

Arndt, Sven W.

**Article — Digitized Version**

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Intereconomics

*Suggested Citation:* Arndt, Sven W. (1983) : German export performance, Intereconomics, ISSN 0020-5346, Verlag Weltarchiv, Hamburg, Vol. 18, Iss. 4, pp. 159-165, <https://doi.org/10.1007/BF02928210>

This Version is available at:

<https://hdl.handle.net/10419/139868>

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## EXTERNAL TRADE

### German Export Performance

by Sven W. Arndt, Santa Cruz\*

**The Federal Republic of Germany's exports in 1980 represented approximately 23 % of GNP. Germany's share of total world exports, however, declined throughout the seventies. What are the factors influencing German export performance? What is the outlook for the future?**

Nations take advantage of international trade by exporting commodities in the production of which they hold a competitive edge in order to import those in which they do not. The world benefits from this arrangement because the efficiency of resource utilization is improved, and countries benefit because such trade enhances living standards.

Preservation of its ability to export is important to a nation whose resource endowments prevent it from becoming self-sufficient. Ability to export, however, must be taken in its broadest terms, for time inevitably alters the product mix in which a country holds a competitive edge. For this reason, trading nations must maintain flexibility in their productive structures and create incentives for the reallocation of resources into activities with strong competitive positions.

The shifting among countries of competitive advantage in this fundamental sense is a very gradual process and must be distinguished from forces tending to produce short-term fluctuations in export performance. These forces, which include reversible movements in exchange rates, in relative costs and prices, and in relative factor productivities, are the subject of the following examination of German export performance in the 1970s.

#### Regional Distribution of German Exports

We gain perspective on a country's export structure by considering the country distribution and the commodity composition of its exports. As Table 1 clearly shows, the regional structure of German exports is heavily dominated by shipments to industrial countries, whose share of total German exports has remained remarkably stable over the decade in spite of

considerable short-term fluctuations. The share going to the European Community (EC) shows similar tendencies, while exports to the non-European industrial countries and to the United States have fallen relative to total exports. Shipments to the oil-exporting countries have risen substantially, while those to centrally planned economies expanded rapidly for a time but then receded.

The share of exports destined for developing countries has fallen since 1970, because a small rise in the share of shipments to European developing countries was more than offset by a decline to non-European countries. This decline, moreover, is distributed broadly over developing countries in Africa, Asia and Oceania, and in the Americas.

The regional structure of a country's exports can have an important influence on the growth of its share of total world exports. If, for example, economic growth in the world at large is faster than in the country's main trading partners, its share of world exports will decline. In the 1970s, the industrialized countries who are the Federal Republic's major customers grew less rapidly than the developing countries; growth in the oil-exporting group of nations was also relatively rapid. In combination, world growth patterns suggest influences tending to reduce the German share of world exports.<sup>1</sup>

<sup>1</sup> According to the World Bank, growth in the industrialized market economies amounted to 3.3 % per annum between 1970 and 1980; among these, industrialized Western Europe grew at 2.8 % and North America, Japan and Oceania at 3.6 %. During the same period, average annual growth of all developing countries was 5.1 %, with middle-income oil-importing countries growing at 5.6 % (covering a range of 3.5 % for sub-Saharan Africa to 8.2 % for East Asian and Pacific nations). During this period annual average growth in the non-market industrial economies amounted to 4.8 %. Expressed in terms of growth of GNP per person, the relevant rates were: industrial countries 2.5 %, non-market industrialized economies 3.9 %; capital-surplus oil exporters 4.2 %; oil-importing developing countries 2.7 % and middle income developing oil importers 3.1 %. See World Bank: World Development Report 1981, pp. 3, 10.

\* University of California.

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**Table 1**  
**The Regional Distribution of German Merchandise Exports**  
**(1970-1981)**

Shares (in %) of German Total Exports (Ratios of DM Values)

	1	2	3	4	5	6	7	8	9	10	11	12
	Industrial Countries	EC <sup>1</sup>	Non-European Industrial Countries <sup>2</sup>	US	OPEC	Developing Countries	European Developing Countries	Non-European Developing Countries	Africa	Asia & Oceania	America	Centrally Planned Economies
1970	79.7	47.4	14.2	9.1	2.7	16.2	4.9	11.4	2.6	4.8	4.0	4.3
1971	78.3	47.8	14.4	9.6	2.9	14.2	5.1	9.0	2.1	3.3	3.5	4.3
1972	78.0	48.1	13.6	9.3	3.2	13.6	5.3	8.3	1.6	3.2	3.5	5.2
1973	76.9	48.2	13.0	8.5	3.3	13.5	5.3	8.2	1.8	3.3	3.1	6.1
1974	73.2	45.8	12.3	7.5	4.4	15.1	5.6	9.5	2.0	3.6	3.9	6.9
1975	68.9	44.8	10.2	5.9	7.5	15.5	6.6	8.9	2.1	3.3	3.5	7.9
1976	70.7	46.8	9.5	5.6	8.0	14.1	5.9	8.2	2.2	3.2	2.8	6.8
1977	76.5	45.9	10.4	6.7	9.0	13.8	5.8	8.0	2.3	3.2	2.5	6.1
1978	76.9	46.9	11.0	7.1	8.5	13.3	5.3	8.0	2.0	3.5	2.5	6.2
1979	79.4	49.4	10.4	6.6	6.1	13.7	5.5	8.2	1.8	3.8	2.6	6.0
1980	79.3	49.1	9.9	6.1	6.5	13.3	5.1	8.3	1.8	3.5	2.9	5.5
1981	76.8	46.9	10.8	6.6	8.8	14.1	5.2	9.0	1.9	4.0	3.0	4.9

<sup>1</sup> Membership as of 1981.

<sup>2</sup> Canada, Japan, Australia, New Zealand, United States, South Africa.

Sources: Deutsche Bundesbank: The Balance of Payments of the Federal Republic of Germany: Regional Breakdown (various issues); Sachverständigenrat: Jahresgutachten 1981/82.

**Table 2**  
**Share of German Exports in World Exports**

	1	2	3	4	5	6
	$\frac{X_{FRG}}{X_W}$	$\frac{X_{FRG}^I}{X_W^I}$	$\frac{X_{FRG}}{X_I}$	$\frac{X_{FRG}^I}{X_I^I}$	$\frac{X_{FRG}^{oil-X}}{X_I^{oil-X}}$	$\frac{X_{FRG}^{CPE}}{X_I^{CPE}}$
1970	12.1	12.9	16.4	17.9	13.0	19.7
1971	12.4	13.1	16.7	18.2	12.5	20.8
1972	12.4	13.1	16.9	18.2	12.7	22.3
1973	12.9	13.6	17.9	19.3	14.5	24.7
1974	11.5	12.0	17.7	18.9	14.9	25.9
1975	11.4	11.5	16.8	18.0	14.8	23.3
1976	11.1	11.4	17.0	17.0	15.5	23.9
1977	11.3	11.7	16.4	17.4	16.2	24.4
1978	11.8	12.4	16.6	17.8	15.6	23.5
1979	11.3	12.0	16.3	17.6	13.9	22.9
1980	10.3	11.2	15.6	17.1	12.8	20.7
1981	9.6	10.4	14.5	15.9	13.3	17.3

$X_I^J$  = exports (value in U.S. dollars)  
(subscript: country of origin  
superscript: country of destination)

FRG = Federal Republic of Germany

I = industrial countries

W = world

oil-X = oil exporting countries

CPE = centrally planned economies

Source: IMF: Direction of Trade (various issues).

The evolution of the exports of Germany relative to those of the world is presented in the first two columns of Table 2. The country's share of total world exports declined in the seventies, as did its share of world exports to its major trading partners, the industrial countries. Given the importance of these countries as the Federal Republic's major customers and as her main competitors, German export performance in relation to the industrial countries as a group is given in columns 3-6. The German share of industrial country exports to the world was 16.4 % in 1970, rose to 17.9 % in 1973, and declined to 14.5 % in 1981. Similar patterns are indicated in the other columns which suggest a surge that peaks in 1973 or 1974 and a decline thereafter.

The year 1973 marks the general introduction of floating exchange rates, a major institutional rearrangement that was followed rapidly by the first oil shock. Figure 1 compares changes in the German share of world exports with two measures of the real exchange rate. A real appreciation (depreciation) of the D-mark is accompanied by a rising (falling) German share in world exports. The valuation effect of the exchange rate change thus dominates whatever changes in export volume may be brought about by that change. According to the IMF's *World Outlook* (1982), the

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**Table 3**  
**Export Ratios and Export Penetration**

	Exports (in % of total exports)			Export Penetration (exports in % of total turnover from production)											
	Basic & Prod. Goods Sector	Capital Goods Sector	Consumer Goods Sector	Basic & Prod. Goods			Investment Goods				Consumer Goods				Manufacturing
				Total	Iron & Steel	Chem.	Total	Mech. Eng.	Road Veh.	Elect.	Total	Textiles	Clothing	Food, Drink, Tobacco	
1970	27.1	54.0	11.2	19.0	22.0	29.9	30.2	39.4	33.4	21.8	14.0	17.3	7.2	4.0	20.6
1971	26.0	54.5	11.5												
1972	25.2	55.4	11.6												
1973	26.7	53.7	11.6	21.2	30.1	30.9	33.3	44.5	37.1	23.9	17.3	26.5	10.6	6.3	23.4
1974	32.1	49.1	10.6												
1975	27.5	53.2	10.3	24.4	40.6	30.4	36.9	49.8	27.3	38.7	18.5	28.6	13.0	7.9	26.3
1976	26.2	54.3	11.1	24.0	33.9	32.1	38.6	49.7	39.8	30.1	21.1	32.1	17.2	7.8	27.3
1977	24.9	54.9	11.1	24.2	33.6	31.7	38.6	48.9	39.7	30.2	21.0	32.0	18.5	9.2	27.2
1978	25.5	53.8	11.3	25.0	38.8	32.2	37.4	47.4	38.3	31.0	21.6	33.3	19.1	9.1	27.6
1979	27.2	51.8	11.5	24.8	39.3	34.1	37.2	46.2	39.9	29.8	22.3	35.7	21.2	10.1	27.6
1980	27.2	51.4	11.5	25.0	39.4	36.5	38.3	46.7	41.6	30.5	23.4	36.7	22.5	11.2	28.4
1981	26.6	51.6	10.9	26.0	39.6	37.5	40.8	49.2	42.7	31.4	24.4	39.0	23.9	13.0	29.9

Sources: Sachverständigenrat: Jahresgutachten 1981/82; Deutsche Bundesbank: Monthly Report, Supplement, Reihe 3.

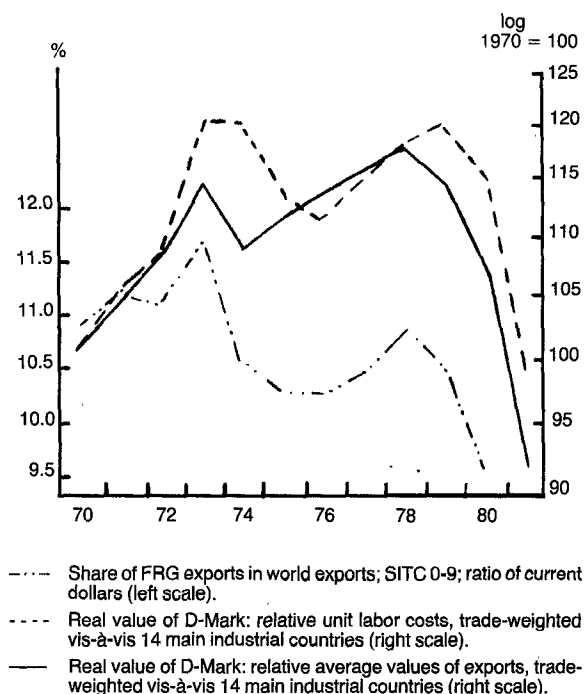
volume of German exports rose in 1973 and 1974, fell sharply in 1975, and then rose each year for the rest of the decade. The volume of German exports rose relative to the volume of world trade between 1973 and 1980 except for the years 1975, 1976, and 1978.

### Commodity Composition

The Federal Republic's merchandise exports are heavily dominated by producer and capital goods. As the first three columns of Table 3 make clear, the relative shares in German total exports of basic and producer goods, of capital goods, and of consumer goods have changed very little over the decade, although they exhibit some cyclical variability during the period.

In contrast to the commodity composition, export penetration has advanced substantially. As a proportion of total turnover from domestic production, exports have risen in every product group. Export penetration increased least in categories like mechanical engineering and road vehicles where the ratio was already relatively high in 1970. With the exception of iron and steel, the largest increases were registered in the consumer goods sector with textiles more than doubling, and clothes and food, drink and tobacco more than tripling their degrees of export penetration.

**Figure 1**  
**German Export Share and Real Value of D-Mark**



Source: Sachverständigenrat: Jahresgutachten 1981/82.

**Table 4**  
**German Export Performance**  
**by Country and Commodity**

	Average Market Growth	FRG Share in Total Market		Share of Exports in Total German Exports		Annual Average Market Gain (+) or Loss (-)
	1969/71-79	70	79	70	79	69/71-79
<b>Countries</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
EEC	19.9	18.7	19.9	46.5	48.4	0.6
Italy	19.5	29.5	29.0	9.0	7.8	-5.6
France	20.4	31.1	31.0	12.4	12.8	-2.7
UK	21.1	9.6	17.5	3.6	6.7	12.9
Netherlands	19.4	31.1	31.0	10.7	10.0	0.1
Denmark	18.0	23.5	25.8	2.3	2.2	5.7
EFTA	18.8	29.6	30.8	18.0	15.7	-1.9
Austria	20.9	53.1	57.0	4.6	5.3	2.4
Switzerland	19.4	34.0	30.8	6.1	5.2	-8.5
Eastern	22.4	22.2	23.7	3.8	5.1	2.8
OPEC	28.8	14.3	14.5	2.8	6.1	4.9
USA	15.5	12.5	10.8	9.2	6.6	-5.6
<b>Commodities</b>						
Chemicals	21.1	20.7	20.4	13.9	14.8	-1.6
Electrical Industry	21.3	18.8	19.6	9.2	10.0	-0.4
Iron & Steel	17.8	18.4	19.7	7.4	6.4	1.1
Road Vehicles	20.2	23.0	23.2	13.7	14.9	1.7
Paper & Paper Prod.	16.9	5.0	8.1	1.1	1.4	11.5
Food & Drink	19.3	5.8	13.2	1.3	2.8	19.3
Capital Goods	19.3	23.2	20.1	37.5	36.8	1.2
Consumer Goods	19.2	19.4	18.5	23.3	23.5	2.1
Internal Goods	19.3	18.0	17.1	31.8	32.1	1.3
Total	19.3	18.6	17.0	100	100	0

Source: OECD: Economic Surveys: Germany, June 1981, p. 59.

A country's share in world exports may fluctuate, as we have already seen, due to differentials in rates of growth between its trading partners and the rest of the world. Analogous effects may be due to differences in rates of growth of demand for commodities traded in world markets, with the country's share of world exports rising when world demand for its exports rises faster than demand in general. These demand-side effects on export performance arising from growth differentials in country and commodity markets must be separated from supply-side effects involving competitiveness proper.<sup>2</sup>

#### Demand Versus Supply Effects

The separation of demand- and supply-side effects is presented in Fig. 2 and Table 4. It is accomplished by means of a constant-market-share analysis of export performance which decomposes changes in a country's

exports into export growth it would have achieved if it had maintained its shares in the total demanded in its country and commodity markets (the demand-side effects) and a residual indicating changes in its competitiveness proper.<sup>3</sup>

Thus, the first column in Table 4 gives the growth between 1969/71 and 1979 of the average market in various German trading partners (top half of table) and of the world markets for major commodity groups (bottom half). These may be compared with (i) the share in each market of exports from the Federal Republic at the beginning and end of the decade (columns 2 and 3) and (ii) the share of exports to each market in total German exports (columns 4 and 5). The last column gives the annual average market gain (+) or loss (-).

The influences emanating from the country-commodity structure of German exports are displayed in Fig. 2.<sup>4</sup> Note that the growth of German export markets largely tracks the unweighted growth of world markets in general. The figure highlights the relation between actual and constant-share growth in German export markets. Thus, between 1972 and 1973, actual growth was faster and thus provoked a market gain; the situation was reversed in 1974/75 which saw a loss in market shares.

Comparing the beginning with the end of the period suggests that the Federal Republic managed to protect her export position, balancing weakened positions in some markets with improved positions in others. In terms of commodities, favorable performances in food, paper and paper products, etc., compensated for weaker performance in chemicals and in electrical products.

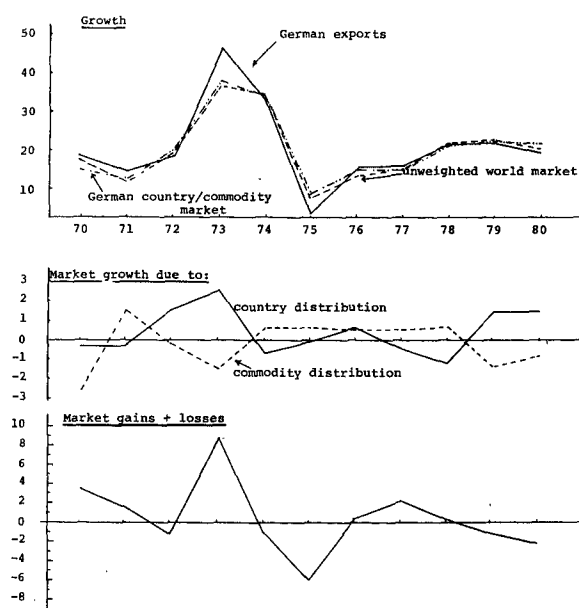
#### Costs, Prices and Exchange Rates

In the foregoing market share analysis, the residual represents the influence of variations in competitiveness on a country's export performance. Since competitiveness refers to a country's ability to

<sup>2</sup> German producers have tended to concentrate their efforts on traditional products, with rather less attention paid to the development of more modern, high-technology products and industries. This exposes German exporters to competition from newly industrializing and developing nations. In order to maintain, let alone advance, living standards developed countries like Germany must permit the structure of their industrial base to shift toward production processes requiring relatively heavy inputs of human capital and towards increasingly sophisticated product lines. Moreover, this transformation of industrial structure must take place against a backdrop of a shrinking industrial base as these economies become increasingly service-oriented.

<sup>3</sup> For details, see E. E. Leamer, R. M. Stern: Quantitative International Economics, Boston 1970, chapter 7; J. David Richardson: Constant Market Share Analysis of Export Growth, in: Journal of International Economics, May 1971; and OECD: Economic Surveys: Germany, Paris, June 1981, pp. 57-59.

**Figure 2**  
**Export Performance**  
 (% change at current US \$ rates)



Source: OECD: Economic Surveys: Germany, Paris 1981, p. 30.

meet the quality and price challenges of rival suppliers, it is appropriate to examine relative prices and relative costs as indicators of competitiveness.

In a competitive world, commodity arbitrage ensures that the price of highly substitutable commodities produced in different countries will tend toward equality when expressed in a common currency (allowing for transport and transactions costs, etc.). Product differentiation based on quality, brand names, joint products and joint services and the like, tends to reduce the degree of substitutability and thus loosens the relationship.

It is generally accepted that exchange rates follow purchasing power parity (P.P.P.) in the long run, but that substantial deviations from P.P.P. may be observed in the short run. They may be due to influences originating in asset markets or to distortions and rigidities in commodity markets. These fluctuations in real exchange rates imply that nominal currency values

move relative to changes in relative prices. Such occurrences are especially likely in the short run when the nominal exchange rate is strongly influenced by events in the financial sector while more sluggish adjustment in the real sector governs the movement of prices.

When such departures from purchasing power parity are temporary, the resulting fluctuations in competitiveness are also of short duration and should not provoke fundamental reallocations of resources – provided that the transient nature of the disturbance is properly understood. Inventory changes and capital market financing of imbalances between production and sales are the temporary shock absorbers. A protracted distortion of price relationships, on the other hand, due perhaps to structural rigidities or government intervention, may provoke more fundamental quantity adjustments – including unemployment and loss of output.

We have noted the substantial fluctuations in the real value of the D-Mark during the seventies. A rise (fall) in the real value of the currency tended to be associated with a rise (fall) in the German market share. As Fig. 2 suggests, German exports tended to rise faster than the unweighted world market or the German country/commodity market when they were rising and to fall faster when they were falling.

### Wages, Prices and Productivity

The Federal Republic is a relatively open economy whose exports in 1980 represented approximately 23 % of GNP. It is a country which faces stiff competition from foreign rivals. If German producers raise prices when wage increases exceed productivity growth, they preserve profit margins but weaken the price competitiveness of their products. If on the other hand, they hold the line on prices, they squeeze profits, thereby impairing capital formation and hence the long-run health of an enterprise. It is for this reason that favorable movements in a country's relative export prices may misrepresent the true state of the export sector's competitive position to the extent that price competitiveness is achieved at the cost of profit margins.

In a detailed study of relative productivities, Kendrick<sup>5</sup> finds that in 1960, which he selects as a benchmark, the Federal Republic had a shortfall of 45 % vis-à-vis the United States in national income per labor hour. (Comparable figures were 44 % for the United Kingdom, 45 % for France, 65 % for Italy and 49 % in 1970 for Japan.) He attributes 11.5 % of the German

<sup>4</sup> In 1974, for example, unweighted world market growth was 33.5 % at current US \$ rates; Germany suffered a loss of 0.8 in terms of its country distribution, while enjoying a gain of 0.6 in terms of its commodity distribution. These forces generated a growth rate of 33.3 % in the Federal Republic's country/commodity market. German exports actually grew by only 32.1 %. For further details, see OECD, op. cit.

<sup>5</sup> See J. W. Kendrick: International Comparisons of Recent Productivity Trends, in: W. Fellner (project director): Essays in Contemporary Economic Problems 1981-1982, Washington, D.C., American Enterprise Institute, 1981, Table 6, p. 137.

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**Table 5**  
**Productivity**  
(year-to-year percentage changes)

	Real GDP per capita			Real GDP per Person Employed			Real Value Added in Industry per Person Employed			Real Value Added in Manufacturing per Person Employed		
	60-67	67-73	73-80	60-67	67-73	73-80	60-67	67-73	73-80	60-67	67-73	73-80
FRG	2.9	4.5	2.4	4.0	4.8	2.8	4.2	5.3	2.9	4.0	5.4	2.7
7 Main Industrial Countries	3.9	3.9	1.8	4.0	3.7	1.4	4.1	4.3	2.1	4.3	5.1	2.7
Total EC	3.5	4.3	2.0	4.3	4.7	2.1	4.4	5.6	2.6	4.8	5.9	2.7
OECD-Europe	3.5	4.2	1.7	4.3	4.5	2.1	4.5	5.5	2.5	4.8	5.8	2.6
USA	3.2	2.5	1.3	2.7	1.6	0.2	3.2	2.1	0.5	3.1	3.3	1.1
Japan	9.1	8.0	2.7	8.6	8.3	3.0	8.4	9.7	4.7	8.8	10.8	6.6

Source: OECD: Historical Statistics 1860-1980.

**Table 6**  
**The Real-Wage Position<sup>1</sup> in Major Countries**

	1972-75	1974	1975	1976	1977	1978	1979	1980	1981
FRG	1.4	3.0	-1.7	-3.2	-0.3	-1.1	-1.1	1.3	0.3
France	3.1	3.4	2.7	-0.3	0.3	-1.5	-1.9	2.4	1.5
UK	3.8	6.8	2.0	-6.4	-5.3	0.3	1.6	2.9	-1.5
Italy	2.2	-0.1	4.0	-3.2	5.1	-1.1	-3.8	-1.2	4.5
USA	0.3	0.6	-1.4	-1.4	-0.3	0.4	0.7	0	0
Japan	4.2	6.4	1.5	-1.6	-2.0	-3.3	-0.1	0.1	0.5

<sup>1</sup> The difference between changes in actual real wages (total compensation per head of dependent employment deflated by the private consumption deflator) and in the warranted real wage (calculated as productivity per head corrected for terms of trade). A negative sign indicates a shift to non-wage incomes.

Sources: OECD: Economic Outlook, July 1982; Sachverständigenrat: Jahresgutachten 1981/82.

shortfall to a lower capital-labor ratio, 19.9 % to technological and efficiency factors, and 6.4 % to the "quality" of labor.

In calculating the sources of growth for the periods 1960-1973 and 1973-1979, Kendrick attributes a major role to capital-labor substitution in raising real gross product per labor hour. Only in Japan does this factor appear to play an even larger role. Changes in labor quality, on the other hand, play a smaller role in Germany than in the other industrial countries in Kendrick's study, while "advances in knowledge" including R+D also are accorded a significant contribution.<sup>6</sup>

If capital/labor substitution provides an important avenue for labor productivity growth, the energy shocks of the seventies are likely to have slowed that substitution process by raising operating costs for many types of capital. At the same time, productivity-raising reallocation of labor from agriculture into industry was largely completed at the beginning of the decade and a shift of labor into the services sector with its characteristically slower productivity growth had begun.

Hence, the major burden for total factor productivity growth must fall increasingly on technological progress.<sup>7</sup>

International competition sharply limits the extent to which real wages may rise in the tradable goods sector of a country. The "warranted" rate of real wage increase is determined in a major way by productivity increases and by changes in the terms of trade. Labor productivity, which is shown for Germany in comparison with other countries and country groups in Table 5, grew at lower rates after 1973 in all regions. The German overall performance during that period was superior to the seven main industrial countries, to the United States, the EC, and OECD-Europe, but it fell far short of the Japanese record.<sup>8</sup>

The movement of actual real wages relative to the warranted real wage is given in Table 6, where a positive (negative) entry indicates real wage movements exceeding (falling short of) those warranted by productivity growth and changes in the terms of trade. The table reflects the real wage explosion in Europe in the early seventies and the subsequent retrenchment.

Over the period as a whole, Germany's record is one of relative real wage moderation.

In sum, there are reasons for concern over the quality of the German producing sector. The capital stock is aging, rates of capital formation may not be adequate both in terms of quantity and type, product mixes show signs of becoming antiquated, and factor productivities are growing less rapidly. But this is by and large an absolute deterioration and not one relative to the group of industrial countries who are still the Federal Republic's major export partners. Indeed, some of them face more serious immediate difficulties. And many, including the Federal Republic, face more immediate

competitive threats from imports produced in the newly industrializing countries. Hence, the changing situation is likely in the first instance to make itself felt in less buoyant growth or perhaps even in a decline in living standards and in a worsening domestic economic climate, rather than in major and sudden shifts in relative export position.

### Outlook

The immediate outlook for the Federal Republic's export position depends on prospects for a resurgence in world production and trade. To the extent that past patterns continue to hold, a world economic recovery will bring with it not only a rise in German exports but in the German export share as well. This development is likely to be accompanied by an appreciation of the D-Mark.

We have seen that Germany's export performance is influenced by the rate of growth of her country-commodity markets relative to the rest of the world. According to the World Bank, growth in GNP between 1980 and 1990 will run between a low of 2.3 % and a high of 3.1 % per annum in the industrial countries; between 2.1 and 2.8 % in the capital-surplus oil-exporting countries; between 2.8 and 3.0 % in non-market industrial economies; and between 2.2 and 3.3 % in the developing countries as a whole. The absolute magnitudes are less important than the relative ones, for the Federal Republic's world export share will rise more, the more her country-commodity market grows relative to the unweighted world market.

In the long run, preservation of competitiveness and thus of living standards requires product and process innovation, and flexibility in the allocation of productive resources which stresses production of commodities and services demanding heavy inputs of human capital and of research and development.

<sup>6</sup> Artus and Turner found a declining rate of growth of the capital stock and an increase in its average age in the seventies in Germany as well as in other industrial countries. Hill has found a fall in the rates of return on capital during the period and the Sachverständigenrat reports a steep decline in profit margins in manufacturing. These developments are likely to have contributed to a slowdown in productivity growth in the Federal Republic. Since, however, similar forces were at work in other countries, it is the relative position of the Federal Republic that matters, and there is little evidence to suggest that a fundamental change in the German competitive position has occurred. There is general evidence, reported by Balassa, that inter-country differences in the structure of exports are, in the case of trade among developed countries, due largely to differences in endowments of physical and human capital. Hence, an advanced country which falls behind in its accumulation of both types of capital will lose competitive strength. Here the German failure to move aggressively into modern product areas using human capital and sophisticated processes may spell trouble in the future. Cf. J. R. Artus, A. G. Turner: Measures of Potential Output in Manufacturing by Ten Industrial Countries, 1955-1980, IMF, processed, May 1978; T. P. Hill: Profits and Rates of Return, OECD, Paris 1979; and B. Balassa: The Changing International Division of Labor in Manufactured Goods, in: Banca Nazionale del Lavoro, Quarterly Review, No. 130, September 1979.

<sup>7</sup> The ratio of R+D expenditures to gross domestic product rose in Germany from less than 1.0 in 1960 to 2.3 in 1973 and 2.39 in 1979. See Kendrick, p. 158. See also the Sachverständigenrat: Jahresgutachten 1981/82, p. 196.

<sup>8</sup> In his comparative study, Kendrick found capital productivity to have declined between 1973 and 1979 in Germany (at an annual rate of 1.9 %), in the United States (-0.2 %), in Japan (-2.3 %), in France (-1.1 %), and in the United Kingdom (-2.6 %). These tendencies are confirmed in a recent study by the Bundesbank: The Growth of Productivity in the Federal Republic of Germany and its Determinants, Monthly Report, July 1980.

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Großoktav, 480 Seiten, 1983, Preis brosch. DM 76,-

ISBN 3-87895-231-7

VERLAG WELTARCHIV GMBH - HAMBURG