

**STRUCTURAL CHANGE AND INDUSTRY PERFORMANCE IN  
FOUR WESTERN EUROPEAN COUNTRIES**

by Harald Fries

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## 1 INTRODUCTION

Too often the economic problems of a country are discussed in isolation from the development in other countries. By examining a group of countries, a wider perspective is given to the study of each country. In this paper, industrial development in four European countries is described and compared. This is done with special reference to the marked deterioration in economic conditions which occurred in the wake of the oil price boom in 1973/74 and which has troubled a large part of the world since. Stagflation - low economic activity accompanied by rapid inflation - has become a widespread and persistent phenomenon. This is illustrated in Figure 1.

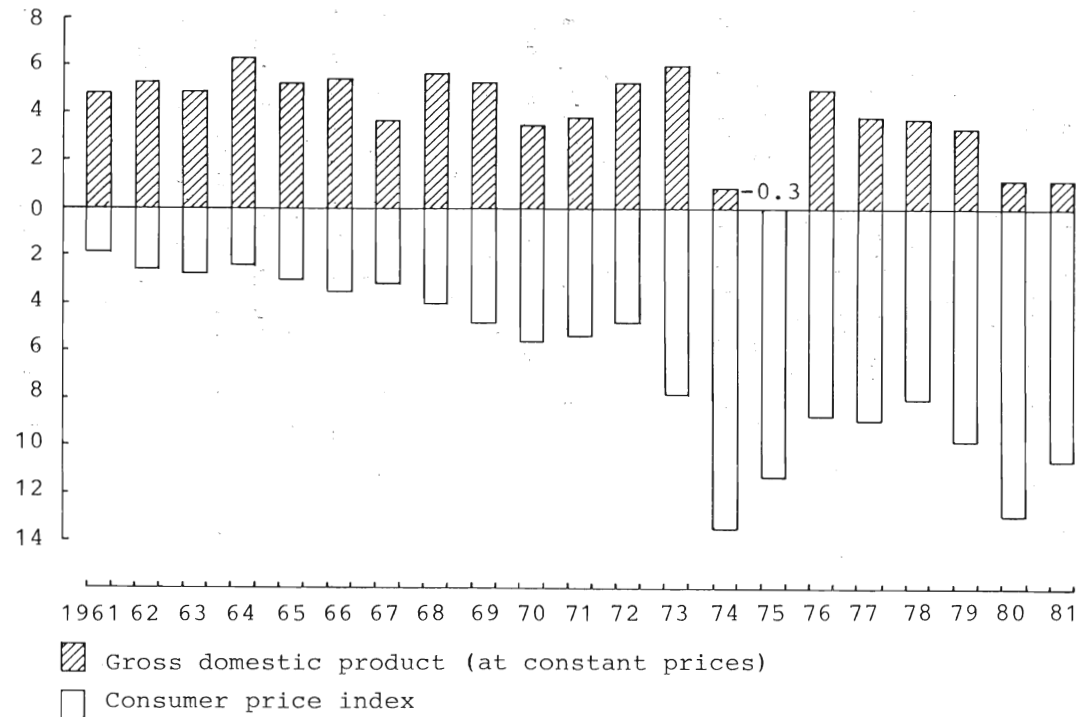
In addition to a purely descriptive part, the study contains a discussion of the significance for structural change and long-run industry growth of such key variables as prices, profits and investments. The arguments brought forward are substantiated by empirical evidence from the four countries.

The countries studied in the paper are the Federal Republic of Germany (subsequently referred to as Germany), the Netherlands, Sweden and the United Kingdom (U.K.). This choice of countries gives a good spread of "economic size" and in policy responses to the economic problems of the 1970s. Germany is representative of a deflationary approach, whereas the U.K. and Sweden ventured a pronounced inflationary route. The Netherlands was closer to Germany in this respect.

The period covered is 1960-80, but data for some variables are not accessible for years before 1963. The figures used for 1980 are preliminary.

Figure 1 Growth of real GDP and consumer prices in the OECD area 1961-81

Percentage change from previous year



Sources: OECD, 1982, "Historical Statistics 1960-80"  
 OECD, 1982, "Economic Outlook, July 1982"

The manufacturing sector is disaggregated into eight sub-sectors (industries), following the United Nations' International Standard of Industrial Classification (ISIC) of 1968. The industries analyzed are:

ISIC code		Subsequently referred to as
31	Food, beverages and tobacco	Food
32	Textiles, wearing apparel and leather	Textiles
33	Wood and wood products	Wood
34	Paper and paper products, printing and publishing	Paper and printing
35	Chemicals and chemical petroleum, coal, rubber and plastic products	Chemicals
36	Non-metallic mineral products except products of petroleum and coal	Non-metallic minerals
37	Basic metal industries	Basic metals
38	Fabricated metal products, machinery and equipment	Engineering

## 2 DATA CONSIDERATIONS

The data presented and analyzed in this paper are collected from a large number of statistical sources. As far as possible, international publications have been used. But to some extent it has been necessary to turn to local statistical publications. In a few instances, local statistical authorities of the countries have been consulted directly. The statistical sources used for the study are listed and numbered on p. 166. References in tables and figures to the list of statistical sources are made by giving the numbers assigned to the sources, instead of writing out their full titles.

It must be recognized that each of the eight industry categories studied here produce a wide variety of products. The industry data used in this study thus represent averages of products (and of firms) which differ in capital intensity, labor productivity, research intensity, demand elasticity and so on. The analysis of the eight industries is therefore bound to oversimplify and leave out many aspects of industrial development. For example, structural change within the sub-sectors cannot be captured. Nevertheless, the level of disaggregation adopted is the finest available which gives adequate comparability between the countries.

Even on this highly aggregated level, the data are not completely comparable between the countries. This is due, for example, to inconsistent industry classifications and variable definitions, different coverages of enterprises and, for monetary variables, the problem of different currencies. But such statistical imperfections should mainly affect across-country comparisons of levels, but not comparisons of rates of change.

The data considerations mentioned here should be kept in mind when interpreting the results in the following presentation.

### 3 THE MANUFACTURING SECTOR

Let us first take a broad look at the aggregate manufacturing sector in the four countries. It will serve as a framework for the subsequent industry analysis.

#### 3.1 Manufacturing in the Total Economy

In the countries studied here, the manufacturing sector constitutes around one fourth to one third of total production and employment (see Table 1). Germany has the relatively largest manufacturing sector of the four. The employment shares are larger than the production shares in Sweden and the United Kingdom, whereas the reverse is true in Germany and the Netherlands. In all four countries, the manufacturing sector - in terms of both production and employment - diminished somewhat in the 1970s relative to the rest of the economy.

The manufacturing industry also provides the countries with foreign currency through international trade. Table 2 shows that exports of manufactured goods account for two thirds of total current account receipts in Germany and Sweden, and well over one half in the other two countries. The relatively low and falling figures for the Netherlands and the U.K. can partly be explained by sizable and rapidly growing exports of petroleum and natural gas products from these countries. The Netherlands also have a much larger share of exports of agricultural products.

#### 3.2 Production Growth

As indicated above, the manufacturing sector in the four countries did not even keep up with the sluggish growth of the rest of the economy in the 1970s. Clear evidence of the poor industrial growth performance in the last decade is presented in Figure 2.

**Table 1** Percentage share of the manufacturing sector in GDP<sup>a</sup> and total employment  
Annual averages

	Production		Employment	
	1960-70	1970-80	1960-70	1970-80
Germany	40	38	35	35
Netherlands	33	28	28	24
Sweden	26	24	31	27
United Kingdom	29	26	35	31

<sup>a</sup> Gross domestic product at current prices.

Source: OECD, 1982, "Historical Statistics 1960-80".

**Table 2** Percentage share of exports of manufactured goods in total current account receipts

	1970	1980
Germany	75	76
Netherlands	62	60
Sweden	76	75
United Kingdom	57	54

Sources: OECD, 1982, "National Accounts", Vol. II.  
United Nations, "Yearbook of International Trade Statistics", editions 1976 and 1980, Vol. I.



In Germany, Sweden and the Netherlands, industrial production increased rapidly during the 1960s and the first few years of the 1970s. A pronounced break in the growth trend occurred in all four countries in connection with the oil crisis in 1973/74. (See also Tables 4A - 4D.)

Figure 3 reveals some interesting deviations between the countries starting with the severe recession of the mid 1970s. The main objective of Swedish economic policy in 1974/75 was to bridge the recession. The expansionary measures taken seemed successful at first: Sweden was not as hard hit by the recession of 1975 as were the other countries. But prices and, in particular, wages rose by far more than in most competing countries. Thus, the competitiveness of Swedish industry deteriorated rapidly. As a result, Sweden saw a sharp "delayed" reduction in industrial activity in 1977, from which the country has not yet fully recovered. What was gained at first was more than lost in subsequent years.

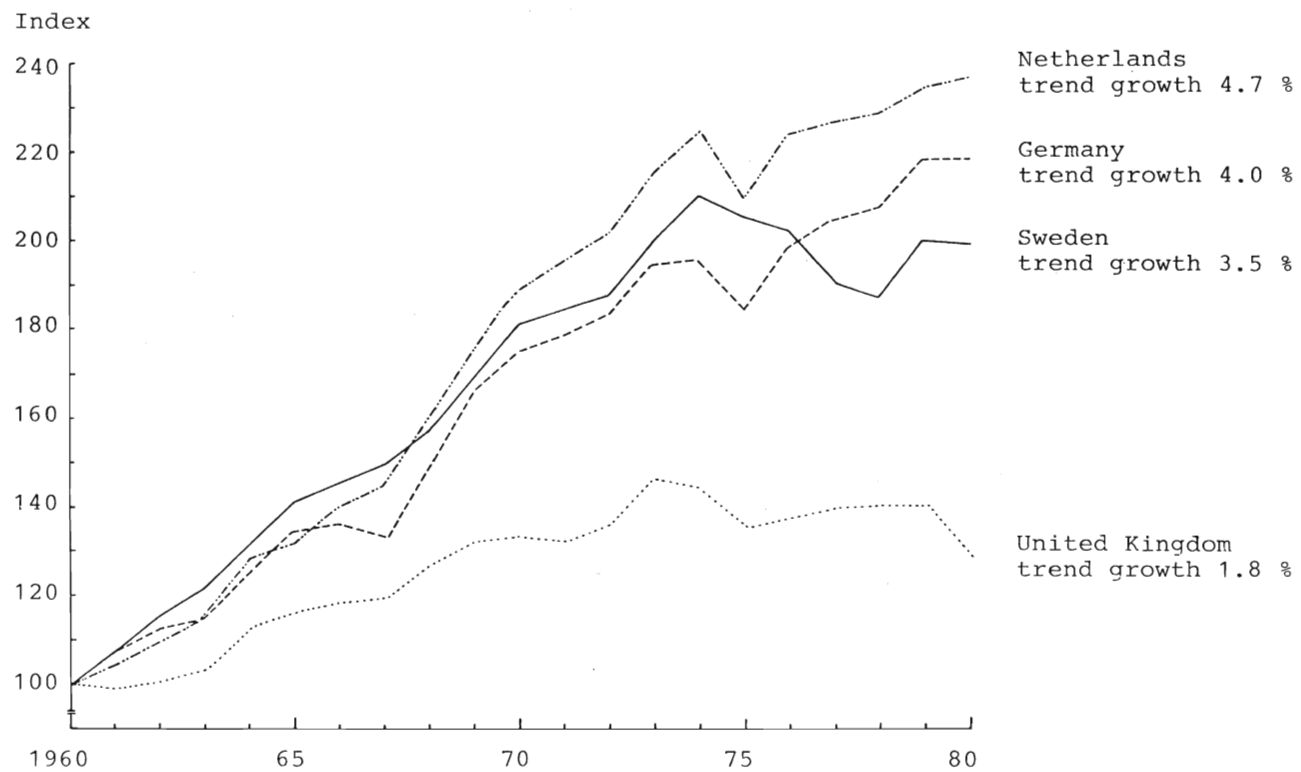
Germany and the Netherlands, on the other hand, lived through the recession of 1975. Then, in 1976-80, the German and Dutch manufacturing industries followed a relatively favorable growth path.

The unique development of the British manufacturing industry is rather ruthlessly exposed in Figure 2. The U.K. did not ride the boom of the 1960s. British industry followed a negatively diverging growth path compared to the other countries over the whole period studied. The general deterioration in business conditions of the mid 1970s implied for the U.K. economy that an already troublesome situation got even worse.

### 3.3 Employment Growth

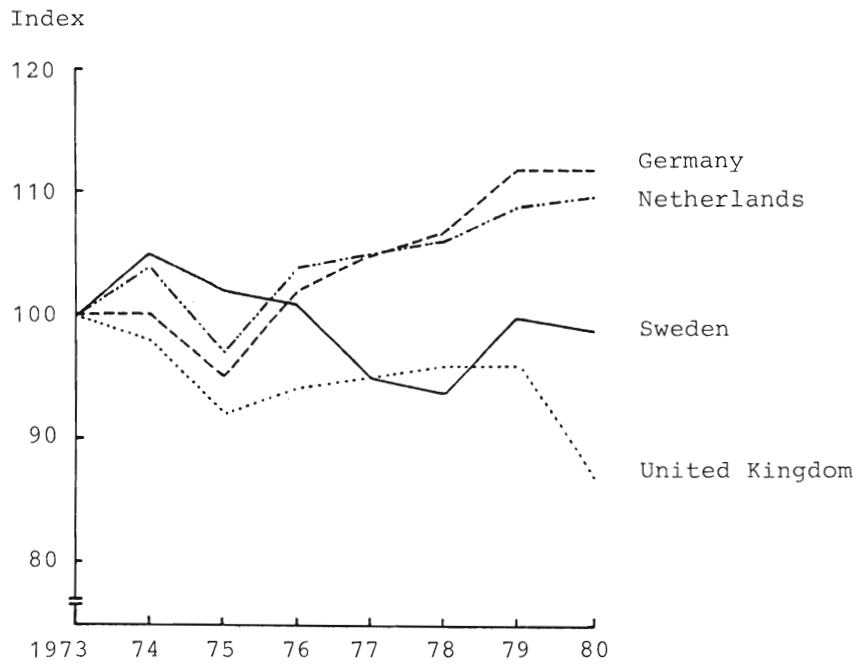
Manufacturing employment and production developed quite differently in the 1960s and 1970s (see Figure 4). A striking feature is that it decreased over the two decades in each of the four

Figure 2 Total manufacturing production (at constant prices) 1960-80  
Index 100 = 1960



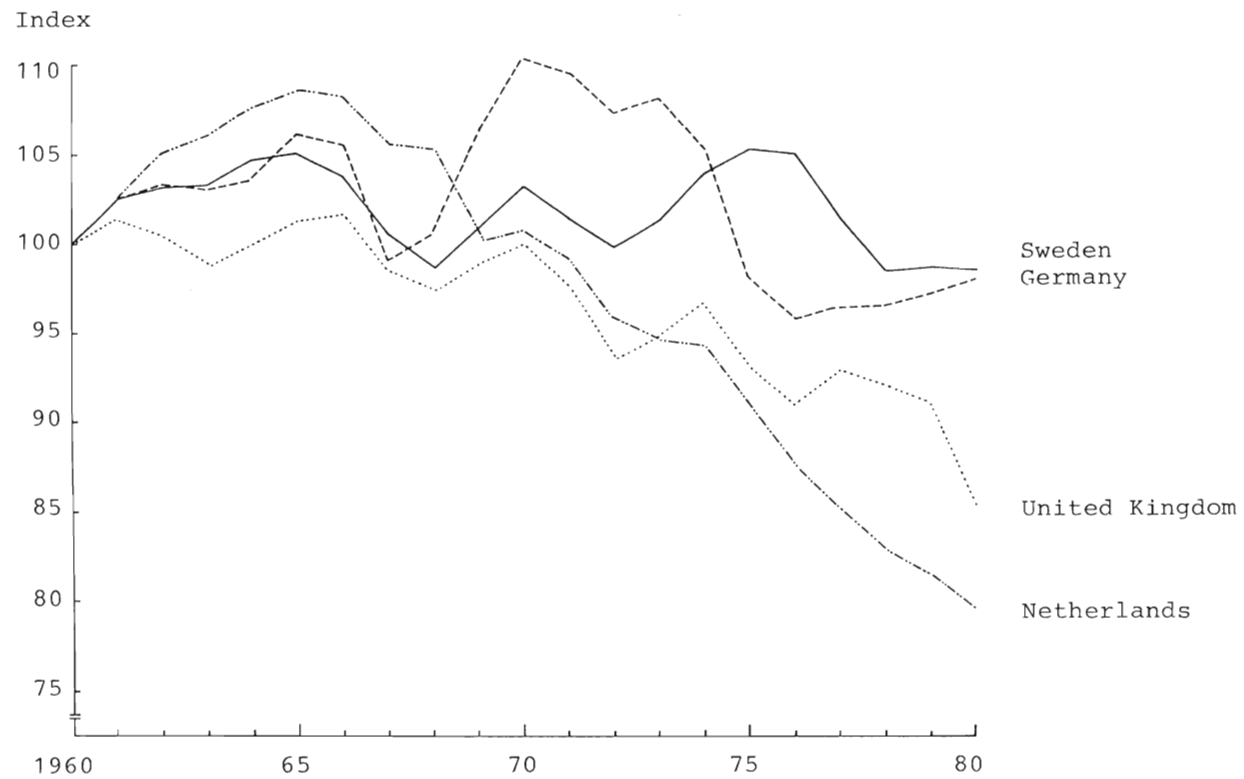
Sources: Germany: 10, 13, 21, Netherlands: 9, 10, 13, Sweden: 13, 17,  
 United Kingdom: 10, 13, 19 (see Statistical Sources)

Figure 3 Total manufacturing production (at constant prices)  
1973-80  
Index 100 = 1973



Sources: Same as in Figure 2.

**Figure 4 Total manufacturing employment 1960-80**  
 Index 100 = 1960



Sources: Germany: 6, 10, 11, 19, Netherlands: 6, 10, 11, 19,  
 Sweden: 6, 17, 19, United Kingdom: 10, 11, 19, (see Statistical Sources).

countries. That decline was not set off by the deep recession initiated by the oil crisis. Tables 4A-4D show that Dutch, Swedish and U.K. manufacturing employment had a negative growth trend even in the industrially expansive period of 1960-73. And the corresponding German figure is just barely on the positive side.

The four countries show a similar pattern up through the mid 1960s. In the first half of the decade, employment increased in the manufacturing sector. It peaked around 1965. The decline that followed continued through the 1970s in the Netherlands and the U.K., halted only by a few cyclical upturns. The drop in the Netherlands is conspicuous. Following several years of steady increase, Dutch manufacturing employment decreased by more than 25 percent from 1966 to 1980. As we can see, out of those 15 years there was only one - 1970 - with an increase in employment. This development is even more striking given the fact that, in terms of volume of production, the Dutch manufacturing industry was the most expansive of the four in the period.

In contrast to the other two countries, Germany and Sweden have on the whole maintained their level of manufacturing employment since 1960, although it was slightly lower at the end of the period than at the beginning. Apart from a much stronger increase in Germany than in Sweden in 1969 and 1970, they followed essentially the same cyclical path up to 1974. From then, the curves quite nicely mirror the contrasting development of output in the two countries since the oil crisis. Swedish industrial employment rose substantially in the mid 1970s - much a result of the inflationary "bridging over" policy of the time. It then fell sharply in 1977 and 1978, before leveling out. In Germany, on the other hand, industrial employment declined markedly from 1970 to 1976, and then started to rebound. In each of the years 1977-80, German manufacturing employment increased.

A corollary of the diminished labor force in manufacturing is that the expansion in production has, on the whole, been achieved through gains in labor productivity.

To sum up, we have noted three salient features of the aggregate industrial development in the four countries during the two last decades:

- the abrupt and uniform deterioration in growth trends in 1973/74,
- the extremely poor growth performance of the British manufacturing industry over the whole period,
- the long-run stagnation in manufacturing employment.

#### 4 GROWTH AND DECLINE AT THE SUB-SECTOR LEVEL

In this section, the growth performance of the eight manufacturing sub-sectors is examined and compared across the sectors and countries. We ask: Was the boom of the 1960s evenly spread out among the industries? Have some industries been able to maintain their momentum from the 1960s into the mid and late 1970s? What impact has the worsening business climate had on employment and productivity? What are the principal across-country differences and similarities in industry growth patterns?

##### 4.1 The Growth Race over 1960-80

Indicators of the relative output<sup>1</sup> performance of the industry categories are the growth elasticities, defined and shown in Table 3. The winner and the loser in the growth race - chemicals and textiles, respectively - are easily identified.

The chemical industry's performance was outstanding. It shows the strongest growth in all countries. Several factors are important here (see Pousette, 1981). Foremost among these are relatively inexpensive raw materials (oil and natural gas) and the development of significant new products, e.g. plastics and other synthetics. Furthermore, the considerable improvements in living standards since the second world war have had more favorable demand effects on chemicals than on other industries.

The poor performance of the textile industry is almost as striking. This industry experienced the weakest growth in all countries except the U.K. where basic metals were even less vigorous. The textile industry has witnessed a rapid technological change in the last few decades. But that technology is internationally mobile, and less know-how is needed than in other industries (SOU 1980). This has enabled newly industrializing countries<sup>2</sup> with

Table 3 Industry elasticities of output growth<sup>a</sup> (1960-80)

ISIC code		Germany	Netherlands	Sweden	United Kingdom
31	Food	0.52	0.79	0.43	1.06
32	Textiles	0.18	-0.42	-0.28	0.11
33	Wood	1.00	0.62	1.14	0.94
34	Paper and printing	0.80	0.87	0.77	0.89
35	Chemicals	1.70	1.89	1.69	2.50
36	Non-metallic minerals	0.90	0.68	0.59	1.11
37	Basic metals	0.62	1.19	1.02	-0.61
38	Engineering	1.25	0.98	1.32	0.67

<sup>a</sup> The ratio of the growth rate of each industry to the growth rate of manufacturing as a whole.

Sources: Same as in Figure 2.

lower labor costs to enter and capture substantial market shares. World textile competition has thus tightened considerably at the expense of manufacturers in the industrially mature countries.

For the other industries, the picture is less clear-cut. The relative output performance of these industries differ considerably between the countries. An exception is the paper and printing sector; its growth elasticities in the four countries lie close to each other, and place the sector in the middle range of performance.

As for the across-country differences, the growth pattern of the U.K. deviates most strikingly from the norm.<sup>3</sup> In particular, the food and non-metallic mineral industries were notably more expansive in relative terms in the U.K., whereas the reverse holds for basic metals and engineering. The growth patterns of Germany, Sweden and the Netherlands are more alike. This is especially true for Germany and Sweden.



## 4.2 The Trend Break

We next divide the 1960-80 period studied thus far into two subperiods. The first covers the "golden" years of the 1960s and early 1970s, and the second covers the stagflation years that followed. This is to study the impact on the industries of the deteriorated business climate of recent years.

The cut-off point between the two periods is taken as 1974. Although Dutch and Swedish industrial production still increased strongly in 1974, this is the year that marks the beginning of the persistent slowdown in growth in most of the industrialized world. In Tables 4A-4D absolute growth rates of production, employment and labor productivity are exhibited.

It is clear from comparing growth rates of the two periods that we are dealing with a marked and general stagnation in industrial activity. In both Sweden and the U.K., total manufacturing actually had a negative trend growth in the period after 1973. Germany and the Netherlands did better in this respect, but the stagnation is evident. The extent of the deterioration is well illuminated by the fact that not one industry in any of the four countries came even close to equaling its first-period growth performance.

Growth of employment were, not surprisingly, lower for almost all industries in the latter period. But the reductions in employment growth rates were, in general, significantly smaller than the reductions in output growth rates. Consequently, labor productivity must have developed unfavorably in the mid and late 1970s. This is verified by the two last columns of Tables 4A-4D.

When calculating labor productivity growth rates, an adjustment must be made for changes in working time per employee. Over 1960-80, the average industrial worker in Germany, the Netherlands and the U.K. enjoyed an approximate 0.5 percent reduction

Tables 4A-4D Annual percentage growth rates<sup>a</sup> of production,<sup>b</sup>  
employment<sup>c</sup> and labor productivity<sup>d</sup>

Table 4A Germany

ISIC code	Production		Employment		Labor productivity	
	1960-73	1973-80	1960-73	1973-80	1960-73	1973-80
31 Food	3.0	1.2	-0.1	0.6	4.1	1.0
32 Textiles	1.7	-0.9	-1.9	-4.3	3.9	4.8
33 Wood	5.2	1.1	-0.1	-0.2	6.2	1.6
34 Paper and printing	4.3	2.9	1.5	-1.7	3.5	4.7
35 Chemicals	9.6	2.4	2.6	-0.6	7.7	3.1
36 Non-metallic minerals	4.8	2.2	-0.6	-0.3	5.7	5.4
37 Basic metals	3.1	1.1	-0.6	-5.2	3.9	6.5
38 Engineering	5.9	3.1	1.4	-0.7	5.0	3.8
3 Total manufacturing	5.1	2.1	0.5	-1.3	5.0	3.6

Sources: Production and employment: same as in Figures 2 and 4. Hours worked per employee: 6, 9, 12 (see Statistical Sources).

Table 4B The Netherlands

ISIC code	Production		Employment		Labor productivity	
	1960-73	1973-80	1960-73	1973-80	1960-73	1973-80
31 Food	4.3	1.7	-0.5	-2.3	5.6	4.5
32 Textiles	0.4	-5.2	-4.9	-9.6	5.9	5.3
33 Wood	4.6	0.0	0.5	-2.7	4.7	3.4
34 Paper and printing	5.4	2.7	1.2	5.0	4.1	-1.0
35 Chemicals	11.8	2.9	1.8	-1.3	10.8	4.3
36 Non-metallic minerals	4.5	2.0	-0.8	-2.8	5.8	5.6
37 Basic metals	8.8	-0.4	3.2	-1.5	6.1	1.9
38 Engineering	5.9	1.6	-0.4	-2.1	7.1	4.3
3 Total manufacturing	6.2	1.4	-0.6	-2.7	7.6	4.5

Sources: Production and employment: same as in Figures 2 and 4. Hours worked per employee: 5, 6 (see Statistical Sources).

Table 4C Sweden

ISIC code	Production		Employment		Labor productivity	
	1960-73	1973-80	1960-73	1973-80	1960-73	1973-80
31 Food	1.9	0.6	-0.8	0.3	4.3	1.8
32 Textiles	1.0	-6.0	-5.1	-6.8	7.4	2.3
33 Wood	6.1	-1.1	0.4	-1.4	6.8	1.4
34 Paper and printing	4.4	-0.4	-0.6	0.1	6.3	1.2
35 Chemicals	8.4	-0.1	2.1	-0.2	7.9	1.9
36 Non-metallic minerals	5.0	-3.0	-1.1	-3.0	7.4	1.3
37 Basic metals	6.3	-1.6	0.3	-1.4	7.4	1.7
38 Engineering	6.4	-0.3	1.0	-0.3	6.9	1.8
3 Total manufacturing	5.3	-0.7	-0.1	-0.8	6.7	1.7

Sources: Production and employment: same as in Figures 2 and 4. Hours worked per employee: 6, 12, 15, 17 (see Statistical Sources).

Table 4D The United Kingdom

ISIC code	Production		Employment		Labor productivity	
	1960-73	1973-80	1960-73	1973-80	1960-73	1973-80
31 Food	2.5	0.8	0.3	-0.8	2.5	2.0
32 Textiles	1.1	-2.4	-2.2	-3.1	3.8	1.3
33 Wood	3.1	-2.3	-0.1	-0.7	3.5	-0.9
34 Paper and printing	2.6	-0.5	0.2	-0.9	2.8	0.7
35 Chemicals	6.0	0.9	0.3	0.0	6.1	1.2
36 Non-metallic minerals	3.6	-2.2	-0.6	-1.8	4.6	0.2
37 Basic metals	0.6	-5.3	-1.3	-2.8	2.4	-1.7
38 Engineering	2.1	-1.2	-0.2	-0.9	3.0	0.4
3 Total manufacturing	3.0	-1.1	-0.4	-1.2	4.0	0.7

Sources: Production and employment: same as in Figures 2 and 4. Hours worked per employee: 6, 12 (see Statistical Sources).

a Logarithmic linear trend growth.

b At constant prices.

c Number of employees.

d Output per hour.

in working time per year. In Sweden, the corresponding figure was 1.5 percent. Those reductions in working time explain why growth rates of labor productivity are higher than what would be implied by a linear relationship between growth rates of production and employment (measured by the number of employees).

Note that the two most expansive economies of the four after the oil crisis - Germany and the Netherlands - experienced a larger decrease in manufacturing employment than the other two countries. This is reflected in their more favorable labor productivity growth rates for the period.

Turning to the individual industries, we find that the strength of the chemical industry has diminished quite considerably (both relatively and absolutely). In terms of output and productivity growth, the chemical industry has not maintained the unique position it enjoyed in the 1960s and early 1970s. Nevertheless, the chemical industry still ranks high in all countries. It stands out as the only industry which, in each of the four countries, has contributed to total employment growth by employing a larger labor force in 1980 than in 1960.

The food industry exhibits a reverse development. It performed poorly during the 1960s and early 1970s. Since then, food has fared better relative to the other industries. Besides chemicals, it is the only industry, which increased its output in each country over 1974-80, albeit at a very low rate. In Sweden it even shares with chemicals the top position in terms of output growth. Furthermore, the German and Swedish food industries were the only sub-sectors (not counting a tiny increase in Swedish paper and printing), which increased their employment in the period. Generous government assistance to the food industry has contributed in dampening the impact of the general recession in the economies.

In recent years one of the frequently-mentioned "crisis industries" has been basic metals. The mid and late 1970s saw a marked

deterioration in its growth performance in the countries studied here, as well as in most other industrialized countries. Iron and steel manufacturing constitutes the main sub-activity of the basic metal industry. Productivity performance of basic metals was exceptionally poor in the Netherlands, Sweden and the United Kingdom in 1974-80. The decline in output growth rates was not matched by a proportional decline in employment growth rates. In sharp contrast to this, however, was the development in Germany. There, basic metal employment dropped to the extent that output per hour increased by more than in any other industry in the four countries in the period after the oil crisis.

To explain the decline of basic metals, it is crucial to understand that the growth of this sector in a country is closely linked to domestic industrial expansion. Due to heavy transportation costs and trade barriers of various kinds, the basic metal industry is a relatively home-market dependent industry. The rapid industrial upswing and the extensive reconstruction work that followed the second world war consequently fueled the growth of the basic metal industry in most OECD countries. But when the industrial machinery in these countries started to break down in the 1970s, the iron and steel and related industries were more severely affected than other industries. The slow growth of U.K. basic metals, already evident in the 1960s, foreshadowed the long-run stagnation in British industrial activity.

Indeed, there is more to the problem of the basic metal industry than a shrinking homemarket. The basic metal producers in the developed countries have lost considerably in competitiveness to manufacturers in newly industrializing countries. Many developing countries experienced an industrial boom in the 1970s. Demand conditions in these countries were thus favorable for building up a basic metal production capacity with best-practice technology and efficient scale. Aided by a relative fall in transportation costs, these more efficient manufacturers can successfully compete even within the OECD area.<sup>4</sup>

It is clear from the numbers in Tables 4A-4D that the problems of the textile industry are of older date than those of other industries. The trend growth rate of textile output was very low already in the 1960s. A high rate of liquidations, in combination with an extensive mechanization of surviving firms, led to a significant exodus of labor. This helps to explain why textile labor productivity growth was quite favorable in the 1960s and 1970s.

Wood products manufacturing is another industrial activity which has experienced severe problems since the oil crisis. As we shall see in a subsequent section, this industry is (relatively) far more important in Sweden than in Germany, the Netherlands or the United Kingdom. With an abundance of quality raw materials, and with proximity to the European market, the Swedish wood industry has traditionally supplied a large share of Swedish export revenues. But competition from North America has stiffened. And increasing exploitations of fast-growing forests in Latin America (Brazil), West Africa and parts of Asia represent major long-term threats to the traditional manufacturers.

Thus far we have dealt almost exclusively with the growth performance of the industries. The next step is to examine the structure and change in the manufacturing sectors of our four countries. This section unambiguously shows that a trend break in growth occurred in the mid 1970s. Of particular interest then is the question of whether a more rapid industrial transformation has followed in the wake of the worsened business conditions.

## 5 STRUCTURE AND CHANGE

The law of comparative advantages states that a country will specialize its production apparatus according to the country's relative cost advantage. Differences in cost structure exist since countries differ in raw material endowment, climate, skill and size of labor force, capital stock, etc. In this section the industrial specializations of Germany, the Netherlands, Sweden and the U.K. are studied. The characteristics of the change in each country's industrial composition in the 1960-80 period is examined. The "magnitudes" of the structural change are determined and compared across countries and between the growth and the stagflation periods.

### 5.1 A Standard for Comparison: The "Average" Developed Economy

Table 5 displays the relative size of the eight industry categories in two major groups of countries in 1963 and 1975. Looking at the sector weights in the developed market economies, which are the relevant ones in this context, we see that a dominant position is held by the engineering industry. Approximately 40 percent of total manufacturing production consists of the manufacture of engineering products, such as metal tools, office and computing machinery, electronics, motor vehicles and ships. The second largest sector is chemicals, which accounts for about 15 percent of total manufacturing. The food industry is third in size, and the other sub-sectors follow with gradually declining weights. The figures indicate that the two largest sectors are gaining in importance, whereas textiles and basic metals are regressing. But on the whole, the industrial structure in the developed market economies changed only marginally over the period 1963-75.

To show that the industrial structure sketched above is by no means universally applicable, corresponding figures are given for

**Table 5** Percentage weights of industries in total manufacturing production in the world market economies

ISIC	Developed market economies <sup>a</sup>		Developing market economies <sup>b</sup>	
	1963	1975	1963	1975
31 Food	12	12	27	20
32 Textiles	10	8	20	15
33 Wood	4	4	4	3
34 Paper and printing	8	8	5	4
35 Chemicals	14	15	16	22
36 Non-metallic minerals	4	4	5	5
37 Basic metals	9	8	6	6
38 Engineering	40	16	22	
38 Engineering	38	40	16	22

Source: United Nations, 1982, "Yearbook of Industrial Statistics", Vol. I.

<sup>a</sup> Canada, the U.S., Europe (excluding centrally planned economies), Australia, Israel, New Zealand, Japan and South Africa.

<sup>b</sup> Caribbean, Central and South America, Africa (other than South Africa), Asian Middle East and East and South-East Asia (other than Israel and Japan).

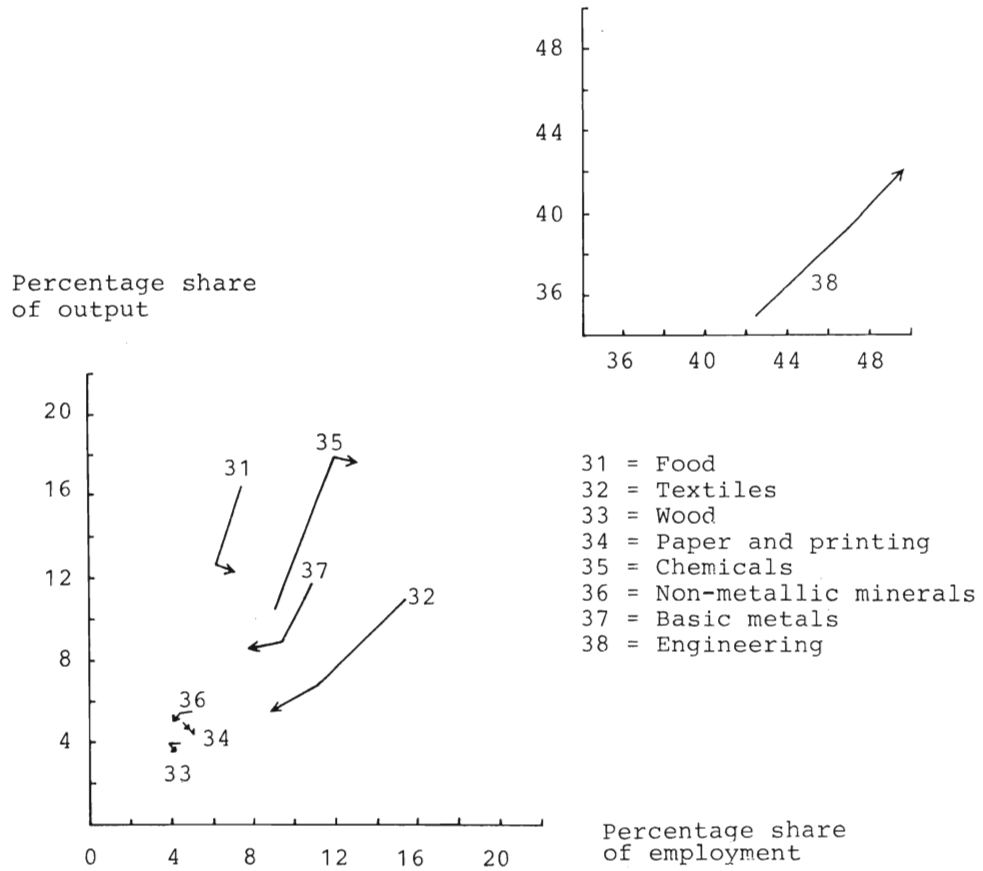
the developing market economies. In this group of countries, food and textiles play a much larger role. But a significant shift is evident, from these industries to the more technology-intensive chemicals and engineering. The large weight of chemicals is primarily due to large-scale petroleum based activities in oil-rich nations.

Now, let us redirect our attention to the manufacturing sectors of Germany, the Netherlands, Sweden and the U.K. A substantial amount of information is compressed into Figures 5A-5D. The arrows connect three points, with each point representing the output and employment shares of a particular industry in total manufacturing in the bench-mark years 1960, 1973 and 1980, respectively. Thus, the figures give an overall picture of the industrial structure and its change in each country since 1960.



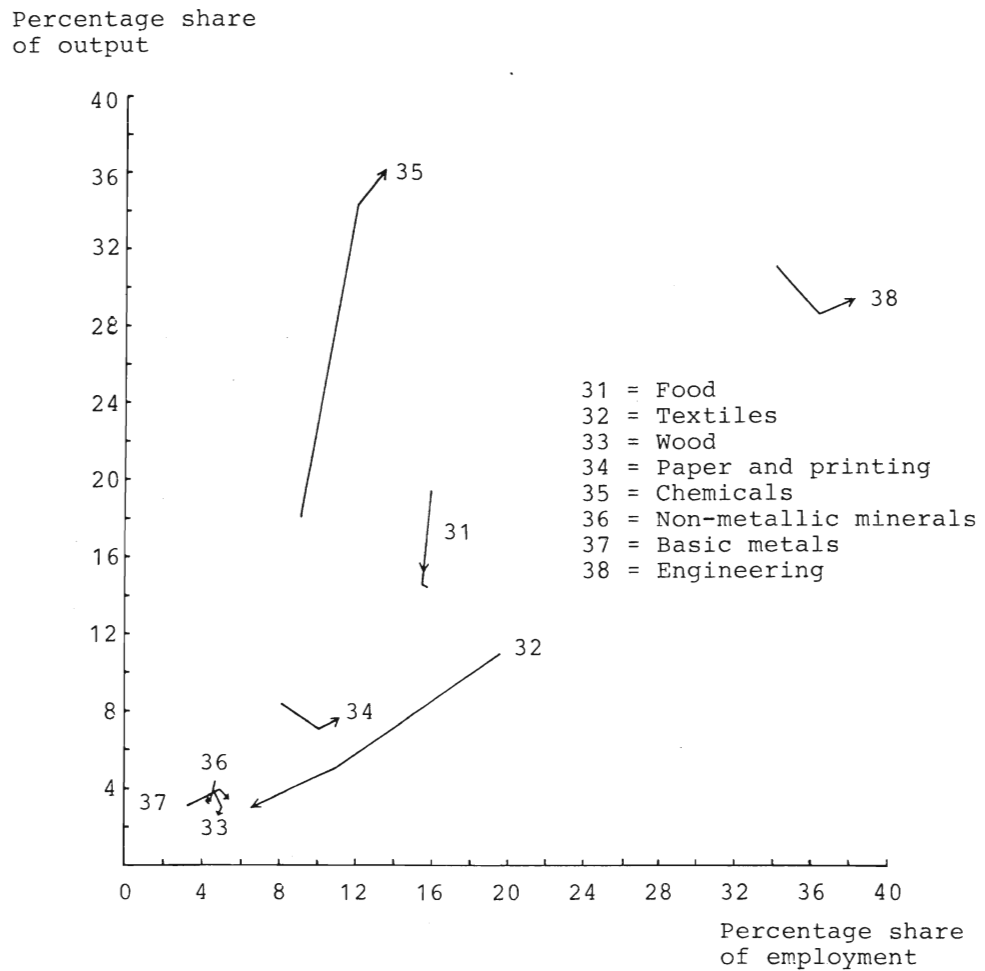
**Figure 5A Germany**

Percentage share of sub-sectors in total manufacturing output and employment 1960, 1973, 1980



Sources: Same as in Figures 2 and 4.

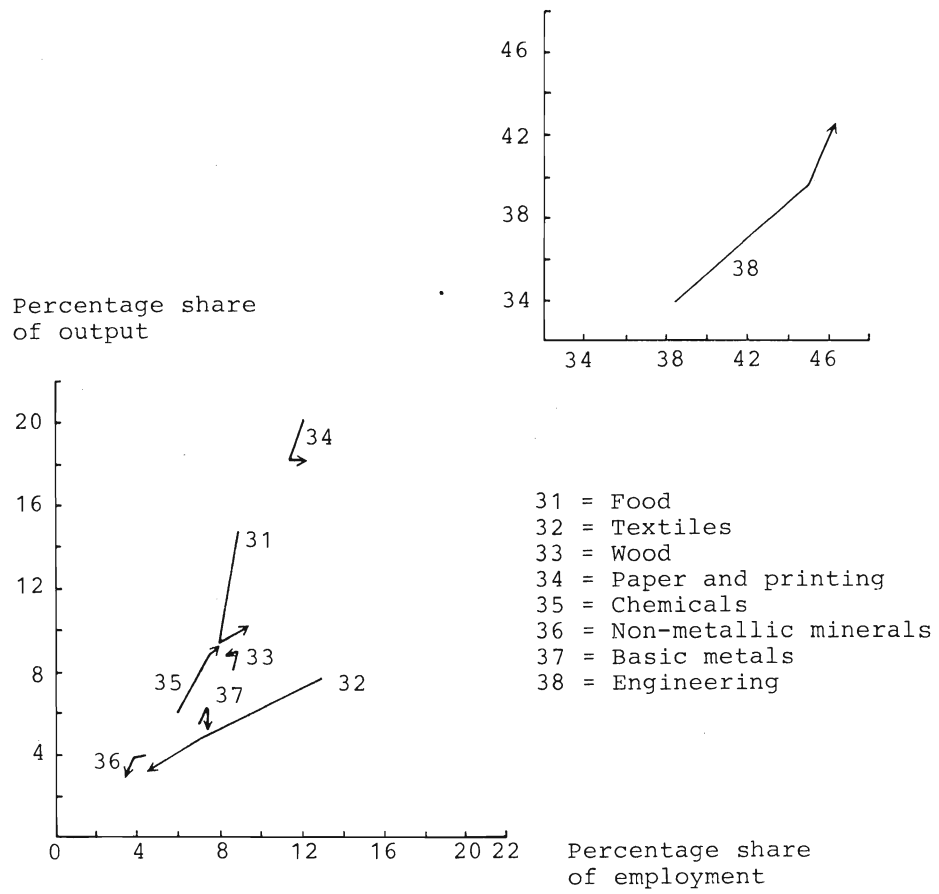
**Figure 5B The Netherlands**  
 Percentage share of sub-sectors in total manufacturing output and employment 1960, 1973, 1980



Sources: Same as in Figures 2 and 4.

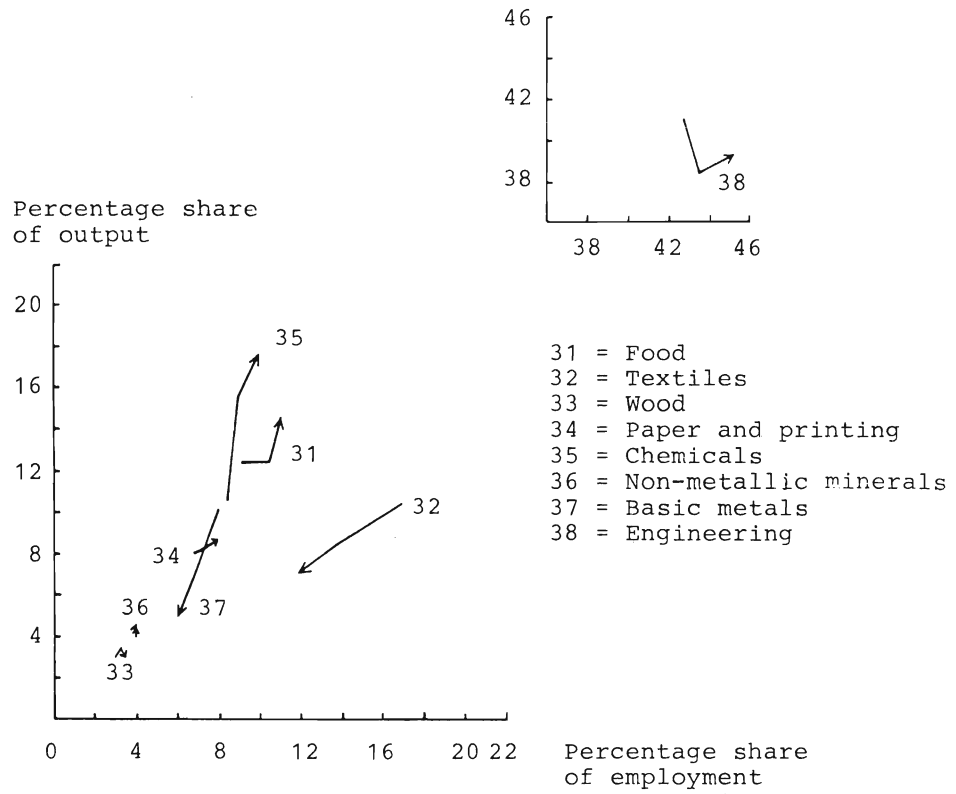
Figure 5C Sweden

Percentage share of sub-sectors in total manufacturing output and employment 1960, 1973, 1980



Sources: Same as in Figures 2 and 4.

**Figure 5D The United Kingdom**  
 Percentage share of sub-sectors in total manufacturing output and employment 1960, 1973, 1980



Sources: Same as in Figures 2 and 4.

Not surprisingly, the pattern of industrial structure in the developed market economies combined is clearly recognizable in all four figures. The degree of conformity with the general pattern is particularly high in Germany and the U.K. In this sense, manufacturing is less specialized in these economies than in the Netherlands and Sweden.

### **5.2 Germany**

The advance of engineering and chemicals, and the relative decline of food, textiles and basic metals, have characterized structural change in Germany since 1960. The engineering industry strengthened its already dominant position. In 1980, 42 percent of industrial production and practically half of industrial employment originated in engineering activity. With rapid growth in the 1960s and early 1970s, chemicals moved up from fifth to second place in terms of volume of production - past the stagnating food, textile and basic metal industries. Non-metallic minerals and the forest-based wood and paper and printing sectors, each accounted for approximately five percent of total manufacturing, with no significant changes over the period.

### **5.3 The United Kingdom**

The U.K. appears to be cast from the same industrial mold as the "average" developed economy. The similarity in structure and change is striking. But in this seemingly "normal" picture of the U.K. industrial sector one can still see important characteristics of the British economic problems of recent decades. The U.K. economy has traditionally been heavily dependent on export revenues in textiles, basic metals and two engineering sub-sectors - shipbuilding and motor-vehicle manufacturing.<sup>5</sup> Those industries are the ones that have lost most ground since 1960. They have

not been able to keep up with the technological advance in competing countries, and therefore have declined continuously in international competitiveness.<sup>6</sup>

But, a reorientation towards industries based on scientific and production skills can be discerned. The U.K. chemical industry, which exports such articles as cosmetics, pharmaceuticals and fertilizers, almost doubled its share of total manufacturing production over 1960-80. Machinery (office and computing in particular), electrical engineering and electronics are other relatively vigorous sectors. These are now major export industries, and their expansion in the 1970s has reversed the decline of the aggregate engineering sector.

#### **5.4 The Netherlands**

Turning to the two smaller countries we find that their industrial activity is more country-specific. With a small home market, these economies must rely more on specialization and foreign trade. The distinct features of their manufacturing structure clearly reflect differences in their comparative advantages.

A major trait of Dutch manufacturing is the extraordinary growth of the chemical industry. In 1960 it already accounted for almost one fifth of total industrial production. By the time of the oil crisis, chemicals had advanced to a leading position with over one third of manufacturing output. The employment share of the chemical industry, however, was at this time a mere 12 percent. Since then the Dutch chemical industry has lost a great deal of its momentum, but, as is noted above, it has continued to be the most expansive sub-sector of Dutch manufacturing.

The rise of chemicals in the Netherlands is closely associated with the country's function as a major sea gateway into Western Europe. Rotterdam is the world's top-ranking port, and receives much of Europe's imported oil. Some of the crude oil is passed

on to other countries - for example by pipeline to Germany - but much is refined within the Netherlands before forwarding. Petrochemicals, made from products of the refinery operations, represent a principal sub-sector of the country's chemical industry. Other sub-sectors of Dutch chemicals have greatly benefited from significant discoveries of natural gas in the northeastern Netherlands at the end of the 1950s.

The Netherlands' comparative advantage in trading is based on historical and geographic grounds, as well as on sheer necessity, since trading is the way the Netherlands can make maximum use of a limited variety of domestic resources. The trading advantages spill over to many other parts of Dutch manufacturing.<sup>7</sup> Another industry particularly linked to the ports is basic metals. Cheap imported ores and coal provided a basis for the rapid growth of the iron and steel industry in the 1960s and early 1970s. But, as Figures 5A-5D show, the basic metal industry accounts for a smaller share of total manufacturing in the Netherlands than in the other countries studied here. The recent difficulties of this industry, felt throughout most of the industrially mature countries, are also evident in the Netherlands.

The combined engineering sector in the Netherlands today generates a lower value added than chemicals, but in terms of employment it is more than twice the size of any other industry. Good transport connections and a highly skilled labor force are key factors behind the growth of successful electrical and electronics industries. However, other parts of the engineering industry, most notably the once-flourishing shipbuilding sub-industry, are experiencing severe problems.

The food industry plays a more important role in the Netherlands than in most industrialized countries. It is based on the remarkably productive Dutch agriculture. A relative decline of the industry in the 1960s has come to a halt. The beverage industry, in particular, proved quite viable in the 1970s.

### 5.5 Sweden

Vast forests and a wealth in high-grade iron ore are pivotal factors behind the evolution of the Swedish industry. Forest-based industries, such as saw-milling, pulp-milling, paper-making, wood chemicals, plywood and lumber, yielded the bulk of Swedish export revenues for several decades. Sweden's specialization in those industries is plain from Figure 5C. The combined wood and paper and printing share of total manufacturing is more than twice as high in Sweden as in the average industrialized country. But for some decades, there has been a continuous trend toward greater forward integration, i.e. increasing the value added, in this sector of Swedish manufacturing. This is necessary to withstand the increasing competition from developing countries better endowed with raw materials.<sup>8</sup>

The rich iron deposits in northern Sweden were the basic source for a once world-dominant iron-ore industry. They also fostered the development of an important specialty and high-quality steel industry. The basic metal industry in Sweden is in fact smaller, relative to total manufacturing, than in most developed economies. Like the case in other industrialized countries, the Swedish iron and steel industry has experienced increasingly severe problems since the early 1970s, due to an erosion of competitiveness. The specialty steel industry has weathered the crisis in better shape than have related sub-sectors, thanks to a higher degree of specialization and quality.

The long emphasis on skill and quality in the Swedish steel industry carries over into those finishing and fabricating industries which process that steel. Among Swedish specialities are industrial and office machinery, electrical equipment and motor vehicles. These are the main elements of the Swedish engineering sector, which has throughout this century steadily increased its share of industrial production, employment and exports. Although the engineering sector did not grow, in terms of output, in the second



half of the 1970s, its share of total exports continued to increase. The viable sub-sectors of engineering are expected to provide the expansion needed in the Swedish economy to offset the anticipated continued stagnation in basic industries.

Another important industry, also with roots in the forest and basic metal sectors, is chemicals. It has been the fastest growing industry in Swedish manufacturing since the second world war. In spite of this, chemicals in Sweden accounted for a smaller share of total manufacturing value added than in any other developed market economy in the late 1970s (United Nations, Yearbook of Industrial Statistics, 1978 edition). Pharmaceuticals and certain plastics represent the most vigorous sub-sectors, taking advantage of high quality research.

As for the textile industry, its position and development in Sweden has largely been the same as in the other three countries. It entered the 1960s still as a major industry. But its importance has continuously diminished due to the factors discussed above.

## 5.6 Structural Change Quantified

Significant structural changes occurred in Germany, the Netherlands, Sweden and the United Kingdom in the 1960s and 1970s. Some of the principal characteristics of those changes were highlighted in the previous sections. In this section, we define a summary measure to quantify the overall industrial transformations of the four countries. In particular, a measure of structural change with respect to output is compared, for each country, with the degree of change in the employment structure.

In Figures 6A-6D we can follow the extent of the year-by-year structural change that took place, in terms of both output and employment.<sup>9</sup> (Shifts within the sub-sectors are not accounted for.) Except for a few major fluctuations, there appears to have

Figures 6A-6D. Annual structural change<sup>a</sup> with respect to output and employment 1961-80

Figure 6A Germany

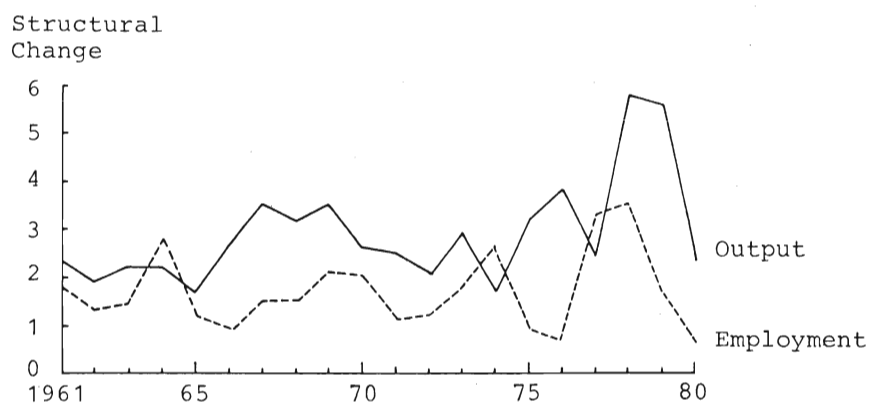
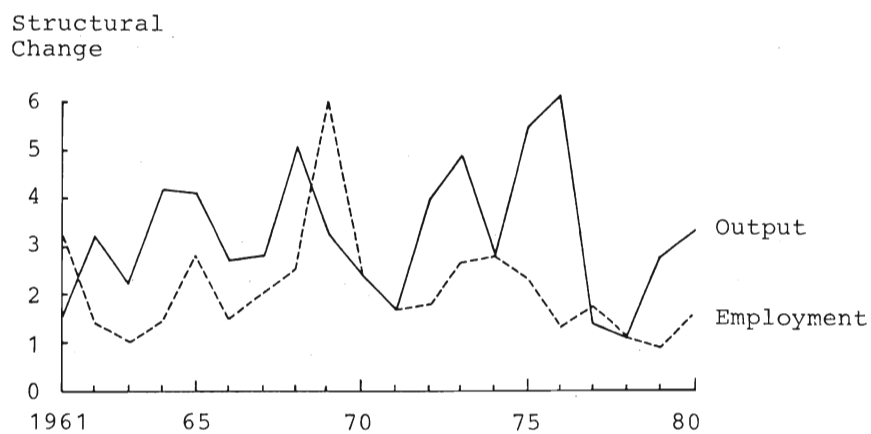


Figure 6B The Netherlands



Sources: Same as in Figures 2 and 4.

<sup>a</sup> Structural change is defined in note 9.

Figure 6C Sweden

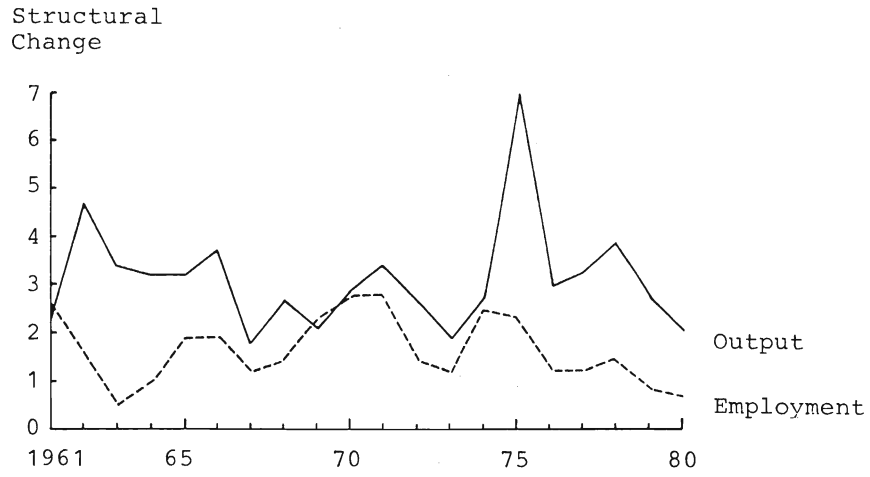
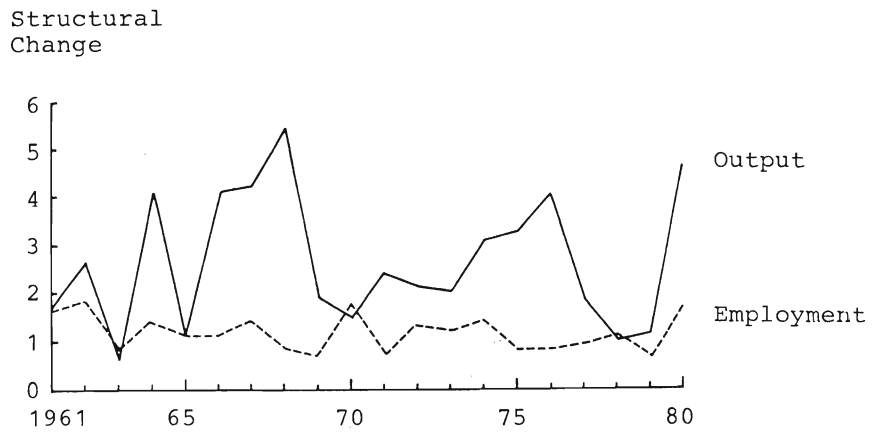


Figure 6D United Kingdom



Sources: Same as in Figures 2 and 4.

been no significant change in the rate of the transformation over the period. Nor are any conspicuous across-country differences readily suggested by the figures.

A comparison between output and employment structural changes yields some interesting results. We note that in the four countries the organization of manufacturing activity was clearly more rigid with respect to employment. A closer inspection of the curves indicate that this tendency was stronger in the United Kingdom and, to some extent, in Sweden than in Germany and the Netherlands. This can be checked for a given period by dividing the average yearly output transformation with the average yearly employment transformation. The greater the resulting ratio, the "more rigid" (on average) was the employment structure relative to the output structure. Such ratios are displayed in Table 6.

All our ratios increase between the first and second period. That increase is particularly marked for Sweden, whereas Germany accounts for the smallest rise. For both periods, the U.K. shows the highest "relative rigidity" of employment structure.

**Table 6** Ratio between average yearly output transformation and average yearly employment transformation<sup>a</sup>

	1960-73	1973-80
Germany	1.63	1.89
Netherlands	1.40	1.95
Sweden	1.67	2.45
United Kingdom	2.14	2.59

<sup>a</sup> See note 9 for a definition of structural transformation.

Sources: Same as in Figures 6A-6D.

Part of an explanation of these across-country differences can be found in the industrial policy carried out by the respective governments.<sup>10</sup> Massive post oil-crisis government subsidies to Swedish "crisis industries" (shipbuilding, steel, textiles) have slowed adjustments in the Swedish employment structure (Carlsson, Bergholm and Lindberg, 1981). In contrast to the Swedish orientation of industrial policy, German government support has to a large extent promoted promising knowledge-intensive industries, primarily in the chemical and engineering sectors. Germany's pool of migrant "guest workers" may also have fostered a greater correspondence between output and employment transformation.

In the United Kingdom, plans for an active industrial policy, with emphasis given to promoting growth-sectors, were formulated in the early and mid 1970s. But by the end of the decade, little progress along these lines had been made. Large-scale government rescue operations were still common.

## 6 PROFIT MARGINS AND TRANSFORMATION PRESSURE

Previous chapters have given an overview of the direction and speed of changes in the manufacturing sectors of each of the four countries. In the remainder of this paper, some underlying determinants are discussed. In particular we focus on the roles of profits (this chapter) and investment activity (next chapter).

### 6.1 An Operational Profitability Measure

Data limitations force us to use crude measures of industry profitability. The measure used here is the gross profit margin (or operating surplus). It is defined as

$$M = \frac{PQ - WL}{PQ} = 1 - \frac{W}{P \cdot Q/L} = 1 - \frac{ULC}{P}$$

where

M = gross profit margin

P = value added price index

Q = value added at constant prices

W = hourly labor costs (including all social charges)

L = hours worked

Q/L = labor productivity

ULC = unit labor cost

The measure is then standardized by transformation into index form. Index 100 denotes the average level for the period 1963-73, which we regard as an approximation of a "long-run equilibrium level" of the rate of return on total capital. A useful feature of this measure is that it is easily decomposed into prices, labor costs and labor productivity (or prices and unit labor costs). This facilitates the analysis of changes in profitability.<sup>11</sup>

To use the gross profit margin as a measure or an indicator - which is the point here - we have to assume that the value added share of depreciation charges on fixed capital<sup>12</sup> remains constant over time. If that share is actually rising (falling) then M gives a positively (negatively) biased picture of changes in profitability. National account statistics of the four countries suggest that the share of depreciation charges on fixed capital in the total economy has been fairly stable since 1960, with a slight tendency to rise in the 1970s. Figures available for the Swedish manufacturing sector show the same development. Hence, it seems reasonable to assume that M gives a fair picture of profitability over time. The measure should at least not exaggerate the negative development of profit margins in the 1970s.

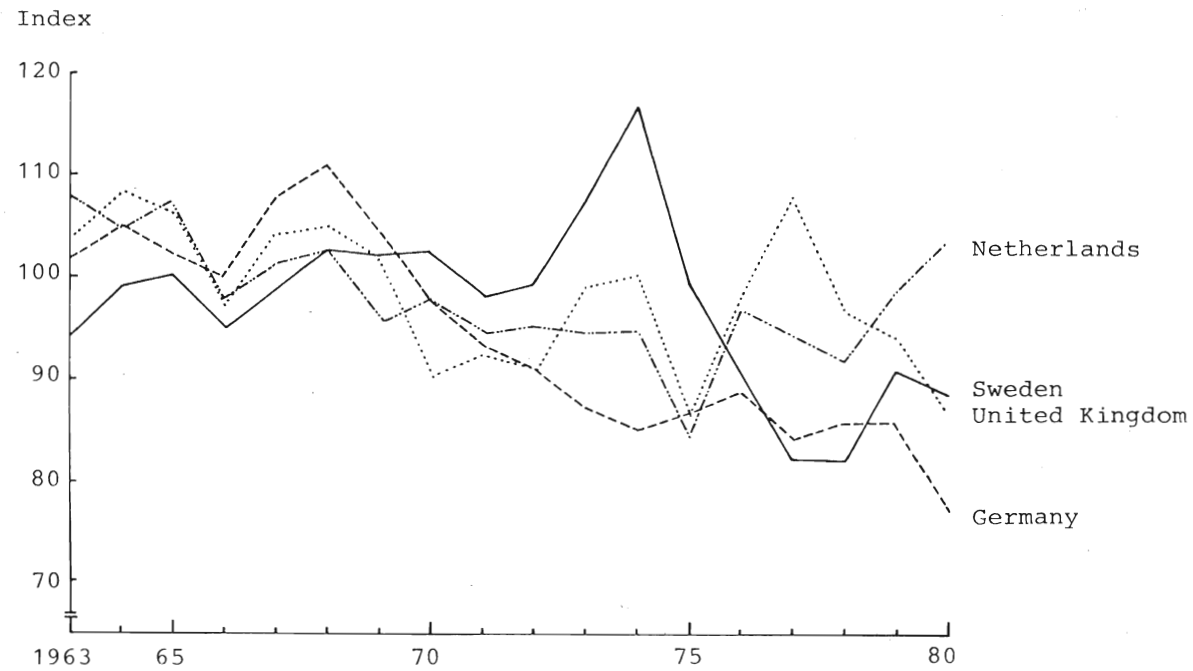
## 6.2 Manufacturing Profit Margins in 1963-80

Figure 7 exhibits the development of total manufacturing profit margins in Germany, the Netherlands, Sweden and the U.K. It must be stressed that the graph should not be used to compare levels of profit margins; here we are studying the development over time.

Over the whole period 1963-80, profit margins are declining. Up through 1972, profit margins in the four countries moved together quite closely, with relatively moderate fluctuations. Then they became more volatile and unsynchronized.

We can observe some interesting differences between the countries. Swedish manufacturing profit margins developed more favorably up through 1974. But the conspicuous profit boom of 1973/74, attributable to rapid price increases in raw material products of particular importance in Swedish manufacturing, was followed by several years of extreme wage escalations and small positive, or even negative, productivity changes.

**Figure 7 Profit margins in total manufacturing 1963-80**  
 Index 100 = average for 1963-73



Sources: Germany: 6, 9, 10, 11, 12, 13, 14, 18, 19, 21,  
 Netherlands: 1, 2, 5, 6, 10, 11, 13, 18, 19, 21,  
 Sweden: 6, 12, 13, 15, 16, 17, 18, 19,  
 United Kingdom: 4, 6, 9, 10, 11, 12, 18, 19,  
 (see Statistical Sources).



Dutch profit margins followed a somewhat different path. From 1963 to 1975 they decreased more than in Germany, Sweden and the U.K. But in the second half of the 1970s, Dutch profits rebounded strongly, thanks to good productivity performances and moderate labor cost increases.

In Germany, a deflationary economic policy with a revalued DM kept inflation in the 1970s at lower levels than in most competing countries. But wages were not checked to a corresponding degree. And since productivity growth was not sufficient to offset the gap between the wage and price increases, profit margins developed unfavorably.

Aggregate profit margins in British manufacturing fluctuated greatly during the 1970s. But on the whole, rapid price increases offset poor productivity performance and substantial wage escalations.

### **6.3 Prices, Profits and Structural Change**

What roles do prices and profits play in structural change? In a market economy the price system fulfills an important signaling function in the resource allocation process. A decrease in the demand for a product, for example, puts downward pressure on the product's price. This is a signal to existing and potential producers to reduce output. In that case, a decrease in price is accompanied by a decrease in quantity.

But one should not expect to find that the relationship between relative prices and output is always positive. Whether the two variables change in the same or opposite direction over a period depends, to a great extent, on changes in relative production costs. In the example above, a cost-saving technical break-through in the manufacture of the product leads to an increase in supply. If this increase in supply is greater than the decrease in demand, the end result will be that the price dropped and the quantity increased.

In principle, the price-output relationship is positive if the market disturbance primarily derives from the demand side, and negative if the disturbance is primarily due to changes in relative costs (the supply side). Hence, the development of relative prices is, in isolation, a poor indicator of the direction of structural change. This is underlined by Table 7, which shows that there was no systematic long-run correlation between the relative development of sub-sector prices and output in the four countries included in this study.<sup>13</sup>

A more fruitful approach to "explaining" structural change would begin with an examination of relative profit performance across industries. After all, producers generally try to allocate their resources in the most profitable way. And since changes in both prices and costs are captured by the profit concept, the relationship between relative profit performance and output growth should be unambiguously positive. But because, for instance, of imperfect foresight, government intervention and rigidities in factor mobility, the ex post relationship may not be monotonic.<sup>14</sup>

According to this line of reasoning, the most expansive industries over a period should be the ones which performed most favorably in terms of profitability, and vice versa. Table 8 shows that this holds well for Germany, the Netherlands and the U.K. The low correlation coefficient for Sweden is to a large extent due to the fact that a sharp fall in basic metal profit margins in the second half of the 1970s was not matched by a corresponding decline in output growth. The level of operations in the Swedish basic metal industry in the period was artificially sustained by massive government support. In fact, if the basic metal industry is deleted from the calculation, the coefficient for Sweden becomes highly significant.

**Table 7** Correlation between the relative development of sub-sector prices and output

	Germany 1960-80	Netherlands 1963-80	Sweden 1960-80	United Kingdom 1963-80
Correlation coefficient	-0.24	0.54	-0.10	-0.33
Level of significance	-	0.10	-	-

**Table 8** Correlation between the relative development of sub-sector profit margins and output

	Germany 1963-80	Netherlands 1963-80	Sweden 1963-80	Basic metals deleted	United Kingdom 1963-80
Correlation coefficient	0.65	0.66	0.11	0.81	0.75
Level of significance	0.05	0.05	-	0.025	0.025

#### 6.4 Transformation Pressure

An interpretation of the discussion and the empirical evidence presented in the previous section is that the greater the spread of profitability across the industries, the greater the "structural tension" in the manufacturing sector. Lacking proper data on profitability the dispersion in profit margins should be an appropriate measure of the degree of transformation pressure.

In this section our profit margin indices (defined on p. 148) are used to construct proxies for "transformation pressure" in the four countries. As a measure of dispersion, we take the sum of the weighted absolute differences between the profit margin

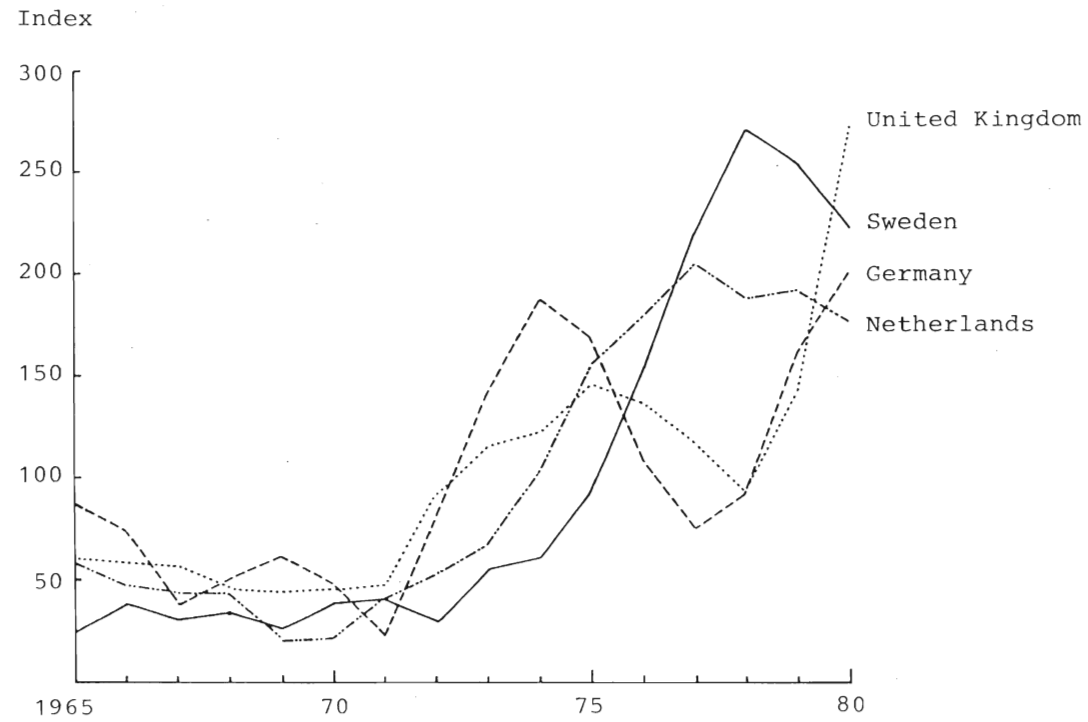
index of each sub-sector and the index of the aggregate manufacturing sector. It seems plausible that structural change in one year is affected by the dispersion in industry profitability in previous years. This is taken into account by defining the transformation pressure in year  $t$  as the arithmetic average of the dispersion in profit margins in the years  $t$ ,  $t-1$  and  $t-2$ .<sup>15</sup>

Thus defined, the year-by-year transformation pressure in the four countries is presented in index form in Figure 8. It is important to note that the curves represent crude approximations of the changes in transformation pressure over time. They cannot be used for across-country level comparisons. Nevertheless, at least one conclusion follows from Figure 8. Concurrently with the general deterioration in business climate in the mid and late 1970s, pressure for structural change increased considerably in all four countries.<sup>16</sup>

Recall from section 5.6 that a corresponding increase in the rate of actual transformation did not take place. On the contrary, the extent of employment structural change generally decreased somewhat in the period. To explain this seemingly contradictory development - that high transformation pressure went hand in hand with low transformation response - one has to deal with the delicate problem of a possible two-way causality. Certainly, one can readily suggest that in the sluggish economic climate, in which the expansive sectors cannot soak up unemployed resources, factor mobility tends to decrease even if transformation pressure is high. On the other hand, it is also quite plausible that the rigidity of the economic structure is a principal cause - not an effect - of the economic imbalances, which, in turn, are manifested in a rise in transformation pressure. In other words, as long as the industrial structure does not adjust according to transformation pressure, the fundamental imbalances will persist and may even get worse.<sup>17</sup>

As a final remark we add that the tendency to low factor mobility in periods of low economic activity is frequently enhanced by government actions aimed at curbing short-run unemployment.

Figure 8 Annual transformation pressure,<sup>a</sup> 1965-80  
 Index 100 = average for 1965-80



Sources: Same as in Figure 7.

<sup>a</sup> Transformation pressure is defined in note 15.

## 7 INVESTMENTS AND GROWTH

Investment is a key element of the growth process. Besides adding directly to aggregate demand in the economy, investments lay the foundation of future production growth. The "good old years" of the 1950s and 1960s were to a large extent the result of a vigorous investment activity. Today, it is frequently said that to get the wheels spinning as they used to, capital formation must increase significantly.

In this chapter we take a broad look at the industrial investment development in Germany, the Netherlands, Sweden and the United Kingdom and relate investment growth to output growth. We want to highlight statistically a few widespread "beliefs" about investments. The ambition is not to explain investment behavior. Finally, we discuss the importance of the allocation of a given amount of aggregate investments between sectors.

### 7.1 Manufacturing Investments in 1963-80

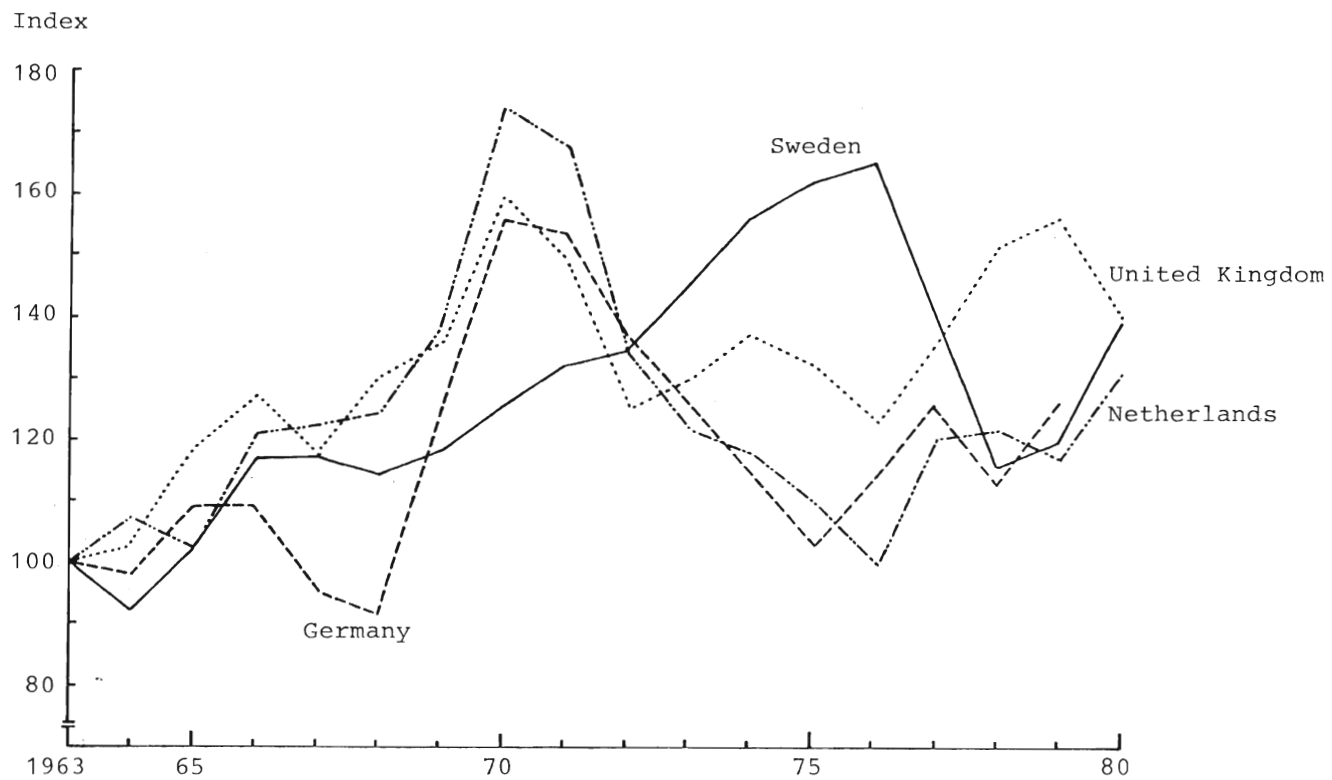
Figure 9 displays the growth of the volume of manufacturing investments from 1963 to 1980. It is evident that investment activity was, on the whole, strong up through 1970. For Germany, the Netherlands and the U.K. the first half of the 1970s saw a dramatic drop in annual investments. It is worth noting that this drop started before the oil crisis of 1973/74. Swedish industrial investment, on the other hand, continued for several more years along the trend from the 1960s.

In 1977 the investment trend turned upward again in Germany, the Netherlands and the U.K., whereas Swedish investments fell sharply in the last three years of the 1970s.

### 7.2 Investments, Investment Ratios and Growth

With the development in the last decade as shown in Figure 9, it is not surprising that an increase in investment activity is fre-

Figure 9 Total manufacturing investments (at constant prices) 1963-80  
Index 100 = 1963



Sources: Germany: 7, 10, 13, 14, 19, 21, Netherlands: 1, 2, 3, 9, 10, 12, 19, 21, Sweden: 13, 15, 17, 19, United Kingdom: 4, 9, 10, 13, 19, (see Statistical Sources).

quently called for as a remedy for economic stagnation. In this section we ask whether the most expansive industries in each country (in the years since 1963) are the ones which showed the strongest growth of investment, and vice versa.

Correlation coefficients between the relative growth of industry output and investments are presented in Table 9. In Germany and Sweden a strong positive correlation is evident. The coefficient for the United Kingdom is significant only at a .25 level. The extraordinary output growth of the Dutch chemical industry in the 1960s and early 1970s was achieved despite low levels of investment. To a large extent this explains why the correlation between the growth of investments and output is so weak in the Netherlands. If the chemical industry is deleted from the calculation we find that the correlation becomes highly significant.

Frequently, investment development is discussed in terms of investment ratios, i.e. capital formation related to production. The investment ratio is sometimes casually taken as equivalent to "willingness to invest". Since industrial investment ratios have generally fallen in the 1970s, it is accordingly concluded that "willingness to invest" has diminished. This, so the argument goes, is one reason for the current economic stagnation. For the economies to return to the old growth path, investment ratios must be raised to their former levels. That means that investments must increase by more than production.

If this line of reasoning is valid, there should be a long-run positive relationship between the relative development of industry output and investment ratios. In other words, industries with the strongest development of their investment ratio should, in principle, grow faster than the other industries.

This has not been the case in the four countries since 1963, according to Table 10. The relationship actually seems to be negative. A plausible explanation is that the most expansive industries are the ones that tend to become more and more knowledge-intensive.



**Table 9 Correlation between the relative development of sub-sector investments and output**

	Germany 1963-79	Netherlands 1963-80	Chemicals deleted	Sweden 1963-80	United Kingdom 1963-79
Correlation coefficient	0.65	0.27	0.61	0.94	0.37
Level of significance	0.05	-	0.10	0.005	0.25

**Table 10 Correlation between the relative development of sub-sector investment ratios and output**

	Germany 1963-79	Netherlands 1963-80	Sweden 1963-80	United Kingdom 1963-79
Correlation coefficient	-0.53	-0.60	-0.35	-0.39
Level of significance	0.15	0.10	0.25	0.25

**Table 11 Correlation between the relative development of sub-sector investments and profit margins**

	Germany 1963-79	Netherlands 1963-80	Sweden		United Kingdom 1963-79
			1963-80	1963-73	
Correlation coefficient	0.68	0.61	0.10	0.81	0.11
Level of significance	0.05	0.10	-	0.01	-

Substantial increases in fixed capital formation in these industries, large enough to raise investment ratios, could very well be detrimental to those industries.

### 7.3 Investment Allocation and Growth

Growth in investments in machinery and buildings is certainly necessary for long-run output growth. But the quantity of investments is not the only important explanation. One should not only ask the question How much?, but also Where?. That is, not only the level, but also the allocation of investments among firms and industries, should be studied. This could be called the "quality" aspect of investments. For favorable long-run growth, it is crucial that uncompetitive firms and industries do not account for a "disproportionally" large share of total capital formation. In principle, investment resources should be allocated in proportion to the competitiveness of the industries. A misallocation of investment resources is likely to impede the expansion of viable sectors, and to postpone an inevitable adjustment of the structure of the economy.

We now examine the allocation (or the "quality") of the manufacturing investments made since 1963 in the four countries. We regard relative profitability as equivalent to competitiveness. Ideally, the industries with the strongest investment growth over a period should be the ones with the most favorable development of profitability. Thus, a suitable measure for this study of the quality of investments within the manufacturing sector is the correlation between the sub-sector development of investments and profit margins. The stronger the positive correlation, the higher the "quality" of the combined investments made in the period.

We see from Table 11 that in Germany and, to a lesser degree, in the Netherlands, there is a clear positive association between relative growth of investments and profit margins. In Sweden and the U.K., on the other hand, there is no significant correlation. If

we choose the period 1963-73, however, the Swedish correlation coefficient becomes highly significant.

Hence, given that the coefficients in Table 11 are appropriate measures of the quality of investments, we can conclude that Germany and the Netherlands in 1963-80, and Sweden in 1963-73, benefited from a growth-conducive allocation of investments. By this definition, a considerable misallocation of resources must have taken place in Sweden in the last decade. This appears to be true for the whole period 1963-80 in the U.K.

The results provide a plausible explanation of two "inconsistencies" between aggregate investment and output growth in the British and Swedish manufacturing sectors. The first inconsistency (compare Figures 2 and 9) is that the British manufacturing investments followed the same growth path as did the German and Dutch investments, and yet the British output growth was much below the others.

The second inconsistency is that the very strong Swedish investment activity from 1970 through 1976, relative to the other countries, did not lead to a correspondingly favorable growth in industrial production. In fact, since the mid 1970s, Swedish industrial growth has been lower than in most developed economies. In Örtengren (1981) it is shown that the seemingly favorable growth of Swedish manufacturing investments in the first half of the 1970s was to a large extent based on vigorous investment activities in government-owned industries which are now considered crisis industries.

In conclusion, an inference to be drawn from this section is that some of the sluggishness in the British economy in the last two decades, and in the Swedish economy in recent years, is due to a misallocation of investments.

## 8 SUMMARY AND CONCLUSIONS

The most significant aspect of manufacturing growth in Germany, the Netherlands, Sweden and the United Kingdom in the last two decades is the sharp break in output growth trends which occurred in connection with the oil crisis in 1973/74. The deterioration is evident for all industries.

The German, Dutch and Swedish manufacturing sectors experienced a similar development in terms of production growth up through the first half of the 1970s. Thereafter German and Dutch industries outgrew Swedish industries. British manufacturing followed a considerably slower growth path throughout the whole period.

Total industrial employment in the four countries dropped over the period 1960-80. It peaked in the mid 1960s (in 1970 in Germany) and the subsequent decrease was most notable in the Netherlands and the U.K. The rate of decline did not increase appreciably in the period after the oil crisis, despite the marked slowdown in output growth. This circumstance reflects an unfavorable labor productivity growth in the mid and late 1970s.

Regarding performance of individual industries, knowledge-intensive industries gained in importance at the expense of labor and raw-material intensive industries. In the last two decades, the chemical industry was the by far most expansive, whereas textiles declined considerably in both absolute and relative terms. More recently, the basic metal industry has run into severe problems.

The industrial structure and its change in Germany and the U.K. correspond closely to that of the average industrialized economy. Engineering accounts for about 40 percent of total manufacturing production, and the chemical industry is growing in relative size.

In the Netherlands, chemicals, and to some extent the food industry, play a larger role than in the other three countries. Sweden has a strong specialization in forest-based and investment-goods industries.

Transformation pressure (measured as dispersion in profit margins) increased considerably in the stagflation period. But structural change did not "follow" transformation pressures. In fact, the rate of employment structural change appears to have fallen in the second half of the 1970s. Throughout the period 1960-80, the industrial structure was clearly more rigid with respect to employment than to output.

A correlation analysis shows that relative growth rates of the various industries were positively associated with profit performance and investment activity. Investment ratios, on the other hand, appear to have been negatively correlated with output growth, whereas no systematic relationship is found between the relative development of sub-sector output and prices.

Empirical evidence presented in the study suggests that the poor industrial performance of the United Kingdom since 1960, and of Sweden since the mid 1970s, is to some extent a result of a misallocation of resources. Section 5.6 indicates that the structural adjustment of employment was relatively slow over the whole period in the U.K., and slow also in Sweden in the period after the oil crisis. Furthermore, section 7.3 shows that in the U.K. over the whole period, and in Sweden in the period 1973-80, the allocation of investment resources to a relatively large extent went to uncompetitive industries.

<sup>1</sup> The term output is used interchangeably with volume of production throughout the paper.

<sup>2</sup> Such as Brazil, Mexico, Singapore, South Korea, Taiwan and Hong Kong.

<sup>3</sup> This observation coincides with one made in United Nations (1977) where the manufacturing industries in a group of European countries are studied for the period 1958-70.

<sup>4</sup> For a thorough discussion on the recent development in the steel industry in a historical perspective, see Carlsson (1981).

<sup>5</sup> Coal mining is another historically vital industry. But it is not dealt with here, since it is not part of the manufacturing sector.

<sup>6</sup> See Pavitt (1981) for a thorough exposition on innovation activity and British economic performance.

<sup>7</sup> See Wheeler (1975) for a discussion on the significance of trade for the economic life in the Netherlands.

<sup>8</sup> See Rhenmann (1979) for an examination of the new conditions for the Swedish forest industry.

<sup>9</sup> Overall structural change  $S$  in period  $t$  is here defined by

$$S = \sum_{i=1}^n |x_{i,t} - x_{i,t-1}|$$

where  $n$  = number of sub-sectors

$x_{i,t}$  = percentage share of sub-sector  $i$  in total manufacturing in period  $t$ .

<sup>10</sup> Boston Consulting Group (1979) contains a comparative review of the industrial policy in Germany, Sweden and United Kingdom.

<sup>11</sup> See Eliasson (1976) for a discussion on the merits of using gross profit margins as an approximation of profitability.

<sup>12</sup> Depreciation charges on fixed capital is synonymous with consumption of fixed capital, which is the term often used in national accounts statistical sources.

<sup>13</sup> See Josefsson-Örtengren (1983) for a thorough investigation into the relationship between relative prices and output growth in the Swedish industry disaggregated into 42 sectors.

14 Two variables are monotonically related if they always change in the same direction.

15 Transformation pressure TP in period t is thus defined by

$$TP_t = \frac{1}{3} \sum_{a=0}^2 \sum_{i=1}^n x_{i,t-a} \left| (m_{i,t-a} - M_{t-a}) \right|$$

where  $n$  = number of sub-sectors  
 $x_{i,t-a}$  = percentage share of sub-sector i in total manufacturing production in period t-a  
 $m_{i,t-a}$  = profit margin index of sub-sector i in period t-a  
 $M_{i,t-a}$  = profit margin index of aggregate manufacturing sector in period t-a.

16 This is in agreement with Josefsson-Örtengren (1980), in which the dispersion in relative price changes is used as a measure of transformation pressure in Swedish industry in 1913-77. Josefsson and Örtengren found a marked rise in the transformation pressure for the first half of the 1970s.

17 This discussion is further elaborated in, for instance, Carlsson, Bergholm & Lindberg (1981) and Eliasson & Lindberg (1981).

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