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Industrial adjustment in Western Europe: Retrospect and prospect

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INDUSTRIAL ADJUSTMENT IN WESTERN EUROPE
- Retrospect and Prospect -

by

Juergen B. Donges and Hans-Hinrich Glismann

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INDUSTRIAL ADJUSTMENT IN WESTERN EUROPE
- Retrospect and Prospect -*

I. Introduction

West European countries (as other countries, industrialized and developing alike) have been facing the challenge to adjust their structure of production, services and employment to profound changes of the overall economic environment during the past fifteen years. Some of these changes were more foreseeable than others. The less foreseeable changes included the wage explosion, the oil-price hikes, the exchange-rates volatility and the microelectronics revolution. The better foreseeable changes were related with the enlargements of the European Community and the shifts in the international division of labour, in particular the fast penetration of European markets by those developing countries which have been pursuing outward-oriented industrialization strategies.

In principle, there are two strategies of adjustment: a positive (forward-looking) and a negative (defensive) one. Positive adjustment operates through a change in (relative) prices and through the incentives and disincentives thereby created for investors and workers. By contrast, negative adjustment operates "at constant prices", i.e. by changes in quantities, and thus is highly correlated with output losses, unemployment and bankruptcies. The notorious deterioration in the economic performance of the West European countries since the early seventies means that too much negative adjustment has taken place, not least because governments, time and again, resorted to protective measures and subsidies in favour of declining activities and thereby delayed the process of restructuring.

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* We are indebted to Klaus-Dieter Schmidt for his constructive comments on an earlier draft and to Hermann Dick for computational assistance with the Kiel general equilibrium model on the West German economy. The usual disclaimer applies.

The purpose of this paper is to discuss major factors behind failures and successes in structural adjustment. The analysis includes the experience of four major European countries: France, Italy, the United Kingdom and West Germany. These countries are known for diverging performances. Germany has the highest real per capita income, the lowest inflation, and the strongest currency, while its unemployment rate, though depressing by her own historical standards (8 per cent in 1986 as compared to 1 per cent on average during the sixties), is distinctly below those of the other three countries. On the other side of the spectrum is Italy, but this nation is in fact composed of three economies - a highly developed and rapidly growing one in the north, a very backward one in the south and a dynamic "economia somersa" almost everywhere. The United Kingdom has become the only oil-rich country in the sample, but probably the one which has been struggling most with micro-economic inefficiencies and the power of interest groups (labour unions in particular) in the economic-political decision process for decades. France has become an industrial and technological leader in a shorter space of time (starting its economic transformation in the late fifties) than any of the other sample countries, but it also was struck by an unparalleled experimentation with socialism during the early eighties.

Notwithstanding such differences, these countries have much in common when the problem of structural adjustment is brought into perspective. They all have seen the public sector expanding, the work ethic of the labour force deteriorating, the scepticism about economic growth and technology and science increasing, and the reluctance to adapt to change enduring. And, as opposed to Japan and the United States, these countries seem to increasingly lack capability of consensus among social groups. This is also true of the other Western European countries, perhaps with the exception of Switzerland.

Therefore, it seems appropriate to focus this study on the four countries mentioned. There will be a certain bias towards West Germany, which is mainly due to the greater availability of adequate statistical data and studies on structural change. This bias may not be that bad after all given the share and importance of the German industry in the EC.

The paper is organized as follows: The next section describes the overall pattern of structural change. Subsequently, the sources of the decline and rise of industries are explored. This is followed by some tentative estimates of future output effects in alternative adjustment scenarios. Finally, the major policy implications are briefly discussed.

II. Patterns of Structural Change: France, Italy, the United Kingdom, West Germany

1. The Overall Picture:

Economic growth in the four countries by and large shows the same pattern over time: high rates of growth between 1950 and 1960, and continuously declining rates thereafter (Table 1). Minor exceptions from this picture are France and the United Kingdom during the fifties and sixties. These countries relied most on "planification" (France) or on extensive governmental controls at the micro-level (the United Kingdom) in the years following World War II. Except for the eighties, the United Kingdom reveals by far the worst performance. With regard to West Germany, it is worth noting that economic growth was fastest during the fifties, when the government happened to rely largely on the market mechanism for steering structural changes, and that the downward trend of growth was accompanied by increased government involvement in this process (Donges, 1980; Wolter, 1984). And it was in the fifties that West Germany faced unexampled adjustment requirements in order to recover from postwar stagnation; in particular, the capital stock, which was

Table 1: Growth of Real Gross Domestic Product in Four Industrial Countries, 1950-85[a]
(per cent)

Period	France	Italy	United Kingdom	West Germany
1950-60	4.7	5.6	2.7	7.9
1960-70	5.4	5.3	2.9	4.2
1970-80	3.5	3.0	2.0	2.6
1980-85	1.2	0.7	1.8	1.2

[a]Average annual rates of change as measured by the exponential trends

Source: IMF, International Monetary Statistics, current issues; own calculations.

destroyed during the war or dismantled by the victorious Allies, had to be rebuilt, and millions of refugees, first from the old Eastern areas of the former Germany and then from the German Democratic Republic, had to be absorbed.

In all four countries, economic growth has been accompanied by notable changes in the production and employment structure at the three-sector level. The general trends have been a relative decline in the primary and the secondary sector and a relative increase in the tertiary sector (as measured by these sectors' shares in gross value added and employment). West Germany has resembled this pattern as from the mid-seventies onwards only; in previous years this country had become "over-industrialized" if compared to value-added and employment shares derived from international cross-section regression analyses (Fels, Schatz, Wolter, 1971).

The primary sector will continue to lose relative weight in the advanced economies (mainly due to effects described by Engel's law), while there will be a fundamental shift in production and employment from the secondary to the tertiary sector (as result of the ongoing move towards the information-and-communication(s)-based society). As illustration, Table 2 gives the estimates for West Germany up to the year 2000. It should be noted that, in the secondary sector, the share of value added declines more rapidly than the respective share of labour; in the tertiary sector the opposite can be observed. Hence, labour productivity differentials between the secondary and the tertiary sector become smaller over a period of time.

Table 3a highlights structural developments in the four EC countries since 1970, with the manufacturing sector being more disaggregated and the services sector split up between market and non-market activites. The co-efficients shown are individual sectors' rates of growth in the period 1977-83 relative to growth rates in the years from 1970 to 1976, standardized by setting this ratio equal to unity for gross domestic product. Manufacturing has indeed followed the general trend described by the three-sector hypothesis in all four countries. The ratios for the building and construction sector are biased in an upward direction in West Germany as result of a rapid expansion of public investment during most of the period under consideration. With regard to services, only Italy exhibits an increase which is distinctively above average; in the other countries services expanded more or less with the overall growth rate[1]. The fact that growth of value added in fuel and power products accelerated in all countries is certainly due to the rising prices of energy in that time and, in the case of the oil-importing countries, to the endeavours to discover and produce oil substitutes.

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[1] In Germany, "market services" are, in terms of value added, between three and four times as large as "non-market services".

Table 2: Structure of Production and Employment in West Germany
(per cent)

Sectors	1960	1970	1980	1985	2000[a]
	Gross value added[b]				
Primary sector[c]	8.6	4.6	3.1	2.8	2.3
Secondary sector[d]	50.4	50.4	43.5	41.1	30.2
of which: Manufacturing	40.3	40.2	33.9	33.2	25.2
Tertiary sector[e]	49.0	45.0	53.4	56.1	67.5
	Active labour force				
Primary sector[c]	15.9	9.7	6.4	6.3	3.7
Secondary sector[d]	45.8	47.7	43.2	40.1	29.8
of which: Manufacturing	36.9	38.1	34.2	32.0	25.1
Tertiary sector[e]	38.3	42.6	50.4	53.6	66.5

[a]On the basis of a 3 per cent annual growth rate of per capita income. - [b]At current market prices. - [c]Agriculture, forestry, and fishing; mining and quarrying. - [d]Manufacturing; electricity, gas, and water; construction. - [e]Trade, transport and communications; banking, insurance, and real estate; public administration; other services.

Source: Donges, Klodt, Schmidt (1986); figures for 1985 have been updated.

Table 3a: Relative Growth Performance in Four EC Countries by Sectors[a], 1970-83

Sectors	France	Italy	United Kingdom	West Germany
Agricultural, forestry, fishing	1.27	0.83	0.90	0.73
Energy production and distribution	1.49	1.30	1.13	1.04
Manufacturing industry	0.92	0.79	0.77	0.92
of which				
- Basic metals	1.33	0.53	-0.07	1.27
- Non-ferrous minerals and mineral products	0.88	0.87	0.98	1.47
- Chemicals	0.88	0.75	0.77	0.17
- Fabricated metal products	0.81	0.71	0.55	0.81
- Agricultural and industrial machinery	0.75	0.60	0.74	0.96
- Office and data-processing machines, precision and optical instruments	1.94	1.04	1.64	0.57
- Electrical engineering	0.75	0.68	1.11	0.68
- Transport equipment	0.81	0.60	0.81	0.75
- Paper and paperboard, printed matter	1.01	0.81	1.30	1.35
- Rubber and plastic products	1.03	0.75	0.58	2.60
- Textiles, clothing, leather, footwear	0.85	0.80	0.67	1.73
- Food, beverages, tobacco	1.11	1.26	1.39	1.05
- Other manufactures	0.61	0.77	0.68	0.91
Building and construction	0.78	1.08	0.90	1.86
Market services	1.03	1.03	1.04	1.12
Non-market services	0.97	1.16	0.96	0.69
TOTAL	1.00	1.00	1.00	1.00

[a]Growth rates 1976-83 in relation to those in 1970-76 as measured by exponential trends at current prices. Ratio for GDP = 1.

Source: Statistical Office of the European Communities, Eurostat, National Accounts. Current issues; own calculations.

It cannot be inferred from Table 3a whether success or failure has occurred in "real" terms or whether the development of value added has rather been based on changes in the price structure of the economy. This aspect is of special importance in times of severe price shocks. One should expect that in the period under consideration real prices of non-tradable goods expanded in oil-producing countries, like the United Kingdom, relative to other countries (Corden, Neary, 1982). Indeed, the development of relative prices in building and construction, market services and non-market services confirm this hypothesis (Table 3b): Non-tradables exhibit a major price increase in the United Kingdom relative to the other countries and relative to manufactures and agricultural products[1]. The same applies to energy production (oil) relative to the two other tradables sectors.

The overall speed of structural change of production during the period under consideration has increased in France and Italy, while it remained almost constant in the United Kingdom and declined significantly in Germany (Table 4). Structural change in Germany, by far the highest in the first half of the seventies, has been the lowest in recent years[2]. With regard to employment, structural shifts were similar, though there was a marked slowing-down in the United Kingdom. The speed of structural change does, of course, not necessarily indicate whether it has been adequate to cope with current adjustment requirements. From the fact that the rate of economic growth has decreased and the rate of unemployment has increased throughout the sample countries (and in other European countries as well) it may be

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[1] Non-market services seem to be an exception to this rule in West Germany where the price increase was even more pronounced than in the United Kingdom. However, this reflects mainly the fact that salaries paid by the public sector are not subject to market forces and increased quite fast during most of the period under consideration.

[2] A similar development for Sweden and the Netherlands has been reported by Rodrik (1982).

Table 3b: The Sectoral Structure of Prices in Four EC Countries (1980 = 100)

Sectors	France			Italy			United Kingdom[a]			West Germany		
	1970	1976	1983	1970	1976	1983	1973	1976	1982	1970	1976	1982
Agricultural, forestry, fishing	1.25	1.23	0.96	1.08	1.13	0.88	1.04	1.93	0.93	1.33	1.23	0.95
Energy production and distribution	1.13	0.97	1.07	1.08	0.95	1.14	0.40	1.02	1.02	0.98	1.05	1.06
Manufacturing industry	1.10	0.96	0.99	1.04	1.05	0.93	0.62	1.00	0.98	1.14	1.01	1.00
of which:												
- Basic metals	1.25	0.95	1.05	1.36	1.06	0.78	0.76	1.24	0.81	1.22	1.03	0.99
- Non-ferrous minerals and mineral products	1.08	1.03	0.98	0.96	1.00	0.93	0.54	1.83	0.93	1.24	0.99	0.99
- Chemicals	1.20	1.03	0.86	1.64	1.16	0.81	0.76	1.05	0.92	1.32	1.12	1.03
- Fabricated metal products	0.93	0.99	0.99	0.84	0.98	0.99	0.48	0.88	0.90	1.13	1.16	1.02
- Agricultural and industrial machinery	1.00	1.01	0.99	0.80	1.03	1.07	0.58	0.92	0.96	0.92	0.95	1.01
- Office and data-processing machines, precision and optical instruments	2.13	1.11	1.29	1.92	1.52	1.04	0.94	1.12	0.96	1.46	1.20	0.94
- Electrical engineering	1.33	1.05	0.93	1.04	1.16	0.92	0.60	0.97	1.00	1.24	1.12	0.95
- Transport equipment	1.00	1.07	0.94	0.96	1.14	0.84	0.82	1.20	1.05	0.90	1.03	1.01
- Paper products, printed matter	0.95	1.01	1.02	0.96	1.05	0.93	0.62	0.97	1.03	0.90	1.00	0.99
- Rubber and plastic products	1.03	1.04	0.92	0.96	0.98	0.93	0.58	1.00	0.98	1.29	1.03	0.97
- Textiles, clothing, leather, footwear	1.00	0.99	0.96	0.84	1.00	1.00	0.76	0.98	0.93	1.19	1.00	0.99
- Food, beverages, tobacco	1.03	0.95	1.06	1.28	1.00	0.98	0.54	1.15	1.03	1.16	0.98	0.97
- Other manufactures	1.28	1.04	1.00	0.96	0.95	1.02	0.56	0.97	1.01	1.19	0.93	1.03
Building and construction	0.80	0.95	0.97	0.80	0.95	1.03	0.66	0.97	1.00	0.89	0.88	0.98
Market services	1.00	0.97	0.99	1.04	0.98	1.01	0.78	1.02	0.96	0.98	1.01	1.03
Non-market services	0.75	0.95	1.05	0.84	0.86	1.09	0.58	0.95	0.99	0.43	0.97	0.98
TOTAL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00[b]	1.00	1.00	1.00

[a]Based on data for gross value added at market prices. - [b]1982: estimates.

Source: As table 3a; own calculations.

Table 4: Speed of Structural Change (SCI)[a] in Four EC Countries, 1970-83 (6 sectors)

Country	Gross Value Added		Employment	
	1970-76	1976-83	1970-76	1976-83
France	3.55	4.80	4.70	5.75
Italy	2.95	5.85	4.95	5.95
United Kingdom	4.90	4.40[b]	5.70	3.55[c]
West Germany	6.75	3.85[b]	6.15	3.50[b]

[a]Structural Change Index $T_t = 100\ (0.5 \sum_i |\ S_{iT} - S_{it}\ |)$, with S_i share of sector i in GDP; t = 1970 (1976); T = 1976 (1983)
[b]1976-82 - [c]1976-81

Source: See Table 3; own calculations.

inferred that the pace of structural change is not the only indicator of successful adjustment.

2. The Manufacturing Industry

More light on the pattern of structural change is shed by classifying manufacturing activities into strong, normal and weak, depending on whether output grew faster than, equal to, or slower than manufacturing average. This average is reported in line 3 of Table 3a.

Two industries improved performance in the four countries between 1970 and 1983: food, beverages, tobacco as well as paper, paperboard and printed matter. Two industries did so in three countries: non-ferrous minerals and mineral products (with the exception of France) and office and data-processing machines (with the exception of West Germany). It is interesting to see that the textiles industry performed better than average in Italy and West Germany, which is an indication for successful adjustment (behind the protective

barriers of the Multi-Fibre Arrangement) to changing comparative advantage. The success of food and beverages has been accompanied by a relative improvement of relative prices since 1976 as compared to the first half of the seventies, though not in West Germany (Table 3b). By contrast, the relative prices of paper and printing products declined in West Germany and remained constant in Italy.

Only one branch was below average industrial growth performance in all countries, namely fabricated metal products. Transport equipment and electrical goods were so in all countries but the United Kingdom, and agricultural and industrial machinery in all but West Germany. The fact that transport equipment suffered from a decline in relative prices since 1976, can be ascribed to the energy price increases which have induced demand to substitute large cars for smaller ones. It should be noted, however, that the level of aggregation in Tables 3a and 3b is quite high, as the branch "transport equipment" includes industries with very diverging economic performance: rapid shrinkage (shipbuilding), moderate growth (automobiles) and emerging dynamism (aircraft production).

The indicator best suited for measuring economic performance is probably the rate of return on capital. Again, the development of the profitability of the capital stock is much the same among European countries (Table 5). There has been a decline of profitability of the capital stock since the sixties in all countries except Italy, where rates of return peaked in 1968 and 1969 (not shown here). As compared to the United States, profit rates have been relatively unstable in Europe, although the continuity of the downward trend is worth noting.

The picture is somewhat misleading, though, the reason being that measurement of profits as well as that of the capital stock suffers from some intrinsic problems. West

Table 5: Rates of Return on Capital[a], Selected Years (1980 = 100)

Year	France	Italy	United Kingdom	West Germany	USA
1960	300.0	188.9	518.2	203.8	102.9
1970	280.4	250.0	209.1	137.5	107.1
1976	149.0	38.9	159.1	102.5	111.4
1984	66.7	0.0	77.3	103.8	85.7

[a]Net returns as per cent of net capital stock (excluding construction). Capital stock and depreciation at current prices.

Source: Commission of the EC (1986); own calculations.

German companies, for example, have sold assets during the past ten years in order to improve their cash balances. Such earnings, which do not stem from production, are included in Table 5. Recalculation of rates of return in order to exclude the bias resulting from non-production activites reveals that the decline of profit rates in Germany has been quite similar to that shown in Table 5 for the United Kingdom. The adjusted yield on fixed assets in Germany was 13.6 per cent in 1966 and 4.1 per cent in 1983, with a trough of 3.7 per cent in 1982 (Dicke, Trapp, 1984). Even these figures do not say too much about the investment climate in Germany, unless compared to returns on alternative investments, as for instance in the financial sector. Comparison of the above-mentioned returns on fixed capital with the real rate of interest on bonds show positive differentials of more than 9 percentage points for the second half of the sixties and of about 3 percentage points for the seventies. It was only in the early eighties, when the returns on fixed capital declined and the real interest rate on financial capital increased, that the differential became negative (1981: -2.5 percentage points; 1983: -0.7 percentage points).

The industry structure of returns on the capital stock is given in Table 6, again for West Germany as an illustrative example. The trend has been distinctly downwards across the board. In 1981, the last year for which data are available, some industries, such as iron and steel and non-ferrous metals, incurred marked losses. Profits were remarkably low in other industries such as chemicals, engineering, and textiles. Even the more successful industries, such as furniture, plastic products, or wood processing, might have had difficulties in attracting investors in 1981, because the real rates of interest on financial assets were about 6 per cent at that time.

Whether or not headways in the adjustment process have been made can also be derived from the evolution of capital productivity. If adjustment is forward-looking the new investments enlarge productive capacities, incorporate a capital-saving technological progress, and ultimately lead to product innovations; in this case, capital productivity would increase. If adjustment is defensive, the new investments substitute capital for labour; in this case, capital productivity would decline[1].

Table 7 provides information about the evolution of capital productivity in the manufacturing industry, in comparison to that of the gross manufacturing product, of the working time and of the capital intensity, before and after the first oil price explosion in 1973. The following picture emerges for France, the United Kingdom and West Germany[2]:

- Manufacturing in all countries lost considerable momentum after 1973 in terms of growth in gross value added at constant prices.

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[1] A caveat is in order: Problems of identification arise when adjustment to declining profits is carried out by reducing the capital stock. In this case the "law of diminishing returns" would lead to an increase of the measured capital productivity.

[2] Data on Italy were not available.

Table 6 - Rates of Return on Tangible Assets in Selected West German Industries (per cent)

Industry	1966	1970	1976	1980	1981
Stone, sand and clay	13.0	9.9	4.2	6.3	3.2
Iron and steel	5.2	6.0	0.1	-1.0	-4.8
Non-ferrous metals	12.1	4.1	-0.7	1.1	-1.3
Chemicals	16.5	7.1	5.5	2.8	0.5
Sawmills and timber processing	10.9	6.4	5.7	5.4	3.5
Structural metal products	13.7	9.4	3.9	5.4	2.5
Fabricated metal products	18.8	16.9	11.2	9.4	5.4
Mechanical engineering	11.5	8.2	4.2	2.4	1.7
Electrical engineering	12.4	7.7	3.1	0.0	0.0
Motor vehicles	16.5	10.5	16.6	2.1	2.3
Wood products	18.3	11.2	8.5	7.7	7.7
Manufactures of paper and paperboard	17.5	10.0	4.9	3.8	1.6
Plastic products	16.0	9.5	8.4	7.4	4.2
Textiles	10.6	4.3	2.3	1.9	1.9

Source: Dicke, Trapp (1984).

- There was a tendency to cut working hours in the seventies, most notably so in the United Kingdom and West Germany. The number of hours a plant operates per day or week has not been increased accordingly, so that capital utilization was lower than it would have otherwise been and capital productivity continued to decline.
- The increase in the capital-intensity of manufacturing production, which took place before 1973, slowed down afterwards only in West Germany.

Table 7 Growth and Productivity Change in Manufacturing: Before and After 1973[a] (average annual rates of change)

	France	United Kingdom	West Germany
Gross value added[b]	7.1/ 2.3	3.0/-1.9	5.1/ 1.4
Hours worked	1.0/-2.0	-0.9/-3.5	-0.9/-3.1
Capital/labour-ratio	5.0/ 5.1	4.6/ 5.5	6.6/ 4.0
Capital productivity	1.2/-0.7	-0.8/-3.8	-1.6/-0.9

[a]"Before 1973": 1955-73 except for West Germany, where the period is 1960-72. "After 1973": 1973-80 except for West Germany (1972-84). - [b]At constant prices.

Source: OECD (1986). For West Germany: own calculations from statistics of the Federal Statistical Office, the Council of Economic Experts and the Ifo-Institut für Wirtschaftsforschung.

Recent information on West Germany available on a more disaggregated level for the period 1979-85 corroborates these findings (Schmidt, Gundlach, Klodt, 1986). The branches which increased capital productivity most include chemicals, plastic materials, office and data processing equipment, and aircraft and aerospace. However, this should

not conceal the fact that a number of industries have adjusted by simultaneously reducing employment and increasing their capital-intensity. Cases in point are shipbuilding, clothing, wood products, musical instruments and sport goods as well as other consumer goods industries facing stiff competition from developing countries[1].

III. Why Do Industries Decline or Rise?

Profit rates as discussed above do not tell the whole story of the rise and decline of industries: Measurement is extremely controversial and it only takes account of big companies which have to report on their performance as they see it; moreover, future prospects as well as past performance have different sets of determinants. Some of these determinants are strongly influenced by governments, like foreign trade protection and domestic subsidisation; some of them consist of international shifts in comparative advantage which are, in a sense, "natural" (because there is hardly a way of escaping); and some are, at a first glance, handmade, like the technical progress, the speed of which depends on the intensity and the efficiency of R&D.

1. Selected Performance Indicators

a. Sectoral Growth Orientation and Competitiveness

The Commission of the European Community recently analysed the growth performance of seven member countries[2] by branches, grouped according to the paths of domestic real demand in Europe, in Japan and in the United States during the period 1972-82. The details are given in Table 8. Branches facing strong demand enjoyed average annual in-

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1 It should be noted that calculations of the capital-productivity developments are quite sensitive to the period chosen and to business fluctuations.

2 The four countries studied here as well as Belgium, Denmark and the Netherlands.

Table 8: Manufacturing Sectors and the Strength of Domestic Demand[a], 1972-82

Sectors	Average annual rate of change of demand (per cent)			
	France	Italy	United Kingdom	West Germany
Strong-demand sectors (+6.7)[b]	5.7	7.1	2.9	4.9
Chemicals	4.9	7.7	3.9	5.1
Office and data processing machines	7.4	16.0	7.0	8.2
Electrical engineering	5.9	4.3	0.6	3.5
Moderate-demand sectors (+2.5)[b]	2.3	2.8	0.3	1.4
Mechanical engineering	0.2	-1.0	-1.0	0.2
Transport equipment	4.7	5.8	-0.3	3.2
Paper, board, and products	2.6	2.6	0.7	1.1
Plastic goods	3.5	1.6	0.8	4.1
Food and beverages	1.5	4.0	1.2	1.1
Weak-demand sectors (+1.1)[b]	-0.1	2.6	-2.1	-0.1
Iron and steel, metal ores	-0.7	3.5	-0.7	0.6
Fabricated metal products	-0.9	-0.2	-3.9	0.3
Building materials	2.2	3.7	-3.2	0.4
Textiles, leather, clothing	-0.9	2.7	-0.3	-0.5

[a]At prices and exchange rates of 1975. - [b]Numbers in brackets refer to the increase in seven major EC countries, as well as the USA and Japan, in per cent.

Source: Buigues, Goybet (1985a).

creases ranging from 4.9 per cent (Germany) to 7.1 per cent (Italy). Medium demand expansion was between 0.3 per cent (United Kingdom) and 2.8 per cent (Italy). Weak demand sectors expanded on average at annual rates of between 2.6 per cent (Italy) and -2.1 per cent (United Kingdom). This classification does not fit very well in all cases. For example, in Italy three out of the four weak-demand industries showed relative buoyancy; the achievement of a strong international competitiveness in textiles and clothing as well as in small-scale steel production spared this country the crisis which affected these two sectors elsewhere. On the other hand, Buigues and Goybet (1985a) have shown that European performance came close to the development of world demand, by contrast, demand in Japan expanded more rapidly in all three industry categories, whereas demand in the United States grew slightly faster in the medium and weak industries and slower in the industries with strongly expanding demand.

In view of the on-going debate in Europe about the international competitiveness of its industries, it may be interesting to link the above-mentioned demand indicators with the technology content of production[1] and with changes in foreign trade specialization. Table 9 reveals two interesting features:

- Firstly, European exports tended to be strong - both in 1983 and over the previous eleven years - in low or medium technology products and in sectors with slowly or moderately expanding demand. The chemical industry is the only exception to this rule.
- Secondly, the success of non-European suppliers on the European market seem to correlate negatively with European successes on foreign markets. In two of the three strongly expanding sectors (offices and data processing

[1] The technology content refers to OECD classifications as far as possible; otherwise, information on German technology structures was used as a proxy.

Table 9: Growth Characteristics of Selected European[a] Industries

Industry	Domestic demand[b]	Technology content[c]	Foreign trade specialization index[d]			
			Exports 1983	Imports 1983	Change 1972-1983	
					Exports	Imports
Iron and steel	W	L	0.95	1.12	0.10	-0.13
Non-ferrous metals	W	L	1.21	0.93	0.24	0.05
Chemicals	S	H	1.16	0.83	-0.02	-0.02
Fabricated metal products	W	L	1.32	0.82	0.19	0.17
Mechanical engineering	M	M	1.25	0.92	-0.05	0.16
Office and data processing machines	S	H	0.64	1.34	-0.19	0.23
Electrical engineering	S	H	0.89	1.10	-0.08	0.24
Transport equipment	M	M/H	0.84	0.61	-0.08	0.20
Paper, board, and products	M	L	0.50	1.49	0.04	-0.13
Plastic products	M	M	0.97	0.68	-0.11	0.08
Textiles, leather, clothing	W	L	1.06	1.10	0.13	0.16
Food and beverages	W	L	1.00	1.03	0.10	-0.42
Other manufactures	W	n.a.	1.23	1.38	0.18	-0.30

[a] EC 10 - [b] S: strong; M: moderate; W: weak.- [c] H: high; M: medium; L: low;

[d] Defined as $(T_{i,e} : T_{i,o}) : (\sum_i T_{i,e} : \sum_i T_{i,o})$, where T = exports (imports) of industry i,

e = EC 10, o = OECD.

Source: As table 8; own estimates.

machines, electrical engineering), the performance of non-Europeans is better than that of the Europeans; these sectors happen to display a technology content above average.

A regional breakdown of revealed comparative advantage (RCA) by and large confirms these trends (Table 10). In 1983, measured comparative advantage can be detected mainly in the fields of basic and investment industries (mineral and metal products, mechanical engineering, motor vehicles). Comparative disadvantage is revealed by those consumer goods which are relatively labour-intensive (and in which developing countries are strong exporters), but also by high-technology goods such as office and data processing machinery, which is the world's growth industry par excellence.

b. Adjustment under Changing Terms of Trade

As said at the outset, the European economies have been subjected to a number of severe external shocks since the early seventies. Long-lasting shocks such as sharp exchange-rate fluctuations, oil price hikes, increased protectionism or the upsurge of new competitors have structural effects - if some industries are in a position to adjust prices before adapting output, while others would go bankrupt if they had to make price concessions and therefore would have to reduce the degree of capacity utilization. Consequently, there would be a notable dispersion among branches with regard to both revealed comparative advantage (in constant prices) and terms of trade; moreover, changes in revealed comparative advantage would have a different sign than changes in terms of trade.

Information on these points is shown in the Annex Figures A6 to A8 for France, Italy and West Germany, at the level of 30 manufacturing branches, for the periods 1965-73

and 1978-84[1]. Remarkably, the industry-specific terms of trade exhibit a tendency to converge over the two periods in Italy and West Germany. In the latter country, the average change of the terms of trade during 1978-84 was virtually zero along with a very low interindustry variance, while it was distinctly positive during 1965-73 along with a high dispersion. In a sense, this may reflect the growing importance of intraindustry trade, because the terms of trade of close substitutes are likely to change more or less uniformly. The oil-price increases during the seventies might also be a part of the explanation, as they contributed to a deterioration of terms of trade in the second period under consideration. By contrast, the changes in real revealed comparative advantage show much less of a convergence across-the-board in each of the three countries.

Cases in which branches significantly improved their international competitiveness and at the same time achieved better terms of trade are rare. In the first period (1965-73), there was no such case in Italy, and only two branches can be detected in France (fine ceramics, food and beverages) and in West Germany (stone, sand and clay, non-ferrous metals). None of these branches kept this position in the second period (1978-84). Now, just one branch with the above-mentioned characteristics can be shown in each of these countries: fabricated metal products in France and Italy and motor vehicles in West Germany[2].

As opposed to these "entirely positive" cases there are also only a few "entirely negative" cases, which lost ground regarding both relative prices and quantities. Again, the affected branches varied from the former period to the latter, with the exception of the Italian manufacturers of

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[1] The United Kingdom has been excluded due to lack of data for the first period.

[2] Only changes in real revealed comparative advantage and in terms of trade exceeding 10 per cent have been taken into account. The same applies to the next paragraph.

musical instruments, toys and the like which were subjected to heavy adjustment pressure during both periods. There were two more Italian industries in this situation in the period 1978-84 (motor vehicles, printed matter), also two in West Germany (foundries, chemicals), but none in France.

There is more continuity, and a marked predominance, with regard to branches with losses in international competitiveness in spite of a positive terms-of-trade development ("product-impacted group") and branches with gains in real revealed comparative advantage combined with a deterioration of terms of trade ("price-impacted group"). The "product-impacted group" became smaller in France (from 12 branches in 1965-73 down to 8 branches in 1978-84) and West Germany (from 11 down to 4 branches), while its size increased in Italy (from 5 to 9 branches). Three branches were affected in both periods in France (chemicals, office and data processing machines, leather products), two in Italy (electrical engineering, textiles) and three in West Germany (iron and steel, precision engineering, glass products). As to the "price-impacted group", now it is Italy where the size was reduced over time (from 10 down to 5 branches), while it augmented in France (from 3 to 6 branches) and West Germany (from 2 to 6 branches). None of these six German branches were in a similar situation in 1965-73. In France, continuity applies to one branch (musical instruments, toys and the like), in Italy to three (shipbuilding, aircraft and aerospace, food and beverages)[1].

The main conclusion from this evidence is that today there is a greater vulnerability to external shocks across-the-board. The need for adjustment is no longer confined to (labour-intensive) consumer goods industries; it now also challenges (capital-intensive) investment goods industries,

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[1] It should be noted that the classification of industries in one group or another is sensitive to the period chosen. For a divergent grouping of German industries, referring to the period 1979-85, see Schmidt, Gundlach, Klodt (1986).

which are going to make similar experiences with international competitive pressures - experiences which have been made by the producers of consumer goods since the sixties. The problems are even more manifold, because the European investment goods industries do face competition not only from the newly industrializing countries, but also from innovating industrial countries, in particular Japan.

c. Inadequacies in Destructuring

It appears that the EC countries have specialized in those industrial activities which face low domestic demand growth and have a relatively low technology content[1]. Both characteristics explain why the EC has lost some ground in international competition with the United States and Japan, in particular in microelectronics and other new technology fields, while the adjustment pressures caused by the export-oriented, newly-industrializing countries have not eased off so far. This confirms our above-mentioned presumption that the restructuring both of production and of the capital stock towards more viable and profitable activities in the medium run has been inadequate in the EC.

This inadequacy becomes evident when one looks at the evolution of labour costs and of the application of new technologies. As regards unit labour costs, it turns out that they rose faster, or declined less, in the moderate- and weak-demand sectors than in the strong-demand industries in all countries studied (Table 11); from an economic point of view, unit labour costs should have fallen the most in the weak-demand sectors. It is only in recent years that wage moderation has contributed to a change in this trend. Moreover, all four countries exhibit a relatively narrow wage structure. The co-efficients of sectoral dispersion of labour costs per hour varied, in 1982, between 0.11 (Italy) and 0.17 (the United Kingdom); by comparison they were

[1] See Klodt (1987) and Pelkmans (1986) for similar findings.

Table 10: Index of Revealed Comparative Advantage[a] in Manufacturing, 1983

Industry	Extra-community				Intra-community			
	France	Italy	United Kingdom	West Germany	France	Italy	United Kingdom	West Germany
Manufacturing industry	0	0	0	0	0	0	0	0
Petroleum refining	1.67	-1.54	-1.05	-1.96	-0.58	-0.39	0.97	-1.99
Basic metals	0.09	-1.00	0.10	0.36	0.15	-0.45	0.05	-0.11
of which:								
- Iron and steel	1.02	0.15	0.75	0.11	0	-0.30	-0.10	-0.28
- Non-ferrous metals	0.92	1.75	0.69	0.35	0	0.77	-0.13	-0.22
Chemicals	0.20	-0.19	0.56	0.55	-0.04	-1.02	0.20	-0.02
Fabricated metal products	0.89	1.83	0.80	0.78	-0.06	0.74	0	-1.46
Mechanical engineering	0.65	1.40	0.94	1.12	-0,36	0.31	-0.01	0.70
Office and data processing machines	-0.85	-0.61	-0.71	-0.89	-0.15	-0.14	0.34	0
Electrical engineering	0.10	0.18	-0.14	-0.06	-0.05	-0.12	0	0.38
Precision engineering	-0.42	-0.61	-0.12	-0.20	-0.44	-0.58	0.32	0.55
Transport equipment	0.57	0.50	0.41	1.31	0.23	-0.45	-0.83	0.68
of which:								
- Shipbuilding	1.48	1.30	0.25	1.20	1.10	1.10	0.29	0.69
- Aircraft and aerospace	0.11	0.36	0.35	-0.96	0.53	-0.29	0.26	-0.36
Wood products	-0.97	-0.43	-2.08	-0.57	-0.56	1.95	-0.69	-0.25
Paper, board, and printed matter	-1.02	-1.24	-0.78	-0.98	-0.22	0.65	-0.15	0.44
Plastic products	0.11	0.85	0.53	0.47	-0.39	0.29	-0.23	0.33
Textiles	-0.35	0.10	-0.36	-0.74	0	1.12	-0.25	-0.56
Leather products, clothing	-0.55	0.93	-0.98	-1.10	-0.44	2.52	-0.44	-1.43
Food, beverages, tobacco	0	-0.62	-0.25	-0.94	0.18	-1.35	-0.29	-0.25

[a] Defined as $\ln \left(\frac{X_i : M_i}{\Sigma_i X_i : \Sigma_i M_i} \right)$, where X (M) = exports (imports) and i = industry shown.

Source: As table 3; own calculations.

Table 11 : Real Unit Labour Costs 1972/73 - 1981/82
(average annual changes in per cent)

	France	Italy	United Kingdom	West Germany
Strong-demand sectors	-1.6	-3.7	-0.9	-0.6
Moderate-demand sectors	1.3	-0.7	0.3	0.7
Weak-demand sectors	-0.1	0.3	1.0	0.6

Source: Buigues, Goybet (1985b).

almost twice as high in Japan and the United States (Buigues, Goybet, 1985b, p. 47). There is no indication that this has changed recently; if anything, wage differentials have been compressed even more from below in the course of collective bargaining, whereby labour-intensive, low-skilled workers have continued to be driven out of the market by foreign competitors (if not effectively protected).

As far as technology is concerned, what matters in the ongoing technological race is innovation rather than invention, innovation being defined as the commercial application of new technologies (i.e. of inventions). The size of R & D activities is roughly similar among leading industrial countries, around 2.5 per cent of gross domestic product (Klodt, 1987). Given a country's ability to absorb foreign technologies, inventions made in other countries can be acquired through licensing arrangements; in fact, all industrial countries make use of this opportunity (Glismann, Horn, 1986).

With respect to innovation, the EC countries are credited for important achievements in nuclear power stations, aircraft industries, high-speed trains, military equipment, and rocket launching (backed by massive government support), along with a traditionally strong competitive position in

chemicals, pharmaceuticals, medical technology, industrial machinery and motor cars. These achievements are considered by many as indicative of prevailing technological strength.

And yet, losses in foreign sales and increased import competition in various high-technology fields, particularly in informations and communications industries, lend support to the presumption that the translation of inventions into commercially viable products and services has become more difficult in Europe, notwithstanding remarkable successes on the market place of individual companies in almost every country. As Table 12 shows, the four countries considered here have lost ground on the world market over the past twenty years. Where new technologies were applied, the primary objective of many firms has often been the reduction of labour costs, i.e. process innovations were given priority over product innovations, though it is the latter which

Table 12: Comparative Advantage Indicators of Exports With a High-Technology Content[a], 1963, 1970, 1980

Year	France	Italy	United Kingdom	West Germany	EUR12
1963	1.00	0.84	1.05	1.21	1.02
1970	1.06	0.83	0.92	1.06	0.94
1980	0.93	0.63	0.94	0.99	0.88

[a]Defined as the export specialization index (Table 8)

Source: Commission of the EC (1982).

has the greatest potential for resuming economic dynamism. All this holds true also for Germany, a country often considered to be in a technologically leading position (Donges, Klodt, Schmidt, 1986, pp. 10-12).

Recently, the European high-tech industry has reconquered lost ground to some extent. Cases in point are telecommunications equipment, mechanical engineering and motor car manufacturing. Intensified R & D efforts and more aggressive marketing strategies have been important factors behind this improvement. Moreover, the soaring U.S. dollar (until early 1985) provided European firms excellent export opportunities, while sheltering them to a certain degree from competitive imports. However, with European currencies now appreciating in real terms against the U.S. dollar, there are renewed fears that the technological catching-up process may again slow down and that many companies, after all, may prove too weak to cope with the challenges of rapid change in modern technologies. This is said to justify an active role of governments in this area, each for itself or in co-ordination[1].

2. Technology Policies

In all European countries, government supports R & D activities of private firms. The fraction of industrial R & D spending financed by government has been amounting to 17 per cent in West Germany, 23 per cent in France and 30 per cent in the United Kingdom in the early eighties (Klodt,

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[1] As to the co-ordinated efforts, two major projects have got under way recently: One is the EC-sponsored "European Strategic Programme for Research and Development in Information Technology" (known as ESPRIT and launched in 1984); the other one is a ministerial agreement involving 18 European countries and the EC Commission to co-operate in the promotion of high-tech ventures by private companies (called EUREKA and started in 1985).

1987)[1]. The distribution by industry of government R & D support reveals some striking similarities (Table 13): Aircraft and aerospace industries are on top of national research priorities in all countries, with France being the leader and Germany, having half the share of France, at the end of the line. Second is electrical engineering in all countries, though with less variation in the shares of government funding. The structure of private R & D efforts differs in two ways from that of public support. Firstly, aircraft and aerospace is of much less importance for private R & D; the interest of German producers in aircraft-related research ranks far behind that which goes into this sector in the other countries. Secondly, private R & D spending is more evenly distributed among industries than government R & D subsidies.

Another striking feature of national technology policies in Europe is that the governments channel their R & D subsidies to a large extent into similar sectors. On the basis of ten industries (not shown here), which absorb most of the R & D funding in the countries studied, high and significant rank correlations with regard to public support can be found, namely $r = 0.87$ between France and West Germany in 1983, $r = 0.85$ between the United Kingdom and West Germany, and $r = 0.90$ between France and the United Kingdom (Klodt, 1987). When compared to the United States or Japan, the ranking of priorities is quite similar. Evidently, each government seems to believe that it can create its own winners in the technology race, at the expense of foreign competitors. Whether or not this belief will turn out to be correct remains to be seen. But the more countries support the same lines of production the less probable it will be-

[1] For comparison, the government's share is much higher in the United States (32 per cent in 1983) and much lower in Japan (less than 2 per cent). The high U.S. share reflects the importance of defence-related R & D; Japan's low share may be ascribed to the fact that a large part of private R & D activities is carried out by universities (which are highly subsidized).

Table 13: R & D Expenditures by Industries[a], 1983
(per cent)

Industry	France		United Kingdom		West Germany		USA		Japan	
	G	P	G	P	G	P	G	P	G	P
Total manufacturing	100	100	100	100	100	100	100	100	100	100
of which										
Chemicals	5.0	28.2	0.7	25.2	8.4	26.8	2.3	21.3	11.5	19.4
Mechanical engineering	3.9	8.5	3.5	14.6	10.0	16.4	6.0	17.4	7.9	11.8
Electrical engineering	31.5	24.1	47.8	26.5	38.6	18.9	26.5	20.6	21.7	29.0
Motor vehicles	1.4	14.3	0.6	7.2	1.9	18.3	3.0	11.6	0.1	14.5
Aircraft and aerospace	56.1	10.4	45.7	10.2	25.8	1.9	53.7	8.3	0.0	0.02

[a]G = Government support; P = privately financed; all in current U.S. dollar prices.

Source: Klodt (1987).

come that the expected high rates of return will materialize. On the contrary, there is a risk of a global overinvestment in certain high-technology industries which would easily lead to excess capacities and new adjustment problems in the future. After all, several of the nowadays declining industries were, at some time in the past, growth industries, and governments of various European countries promoted them for this very reason.

Mainstream economics would in any case suggest that government technology policies should concentrate on areas in which important non-pecuniary externalities can be expected; basic research is a case in point. In this sense, one would expect that the more prudently a government handles R & D, the less will public R & D funding across industries be correlated to private R & D spending. In Europe, West Germany comes relatively closest to this expectation: the rank correlation is moderate ($r = 0.55$) and statistically insignificant. In France ($r = 0.73$) and the United Kingdom ($r = 0.92$), however, the co-efficients are distinctly higher and significant (Klodt, 1987).

3. The Rise of Common Policies and the Decline of an Industry: Iron and Steel

One aspect of growing importance regarding structural change and industrial adjustment is the international co-ordination of (economic) policies. Such co-ordination has a long tradition in post-war Europe, and the iron and steel industry is a prominent case in point. Even before the formation of the European Economic Community in 1957, European steel policies were formally co-ordinated by the European Coal and Steel Community (ECSC), established in 1951. The ECSC had, inter alia, the task of planning for the future of steel industries, to advise firms regarding investment production and foreign trade, and to forecast developments in steel markets. In addition, the ECSC has been entitled:

- to set production quotas in case of demand slacks;
- to distribute steel output in cases of supply bottlenecks (among industries as well as among member countries);
- to shape policies regarding international trade in steel products;
- to fix steel prices.

At the same time the ECSC treaty rigorously forbids subsidization, or any other kind of discrimination, by member countries "in whatever manner this might occur" (Article 4).

Structural changes in steel production leading to today's steel crises, and to the corresponding crisis management of the ECSC, has many roots (Tarr, 1986). Firstly, the rate of growth of world steel demand has been virtually zero since the first oil price shock in 1973-74; in fact, the demand by industrial countries has been declining in real terms by some 2 per cent per annum since then, and the developing countries just filled the gaps. Secondly, there have been quite remarkable changes in the international structure of comparative advantage since the mid-seventies, with Japan emerging as the big low cost newcomer on world steel markets. Developing countries, first of all South Korea and Brazil, followed Japan as major competitors to the classical steel producers in the EC (and in the United States alike). Of all cost factors explaining changes in comparative advantage, such as those related to the input of coal, energy, capital and manpower, the unit labour costs exhibit by far the highest degree of variance among countries; the productivity advantages of the leading industrial countries have been neutralized by too high wages when compared to the newcomers (Tarr, 1986). Widespread and persistent overcapacity of the European steel industry, which did not disappear in periods of economic recovery, was the consequence.

The history of the most recent crisis management of the ECSC starts as early as January 1977, when the EC Commission organized a system of voluntary production and delivery quotas on six steel product categories ("Simonet Plan", named after the responsible Commissioner). As the quotas were set rather generously and as they were virtually ignored by the extremely efficient North-Italian mini-mills, a more dirigistic "structural crisis cartel" was implemented in May 1977 ("Davignon Plan", named after Simonet's successor). All major steel firms of the EC became part of this cartel (called "Eurofer")[1]. It provides compulsory domestic minimum prices (set above world market prices) for key steel products, tight production and delivery quotas as well as import licensing. A system of "basic prices" for imports from third countries introduced in 1978 was to enable the Commission to define cases of dumping by foreign suppliers clearly without showing additional proof. In support of this cartel the Commission initiated (or forced) "voluntary" export restraints from third countries, such as Japan, Sweden, Switzerland, Spain, Brazil, South Korea among others.

The production quota system was severely tightened in 1980, when the EC Commission declared the "manifest crisis" according to ECSC Article 58. Moreover, a code of subsidies was implemented with the aim of getting national subsidization under control. The whole regulatory system was to be in force until mid-1981; after its renewal it was to be phased out at the end of 1985 at the latest. But as European steel

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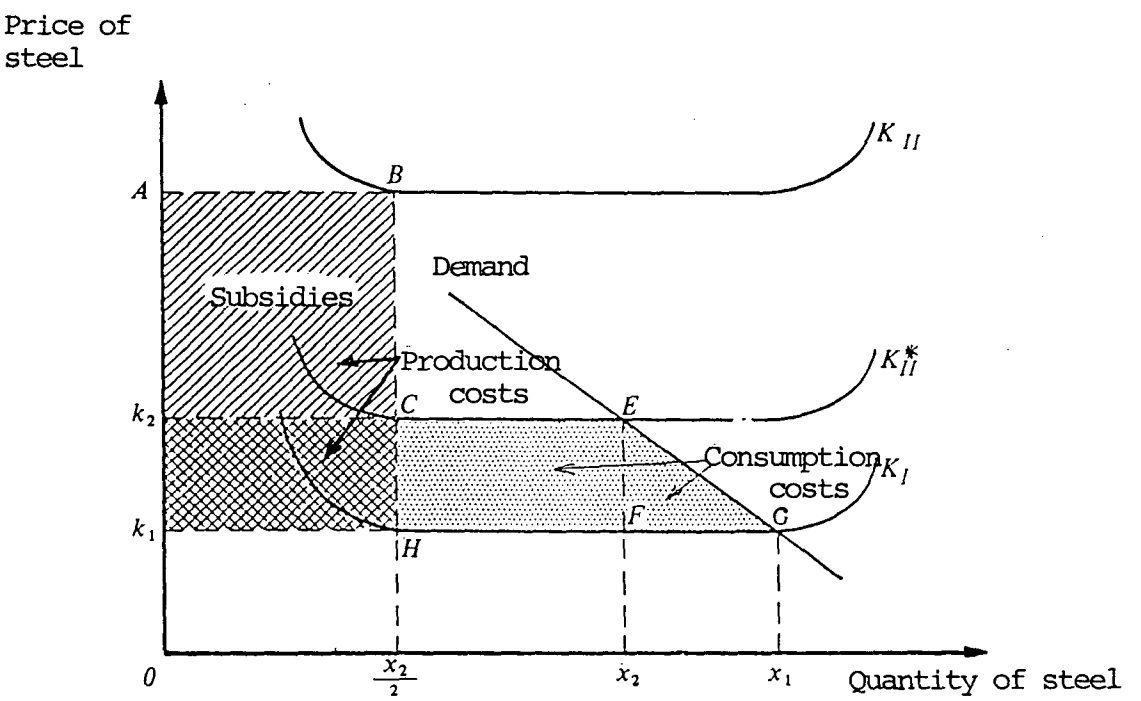
[1] Cartels (and combines) among European steel producers have a long tradition. For example, in 1926 the IRG or "Internationale Rohstahlgemeinschaft" (International Crude Steel Association) was founded, one of the objectives being to close some European markets for foreign suppliers. Cartelization was still going strong after World War II had broken out. After the war, the ECSC steel producers together with UK producers formed the "Brüsseler Exportkonvention" (Brussels Export Convention) in 1953 to agree upon minimum prices, cost-plus calculations, terms of payment and other restrictive practices in exports (Glismann, 1975).

industry continued suffering from overcapacities (actually in the order of 20 million tons, despite capacity reduction in recent years) and as many firms continued incurring huge operating losses, the system has been prolonged: until the end of 1987 for production quotas and import protection, and until the end of 1988 and of 1990 for subsidies (depending on the kind of subsidy).

The ways in which these interventions work can be illustrated formally as shown in the following graph (Herdmann, Weiss 1985). For the sake of simplicity the European steel market has been reduced to contain only two suppliers: I, the efficient supplier operating at K_I costs; II, the inefficient supplier operating at K_{II} costs. Subsidization makes K_{II} the relevant cost function for II's investment decision. Without quotas, however, production would be x_1 with I being the only supplier. Minimum prices (basic prices for imports) are then set at k_2. Still, I would supply x_2 with hardly a chance for II. Quota regulation $x_{2/2}$ assures that both steel producers get their "fair share" of the

Figure 1:

The European Steel Market



market, but obviously, the efficient producer is discriminated against.

Indeed, German steel producers have objected again and again to this system of interventions. They have complained about the high degree of subsidization (though two German producers, Arbed-Saarstahl and the Bavarian Maxhütte, have benefitted from such public aids), arguing that international competition is distorted; and they have strongly criticized the system of production quotas on the grounds that it does not take into account that German steel-makers rank high on the international ladder of comparative advantage and that they have undertaken much more efficiency-raising adjustment than their competitors from other EC countries.

The impact of European (and German) steel policies has been negative on any account. The adverse effects include (1) a misallocation within European steel production towards the less efficient producers, (2) an exponential increase of the capital stock in spite of an exponential decrease of the rate of capital utilization between 1955 and 1980 (Dicke, Glismann, 1984a), and (3) a trade diversion away from third countries. The process of restructuring has been unduly delayed under these circumstances. One should add the dead-weight losses intrinsic to subsidies, quotas and price administration. Moreover, there has been increasing tension among EC member countries, emanating from attempts and actions by several producers to evade production quotas and to cheat on official prices.

4. Lessons from West Germany

Germany is generally regarded as a country which has brought about the required overall structural changes with relative ease (Renshaw, 1986). This was true in the fifties. But afterwards, this economy was increasingly plagued with adjustment problems, so that the annual rate of growth of

potential output, declined to less than 2 per cent in the first half of the current decade.

a. Slowdown of Adjustment

The adjustment problems are partly economic, partly institutional. The economic side is related to the notorious shifts in the international division of labour. These shifts were felt perhaps more intensively in Germany than in other EC countries because of the "over-industrialization" which had taken place before, effectively spurred by a long-lasting undervaluation in real terms of the deutschmark throughout the fifties and sixties. When the Bretton-Woods system of adjustable exchange rates collapsed in the early seventies and was replaced by a system of (managed) floating, the deutschmark appreciated in real terms, thereby increasing foreign competition on the domestic market, including competition from developing countries.

The total share of imports from developing countries in the apparent consumption of manufactures in Germany has increased, since 1970, by about the same relative magnitude as did the total share of all imports. The overall share of developing countries is relatively low (Table A1). However, market penetration by these countries has grown faster than average in labour-intensive consumer goods such as leather, textiles, clothing, musical instruments, and toys; shipbuilding is another sector in which the share of developing-country imports in apparent consumption has risen rapidly. All these import pressures occurred at a time in which Germany, as other European countries, was facing persistent macroeconomic difficulties in terms of slow and erratic growth, unprecedented high unemployment and accelerating inflation, let alone the premature obsolescence of large parts of the capital stock due to the rise in energy prices after 1973.

The institutional side of Germany's adjustment problems has two major features. One refers to the labour markets, the other to government activities. The German labour market has traditionally been subject to collective bargaining in the course of which the wages and supplements agreed upon between labour unions and employers' associations tend to become nationwide mandatory minimum wages for all labour and firms in the respective industry. In addition, many labour-market regulations have been tightened or newly implemented during the last fifteen years in pursuit of well-intended social objectives (unemployment compensation, allowances to employees regarding vacations, sick and maternity leave, protection of labour against dismissal, severance pay to laid-off workers, and the like).

As long as productivity grew fast and the economy ran at full employment, these labour-market arrangements did not act as a break to adjustment. However, under the conditions of productivity slowdown, which have prevailed in Germany (and in other European countries) in the recent past, it has become evident that the labour market has lost the flexibility which is needed if adjustment to changing supply and demand conditions is to take place promptly - nationwide as well as in specific regions, industries and companies (Donges, 1985). The numerous institutional rigidities built into the labour markets are perhaps the major source of what has become known as "Eurosclerosis" (Giersch, 1985), i.e. the slowness in industrial modernization, economic diversification (towards services), technological innovation and job creation, even in periods of cyclical upswing.

As to government activities in Germany, they virtually exploded in the seventies. The share of government consumption in net national product rose from 14.4 per cent in 1970 to 20.7 per cent in 1980 (1985: 20.6 per cent). Similar rates of increase could be observed for para-fiscal institutions as well as for the state-run social security system

(pensions, health, unemployment), which implied ever-rising payroll taxes on the workers' gross wages (half of these taxes are formally paid by the employer in this basically pay-as-you-go system). The compulsory contributions to the social security system has amounted to 35.2 per cent in 1986 as compared to 32.4 per cent in 1980, and 26.5 per cent in 1970; today, they are about the highest in the OECD area. This development reflects the attempt of successive governments to make Germany a welfare state as encompassing as possible, which have eroded the link between individual efforts and rewards and thereby reduced the responsiveness to changes in the economic environment.

The capability to adjust has been further weakened by the governments' readiness to meet the demands of organized special interest groups (some of which behaved in the best German guild tradition of the Middle Ages) for import protection, subsidies and regulations. Meanwhile more than half of the German economy (in value added terms) is affected by these kinds of government interventions (Donges, Schatz, 1986). They obstruct market entry for newcomers and distort competition and thus inevitably perpetuate structural rigidities.

On a-priori grounds, one would expect that the increased institutional inflexibility would hurt primarily those industries which experience a slow productivity growth and face a weak domestic demand. The indices of revealed comparative advantage and their development should reflect such a differential impact. However, they do not. As Table A2 shows[1]:

- the variation of RCAs among industries has been declining rather than increasing, both in total trade and in trade with developing countries;

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[1] See also UNIDO (1986) where the factor orientation of RCAs is considered.

- the comparative disadvantage of German industries was concentrated in industries producing close to final demand, in addition to a few basic industries;
- the pattern of comparative disadvantage was roughly the same for total trade and for trade with developing countries, though less pronounced (i.e. with less variance) regarding total trade.

For an explanation one should remember that the speed of structural change in the economy as a whole has slowed down over the past fifteen years (Table 4). Recalculating the structural change index for manufacturing provides additional confirmation (Table 14). The slowdown of structural change implies that declining industries do not shrink as could have been expected, and that growth industries are not as dynamic as one would wish them to be. This then also becomes manifest in the foreign trade performance, as captured by the RCA-indices.

Table 14: Speed of Structural Change (SCI) in Manufacturing in Four EC Countries[a] (13 branches)

Country	1970-76	1976-83
France	5.6	5.1
Italy	5.9	6.0
United Kingdom	9.1	4.8[b]
West Germany	6.0	3.0[c]

[a]Index calculated as in table 4 with total manufacturing = 100. - [b]1976-82. - [c]1976-81.

Source: As table 3; own calculations.

All in all, it can be said that Germany's production structure became too rigid just at a time when far-reaching changes in economic conditions demanded higher flexibility, so that the actual speed of adjustment in Germany was too slow (Schmidt et al., 1984). The other European countries, perhaps with the exception of Switzerland, made a similar experience. In spite of many official declarations about the necessity to remove the existing distortions from product and factor markets, it has been difficult in Germany (and elsewhere) to transform this recognition into appropriate policy changes. In particular, public subsidies have not been reduced in recent years; instead they rose from DM 100.5 billion in 1980 to DM 121.5 billion in 1985, equivalent to 6.6 per cent of gross domestic product (Donges, Schatz, 1986, table 3). Thus, the trend observed in previous years has continued (Table A3). In France, Italy and the United Kingdom subsidization also moved along an upward trend (Messerlin, 1986).

Though the bulk of subsidization in Germany (and other European countries) goes to non-industrial sectors (with housing, transportation, and agriculture at the top), industry is also affected. Sometimes the objective is to assist ailing industries (coal mining, shipbuilding, iron and steel), sometimes the government is eager to promote so-called growth industries (aircraft and aerospace). Aircraft production and shipbuilding are outstanding as each of them receive more than 30 per cent of its value added as a subsidy (Table A3). It should also be noted that these are the only two industries within manufacturing which obtain the bulk of subsidies through tailor-made programmes (Table A4)[1].

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[1] Subsidy policies towards manufacturing are normally pursued according to the "watering-can" principle, which allows almost everybody to participate in any single scheme. The different branches compete with each other in order to get what they consider to be a "fair" share of the respective subsidy programme. As Table A4 shows, subsidies go to 26 branches and more in most cases.

b. High Protection and Negative Adjustment[1]

Taking domestic forms of protection (subsidies and regulations) and foreign trade protection together, one can sort out ten highly protected industries in Germany: Iron and steel; shipbuilding; textiles; clothing; food, beverages and tobacco; fine ceramics; pulp, paper and board; leather products; non-ferrous metals; and aircraft and aerospace. The situation is quite similar in the other European countries. Of these industries, only one can be considered to belong to the group of growth industries: aircraft and aerospace (Table A5)[2].

On the basis of the information given in Table A5, three groups of industries can be defined: The first one includes five "sunset industries"; in spite of having received continuous or even increasing protection, their sales performance has deteriorated greatly. The second group consists of four branches with declining sales expansion, but also with a declining degree of protection; they may be labelled "declining industries". The third group, containing only aircraft and aerospace, has received continuous protection until today and increased its sales significantly. Is this the "phoenix industry"?

For the ten highly protected industries, a number of common features emerge:

- Most industries exhibit negative indices of revealed comparative advantage over the whole period considered (exceptions: iron and steel production; shipbuilding; and fine ceramics before 1975). In some industries, RCA

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[1] For this section, see also Dicke, Glismann (1984b).

[2] The other growth sectors are petroleum refinery, motor vehicles, electrical engineering, plastic products, chemicals, mechanical engineering, and precision engineering.

values are negative and at the same time declining. Shipbuilding, the only industry among the ten with positive RCAs throughout the years, lost international competitiveness mainly in the sixties (and has not really recovered since).

- Import shares have been continuously increasing for most industries, exceptions being shipbuilding, aircraft industries and non-ferrous metals. The decline in shipbuilding import shares after 1970 was brought about by a reswitching of subsidization away from the subsidies granted to shipping companies independently of whether the shipyards were foreign or domestic towards subsidies subject to the condition that the ships were domestically built. Declining import shares in aircraft and aerospace between 1956 and 1973 reflect, to a large extent, the establishment of new domestic aircraft plants in the course of the rearmament of West Germany. Since 1973, the import shares have increased again, mainly due to the European Airbus project and to Jumbo-imports. Since West Germany's share in the Airbus production is only about 25 per cent and this aircraft is assembled in France, German re-imports have increased due to the rapidly rising sales of Airbus's jumbo jets.

- There seems to be a mountain-shaped real value added curve. In the course of the seventies the real production of the highly protected industries started to decline. This holds true especially for those industries which are close to final consumption (textiles, clothing, fine ceramics, leather products).

- The development of employment is even more remarkable because only aircraft and aerospace has not been shrinking continuously over the last decade. The longest way down in employment has been experienced by shipbuilding, leather products, and textiles (which have been declining since 1957). More "recent" has been the decline of non-ferrous metals (since 1970; it should be recalled

that the city of Hamburg decided to heavily support local direct investment of US firms in this branch at the beginning of the long downswing).

- Gross fixed assets have expanded in most cases by less than average since 1960 (the exception being aircraft and aerospace production). This may take by surprise those who would expect fixed assets to decline the same way employment did. However, capital intensification normally takes place when relative factor prices favour capital inputs rather than labour inputs. Indeed, wage increases for all industries studied were higher than productivity increases since the sixties; the rates of real interest were, until the late seventies, relatively low (mainly due to accelerating inflation). Hence, the substitution of capital for labour was quite a normal pattern. What is really surprising is the fact that the ten industries expanded real capital inputs in spite of the bad performance in terms of real value added. One reason may be that subsidies to six of the ten industries have centred mainly on furthering fixed capital formation; iron and steel, textiles, as well as pulp, paper and board are cases in point (Jüttemeier, 1987)[1].

Two of the ten highly protected industries are undoubtedly pure subsidy cases: shipbuilding and aircraft/aerospace production. Without subsidization, the shipbuilding and aircraft industry of the Federal Republic would be entirely different today. Aircraft and aerospace operates under non-market conditions on both sides: supply is subsidized and

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[1] In general, subsidies to manufacturing industries favoured capital formation, whereas in agriculture, in mining, and in private services subsidies favoured gross output (and in transport and communications subsidies went to intermediate inputs, and to entrepreneurial incomes as well). The subsidization of capital in the six industries mentioned has even been far above manufacturing average.

demand comes from government or state owned firms[1]. In shipbuilding the demand side at least works under more competition.

Government protection is one thing, the firms' adjustment is another. This adjustment can take place in basically two ways: one is "positive", i. e. forward-looking and efficiency-orientated, the other is "negative", relying more on collusion and other kinds of expropriation of third parties. Positive adjustment would incorporate cost saving measures on the input side, and innovation of products, markets and techniques on the output side. Negative adjustment includes merger and cartel activities as well as lobbying for (more) protection.

Some of these indicators are hard to quantify. Accepting Schumpeter's view that results of public and private activities can be measured by changes in the rate of economic growth, one might take an industry's changes in the rate of return as a proxy for adjustment, be it positive or negative. Due to a poor data base such clues are available for only a few of the ten industries. For example, the development of profit rates in iron and steel, non-ferrous metals, textiles, and paper and board (Table 6) suggests that adjustment was not very successful.

Additional information is provided by Table 15. Indicators of negative kinds of adjustment abound indeed:

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[1] When the Airbus's jumbos are publicly praised to be a great achievement, which Europeans should be proud of, no distinction is made between technical and commercial success. Technically, these aeroplanes may rank high; commercially, there is still a very long way to go before the break-even-point is reached (if costs are ever recovered). To date, cumulative public subsidization for the Airbus industry (launch aid for projects, financial assistance for deals with customers, economic risk insurance) is reckoned to be at least DM 11 billion (Frankfurter Allgemeine Zeitung, 10 February 1987). The situation is similar in the other countries which participate in the Airbus's projects, notably France and the United Kingdom.

- Merger activities were significantly above average in the iron and steel industry (where between 1967 and 1971 more than one third of the existing firms merged), in the non-ferrous metals production, in aircraft and aerospace industry (between 1967 and 1971 the share of merging firms was similar to that of the iron and steel industry) as well as in the pulp, paper and board industry. The development of merging activities increased relatively fast again in the iron and steel industry in 1973-82 (bearing in mind that the level of merging in the period before reduced the merging potential considerably) and in non-ferrous metals; it is also worth mentioning the increase in the number of merging firms in textiles as well as in food and beverages.
- Cartelization was relatively high in iron and steel, non-ferrous metals, shipbuilding, leather products, and fine ceramics; cartel intensity of textile producers has been well above average since the beginning of the seventies.

Mergers, cartels and protection are close substitutes as regards their economic effects. However, the first two have firms as major agents, while government more or less acts as an accounting office. Protection, like subsidies or quotas, depends both on firms demanding it and government and bureaucracies working out their size and forms, which then often are extended to all firms of an industry rather than only protecting those who demanded protection.

Positive adjustment is even harder to analyse empirically. Taking inventive activities as an indicator of positive adjustment, it turns out that, with the exception of aircraft and aerospace, invention has been of little importance in the industries under observation (Table 15). And in the "Phoenix case" the intensity of innovation in aircraft and aerospace has been declining since 1966 (which is

Table 15 - Profiles of Ten Highly Protected Industries in West Germany

Industry	Number of mergers as per cent of number of firms			Number of cartels[a] as per cent of number of firms				Inventions per 1,000 employees[b]			Physical capital per employee as per cent of total manufacturing		
	1958-1966	1967-1971	1973-1982	1958	1962	1971	1980	1966[c]	1970	1982	1960	1970	1980
Sunset industries													
Iron and steel	1.0	35.3	24.5	4.1	7.1	7.1	0	0.06	0.06	0.12	183.5	196.9	186.9
Shipbuilding	0	0.9	0.8	1.4	1.4	1.8	0.8	0.09	0.14	0.19	106.1	93.9	104.3
Textiles	0.1	0.4	0.9	0.2	0.4	1.4	1.7	0.03	0.05	0.11	80.4	93.8	100.2
Clothing	0.02	0.1	0.1	0	0.2	0.3	0.4				29.2	27.2	31.1
Food and beverages, tobacco	0.1	0.7	2.9	0.04	0.1	0.2	0.5	0.02	0.03	0.06	181.3	166.4	166.8
Declining Industries													
Non-ferrous metals	7.7	18.9	11.6	0	1.3	3.7	1.3	0.17	0.13	0.11	161.4	147.8	149.3
Pulp, paper, and board	1.2	7.6	5.1	0	0	0	0	n.a.	n.a.	n.a.	194.1	191.2	214.9
Fine ceramics	3.0	1.1	3.9	0	2.0	3.2	n.a.	n.a.	n.a.	n.a.	54.9	64.8	59.9
Leather products	0.5	0.6	3.9	0	0.5	1.2	2.6	n.a.	n.a.	n.a.	43.7	56.3	55.7
The Phoenix Case													
Aircraft and aerospace	12.9	32.5	8.1	0	0	0	n.a.	1.66	1.62	1.15	38.6	35.8	43.8
Total manufactures	0.6	1.3	2.0	0.2	0.3	0.5	0.4	0.43	0.52	0.77	100	100	100

(continued)

Table 15 (cont.) - Profiles of Ten Highly Protected Industries in West Germany

Industry	Share of the ten largest firms (as per cent of sales)			Wages for low skilled labour[e] as per cent of total manufacturing			Wages and salaries per hour as per cent of total manufacturing			Wages for low skilled labour[e] as per cent of average wages and salaries		
	1954	1960	1980	1960	1970	1980	1960	1970	1980	1960	1970	1980
Sunset industries												
Iron and steel	51.6	57.8	75.1	131.5	118.8	109.8	133.9	122.1	112.4	79.4	71.8	60.0
Shipbuilding	71.5	69.0	71.0	90.0	85.9	92.9	105.4	105.2	105.6	69.1	60.3	54.0
Textiles	7.1	7.2	10.0	89.6	90.1	87.9	87.6	85.6	78.7	82.8	77.6	68.6
Clothing	6.5	7.4	9.4	88.4	87.7	91.6	71.8	71.8	67.3	99.5	90.2	83.6
Food and beverages, tobacco	11.7	12.0	11.3	100.4	95.3	96.0	89.6	84.0	81.6	90.6	83.7	72.2
Declining Industries												
Non-ferrous metals	44.0	44.7	50.3	109.5	108.5	106.9	108.1	105.6	101.9	82.0	75.8	64.5
Pulp, paper, and board	38.5	41.5	52.8	106.2	106.3	104.5	104.0	77.9	101.0	82.6	100.7	63.5
Fine ceramics	28.5	37.5	48.6[d]	96.7	93.3	94.5	87.2	91.2	80.1	89.6	75.5	72.4
Leather products	21.3	19.9	27.5	77.6	76.5	77.5	84.2	79.2	71.1	74.5	71.3	76.0
The Phoenix Case												
Aircraft and aerospace	.	72.3[d]	n.a.	107.1	83.6	91.3	111.4	120.5	129.2	77.7	51.2	43.4
Total manufactures	.	.	.	100	100	100	100	100	100	80.9	73.8	61.4

[a]As registered by the Federal Cartel office (excluding export cartels which "only regulate foreign markets"). - [b]Number of patents granted. - [c]Patents granted between 1963 and 1969 per year per employee in 1966. - [d]Share of the six largest firms. - [e]Male workers only.

Source: Office of Technology Assessment and Forecast, (1985); Bundeskartellamt (current issues); Monopolkommission (1982); Deutsches Institut für Wirtschaftsforschung (current issues).

the first year for which comparative information is available).

The more intensive use of the relatively abundant factor of production can be a form of positive adjustment, too. This would imply a substitution of human capital for unskilled labour. Whether or not this happened may be inferred from the development of the share of low skilled workers' income in total wages and salaries paid in an industry. Again, only the aircraft and aerospace industry seems to have adjusted more than the average manufacturing industry. All other highly protected industries did not change input structures faster than other industries. Adjustment has been particularly slow in leather production (Table 15).

IV. Conditional Forecasts: Output Effects in Alternative Adjustment Scenarios

1. International Cross Section Analysis: The Dynamic Aspect

The assessment of gains and losses due to different adjustment performances is hard to quantify. There are too many parameters, the sets of policies and policy repercussions are too different, and they all differ among countries. Therefore, the following estimates are only intended to give orders of magnitude.

In order to keep the calculations manageable, the number of adjustment policies has been reduced to three: foreign trade protection, government transfers (subsidies), and rules and regulations[1]. The protection variable is effective tariff protection. The redistribution (subsidy) variable is government transfers as per cent of gross domestic product. The rules and regulations variable is the share of investment in GDP; this proxy is the only "indirect" evidence included in this model.

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[1] For details on the method see also the appendix (pp. 64-67).

The basic assumption underlying the rules-and-regulations proxy is that the behaviour of economic agents, in particular that of private investors, does not differ much among countries; firms are supposed to react to incentives and disincentives by and large in the same manner. Under this assumption, an optimal number and kind of rules and regulations would result in the same levels of investment activities in all countries (other things equal). A country having too many rules would thereby exhibit investment shares which are low when compared to other countries. Three caveats should be added, however: One is that in some countries (say, Italy), the economic agents may be more "used" to artificial distortions of markets than the people in other countries (say, West Germany). The second caveat refers to the importance of the "underground economy" which can be regarded as an adjustment of economic agents to too many rules and regulations. Thirdly, too many rules and regulations can bias the investment share also in an upward direction, as widespread excess capacities in public utilities suggest.

Four scenarios have been chosen:

- One is the "maximum adjustment scenario" (MAS), in which no protection and no subsidies are granted and the rules and regulations are optimal.
- In a "high adjustment scenario" (HAS) we assume that effective tariff protection in all four countries is reduced by 50 per cent from what is the "normal" level (see below). Subsidies are supposed to be as low in the countries considered here as they were in Japan in 1979. Rules and regulations, as reflected in the investment climate, are also assumed to be comparable to those in Japan.
- In the "central adjustment scenario" (CAS) the effective rate of protection remains at the same level as in the sixties. It is true that tariff protection has decreased

since then. But non-tariff protection has increased (Donges, 1986). All in all, the effective rate of tariff protection chosen in the computations is likely to underestimate the degree of today's foreign trade protection. As for subsidies, they are supposed to remain at 1979 levels, measured in per cent of GDP; this means that, in absolute terms, the subsidies would steadily increase with the rate of economic growth. Rules and regulations are assumed to create an investment climate under which the countries under consideration can maintain the average investment level which they achieved in the seventies.

- In a "low adjustment scenario" (LAS) we assume a relatively high level of foreign trade protection (the CAS case plus 50 per cent), a subsidy share in GDP equal to that of Sweden in 1979, and a set of rules and regulations the result of which is a decline of investment to the levels reached in the United Kingdom during the seventies.

An important source of economic growth is technology advance. Such advance is - within certain limits which are set by the potential to absorb foreign techniques or to invent - the easier, the greater the distance to technologically leading countries. This distance has been expressed as the per capita income of each country relative to that of the United States[1] ("catching-up potential").

The computations are based on international cross-section analyses of the determinants of economic growth[2]. The

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[1] Each country's own technical progress can also be regarded as being part of the investment activity; as such it is effectively promoted, or restricted, by existing rules and regulations.

[2] The impact of the subsidy and the rules and regulations variables are taken from cross-sections regression of 13 industrial countries. The impact of protection refers to cross-section estimates of a sample of 47 developing and industrial countries. The reason for using differentiated estimates is the lack of complete data.

results are presented in Table 16. In the HAS case, GDP per capita would grow at an average annual rate of 3.8 per cent in France, 5.3 per cent in Italy, 5.8 per cent in the United Kingdom, and 3.6 per cent in West Germany until 1995[1]. The differences are due to differing potentials for catching-up technologically. The growth effects of protection, of transfers, and of rules and regulations are the same for all countries because of the described standardized assumptions. Comparison with MAS reveals that HAS is not without costs of maladjustment regarding protection as well as transfers; in fact, HAS and LAS are closer to each other regarding the protection effects than HAS and MAS.

LAS is the other standardized case, and the worst scenario. It combines Swedish and British socio-economic conditions and would lead to negative growth rates for the two most advanced countries, France and Germany (-0.3 and -0.5 per cent a year respectively). Rules and regulations account for the bulk of growth-retarding policies, which means that protection and transfer increases are of less importance than actual differences in the investment activities of Japan (HAS) and Sweden/UK (LAS).

Individuality of countries is brought out in CAS. Per capita income would increase at an annual rate of 1.1 per cent in France, 2.8 per cent in Italy, 1.8 per cent in the United Kingdom, and 1.4 per cent in West Germany. The results suggest that the negative growth impact of rules and regulations is highest in the United Kingdom, and lowest in France and Germany. Subsidies affect economic growth most adversely in France.

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[1] These rates are obtained by adding up a + b + c + catching-up potential (for France: - 0.9 - 0.8 + 5.0 + 0.5). The forecasting period is in fact 11 years, i.e. 1984-95, as per capita incomes in purchasing power parities are only available up to 1984.

Table 16: Dynamic Output Effects of Adjustment in Four Countries: Average Annual Change of Per Capita Income, 1986-95 (per cent)

Adjustment strategy	Output effects in			
	France	Italy	United Kingdom	West Germany
Maximum adjustment scenario				
a. Protection[a]	0	0	0	0
b. Transfers[b]	0	0	0	0
c. Rules and regulations	.	.	.	.
High adjustment scenario				
a. Protection[c]	-0.9	-0.9	-0.9	-0.9
b. Transfers[d]	-0.8	-0.8	-0.8	-0.8
c. Rules and regulations[e]	5.0	5.0	5.0	5.0
Central adjustment scenario				
a. Protection[f]	-1.3	-1.3	-1.3	-1.3
b. Transfers[g]	-1.8	-1.3	-1.1	-1.3
c. Rules and regulations[h]	3.7	3.4	2.6	3.7
Low adjustment scenario				
a. Protection[i]	-1.5	-1.5	-1.5	-1.5
b. Transfers[j]	-1.8	-1.8	-1.8	-1.8
c. Rules and regulations[k]	2.5	2.5	2.5	2.5
Catching-up potential[l] (in every scenario)	0.5	2.0	1.6	0.3

[a]Zero protection - [b]Zero transfers - [c]50 per cent of the 1965 protection = 6 per cent. - [d]Government transfers as in Japan 1979 = 11.7 per cent. - [e]Investment as in Japan ϕ 1970-79 = 38.7 per cent - [f]Protection as in 1965 = 11.9 per cent. - [g]Government transfers as in 1979. - [h]Investment as in ϕ 1970-79. - [i]150 per cent of the 1965 protection = 18 per cent. - [j]Transfers as in Sweden = 25.2 per cent (1979) - [k]Investment as in the UK ϕ 1970-1979 = 19.6 per cent. - [l]The potential for technological catching up to the United States, as annual growth of per capita GDP in per cent.

Source: IMF, International Financial Statistics, current issues; Summers, Heston (1984); Heitger (1985, 1986); own calculations.

In terms of per capita incomes in U.S. dollars (measured in purchasing power parities), Table 17 shows that their increase would be considerable in all countries in the HAS case. Moreover, real incomes per capita will exhibit a lower degree of variance among countries in 1995 as compared to 1984, which is quite natural to happen if the relatively less advanced countries make use of their higher potential for catching up.

In case of inappropriate adjustment strategies (LAS), France and Germany will suffer per capita income losses in absolute terms. It is only because of the higher potential for a technological catching-up that Italy and the United Kingdom achieve a slight increase in income even in this case.

The loss of output per capita, incurred in the period 1984-95, would amount to more than 50 per cent of the 1984 per capita GDP in the four sample countries in the LAS case (Table 18). The difference between CAS, in which accumulated output losses are lower, and LAS would be greatest for West Germany (31 per cent rather than 53 per cent) and smallest for the United Kingdom (48 per cent rather than 60 per cent). In all countries, maladjustment seems to be subject to a law of diminishing real costs: The fall from HAS to CAS is much deeper than that from CAS to LAS.

2. A Model of the West German Economy: Comparative Statics

The projections on the basis of cross country analyses assume that, under identical "circumstances", each country would react identically to shocks (defined above as changes in protection, in subsidies, in rules and regulations). The real world, of course, is different, and so are the attitudes and reactions of people. The implications for adjustment can be measured only in specific country models. A general equilibrium model for the German economy, con-

Table 17: Dynamic Output Effects of Adjustment Strategies in Four EC Countries up to 1995: U.S. Dollars per Capita[a]

Adjustment strategy	France	Italy	United Kingdom	West Germany
High adjustment scenario income in 1995	19,055	17,726	18,732	19,573
Central adjustment scenario income in 1995	14,259	13,609	13,467	15,456
Low adjustment scenario income in 1995	12,231	11,452	12,081	12,553
GDP per capita in 1984	12,643	10,044	11,068	13,265

[a]On the basis of GDP per head in 1984, in current U.S. dollar, using purchasing-power parities.

Source: Table 16 - OECD, National Accounts - Main Aggregates, Vol. I, 1960-1984. Paris 1986; own calculations.

structed at the Kiel Institute of World Economics[1], may serve this purpose; there is, to our knowledge, no comparable model available for the other three countries considered here.

The different adjustment scenarios, excluding rules and regulations, enter the model as follows:

[1] The model is centred around an input/output matrix of 1978 with 60 sectors. It consists of more than 400 equations. The results of the model are of the comparative static kind, either short run (with low degrees of factor mobility, and unchanged capital stocks), or long-run (with high degrees of factor mobility, including adjustment of the capital stock to changes in both protection and profits). See Gerken and Gross (1985) for details. Recent applications of this model show the effects of subsidy cuts in Germany (Gerken, Jüttemeier, Schatz, Schmidt, 1985) and those of the subsidization of the German steel industry (Gerken, Gross, Lächler, 1986).

Table 18: Dynamic Output Losses of Maladjustment in Four EC Countries up to 1995: U.S. Dollars per Capita[a]

Adjustment strategy	France	Italy	United Kingdom	West Germany
High adjustment scenario loss	0	0	0	0
Central adjustment scenario loss				
Total	-4,796	-4,117	-5,265	-4,117
of which due to:				
- protection	-711	-659	-679	-749
- transfers	-1,776	-823	-510	-936
- rules and regulations	-2,309	-2,635	-4,076	-2,432
Low adjustment scenario loss				
Total	-6,824	-6,274	-6,651	-7,020
of which due to:				
- protection	-999	-918	-973	-1,027
- transfers	-1,664	-1,530	-1,622	-1,712
- rules and regulations	-4,161	-3,826	-4,056	-4,281

[a]On the basis of GDP per capita in 1984, in current U.S. dollars, using purchasing-power parities.

Source: As for tables 16 and 17.

- The central adjustment scenario (CAS) is equivalent to the null-hypothesis: If protection does not change there will be no change in any aggregate. This results from the fact that the model deals with the rates of change in a linear way.

- High adjustment (HAS) is defined as a decline of subsidies from their 1982 level by one half. The explicit and implicit rate of tariff protection (the latter has been calculated by comparing price differentials of domestic and world markets[1]) is reduced by the same rate.

- In the low adjustment case (LAS) it is assumed that the increase of subsidies (in real terms) between 1985 and 1995 will be the same as in the past ten years (+ 32.7 per cent). The same assumption is made for foreign trade protection.

A main feature of the model is that the government's budget is assumed to be balanced for each strategy, which means that in the HAS case the decline in subsidies is accompanied by a similar decline in income taxes and other direct taxes; in the LAS case taxation is raised by the amount by which subsidies are increased.

Let us look first at the "high adjustment scenario" (Table 19). A reduction of subsidies by 50 per cent would raise gross domestic product by 2.8 per cent. A reduction of trade protection by 50 per cent would lead to a slightly lower increase of GDP. With regard to branches, the major difference refers to "leather, textiles, clothing products"; this is due to the fact that import protection plays a much greater role than subsidies in this sector (see below).

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[1] See Witteler (1986) for the most recent calculations of effective protection in Germany.

Table 19 : High Adjustment Scenario for West Germany (comparative statics)

Sector	Effects in per cent of a decline[a] in					
	Subsidies			Foreign trade protection		
	Gross value added[b]	Employment	Gross capital stock[b]	Gross value added[b]	Employment	Gross capital stock[b]
Iron and steel, foundries, etc.	1.6	1.9	-1.7	4.0	4.0	4.1
Electrical engineering, precision instruments, etc.	5.2	6.3	-0.6	7.0	7.1	7.0
Leather, textiles, clothing products	11.2	12.1	7.6	-18.0	-18.4	-17.3
Food, beverages, tobacco	-1.1	0.6	-3.9	-1.0	-1.0	-1.1
Other manufactures	4.7	5.6	0.1	6.5	6.5	6.5
Total	2.8	4.4	-3.1	2.5	2.5	0.4

[a]Linear reduction of subsidies, tariff rates and implicit non-tariff protection by 50 per cent each. - [b]At constant prices.

Source: Gerken, Jüttemeier, Schatz, Schmidt (1985); own calculations.

The effects on employment and on the real capital stock of a reduction of subsidies and import protection differ considerably. The capital stock declines in the case of subsidy reductions, and remains roughly constant in the case of a reduction of foreign trade protection. The explanation is that subsidies nowadays go primarily into capital-intensive activities whereas foreign trade protection on average seems to be rather indifferent regarding factor intensities. For the same reason, a cut of subsidies has a greater positive impact on employment than on gross value added, while the effect on both variables is the same when import protection goes down.

An interesting case in HAS is the sector "leather, textiles, clothing products". Subsidy reduction would improve this industry's situation a lot: Value added, employment and the capital stock would increase; on the other hand, liberalization of foreign trade would hurt this industry the most. The explanation seems straightforward: Production of leather, textiles, and clothing goods receives subsidies far below average (Table A3), whereas foreign trade protection is much above average (Witteler, 1986). The exchange-rate-effect of foreign trade liberalization compensates this industry's losses only at the margin, whereas the tax reduction commensurate to the subsidy cut does favour production.

An important discriminating factor between "leather, textiles, clothing products" and, say, the iron and steel-industry is that the former produce close to final demand. Though iron and steel also receives high foreign trade protection the effects of liberalisation are positive. In this case, the positive effects of trade liberalization on steel demanding sectors (machinery, automobile production, metal products) outweigh the immediate negative impact on steel production. The exchange rate effect of liberalization (a depreciation of the deutschmark) also helps.

Turning to the "low adjustment scenario" (Table 20), it happens to be symmetrical to the HAS case on account of the linear properties of the model applied. The effects thus can also be explained by the same main factors: (1) by the industry structure of foreign trade protection and subsidization; (2) by the input/output structure; (3) by the factor intensities of the industries protected and of the industries discriminated against.

A comparison of these results with those of the cross country analysis reveals some striking similarities, although the German model provides estimates of the static welfare effects of a reallocation of resources, whereas the cross-country analysis is about the dynamic implications of liberalization. For instance, the absolute figures one arrives at when assuming that the static reallocation gains in the HAS case occur each year, are in the order of US $7,000 up to 1995. The cumulative losses of maladjustment (LAS) would amount to US $5,000 (the figures for the dynamic gains and losses are about US $4,000 and US $3,000 respectively[1]). There would be, however, a greater difference between static and dynamic adjustment gains and losses if the estimates derived from the German model had taken into account the rules and regulations argument.

V. Conclusions

As structural change and the adjustment to this change is an inevitable part of the process of economic growth, the central question is what strategies are appropriate. The most general answer would be that an adjustment strategy should, firstly, help internalize external economies of individual adjustment costs; this refers to a Pareto-like optimum of social affairs. Secondly, since social peace can be considered essential for economic growth, the adjustment

[1] Calculated as the difference between HAS and CAS, and between CAS and LAS, respectively, as shown in Table 17.

Table 20: Low Adjustment Scenario for West Germany (comparative statics)

Sector	Effects in per cent of an increase[a] in					
	Subsidies			Foreign trade protection		
	Gross value added[b]	Employment	Gross capital stock[b]	Gross value added[b]	Employment	Gross capital stock[b]
Iron and steel, foundries, etc.	-1.0	-1.2	1.1	-2.6	-2.6	-2.7
Electrical engineering, precision instruments, etc.	-3.4	-4.1	0.4	-4.6	-4.6	-4.6
Leather, textiles, clothing products	-7.3	-7.9	-5.0	11.8	12.0	11.3
Food, beverages, tobacco	0.7	-0.4	2.6	-0.7	-0.7	-0.7
Other manufactures	-3.1	-3.7	-0.1	-4.3	-4.3	-4.3
Total	-1.8	-2.9	2.0	-1.6	-1.6	-0.3

[a]Increase of subsidies until 1995 with the average annual rate observed in 1973-85 (+ 32.7 per cent in prices of 1980); equivalent increase in foreign trade protection. - [b]At constant prices.

Source: As for table 19 ; own calculations.

strategy should assist the adversely affected factors of production in just the right proportion to maintain that social peace. The latter calculus is, of course, obscured by the fact that moral hazard problems are involved, as can readily be seen in the political experience of every day.

Most of what has been done in European countries in the past certainly does not fit condition one (internalization) but rather - due to the wide range of interpretation possibilities - condition two (social peace). Adjustment strategies in manufacturing have had several kinds of biases: A regional one against the developing countries, a policy one in favour of protectionist measures, and a sectoral one in favour of but a few industries.

The first two interact with each other: The anti-developing country bias is revealed by the fact that trade protection is concentrated upon imports from low-wage countries (including Japan for that matter), which are regarded by many as a source of serious market disruption. The system of effective tariff protection retains, even after the tariff cuts agreed in the Tokyo Round of multilateral trade negotiations, relatively high rates for labour-intensive and raw material-intensive manufactures. Moreover, selective non-tariff protectionism has been proliferating, with "voluntary" export restraints on a wide range of consumer goods and other products supplied by developing countries in the forefront. The third renewal of the Multi-Fibre Arrangement (in July 1986), providing further restrictions in trade with textiles and clothing, is the most recent illustration of this anti-developing country bias.

The sectoral bias of adjustment strategies in manufacturing is manifested by the fact that iron and steel production, shipbuilding, textiles and clothing, aircraft and aerospace as well as telecommunications are the branches which receive most government assistance throughout Europe.

The measures applied have been differing among these industries: iron and steel is a cartel-cum-subsidy declining industry case; shipbuilding is an ailing industry assisted by public subsidies, public procurement and nationalization; textiles and clothing are branches enjoying foreign-trade-protection; aircraft is an industry which governments support because of the high-technology content and the growth potential generally ascribed to it; and telecommunication is the sector in which state-owned PTTs have, and exploit, the monopoly for providing switching and transmission systems, for regulating the utilization of the network and for servicing the terminal equipment (a partial deregulation is under way in the United Kingdom since the early eighties). This sectoral bias in adjustment policies shows how governments have come to believe that they should prop up (obvious) losers simultaneously with picking or even creating winners.

All experience in Europe shows that defensive adjustment policies lead into a deadlock. The protected industries become more vulnerable to international competition, not less; output growth opportunities are foregone rather than being used; the process of transforming obsolete jobs into productive jobs which are internationally competitive is retarded, thereby giving rise to more unemployment; the development and application of advanced technologies moves too slowly, causing Europe's economies to operate below their full potential. The reason is that, in a growing world economy, comparative advantages are in a state of constant flux. If governments interfere too much with the operation of the market mechanism, domestic firms and labour obtain wrong information about promising as well as bleak investment and employment paths. Even worse, an opinion is formed whithin the society that non-adjustment to structural change is a sensible option, i.e., that it is compatible in the medium run with economic growth and high employment.

In order to resume sustained economic growth and higher employment in Europe, governments will have to resist more effectively demands of interest groups for tailor-made assistance, and also resist the temptation of regulating activities where competition would be the first best solution. What matters is a policy restructuring away from government-made incentives towards market incentives in all fields of activity - this not only in manufacturing, but also in agriculture, let alone services in which many government interventions distort the relative prices of inputs used in industrial production, and thus have an adverse impact on the international competitiveness of firms.

Improved market incentives as the pillar of more promising adjustment strategies would require the European governments

- to keep or restore monetary stability, to arrest selective protectionism and subsidization of sunset industries, to strengthen domestic and international competition, and to open national public procurement to competitive tender also for foreign firms;
- to reform the tax system in several aspects, namely by generally lowering marginal income taxes and by granting newly founded companies adequate depreciation allowances together with reasonably long periods for carrying forward initial losses;
- to make factor markets more efficient: the labour market, by introducing more contractual freedom and by controlling abuses of monopoly (monopsony) power; the capital market, by dismantling barriers to equity financing and to the supply of risk capital in favour of new or innovative firms;
- to deregulate the economy, including a removal of usually restrictive market entry regulations for new (or foreign) firms, and including the possibility of exit of (public) firms, especially in the services sector (main-

ly transportation, insurance services, telecommunications), thereby lowering input costs also for manufacturing.

Some steps in this direction have already been taken; others are under serious consideration, and whether or not they will be made depends on the ability of the governments to overcome the resistance by interest groups. The commitment of the EC Member State governments (made at the The Hague Summit in February 1986) to achieve a true common internal market by the end of 1992, as called for in the Cockfield Report of the EC Commission (1985), could also become decisive in improving the adjustment process and thereby restoring Europe's economic dynamism; there would be more options for economic activities when the entry to markets is no longer restricted (Giersch, 1986). The ways in which structural change then will take place in detail will be determined in the process of trial-and-error under which entrepreneurs, domestic and foreign, always have to operate. In a world fraught with uncertainty about the future, it is not possible to specify in advance accurately the branches for which the prospects are best, especially not in countries, as the European ones considered here, which are close to the frontier of knowledge available in the world economy. Governments and bureaucracies, each for themselves or in coordination, cannot solve this problem of uncertainty. They have no superior wisdom about future patterns of supply and demand, changes in the international division of labour, and technological developments. Wishful thinking is no substitute for such knowledge. This is another reason for strengthening market incentives in the context of adjustment policies.

APPENDIX: On the Measurement of Dynamic Output Effects

1. The Model

The model underlying the computations for Tables 17 to 19 belongs to the group of Domar-Kuznets-type models which emphasize the role of fixed capital formation and of technological progress in economic growth (Heitger 1985, 1986). Capital formation is measured as the share of investment in gross domestic product. As to technical progress, it is assumed that its rate depends on a country's capacity to catch up with the leading country - here the United States. The argument behind this assumption is that technical knowledge can be imported like any other good; the less advanced a country is in technology, the more options it has to close gaps through technology imports. In case the (autonomous) production of technological knowledge is more costly than the imitation of existing technologies, the latecomer is in a more favourable position than the frontrunner. In the model applied, the per capita income of a country relative to the U.S. per capita income has been taken as a measure for induced technology advance ("technological gap").

With the help of this model it is possible to test for other sources of economic growth by adding additional variables to the equation. Two different approaches have been applied here. The first contains as the crucial additional variable the average effective rate of foreign trade protection (ERP) of the manufacturing industry; the second is concerned with government transfers (subsidies) as a per cent of the gross domestic product (GOV TRANS).

These two separate runs were necessary for statistical reasons: Data on average ERP are available for only four industrial countries; they do not exhibit variances large enough to make regressing sensible. Therefore, developing

countries have been included in the first estimate. Also included is the adult literacy rate (AD LIT) as a measure for a country's endowment with human capital.

The second estimate is intended to single out the effects of government transfers. It refers to 13 industrial countries in the sixties and seventies. The other additional variable is the standard deviation of the change in the consumer price index (CPI STD) to account for the distorting effects of monetary policies on the allocation of resources.

The estimated contribution of each of these variables to real economic growth is set out in Table 21. For measuring the impact of alternative adjustment scenarios, the ERP coefficient has been taken from equation 1; the GOV TRANS and the INV SH coefficients are from equation 2, which deals specifically with industrial countries.

2. Forecasting Procedure

The maximum adjustment scenario (MAS) refers to a hypothetical world with zero protection, zero transfers, and optimal rules and regulations; this is a world we do not live in. It has been constructed to show that high adjustment (HAS) - with a 50 per cent reduction of protection and with transfers like in Japan - is also costly: Economic growth is 1.7 per cent below what it could be, if protection and subsidies were totally abolished[1].

The reasoning behind the impact of rules and regulations is somewhat different. Since we have no knowledge of the investment share under optimal conditions, the corresponding MAS have been marked by dots. HAS is defined as ressembling the Japanese case as far as investment conditions are concerned; it shows that it would be possible to

[1] The figures are derived by inserting the basic data (mentioned in the footnotes of Table 16, page 51) into the growth functions shown in Table 21.

Table 21: Regression Equations for Economic Growth[a]

Endogenous Variable	Constant	Exogenous Variables	$\bar{R}^2$	F	N
1. gGDP	1.71 (1.23)	-0.04 RGDP + 0.18 INV SH + 0.02 AD LIT - 0.51 ERP (-3.63) (4.79) (1.64) (-2.37)	0.52	13.5	47
2. gGDP	5.49 (3.88)	-0.06 RGDP + 0.13 INV SH - 0.38 CPI STD - 0.07 GOV TRANS (-6.10) (3.58) (-4.15) (-2.85)	0.78	23.0	26

[a]Equation 1 is an OLS cross-country regression; equation 2 is an OLS cross-country pool regression for 13 countries, in which each variable enters twice (as average of the sixties and average of the seventies). t-statistics in brackets. - RGDP: Relative per capita income; INV SH: investment share in gross domestic product (per cent); AD LIT: adult literacy rate; ERP: effective rate of protection; CPI STD: standard deviation of the change in consumer price index; GOV TRANS: government transfers as per cent of GDP.

Source: Heitger (1985, 1986)

achieve a 5 per cent growth in all countries, plus an additional growth in the individual countries depending on their technology advance due to imports of know-how from the United States[1].

CAS and LAS are defined and calculated accordingly: Losses due to protection and transfers are expressed as the growth differential to MAS. The figures on rules and regulations are not differentials but absolute percentages derived by inserting the investment shares mentioned in Table 16 into the growth function[2].

The figures shown in the Tables 17 and 18 are calculated on the basis of GDP per capita in 1984, using purchasing power parities; the growth rates for 11 years (1984-95) are from Table 17. Take France as an example for Table 17: an annual rate of growth of per capita income of 3.8 per cent in HAS implies a compound rate of 1.5072 for 11 years (thus the output effect amounts to 12,643x1.5072=19,055). In Table 18, the total losses are derived from the differences of output effects between HAS and the other two cases, as shown in Table 17. These losses are then disentangled according to the three kinds of adjustment strategies by using the growth differentials between HAS and CAS/LAS, as reported in Table 16.

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[1] It would have been wiser, perhaps, to define Japan as the non-plus-ultra-country with respect to rules and regulations. Then MAS (instead of HAS) would show a 5 per cent growth regarding rules and regulations. The consequence would have been to define, say, each country's performance in the sixties as representative of the HAS case; the growth differentials between the newly defined MAS (5 per cent) and the individual country performance would then be the output loss of not having optimal rules. CAS and LAS would be defined accordingly, thus also showing losses (negative signs).

[2] Since HAS and LAS are standardized cases, growth differentials among the four countries are solely due to differences in the technological catching-up potential.

ANNEX TABLES AND FIGURES

Table A1 - Import Shares[a] in West Germany, Selected Years

Industry	Total imports				Imports from developing countries			
	1962	1970	1978	1985	1962	1970	1978	1985
Total manufactures	11.0	15.0	20.5	27.0	1.12	1.11	1.75	2.43
Petroleum refinery	12.1	9.4	19.3	22.0	4.05	0.24	2.19	2.13
Stone, sand and clay	7.6	8.4	10.0	14.8	0.38	0.24	0.26	0.71
Iron and steel	14.4	18.6	27.0	34.9	0.02	0.19	0.56	1.44
Non-ferrous metals	45.2	50.1	44.9	55.7	12.60	11.17	6.19	8.53
Foundries	1.7	2.4	4.0	5.9	0	0.02	0.06	0.16
Iron and steel products	3.4	11.0	18.9	20.9	0	0.02	0.03	0.35
Chemicals	11.6	16.7	21.2	31.3	0.43	0.37	0.44	0.94
Sawmills and timber processing	26.8	24.3	28.2	31.1	1.91	2.64	4.81	5.29
Pulp, paper, and board	28.3	38.3	41.8	50.2	0.04	0.06	0.48	1.08
Rubber products	8.3	13.7	23.2	27.0	0.25	0.17	0.68	0.98
Structural metal products	1.7	3.5	4.5	6.1	0	0	0.01	0.21
Fabricated metal products	4.4	8.8	13.8	17.1	0.04	0.07	0.61	0.90
Mechanical engineering	13.4	15.0	18.1	22.0	0.01	0.06	0.19	0.42
Office and data processing machines	-	48.1	60.9	75.2	-	0.40	1.65	4.05
Electrical engineering	6.5	11.8	19.1	26.2	0.02	0.19	1.40	2.24
Precision engineering	15.4	19.9	32.2	46.1	0.08	0.18	1.68	3.04
Motor vehicles	6.9	11.9	17.4	21.0	0	0.05	0.41	0.42
Shipbuilding	4.0	22.0	16.5	14.6	0.01	0.02	1.45	4.77
Aircraft and aerospace	52.5	41.4	74.2	113.3	1.00	0.12	1.11	3.49
Fine ceramics	6.9	20.5	41.5	38.3	0.03	0.05	1.96	2.51
Glass and products	5.9	14.3	18.9	26.1	0.01	0.04	0.34	1.06
Wood products	4.2	5.1	11.3	15.0	0.29	0.30	0.78	0.68
Manufactures of paper and paperboard	2.5	4.4	8.0	10.5	0.01	0.02	0.39	0.30
Printed matter	3.1	4.4	5.5	6.5	0.02	0.04	0.07	0.12
Plastic products	3.6	12.5	16.0	20.3	0.10	0.21	0.45	0.93
Musical instruments, toys, etc.	26.6	32.4	43.3	68.4	2.58	4.45	9.79	16.71
Leather products	10.4	21.0	40.2	53.3	0.84	2.22	6.06	8.46
Textiles	17.5	24.0	40.0	54.0	1.96	3.04	7.11	9.93
Clothing	5.9	14.0	34.7	47.9	0.83	2.21	10.76	14.78
Food and beverages, tobacco	9.8	11.0	13.4	15.7	2.17	2.27	2.05	3.04

[a]Imports as a percentage of apparent consumption

Source: Federal Statistical Office, Foreign Trade Statistics and Statistical Yearbook, current issues; own calculations.

Table A2 - Revealed Comparative Advantage[a] in West German Manufacturing, Selected Years

Industry	RCA vis-à-vis all countries				RCA vis-à-vis developing countries			
	1962	1970	1978	1985	1962	1970	1978	1985
Total manufacturing	0	0	0	0	0	0	0	0
Petroleum refinery	-1.4	-1.4	-2.3	-2.2	-4.1	-1.5	-3.7	-3.3
Stone, sand and clay	-1.0	-0.9	-0.4	-0.2	-0.7	-0.4	0.8	0.5
Iron and steel	0	-0.2	0.1	0.2	4.1	1.3	1.4	1.0
Non-ferrous metals	-1.5	-1.5	-0.8	-0.8	-3.2	-3.1	-1.7	-1.4
Foundries	0.3	0.3	0.5	0.3	7.0	2.0	2.7	2.0
Iron and steel products	1.4	0.6	0.5	0.2	8.5	4.3	3.7	1.6
Chemicals	0.4	0.4	0.2	0.1	1.8	1.9	1.6	1.3
Sawmills and timber processing	-2.3	-1.7	-1.4	-1.0	-3.8	-3.4	-3.4	-2.9
Pulp, paper, and board	-2.0	-1.7	-1.2	-0.9	1.6	1.6	-0.4	-0.2
Rubber products	0	-0.2	-0.1	-0.2	1.4	1.4	0.5	0.3
Structural metal products	1.3	0.6	1.2	0.8	9.5	6.0	6.3	2.8
Fabricated metal products	1.0	0.7	0.4	0.4	3.5	2.9	0.8	0.8
Mechanical engineering	0.9	0.9	1.0	0.9	5.6	4.0	3.5	2.8
Office and data processing machines	-	-0.2	-0.4	-0.5	-	1.5	-0.1	-1.2
Electrical engineering	0.7	0.4	0.3	0	4.3	1.9	0.8	0.3
Precision engineering	0.9	0.5	0.1	0.1	3.9	2.6	0.4	0.4
Motor vehicles	1.4	0.9	0.7	0.9	7.9	3.8	1.8	2.2
Shipbuilding	2.0	0.1	0.7	0.3	5.8	5.4	1.4	0.4
Aircraft and aerospace	-1.9	1.0	-0.6	-0.4	-1.0	1.7	0.9	0
Fine ceramics	1.1	0.5	-0.2	-0.2	3.6	3.3	-0.4	-0.4
Glass and products	0.8	0	-0.2	0	4.8	2.9	0.8	0.4
Wood products	-0.4	0.1	-0.2	-0.2	-0.6	-0.9	-0.4	0.6
Manufactures of paper and paperboard	0	0.1	0	0.3	3.5	2.3	-0.2	1.2
Printed matter	0.3	0.5	0.5	0.7	2.4	1.7	1.4	1.4
Plastic products	0.3	0.3	0.1	0.2	1.0	0.8	0.3	0.2
Musical instruments, toys, etc.	0.2	-0.3	-0.5	-0.2	-0.4	-1.6	-2.5	-1.5
Leather products	-0.9	-1.1	-1.6	-1.3	-1.1	-2.2	-3.1	-2.7
Textiles	-1.1	-0.8	-0.7	-0.5	-1.7	-1.9	-2.2	-1.9
Clothing	-1.0	-1.1	-1.2	-1.0	-2.5	-3.3	-4.0	-3.4
Food and beverages, tobacco	-2.1	-1.5	-0.8	-0.6	-3.0	-2.8	-1.7	-1.5

[a] Defined as $\ln \left(\frac{X_i : M_i}{\Sigma X_i : \Sigma M_i} \right)$, where X (M) = exports (imports) and i = industry shown.

Source: As for table A1

Table A3 - Subsidies in West Germany by Manufacturing Industries, 1973-74 and 1980-81

Industry	Degrees of subsidization (per cent of value added)		Subsidies per employed person (D-Mark)	
	1973-74	1980-81	1973-74	1980-81
Total manufacturing	2.3	2.5	640	1,100
Petroleum refining	4.3	3.5	3,230	4,300
Stone, sand and clay	1.1	1.4	370	650
Iron and steel	1.0	3.1	320	1,210
Non-ferrous metals	3.5	3.7	940	1,750
Foundries	1.1	0.9	280	380
Iron and steel products	0.4	0.6	120	240
Chemicals	2.0	3.1	880	1,680
Sawmills and timber processing	1.3	2.2	330	870
Pulp, paper, and board	1.7	1.3	590	650
Rubber products	1.0	0.6	254	239
Structural metal products	2.0	1.7	580	880
Fabricated metal products	1.3	1.6	350	650
Mechanical engineering	2.3	2.6	640	1,190
Office and data processing machines	6.0	2.7	2,340	1,860
Electrical engineering	3.5	3.1	940	1,400
Precision engineering	1.4	1.7	390	770
Motor vehicles	1.2	1.0	320	470
Shipbuilding	11.5	38.5	3,130	11,410
Aircraft and aerospace	64.5	31.2	15,250	14,500
Fine ceramics	1.4	2.0	330	690
Glass and products	1.2	1.3	320	550
Wood products	0.7	1.1	180	420
Manufactures of paper and paperboard	1.5	3.3	380	1,220
Printed matter	4.0	4.2	1,020	1,820
Plastic products	1.8	1.9	500	790
Musical instruments, toys, etc.	0.9	1.0	180	330
Leather products	0.4	0.6	70	180
Textiles	1.2	1.2	240	390
Clothing	1.3	1.5	220	390
Food and beverages	2.4	2.1	630	850
Tobacco	8.4	13.0	2,420	7,220

Source: Jüttemeier (1987).

Table A4 - The Distribution of Subsidy Programmes in West German Manufacturing Industries (averages 1980-81)

Industry	Number of branches participating in the same subsidy programme (subsidization shares, per cent)[a]				
	1	2-4	5-10	11-25	≧ 26
Total manufacturing	13.8	6.5	6.8	7.2	65.6
Petroleum refining	41.0	0	7.0	8.8	43.2
Stone, sand and clay	0	0	0.3	4.1	95.5
Iron and steel	31.9	3.6	1.5	13.4	49.7
Non-ferrous metals	0	2.4	5.8	30.7	61.2
Foundries	0	1.7	0	4.4	93.9
Iron and steel products	0	0	0.7	3.6	95.7
Chemicals	4.5	9.4	4.0	8.1	74.0
Sawmills and timber processing	0	0.5	1.1	6.8	91.6
Pulp, paper, and board	0	0	0.9	4.8	94.3
Rubber products	0	0	0.1	0.6	99.2
Structural metal products	1.1	0	0.4	10.8	87.6
Fabricated metal products	0	0	0.2	1.2	98.6
Mechanical engineering	3.4	17.0	18.0	9.6	52.0
Office and data processing machines	0	0	28.9	2.6	68.5
Electrical engineering	0	0.1	2.4	10.0	87.5
Precision engineering	0	0.6	21.8	8.3	69.2
Motor vehicles	0	1.4	6.6	9.9	82.0
Shipbuilding	81.7	0	11.3	1.0	6.0
Aircraft and aerospace	49.4	3.4	12.8	11.6	22.9
Fine ceramics	2.6	0	2.7	8.8	85.8
Glass and products	0	1.6	2.7	6.9	88.9
Wood products	0.1	0.2	8.2	2.7	88.9
Manufactures of paper and paperboard	0	0	0.5	2.0	97.5
Printed matter	0	67.2	0.3	0.8	31.7
Plastic products	0	0	0.3	3.9	95.8
Musical instruments, toys, etc.	0	0	0	1.1	98.9
Leather products	0	0	13.2	1.0	85.8
Textiles	0	0	0	2.3	97.7
Clothing	0	0	1.8	0.4	97.8
Food and beverages	15.7	0.1	1.8	1.0	81.5
Tobacco	5.0	0	0	0.1	94.9
Total Economy	81.4	7.1	1.5	1.1	8.9

[a] Details for sectors and industries may not add to 100 per cent due to rounding.

Source: As for table A3.

Table A5 - Output and Input Performance in West German Manufacturing[a], 1950-80
(average annual change in per cent)

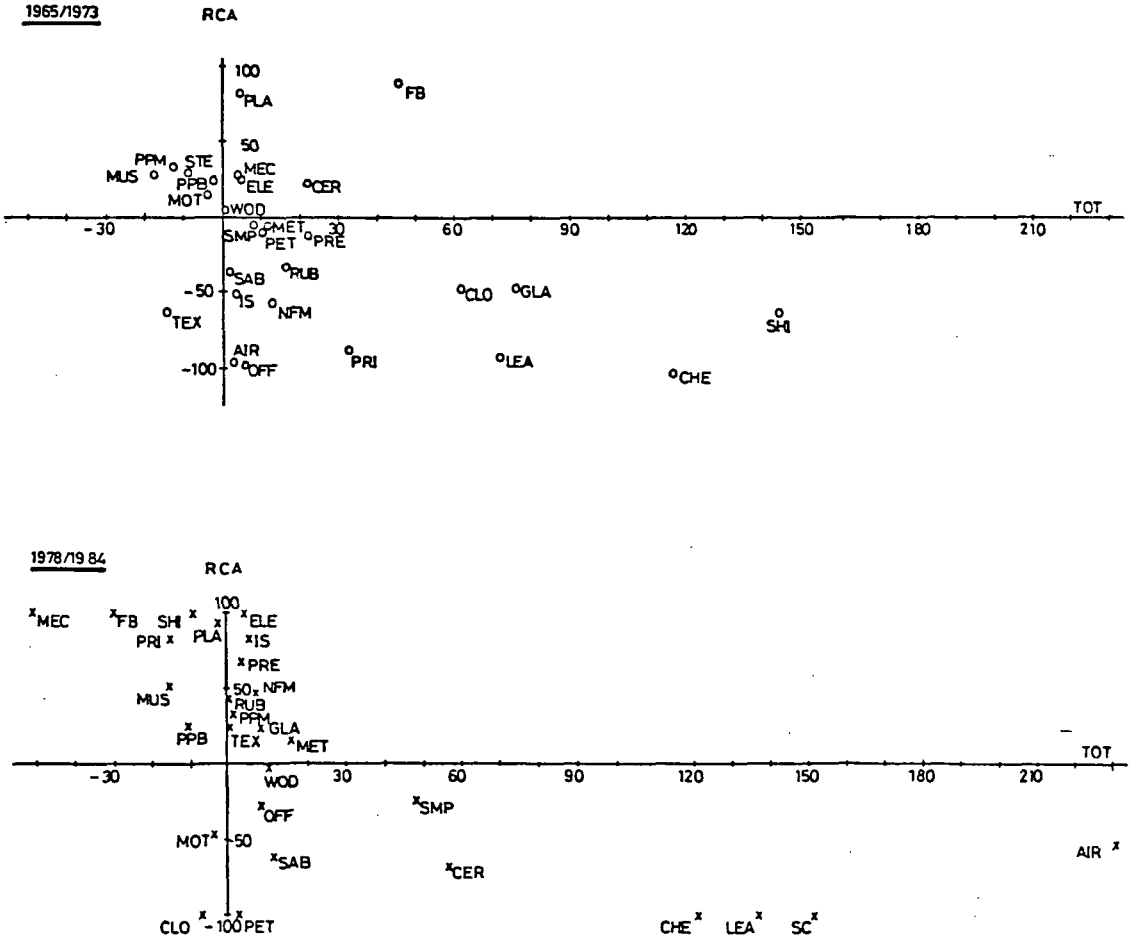
Industry	Real value added			Employed persons			Gross fixed assets			Sales		
	1950 to 1960	1960 to 1970	1970 to 1980	1950 to 1960	1960 to 1970	1970 to 1980	1950 to 1960	1960 to 1970	1970 to 1980	1950 to 1960	1960 to 1970	1970 to 1980
Total manufacturing	10.4	6.7	2.1	5.4	1.4	- 1.4	7.9	5.8	3.1	12.6	8.5	7.3
Petroleum refinery	19.0	11.0	1.2	7.2	1.7	- 0.9	6.7	5.8	1.8	20.5	12.8	14.1
Stone, sand and clay	8.3	6.5	0.8	2.7	- 0.1	- 2.8	9.7	6.5	2.4	13.1	8.9	5.5
Iron and steel	9.3	3.7	0.3	5.4	- 0.1	- 2.1	9.7	5.0	1.8	15.0	5.1	3.7
Non-ferrous metals	10.2	4.1	2.7	5.5	1.2	- 1.3	3.6	4.7	3.3	11.9	8.6	8.3
Foundries	6.6	1.3	- 2.4	4.2	- 1.3	- 3.8	6.0	2.8	0.6	12.7	4.6	3.5
Iron and steel products	10.8	9.3	0.3	6.8	- 1.1	- 2.6	9.0	3.3	1.2	15.9	4.5	3.9
Chemicals	11.7	9.4	3.5	4.8	2.4	- 0.5	4.4	6.1	3.0	13.2	9.7	8.1
Sawmills and timber processing	2.9	3.5	2.2	- 0.9	- 1.1	- 2.5	10.2	2.9	2.7	6.7	6.9	6.9
Pulp, paper, and board	7.3	4.5	3.2	3.4	- 0.7	- 3.6	9.9	3.5	2.0	9.3	4.3	7.1
Rubber products	10.7	5.6	1.0	6.7	1.8	- 2.7	6.3	5.5	3.2	12.3	8.1	5.3
Structural metal products	7.6	1.3	0.5	4.7	0.7	- 0.8	10.5	6.0	3.4	14.0	6.6	7.4
Fabricated metal products	10.2	4.0	1.7	5.8	- 0.4	- 1.5	11.1	6.8	3.6	14.5	6.9	6.2
Mechanical engineering	11.2	4.9	0.6	7.2	1.8	- 1.2	8.5	4.5	3.3	16.0	9.3	7.2
Office and data processing machines	-	-	6.8	-	-	- 1.4	-	-	7.8	-	-	5.0
Electrical engineering	15.9	7.7	3.5	10.1	2.8	- 1.3	10.9	6.4	4.4	18.7	10.3	7.4
Precision engineering	11.1	10.1	0.5	6.3	2.1	- 1.3	9.0	5.1	3.9	13.7	10.9	7.9
Motor vehicles	18.2	10.8	2.7	7.2	6.1	1.1	10.7	9.7	3.9	17.0	12.8	8.8
Shipbuilding	13.8	3.0	- 0.3	8.1	- 2.2	- 3.3	5.2	0.9	2.2	20.6	3.2	3.9
Aircraft and aerospace	-	17.6	7.0	-	12.5	2.3	-	16.5	9.1	-	23.6	12.7
Fine ceramics	8.6	- 0.5	- 0.1	4.6	- 2.9	- 1.8	11.2	3.1	1.9	11.5	3.6	6.5
Glass and products	10.1	6.4	4.7	7.2	0.5	- 2.1	9.5	9.3	4.6	15.3	8.0	6.8
Wood products	7.8	11.4	3.0	2.8	0.8	- 0.1	10.0	7.5	4.7	12.2	9.5	8.3
Manufactures of paper and paperboard	8.9	5.9	2.4	7.1	1.8	- 1.8	14.7	10.5	4.3	13.0	8.9	7.7
Printed matter	8.7	6.2	2.4	5.3	1.1	- 1.2	10.5	4.5	3.8	12.4	8.5	8.5
Plastic products	25.4	15.2	6.8	14.7	6.7	2.4	17.5	15.1	7.9	25.1	13.7	11.6
Musical instruments, toys, etc.	11.9	7.5	- 0.1	7.3	2.3	- 1.1	5.3	12.-	5.2	15.9	9.7	7.8
Leather products	5.8	2.0	- 3.8	2.6	- 2.5	- 4.7	6.2	4.3	- 0.5	5.9	3.4	3.6
Textiles	6.6	3.0	0.7	1.5	- 2.2	- 4.8	6.9	3.7	0.2	5.3	4.2	2.8
Clothing	10.7	3.5	- 1.9	6.5	0.8	- 4.3	15.6	4.4	1.4	11.0	6.8	3.3
Food and beverages	8.6	7.7	2.7	3.6	1.5	- 1.8	7.1	5.0	2.7	9.3	7.5	6.4

[a] Adjusted for regional changes.

Source: Deutsches Institut für Wirtschaftsforschung (current issues); own calculations.

Figure A6: Changes in the Real Revealed Comparative Advantage[a] and in the Terms of Trade[b], 1965-73 and 1978-84

- France[c] -



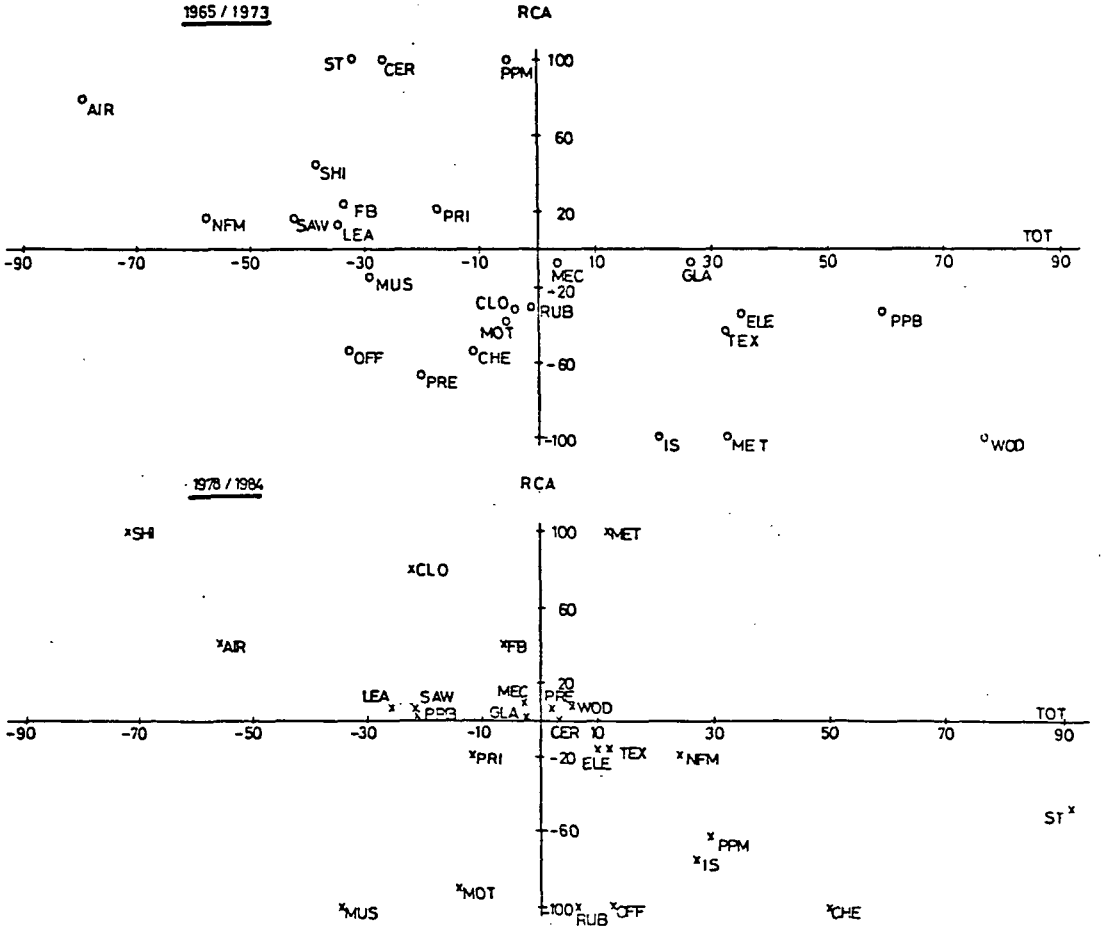
[a]RCA as defined in tables 10 and A2, in prices of 1978.

[b]Defined as the ratio of industry-specific unit values of exports to unit values of imports. For each branch the unit values are weighted averages of subbranches; the 1978 shares in trade by volume have been taken as weights.

[c]For abbreviations of industry and sources of figures A6-A8 see page 76.

Figure A7: Changes in the Real Revealed Comparative Advantage[a] and in the Terms of Trade[b], 1965-73 and 1978-84

- Italy[c] -



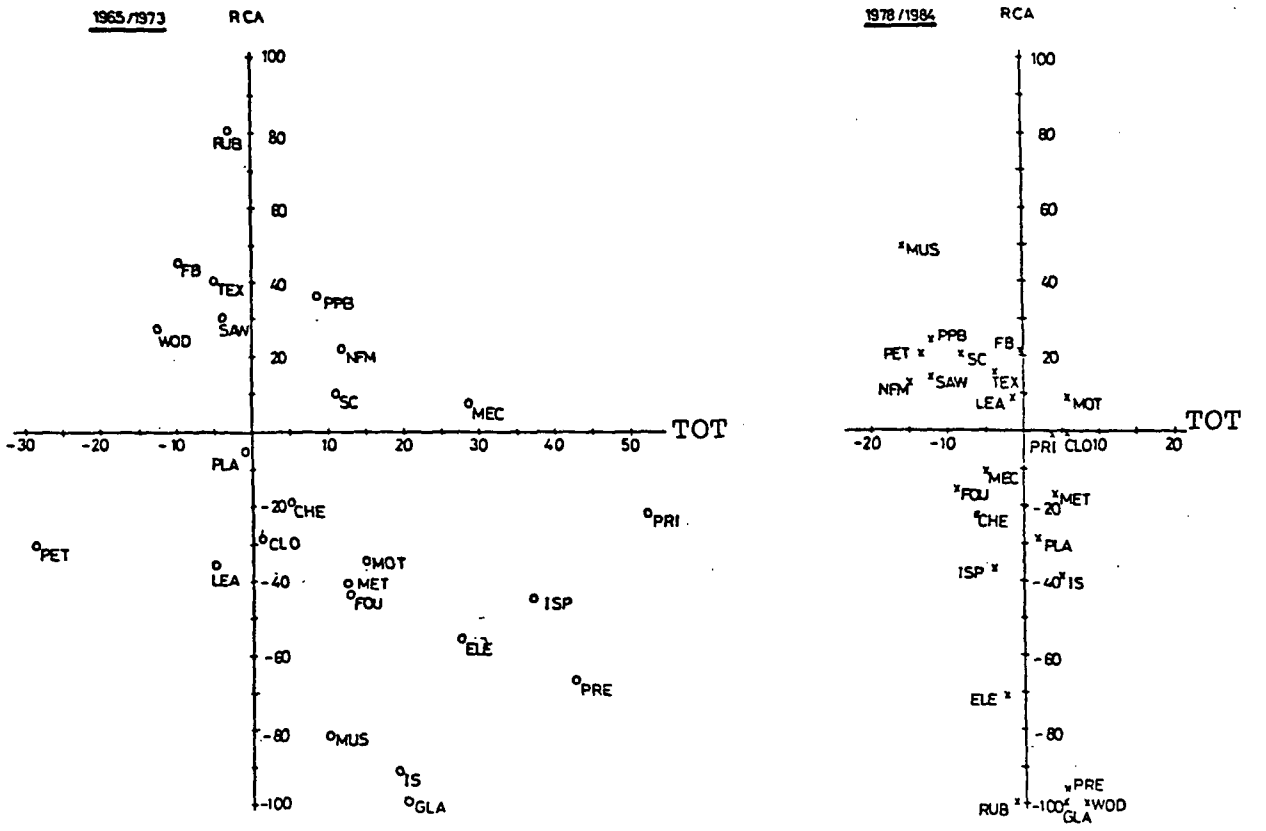
[a]RCA as defined in tables 10 and A2, in prices of 1978.

[b]Defined as the ratio of industry-specific unit values of exports to unit values of imports. For each branch the unit values are weighted averages of subbranches; the 1978 shares in trade by volume have been taken as weights.

[c]For abbreviations of industry and sources of figures A6-A8 see page 76.

Figure A8: Changes in the Real Revealed Comparative Advantage[a] and in the Terms of Trade[b], 1965-73 and 1978-84

- West Germany[c] -



[a] RCA as defined in tables 10 and A2, in prices of 1980.

[b] Defined as the ratio of industry-specific export prices to import prices (1980=100).

[c] For abbreviations of industry and sources of figures A6-A8 see page 76.

Abbreviations of industries and sources for graphs A6, A7, A8

Abbreviation	Industry
AIR	Aircraft and aerospace
CER	Fine cermaics
CHE	Chemicals
CLO	Clothing
ELE	Electrical engineering
FB	Food and beverages, tobacco
FOU	Foundries
GLA	Glass and products
IS	Iron and steel
ISP	Iron and steel products
LEA	Leather products
MEC	Mechanical engineering
MET	Fabricated metal products
MOT	Motor vehicles
MUS	Musical instruments, toys, etc.
NFM	Non-ferrous metals
OFF	Office and data processing machines
PET	Petroleum refinery
PLA	Plastic products
PPB	Pulp, paper, and board
PPM	Manufactures of paper and paperboard
PRE	Precision engineering
PRI	Printed matter
RUB	Rubber products
SAW	Sawmills and timber processing
SC	Stone, sand, and clay
SHI	Shipbuilding
SMP	Structural metal products
TEX	Textiles
WOD	Wood products

Sources:

Graph A6 (France): Direction Générale des Douanes et Droits Indirects, Statistique du Commerce Extérieur de la France, Annuaire Abrégé. Paris, current issues; own calculations.

Graph A7 (Italy): Istituto Centrale di Statistica, Annuario Statistico Italiano, Roma, current issues; own calculations.

Graph A8 (West Germany): Statistisches Bundesamt, Fachserie 7 (Aussenhandel), Reihe 7 (Aussenhandel nach Ländern und Warengruppen der Industriestatistik, Spezialhandel), current issues, and Fachserie 17 (Preise), Reihe 8 (Preise und Preisindices für die Ein- und Ausfuhr). Wiesbaden, current issues; own calculations.

REFERENCES

Buigues, Pierre, Philippe Goybet (1985a), "Competitiveness of European Industry: Situation to Date". European Economy, No. 25, September 1985, pp. 9-33.

--, --, (1985b), "The Determinants of Supply in Industry in the Community". European Economy, No. 25, September 1985, pp. 35-67.

Bundeskartellamt, Bericht des Bundeskartellamtes über seine Tätigkeit sowie über Lage und Entwicklung auf seinem Aufgabengebiet, Berlin (current issues).

Commission of the EC, The Competitiveness of European Industry. Luxemburg, 1982.

--, Completing the Internal Market (White paper from the Commission to the European Council). Luxembourg, 1985.

--, "Improvement of the Competitiveness and the Structures of the European Industry", COM(86) 40 final, 25th February 1986.

Corden, Max, J. Peter Neary, "Booming Sector and De-Industrialisation in a Small Open Economy". The Economic Journal, Vol. 92, December 1982, pp. 825-848.

Deutsches Institut für Wirtschaftsforschung, Produktionsvolumen und -potential, Produktionsfaktoren der Industrie im Gebiet der Bundesrepublik Deutschland einschl. Saarland und Berlin (West), Statistische Kennziffern, Berlin (current issues).

Dicke, Hugo, Hans H. Glismann (1984a), "The Rise and Decline of West German Steel Industry: The Role of National and Supranational Agencies". Paper presented at the Conference on Industry Protection and Adjustment, held at the Institute for International Economics, Washington, D.C., November 27, 1984 (publication forthcoming).

--, --, (1984b), "Troubled Industries in Germany". Paper presented at the Conference on Industry Protection and Adjustment, held at the Institute for International Economics, Washington, D.C., November 27, 1984 (publication forthcoming).

--, Peter Trapp, "Investment Behavior and Yields in Some West German Industries". Kiel Working Papers, No. 205, October 1984.

Donges, Juergen B., "Industrial Policies in West Germany's Not so Market-Oriented Economy". The World Economy, Vol. 3, No. 2, 1980, pp. 185-215.

--, "Chronic Unemployment in Western Europe Forever?" The World Econonomy, Vol. 8, No. 4, 1985, pp. 353-372.

--, "Whither International Trade Policies? Worries about Continuing Protectionism". Kiel Discussion Papers, No. 125, October 1986.

--, Klaus-Werner Schatz, "Staatliche Interventionen in der Bundesrepublik Deutschland. Umfang, Struktur, Wirkungen". Kiel Discussion Papers, Nos. 119/120, May 1986.

--, Henning Klodt, Klaus-Dieter Schmidt, "The West German Economy Towards the Year 2000. An Analysis of Structural Change". Kiel Working Papers, No. 268, September 1986.

Fels, Gerhard, Klaus-Werner Schatz, Frank Wolter, "Der Zusammenhang zwischen Produktionsstruktur und Entwicklungsniveau". Weltwirtschaftliches Archiv, Vol. 106, No. 2, 1971, pp. 240-278.

Gerken, Egbert, Martin Gross, "A Structural Policy Model for the Federal Republic of Germany". Kiel Working Papers, No. 240, October 1985.

--, --, Ulrich Lächler, "The Causes and Consequences of Steel Subsidization in Germany". European Economic Review, Vol. 30, No. 4, 1986, pp. 773-804.

--, Karl-Heinz Jüttemeier, Klaus-Werner Schatz, Klaus-Dieter Schmidt, Mehr Arbeitsplätze durch Subventionsabbau". Kiel Discussion Papers, Nos. 113/114, October 1985.

Giersch, Herbert, "Eurosclerosis". Kiel Discussion Papers, No. 112, October 1985.

--, "Internal and External Liberalization for Faster Growth". Kiel Working Papers, No. 275, November 1986.

Glismann, Hans H., Wettbewerbsbeschränkende Absprachen im Aussenhandel. Tübingen: J.C.B. Mohr, 1975, for the Kiel Institute of World Economics.

--, Ernst-Jürgen Horn, "Comparative Invention Performance of Major Industrial Countries: Patterns and Explanations". Kiel Working Papers, No. 264, July 1986.

Heitger, Bernhard, "Bestimmungsfaktoren internationaler Wachstumsdifferenzen". Die Weltwirtschaft, Year 1985, No. 1, pp. 49-69.

--, "Import Protection and Export Performance - Their Impact on Economic Growth". Kiel Working Papers, No. 260, July 1986.

Herdmann, Ute, Frank D. Weiss, "Wirkungen von Subventionen und Quoten - Das Beispiel der EG-Stahlindustrie". Die Weltwirtschaft, Year 1985, No. 1, pp. 101-113.

Jüttemeier, Karl-Heinz, "Subsidizing the Federal German Economy - Figures and Facts, 1973-1984". Kiel Working Papers, No. 279, January 1987.

Klodt, Henning, Wettlauf um die Zukunft. Technologiepolitik im internationalen Vergleich. Tübingen: J.C.B. Mohr, 1987, for the Kiel Institute of World Economics.

Messerlin, Patrick A., "Public Subsidies to Industry and Agriculture and Countervailing Duties". Paper presented at a European Meeting on the Position of the European Community in the New GATT Round convened by the Spanish Ministry of Finance and Economic Affairs and the Trade Policy Research Centre in Collado-Villalba (near Madrid), October 2-4, 1986.

Monopolkommission, Viertes Hauptgutachten 1980/81. Deutscher Bundestag, Drucksache 9 (1982), 02.08.82.

OECD, Productivity in Industry - Prospects and Policies. Paris, 1986.

Office of Technology Assessment and Forecast, OTAF Custom Report, Patenting Trends in the United States and Other Countries. Fractional Count Report 1963-1983, mimeo.

Pelkmans, Jacques, "The Competitiveness of European Industry and the Internal Market". European Institute of Public Administration, Research Documents, RD 8601, Maastricht 1986.

Renshaw, Geoffrey, Adjustment and Economic Performance in Industrialised Countries: A Synthesis. Geneva: International Labour Office.

Rodrik, Dani, "Comparative Advantage and Structural Change: A Quantitative Analysis". UNCTAD Discussion Papers, No. 8, 1982.

Schmidt, Klaus-Dieter et al., Im Anpassungsprozess zurückgeworfen. Die deutsche Wirtschaft vor neuen Herausforderungen. Tübingen: J.C.B. Mohr, 1984, for the Kiel Institute of World Economics.

--, Erich Gundlach, Henning Klodt, "Im Strukturwandel vorangekommen?" Kiel Discussion Papers, No. 122, May 1986.

Summers, Robert, Alan W. Heston, "Improved International Comparison of Real Product and its Composition: 1950-1980". The Review of Income and Wealth, Series 30, 1984, pp. 207-262.

Tarr, David G., "The Steel Crisis in the United States and the European Community: Causes and Adjustments". Paper presented at the NBER/CEPS Conference on Europe-United States Trade Relations, held in Brussels, June 12-14, 1986 (publication forthcoming).

UNIDO, International Comparative Advantage in Manufacturing. Changing Profiles of Resources and Trade. Vienna, 1986.

Witteler, Doris, "Tarifäre und nicht-tarifäre Handelshemmnisse in der Bundesrepublik Deutschland - Ausmass und Ursachen". Die Weltwirtschaft, Year 1986, No. 1, pp. 136-155.

Wolter, Frank, "From Economic Miracle to Stagnation: On the German Disease". In A.C. Harberger (ed.), World Economic Growth. San Francisco, Cal.: Institute for Contemporary Studies, 1984, pp. 95-121.