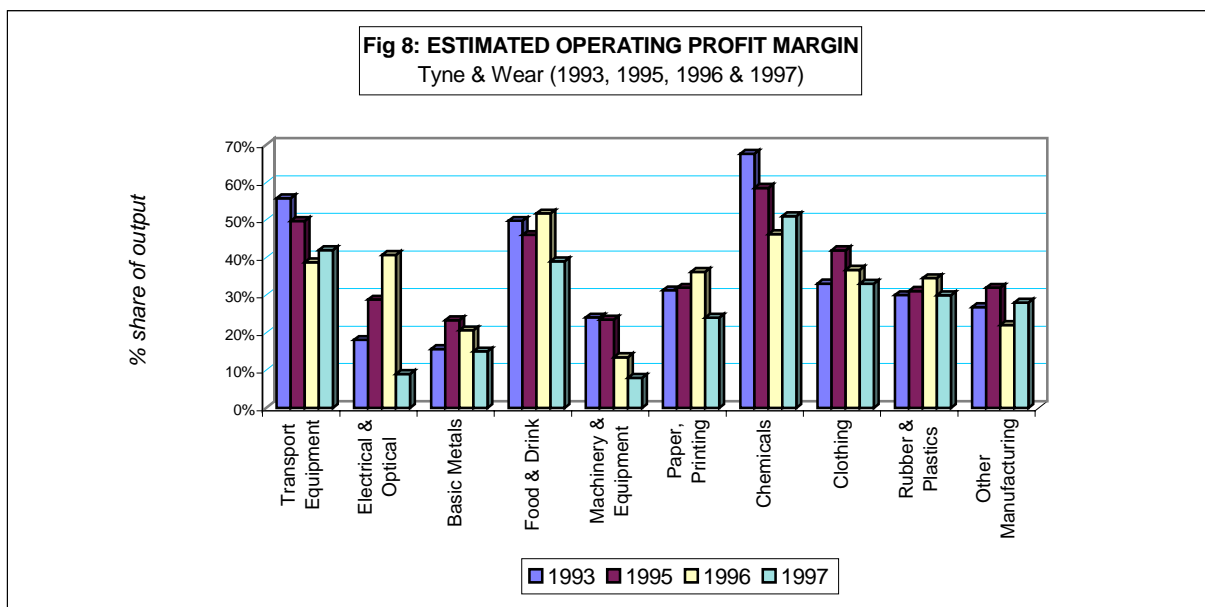
The Textiles & Clothing industry in Tyne & Wear continued to register a healthy profit margin (33%) in 1997 - significantly higher than the North East (25%) and above the UK (31%).

<sup>7</sup> The profit margins considered here are estimated operating profits expressed as a percentage of output (gross value added)

**Table 3: Estimated Operating Profit Margin by Industry, 1997**

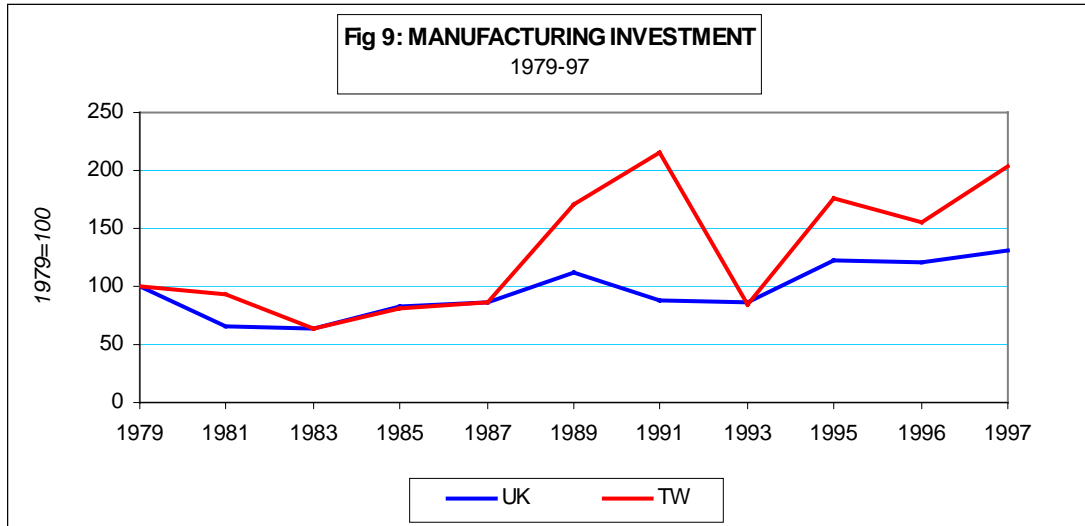
(SIC 92)	Industry	Estimated Profit Margin		
		Tyne & Wear	North East	UK
DM	Transport Equipment	42%	43%	36%
DL	Electrical & Optical	9%	19%	37%
DJ	Basic Metals	15%	24%	32%
DA	Food & Drink	39%	40%	50%
DK	Machinery & Equipment	8%	32%	34%
DE	Paper & Printing	24%	30%	35%
DG	Chemicals	51%	59%	51%
DB	Textiles & Clothing	33%	25%	31%
DH	Rubber & Plastics	30%	36%	37%
DN	Other Manufacturing	28%	31%	34%
<b>All manufacturing</b>		<b>29%</b>	<b>38%</b>	<b>39%</b>

Between 1993 and 1997, margins declined in seven of the top ten industries. The greatest falls were in Chemicals (down 17 percentage points), Machinery & Equipment (16 points) and Transport Equipment (14 percentage points). Margins rose in Other Manufacturing (up 1 percentage point) whilst margins remained constant over the period in both Textiles & Clothing and Rubber & Plastics (see figure 8).



## 6 INVESTMENT

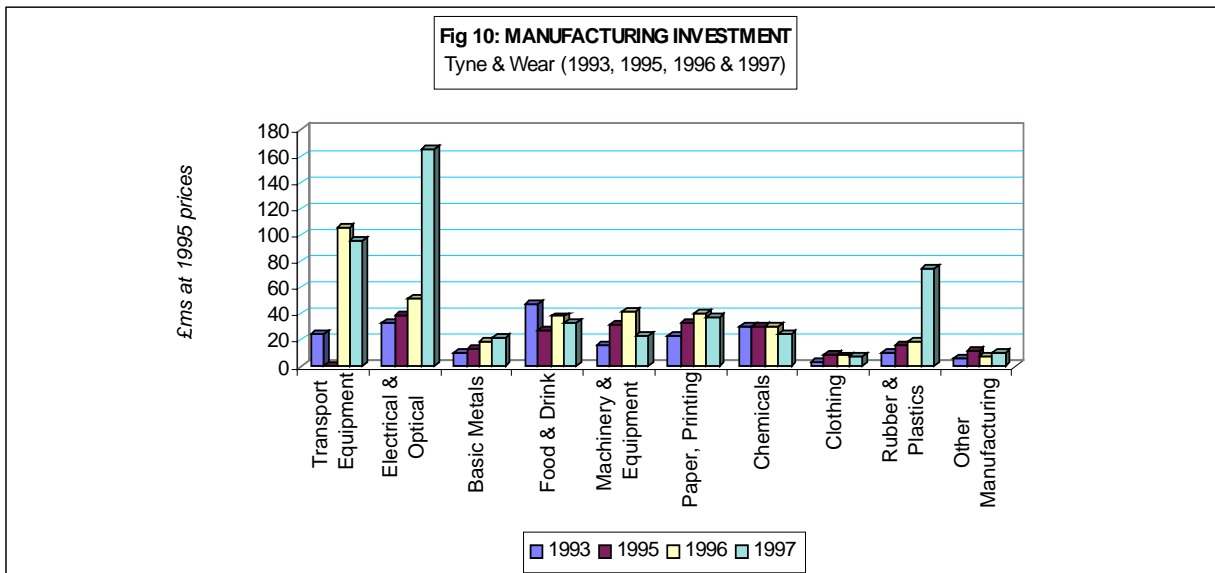
Manufacturing investment in Tyne & Wear has fluctuated sharply (see figure 9). The figures include leased assets after 1987. Fluctuations were greatest after 1987 with investment rising sharply until 1991, but then plummeting in 1993<sup>6</sup> substantially due to big swings in motor industry investment. Since 1993 levels have risen, with the 1997 figure approaching the 1991 peak. Indeed, since 1993 the trend has been increasing. Although investment in 1997 was up 104% from 1979 (in real terms) the figures are not comparable.



<sup>6</sup> Note: There is a discontinuity between 1987 and 1989 due to the exclusion of leased assets prior to 1987. This means that the figures before this change in coverage are not comparable with the figures after it.

Between 1993 and 1997 manufacturing investment in Tyne & Wear rose by 137%, from around £213m to £505m at constant 1995 prices (£537m in current prices). Even this is a material underestimate given what is known of Siemens investment. Investment is sharply cyclical. The huge increase still left investment in 1996 below 1991 levels due to the dramatic decline (-61%) in investment between 1991 and 1993.

Between 1993 and 1997, investment rose significantly, in real terms, in Electrical & Optical (+£134m, 412%), Transport Equipment (+£71m, 284%) and Rubber & Plastics (+£65m, 627%). There was a decline in two industries - Chemicals (-£17m, -19%) and Food & Drink (-£15m, -31%) (see figure 10 below). The vast increases in investment in Electrical & Optical and Rubber & Plastics mainly stem from extensive investment captured during 1997. The 1996 total, however, failed to capture the scale of the Siemens investment. Electrical & Optical investment was recorded at £53m in 1996 (in current prices), which is very low given that the Siemens microchip plant was under construction from 1995-96. The contract for the building alone was reported as £150m. The plant reportedly had up to £600m of investment up to 1997.



Note: Transport Equipment investment data for 1995 is suppressed by ONS, but is known to be up to £210m. Details in Appendix 2.

The definition of investment is wide. The data are called ‘net capital expenditure’ in the Census of Production. This includes expenditure on plant & machinery and on buildings and vehicles. The figures are net of disposals of these assets. No reduction is made for depreciation.

Logically, investment can give a strong indication of the direction in which manufacturing is developing. Investment is both a physical and psychological signal of where growth is expected (by management). It shows where capacity is being increased, or at least improved. In practice, however, investment usually tends to follow previous profitability. This is because the major source of investment capital is retained profit. Clearly, investment by firms new to the area, however, cannot finance these investments from retained profit of existing operations here.

Inference from investment patterns can, therefore, be hazardous. Single years do not give a firm basis for inferences and sampling of firms by the Census of Production can distort the investment variable. It is recommended that readers particularly interested in investment should refer to earlier papers, which date back to 1979.

The Electrical & Optical industry had the highest level of investment in 1997 (£166m at 1995 prices), accounting for 33% of all manufacturing investment in Tyne & Wear. The Transport Equipment industry, ranking second, had a 19% share of all manufacturing investment, at £96m (1995 prices), and the Rubber & Plastics industry, ranking third, had an 15% share, at £75m (1995 prices). Investment within the Textiles & Clothing industry was very low at £7m, or less than 2% of all manufacturing.

Comparisons between 1996 and 1997 (in table 4 below) show a considerable increase in investment in Electrical & Optical (up £115m or 225%) and in the Rubber & Plastics industry (up by £56m or 295%). In general, investment in other industries declined slightly, with the exception of Basic Metals and Other Manufacturing, which recorded modest increases.



**Table 4: Net Investment Levels, 1993, 1995 - 1997**

SIC (92)	Industry	Net Investment (at 1995 prices)			
		1993	1995	1996	1997
DM	Transport Equipment	£25m	*Up to £210m	£105m	£96m
DL	Electrical & Optical	£32m	£39m	£51m	£166m
DJ	Basic Metals	£11m	£13m	£19m	£21m
DA	Food & Drink	£47m	£27m	£38m	£32m
DK	Machinery & Equipment	£15m	£32m	£41m	£23m
DE	Paper & Printing	£24m	£33m	£40m	£38m
DG	Chemicals	£30m	£30m	£30m	£24m
DB	Textiles & Clothing	£3m	£9m	£8m	£7m
DH	Rubber & Plastics	£10m	£16m	£19m	£75m
DN	Other Manufacturing	£6m	£12m	£7m	£10m
<b>All Manufacturing</b>		<b>£213m</b>	<b>£435m</b>	<b>£386m</b>	<b>£505m</b>

Notes: \*=Suppressed by ONS for confidentiality reasons. Investment figure is aggregate of residual.

Net investment per employee in Tyne & Wear in 1997 was £5,700 (at 1995 prices). This was 1% above the North East average and 30% above the UK. The Rubber & Plastics and Electrical & Optical industries had very high investment per employee at £16,600 (over four times the UK average) and £12,500 (more than twice the UK average) respectively.

**Table 5: Net Investment per Employee with UK Comparison, 1997**

SIC 92		Tyne & Wear (at current prices) £	TW/NE NE=100	TW/UK UK=100
DM	Transport Equipment	7,700	119.4	102.0
DL	Electrical & Optical	12,500	150.3	256.3
DJ	Basic Metals	2,300	63.3	80.8
DA	Food & Drink	3,600	83.8	68.8
DK	Machinery & Equipment	2,200	81.3	82.7
DE	Paper & Printing	4,100	63.4	103.1
DG	Chemicals	6,900	51.9	69.7
DB	Textiles & Clothing	1,100	88.0	84.8
DH	Rubber & Plastics	16,600	177.4	415.4
DN	Other Manufacturing	2,000	74.9	82.7
<b>All Manufacturing</b>		<b>5,700</b>	<b>100.6</b>	<b>130.2</b>

## 7 ESTABLISHMENT SIZE

In 1997 the average establishment in Tyne & Wear had 40 employees. This was over 50% greater than the UK average of 25 employees (see table 6). The differential between Tyne & Wear and the UK in establishment size increased to 1.58 in 1997, having remained steady over the period 1993-96 (1993, 1.48; 1996, 1.49). Establishment size in the county increased marginally during 1997 (from 39 employees to 40), whilst the average UK establishment size decreased by 1 to 25).

**Table 6 Establishment Size\* with UK Comparison, 1997**

SIC (92)	Industry	Tyne & Wear (per business)	UK (per business)	TW/UK
DM	Transport Equipment	158.2	33.4	1.75
DL	Electrical & Optical	58.6	33.4	1.97
DJ	Basic Metals	21.9	16.9	1.30
DA	Food & Drink	71.2	59.7	1.19
DK	Machinery & Equipment	48.2	28.1	1.72
DE	Paper & Printing	27.1	14.7	1.84
DG	Chemicals	47.7	64.9	0.73
DB	Textiles & Clothing	48.1	25.1	1.92
DH	Rubber & Plastics	39.5	36.7	1.07
DN	Other Manufacturing	20.8	11.6	1.80
<b>All manufacturing</b>		<b>40.2</b>	<b>25.4</b>	<b>1.58</b>

Notes: \* = Employment per business

In 1997 nine of Tyne & Wear's top ten industries had an establishment size greater than the national average. The large establishment sizes in Tyne & Wear have been noted since the beginning of these analyses (1979). Establishment size was over 50% greater than the UK in:

Electrical & Optical	(1.97)
Textiles & Clothing	(1.92)
Paper & Printing	(1.84)
Other Manufacturing	(1.80)
Transport Equipment	(1.75)
Machinery & Equipment	(1.72)

Two Tyne & Wear industries had establishment size at or below the UK average. Rubber & Plastics differed marginally in establishment size to the UK (1.07). The Chemicals industry (0.73) was below the UK average.

## 8 PURCHASING (OF SERVICES)

Details of the purchasing patterns within the major manufacturing industries in Tyne & Wear can be gleaned from data detailing expenditure on various services including road transport, telecommunications, computer-related services, marketing and advertising. A final category of Other Services can be sub-divided into purchasing by companies with less than 100 employees. Other Services includes business services (accountancy, cleaning, maintenance etc.), payments for hiring, leasing or renting plant machinery and vehicles and commercial insurance. Expenditure on services relates in all cases to purchases from external sources (i.e. not within another department of the same company).

In 1997 establishments within the major manufacturing industries in Tyne & Wear purchased services valued in excess of £1.27bn, the equivalent of 46% of total manufacturing Gross Value Added (GVA). Manufacturing firms in comparative UK industries spent more on services in relation to their total GVA (50%) than companies in Tyne & Wear (see table 7 below).

**Table 7: Purchases of Services by Manufacturing industries in Tyne & Wear, 1997**

SIC (92)	Industry	Service Purchases		
		Tyne & Wear (£ 000s)	Tyne & Wear Service Purchases as % of total GVA	UK Service Purchases as % of total GVA
DM	Transport Equipment	378,723	14.3	5.3
DL	Electrical & Optical	152,345	5.7	6.2
DJ	Basic Metals	68,579	2.6	3.7
DA	Food & Drink	111,795	4.2	9.8
DK	Machinery & Equipment	134,740	5.1	3.7
DE	Paper & Printing	107,053	4.0	8.1
DG	Chemicals	115,353	4.3	7.2
DB	Textiles & Clothing	46,952	1.8	1.8
DH	Rubber & Plastics	65,507	2.5	2.5
DN	Other Manufacturing	39,583	1.5	1.7
	<b>Total</b>	<b>1,220,630</b>	<b>46.0</b>	<b>50.0</b>
	<b>All Manufacturing</b>	<b>1,270,378</b>	<b>47.8</b>	<b>53.8</b>

Purchasing of services came particularly from the Transport Equipment industry at 14.3% of Tyne & Wear GVA, far higher than the comparable figure of 5.3% of UK GVA. The only other manufacturing industry in Tyne & Wear to spend a greater proportion of GVA on services than the UK average was Machinery & Equipment.

In terms of the different services purchased, road transport was the largest item for all of the major manufacturing industries in Tyne & Wear (over £90m), as was also the case in the UK. Purchases of road transport services averaged almost 9% of total purchases in each major manufacturing industry. Other Manufacturing had the greatest proportion of services spend on road transport at 13.7% of its total purchases. The average proportion of road transport purchases by industry in Tyne & Wear was greater than the UK average, possibly emphasising the relative geographical isolation of Tyne & Wear within the UK. Details of the purchasing patterns of the major manufacturing industries in Tyne & Wear with UK comparisons can be found in Table 8 below.

Table 8: Purchases of Services by Major Manufacturing Industry, Tyne & Wear and UK, 1997

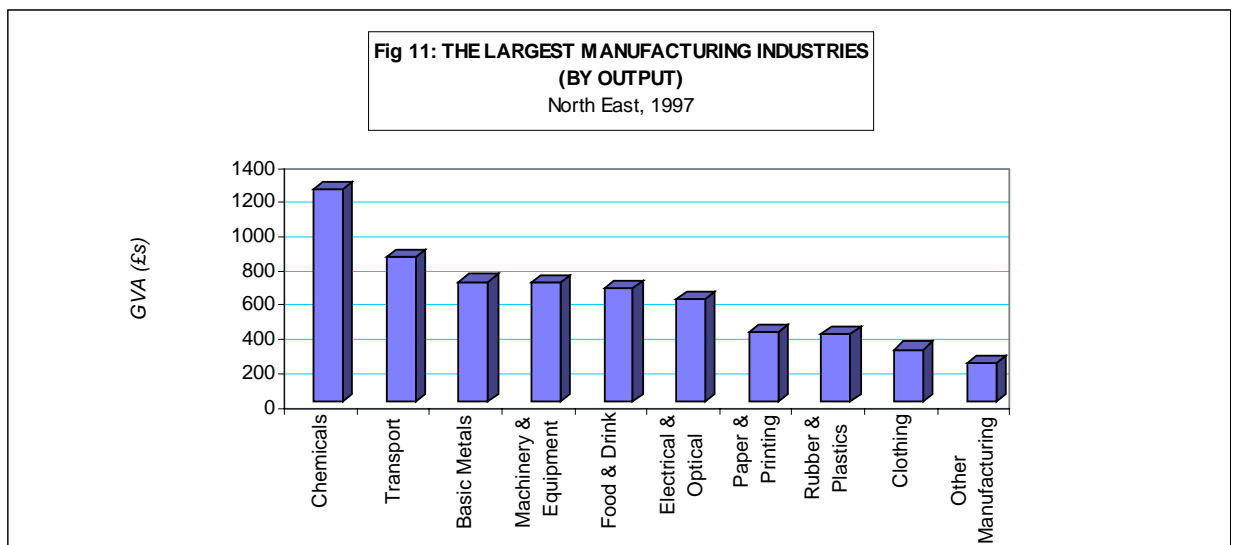
SIC (92)	Industry	Purchases of Road Transport Services			Purchases of Telecommunication Services			Purchases of Computer Related Services			Purchases of Advertising and Marketing Services		
		£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry	£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry	£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry	£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry
<b>TYNE &amp; WEAR</b>													
DM	Transport Equipment	15,700	15.7	4.2	1,500	9.1	0.4	7,600	31.5	2.0	2,600	6.0	0.7
DL	Electrical & Optical	8,800	8.8	5.8	3,200	18.8	2.1	5,300	21.7	3.5	2,900	6.5	1.9
DJ	Basic Metals	7,200	7.2	10.5	1,100	6.8	1.7	1,200	5.0	1.8	1,600	3.6	2.3
DA	Food & Drink	11,700	11.7	10.4	1,000	6.2	0.9	1,200	4.9	1.1	11,300	25.7	10.1
DK	Machinery & Equipment	9,200	9.2	6.8	2,500	14.7	1.8	3,300	13.8	2.5	6,900	15.7	5.1
DE	Paper & Printing	11,200	11.2	10.5	2,200	12.9	2.0	1,600	6.7	1.5	5,100	11.5	4.7
DG	Chemicals	10,400	10.4	9.0	2,000	12.1	1.8	1,800	7.6	1.6	4,300	9.7	3.7
DB	Textiles & Clothing	3,600	3.6	7.7	900	5.5	2.0	600	2.6	1.3	1,500	3.5	3.3
DH	Rubber & Plastics	7,100	7.1	10.8	900	5.5	1.4	400	1.7	0.6	4,700	10.6	7.1
DN	Other Manufacturing	5,400	5.4	13.7	600	3.3	1.4	600	2.5	1.5	1,900	4.3	4.7
<b>Total</b>		<b>90,300</b>	<b>90.4</b>	<b>Avg. 8.9</b>	<b>16,000</b>	<b>94.9</b>	<b>Avg. 1.5</b>	<b>23,700</b>	<b>98.0</b>	<b>Avg. 1.7</b>	<b>42,600</b>	<b>97.0</b>	<b>Avg. 4.4</b>
<b>All Manufacturing</b>		<b>99,900</b>	<b>100</b>		<b>16,800</b>			<b>24,200</b>			<b>43,900</b>		
<b>UK</b>													
		£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry	£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry	£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry	£ '000s	* % of all Purchases by all Industries	# Purchases as % of all purchases by this industry
DM	Transport Equipment	371,774	6.0	4.9	75,008	7.1	1.0	418,152	24.6	5.5	662,387	10.4	8.7
DL	Electrical & Optical	373,759	6.0	4.2	179,199	17.0	2.0	324,353	19.1	3.6	325,365	5.1	3.7
DJ	Basic Metals	632,242	10.2	11.9	68,272	6.5	1.3	98,063	5.8	1.8	133,331	2.1	2.5
DA	Food & Drink	1,331,679	21.5	9.4	99,793	9.5	0.7	137,259	8.1	1.0	2,444,667	38.2	17.2
DK	Machinery & Equipment	313,848	5.1	5.8	112,664	10.7	2.1	130,204	7.7	2.4	289,237	4.5	5.4
DE	Paper & Printing	779,119	12.6	6.7	189,982	18.1	1.6	150,605	8.9	1.3	852,393	13.3	7.3
DG	Chemicals	733,795	11.9	7.0	127,991	12.2	1.2	229,464	13.5	2.2	958,536	15.0	9.2
DB	Textiles & Clothing	216,202	3.5	8.1	41,309	3.9	1.5	72,712	4.3	2.7	176,848	2.8	6.6
DH	Rubber & Plastics	386,925	6.3	10.9	56,245	5.3	1.6	46,263	2.7	1.3	168,759	2.96	4.8
DN	Other Manufacturing	247,732	4.0	10.2	39,650	3.8	1.6	27,475	1.6	1.1	212,079	3.3	8.7
<b>Total</b>		<b>5,387,075</b>	<b>87.1</b>	<b>Avg. 7.9</b>	<b>990,113</b>	<b>94.1</b>	<b>Avg. 1.5</b>	<b>1,634,550</b>	<b>96.3</b>	<b>Avg. 2.3</b>	<b>6,223,602</b>	<b>97.3</b>	<b>Avg. 7.4</b>
<b>All Manufacturing</b>		<b>6,186,637</b>	<b>100</b>		<b>1,052,460</b>			<b>1,697,616</b>			<b>6,392,120</b>		

\* The service purchases by each industry divided by service purchases by all manufacturing industries. # The purchases of this service divided by all the service purchases of this industry.

## 9 NORTH EAST MANUFACTURING

Between 1993 and 1995, manufacturing output in the Northern Region\* rose 5%, under-performing the UK by 11% (UK +16%). It still out-performed Tyne & Wear, however, by 14% (TW -9%). Output in the Chemicals industry, which was very strong in the North East in 1996, fell by 10% during 1993-5, whereas in the UK it rose by 19%. The fall in the Northern Region was very mild, however, compared to Tyne & Wear, where output fell by 32%. Basic Metals output rose by 21%, once again out-performing Tyne & Wear (+6%), but under-performing the UK (+30%).

In 1997, the value of the output of manufacturing in the North East of England was £6,475m. The structure of output varied significantly from that of Tyne & Wear. Figure 11 below shows the ten largest industries in the North East (by output) which can be compared with Tyne & Wear (Fig. 2). Chemicals had the largest output in 1997; £1,248m, or 19% of all manufacturing output. Within Tyne & Wear the Chemicals industry was ranked just 7<sup>th</sup> with just a 7% share of output. Electrical & Optical was ranked 2<sup>nd</sup> within Tyne & Wear with 12% of output. Within the North East, Electrical & Optical ranks just 6<sup>th</sup>, holding a 9% share of manufacturing output. The Transport Equipment and Basic Metals industries were relatively large in both Tyne & Wear and the North East as a whole.



\* Up to 1995 there are no North East data, only Northern Region.

Between 1996 and 1997, manufacturing output in the North East fell 2%, under-performing both the UK and Tyne & Wear, which both increased slightly. Output changes between 1996-97 varied greatly between manufacturing industries (see Table 9 below). Output rose hugely in the Transport Equipment industry (by up to +34%\*) between 1996-97, a possible rise of over £200m. Other notable rises were recorded in the Machinery & Equipment, Other Manufacturing (both +10%), Rubber & Plastics (+8%) and Chemicals (+6%) industries. There were steep declines in Basic Metals (-27%), Electrical & Optical (-19%) and Food & Drink (-17%).

\* = Output (Gross Value Added) data in the Transport & Equipment industry was suppressed in 1996. The residuals, in aggregate in 1996, and 1996 at constant 1995 prices were £615.3m and £595.1m respectively. Output in Transport Equipment in 1996 was, therefore, up to these amounts.

**Table 9: Output of Manufacturing Industries in the North East, 1996-97 (at 1995 prices)**

SIC (92)	INDUSTRY	Output ( <i>Gross Value Added</i> )		
		1996 (at 1995 prices) £m	1997 (at 1995 prices) £m	1996-97 % change
DG	Chemical Industry	1,107.4	1,177.0	6.3
DJ	Basic Metals	906.6	665.9	-26.5
DA	Food & Drink	757.8	626.4	-17.3
DL	Electrical & Optical	697.2	567.9	-18.5
DK	Machinery & Equipment	601.7	661.5	9.9
DM	Transport Equipment	*Up to 595.1	798.9	*Up to 34.2
DE	Paper & Printing	447.1	391.4	-12.5
DH	Rubber & Plastics	347.0	374.9	8.0
DB	Textiles & Clothing	298.8	291.7	-2.4
DN	Other Manufacturing	196.0	216.2	10.3
<b>Total</b>		<b>5,954.1</b>	<b>5,771.8</b>	<b>-3.1</b>
<b>All Manufacturing</b>		<b>6,245.0</b>	<b>6,108.4</b>	<b>-2.2</b>

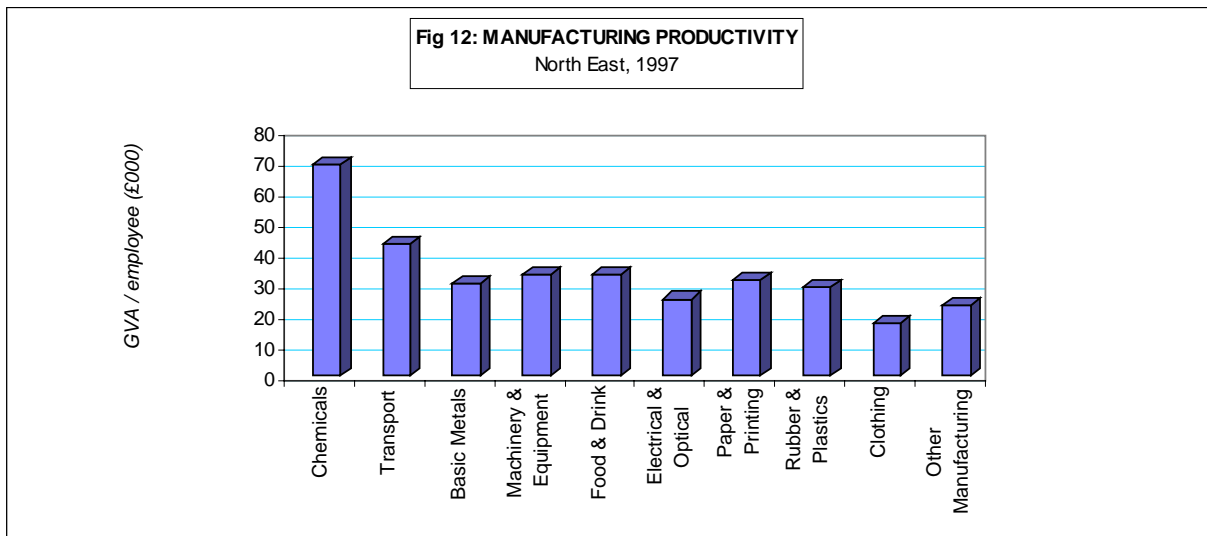
The two largest employing industries in the North East in 1997 were Electrical & Optical (accounting for 13% of manufacturing employment) and Basic Metals (accounting for 12%).

Manufacturing profit margins in 1997 were higher in the North East (38%) than in Tyne & Wear (29%). Operating profits were highest in Chemicals and Food & Drink at £694m and £251m (at 1995 prices) respectively. Their respective profit margins stood at 59% and 40%, slightly higher than the Tyne & Wear margins of 51% and Food & Drink 39%.

Total manufacturing investment in the North East in 1997 was £1,097m (at 1995 prices). Investment was particularly high in Chemicals (£40m) and Electrical & Optical (£204m). Between 1996-97, Chemicals investment fell by almost 12% and Electrical & Optical rose by almost 87% in the North East (in constant 1995 prices). Investment in the Tyne & Wear Chemicals industry fell by a 26% and the Electrical & Optical industry rose by 223%.

The two industries with the highest investment per employee in the North East in 1997 were Chemicals (with an average of around £13,300 per employee) and Electrical & Optical (with an average of around £8,300). Investment per employee in Chemicals in the North East fell 19% between 1996/97 but Electrical & Optical rose by a significant 87%. This is a similar trend to Tyne & Wear, where Chemicals fell by nearly 8% and Electrical & Optical rose by over 202%.

The North East Chemicals industry's productivity in 1997 (£69,000 per employee at current prices) was approximately twice that of other manufacturing industries in the region with the exception of Transport Equipment (£43,000 per employee) (see figure 12 below). Productivity in the North East Chemicals industry was 35% above the Chemicals industry in Tyne & Wear. However, whilst productivity in Chemicals in the North East fell by over 1% (in real terms) between 1996-97, productivity in Tyne & Wear grew by almost 19%.



**APPENDIX 1: MANUFACTURING IN TYNE & WEAR, 1995-97**

SIC (92)	INDUSTRY	Output ( <i>Gross Value Added</i> )				Productivity ( <i>per employee</i> )			
		1995	1996	1997	1997	1995	1996	1997	1997
		£m	£m	£m	£m	£m	£m	£m	£m
DA	Food & Drink	261.0	297.9	269.3	286.0	27,214	34,038	28,005	29,742
DB	Textiles & Clothing	126.3	133.7	117.4	124.7	17,952	18,301	16,716	17,753
DC	Leather & Leather Goods	*	*	2.48	2.6	*	*	13,548	14,388
DD	Wood & Wood Products	26.7	44.6	62.4	66.2	22,213	32,727	46,497	49,380
DE	Paper & Printing	241.4	259.6	247.3	262.6	29,385	32,954	27,039	28,715
DF	Coke, Petroleum	*	*	4.6	4.9	*	*	45,078	47,873
DG	Chemical Industry	256.9	176.7	177.5	188.5	59,148	43,320	50,982	54,143
DH	Rubber & Plastics	121.7	119.3	114.3	121.4	26,007	28,071	25,398	26,973
DI	Other Non-Metal	84.4	87.4	77.6	82.4	25,709	29,567	27,520	29,217
DJ	Basic Metals	202.5	212.9	275.6	292.7	23,183	24,203	30,742	32,648
DK	Machinery & Equipment	300.2	266.2	250.9	266.5	27,525	24,693	23,768	25,242
DL	Electrical & Optical	313.2	424.8	292.4	310.5	25,661	34,017	21,986	23,349
DM	Transport Equipment	363.9	378.0	503.8	535.0	46,240	37,570	40,307	42,806
DN	Other Manufacturing	99.8	85.2	104.6	111.1	20,981	18,663	21,051	22,357
	Process Industries (DF,DG,DI)	341.3	264.1	259.6	275.7	44,757	37,540	40,559	43,074
	Engineering (DJ-DM)	1,179.8	1,281.8	1,322.7	1,404.8	29,706	30,430	29,186	30,995
	Other Manufacturing (DA-DE,DH,DN)	877.0	940.3	917.8	974.7	24,716	27,566	24,953	26,500
	<b>All Manufacturing</b>	2,408.1	2,492.4	2,500.2	2,655.2	29,020	29,837	28,249	30,001

Notes \* = Suppressed by ONS for confidentiality reasons.



**APPENDIX 2: MANUFACTURING IN TYNE & WEAR, 1995-97**

SIC (92)	INDUSTRY	Estimated Operating Profit				Estimated Operating Profit Margin			Investment			
		1995 £m	1996 (at 1995 prices) £m	1997 (at 1995 prices) £m	1997 £m	1995	1996	1997	1995 £m	1996 (at 1995 prices) £m	1997 (at 1995 prices) £m	1997 £m
DA	Food & Drink	120.2	154.1	105.6	112.2	46%	52%	39%	26.8	38.0	32.3	34.3
DB	Textiles & Clothing	53.0	49.1	38.3	40.6	42%	37%	33%	9.3	8.1	7.4	7.9
DC	Leather & Leather Goods	*	*	-0.1	-0.1	*	*	-2%	*	*	0.1	0.1
DD	Wood & Wood Products	9.8	23.9	40.5	43.0	36%	54%	65%	3.6	3.4	4.1	4.4
DE	Paper & Printing	77.2	93.9	58.6	62.2	32%	36%	24%	33.4	40.4	37.7	40.0
DF	Coke, Petroleum	*	*	1.5	1.6	*	*	33%	*	*	0.6	0.6
DG	Chemical Industry	150.4	81.7	91.0	96.6	59%	46%	51%	30.2	30.3	24.0	25.5
DH	Rubber & Plastics	37.9	41.2	34.1	36.2	31%	35%	30%	16.0	19.0	74.5	79.2
DI	Other Non-Metal	29.4	37.9	27.8	29.5	35%	43%	36%	9.4	22.8	9.4	10.0
DJ	Basic Metals	47.2	43.9	40.2	42.7	23%	21%	15%	13.1	18.9	20.9	22.2
DK	Machinery & Equipment	70.5	35.9	19.3	20.5	23%	13%	8%	32.2	41.2	23.2	24.7
DL	Electrical & Optical	90.3	172.9	27.0	28.7	29%	41%	9%	38.8	51.4	165.8	176.0
DM	Transport Equipment	181.2	146.3	211.4	224.5	50%	39%	42%	*#Up to 210.2	105.1	95.6	101.6
DN	Other Manufacturing	31.9	18.8	29.3	31.1	32%	22%	28%	11.8	6.7	9.7	10.3
	Process Industries (DF,DG,DI)	179.9	119.6	120.3	127.7	53%	45%	46%	39.6	53.1	34.0	36.1
	Engineering (DJ-DM)	389.1	398.9	297.9	316.3	33%	31%	23%	*~Up to 294.3	216.6	305.5	324.5
	Other Manufacturing (DA-DE,DH,DN)	330.0	381.0	306.3	325.3	38%	41%	33%	100.8	115.4	165.9	176.2
	<b>All Manufacturing</b>	906.2	901.5	719.2	763.7	38%	36%	29%	434.7	385.6	505.4	536.7

Notes: \* = Suppressed by ONS for confidentiality reasons.

# = Investment in industries for which data are suppressed (the residual) in aggregate is £210.2m. Investment in Transport Equipment was, therefore, up to this amount.

~ = Investment in Engineering incorporates the suppressed data (the residual) of £210.2m.

**APPENDIX 3: MANUFACTURING IN TYNE & WEAR AND COMPARISONS WITH THE UK, 1995-97**

SIC (92)	INDUSTRY	Investment (per employee)				Establishment Size (no. of employees)					
		1995	1996	1997	1997	1995	1995	1996	1996	1997	1997
		£	(at 1995 prices) £	(at 1995 prices) £	£	TW	UK	TW	UK	TW	UK
DA	Food & Drink	2,790	4,337	3,360	3,568	70.0	61.3	61.2	60.0	71.2	59.7
DB	Textiles & Clothing	1,320	1,103	1,056	1,121	48.9	26.1	50.7	24.2	48.1	25.1
DC	Leather & Leather Goods	*	*	602	639	*	35.9	*	27.3	18.3	27.7
DD	Wood & Wood Products	2,949	2,464	3,060	3,250	12.0	10.7	13.6	10.3	13.7	10.6
DE	Paper & Printing	4,070	5,123	4,122	4,377	25.4	16.3	24.3	15.1	27.1	14.7
DF	Coke, Petroleum	*	*	5,465	5,804	*	62.3	*	94.5	12.8	98.1
DG	Chemical Industry	6,958	7,421	6,897	7,325	56.4	62.1	53.0	63.6	47.7	64.9
DH	Rubber & Plastics	3,422	4,476	16,554	17,580	41.8	36.1	37.9	35.4	39.5	36.7
DI	Other Non-Metal	2,851	7,714	3,330	3,536	31.6	3.2	28.4	31.5	26.8	29.6
DJ	Basic Metals	1,501	2,154	2,334	2,479	21.1	18.5	21.3	17.6	21.9	16.9
DK	Machinery & Equipment	2,949	3,820	2,198	2,334	51.2	27.5	50.6	28.9	48.2	28.1
DL	Electrical & Optical	3,180	4,116	12,464	13,237	54.0	30.9	55.3	3.4	58.6	33.4
DM	Transport Equipment	*#Up to 26,714	10,444	7,652	8,126	109.3	60.0	139.7	78.6	158.2	80.2
DN	Other Manufacturing	2,471	1,462	1,960	2,081	20.9	12.1	20.0	11.5	20.8	11.6
	Process Industries (DF,DG,DI)	5,191	7,544	5,304	5,633	40.7	32.0	16.4	47.7	14.2	46.6
	Engineering (DJ-DM)	*#Up to 7,411	5,142	6,741	7,159	38.3	27.5	45.6	28.7	48.5	28.1
	Other Manufacturing (DA-DE,DH,DN)	2,841	3,384	4,510	4,790	33.1	24.6	42.0	21.4	34.1	21.3
	<b>All Manufacturing</b>	5,239	4,616	5,710	6,064	36.1	26.2	38.5	25.8	40.3	25.4

Notes: \* = Suppressed by ONS for confidentiality reasons.

\*# = Investment in industries for which data are suppressed (the residual) in aggregate is £210.2m. Investment in Transport Equipment was, therefore, up to this amount. Using this as a base, we can assume that investment per employee in Transport Equipment was up to £26,714 and subsequently that Engineering was up to £7,411.

**APPENDIX 4: MANUFACTURING IN THE NORTH EAST, 1996-97**

SIC (92)	INDUSTRY	Output (Gross Value Added)			Productivity (per employee)			Estimated Operating Profit		
		1996 (at 1995 prices) £m	1997 (at 1995 prices) £m	1997 £m	1996 (at 1995 prices) £m	1997 (at 1995 prices) £m	1997 £m	1996 (at 1995 prices) £m	1997 (at 1995 prices) £m	1997 £m
DA	Food & Drink	757.8	626.4	664.0	40,097	31,478	33,366	417.2	251.3	266.3
DB	Textiles & Clothing	298.8	291.7	309.2	17,788	16,296	17,723	99.0	72.5	76.9
DC	Leather & Leather Goods	*	10.9	11.5	*	15,498	16,428	*	2.1	2.3
DD	Wood & Wood Products	120.7	154.3	163.5	26,238	30,244	32,058	50.8	77.3	81.9
DE	Paper & Printing	447.1	391.4	414.9	34,930	28,993	30,733	178.0	118.4	125.5
DF	Coke, Petroleum	*	12.8	13.6	*	64,150	68,000	*	6.3	6.6
DG	Chemical Industry	1,107.4	1,177.0	1,247.6	67,936	65,387	69,311	698.1	693.8	735.4
DH	Rubber & Plastics	347.0	374.9	397.4	27,323	27,365	29,007	126.6	134.8	142.9
DI	Other Non-Metal	169.5	158.7	168.2	30,274	28,850	30,581	75.2	62.0	65.7
DJ	Basic Metals	906.6	665.9	705.8	31,698	28,700	30,422	318.1	163.0	172.8
DK	Machinery & Equipment	601.7	661.5	701.2	27,603	31,203	33,075	161.7	214.0	226.8
DL	Electrical & Optical	697.2	567.9	602.0	28,457	23,180	24,571	235.8	108.0	114.4
DM	Transport Equipment	*#Up to 595.1	798.9	846.8	*	40,967	43,425	*	344.2	364.9
DN	Other Manufacturing	196.0	216.2	229.2	21,079	21,841	23,151	56.5	67.9	72.0
	Process Industries (DF,DG,DI)	1,276.9	1,348.5	1,429.4	58,305	56,898	60,312	773.3	762.1	807.8
	Engineering (DJ-DM)	*~Up to 2,800.6	2,694.2	2,855.8	29,446	30,476	32,305	715.5	829.2	878.9
	Other Manufacturing (DA-DE,DH,DI)	2,167.5	2,065.8	2,189.7	28,862	25,597	27,133	928.2	724.3	767.7
	<b>All Manufacturing</b>	<b>6,245.0</b>	<b>6,108.4</b>	<b>6,474.9</b>	<b>33,077</b>	<b>31,666</b>	<b>33,566</b>	<b>2,644.9</b>	<b>2,315.6</b>	<b>2,454.5</b>

Notes: \* = Suppressed by ONS for confidentiality reasons.

\*# = Output (Gross Value Added) in industries for which data are suppressed (the residuals) in aggregate in 1996, and 1996 at constant 1995 prices were £615.3m and £595.1 respectively. Output in Transport Equipment in 1996 was, therefore, up to these amounts.

\*~ = Output (Gross Value Added) in Engineering incorporates the suppressed data (the residuals) of £615.3m for 1996, and £595.1 for 1996 at constant 1995 prices.

**APPENDIX 5: MANUFACTURING IN THE NORTH EAST, 1996-97**

SIC (92)	INDUSTRY	Estimated Operating Profit Margin		Investment			Investment ( <i>per employee</i> )		
		1996	1997	1996 (at 1995 prices)	1997 (at 1995 prices)	1997	1996 (at 1995 prices)	1997 (at 1995 prices)	1997
		£m	£m	£m	£m	£m	£m	£m	£m
DA	Food & Drink	55%	40%	71.8	79.9	84.7	3,797	4,015	4,256
DB	Textiles & Clothing	33%	25%	20.6	21.5	22.8	1,226	1,201	1,273
DC	Leather & Leather Goods	*	20%	*	0.5	0.5	*	673	714
DD	Wood & Wood Products	42%	50%	8.8	18.5	19.6	1,913	3,625	3,843
DE	Paper & Printing	40%	30%	62.9	87.9	93.2	4,911	6,512	6,903
DF	Coke, Petroleum	*	49%	*	2.2	2.3	*	10,849	11,500
DG	Chemical Industry	63%	59%	267.8	239.5	253.9	16,429	13,307	4,105
DH	Rubber & Plastics	36%	36%	57.1	128.1	135.8	4,493	9,351	9,912
DI	Other Non-Metal	44%	39%	37.1	20.4	21.6	6,632	3,705	3,927
DJ	Basic Metals	35%	24%	83.0	85.7	90.8	2,901	3,692	3,913
DK	Machinery & Equipment	27%	32%	78.8	57.5	60.9	3,616	2,710	2,872
DL	Electrical & Optical	34%	19%	108.9	203.6	215.8	4,445	8,309	8,808
DM	Transport Equipment	*	43%	*Up to 138.5	125.2	132.7	*	6,419	6,805
DN	Other Manufacturing	29%	31%	17.9	25.9	27.5	1,924	2,620	2,777
	Process Industries (DF,DG,DI)	61%	57%	304.9	262.1	277.8	13,924	11,058	11,721
	Engineering (DJ-DM)	32%	31%	*Up to 409.2	471.9	500.2	3,614	5,338	5,658
	Other Manufacturing (DA-DE,DH,DN)	43%	35%	239.0	362.4	384.1	3,182	4,490	4,759
	<b>All Manufacturing</b>	42%	38%	953.1	1,096.7	1,162.5	5,048	5,685	6,026

Notes: \* = Suppressed by ONS for confidentiality reasons