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Article — Digitized Version

## Multinationals and structural changes

Intereconomics

*Suggested Citation:* Lefeldt, Mathias; Holthus, Manfred (1977) : Multinationals and structural changes, Intereconomics, ISSN 0020-5346, Verlag Weltarchiv, Hamburg, Vol. 12, Iss. 1/2, pp. 39-45, <https://doi.org/10.1007/BF02929170>

This Version is available at:

<https://hdl.handle.net/10419/139446>

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*Resource-oriented investments* matter even less. In view of its lack of raw materials and — in recent years — its labour market conditions, the Federal Republic even shows locational disadvantages.

For investments of foreign MNCs in Germany the predominating reason is clearly to secure their position in the German market. These investments, particularly those in the mineral oil and the food and beverages sectors are markedly more defensive in character than those of the German MNCs. A look at the age and size of the companies included in our inquiry should suffice to account for this structural difference. The opening up of the German market plays a major role only in the chemical sector, for here a few firms have been included which have been producing in Germany for only a short time. For MNCs operating in the fields of electrical engineering and metal-processing (including the automobile industry) the desire to expand their existing market position is matter of some importance.

Some other differences of motivation between German and foreign MNCs are the following:

- In all branches with the exception of the chemical sector investments are made mainly for reasons of adjustment to measures planned or already put into effect by the predominantly German competitors.
- Trade barriers have ceased to be a matter of importance when investments in Germany are contemplated. In particular subsidiaries of American MNCs do not consider exports as an alter-

native to production in Germany. Maybe if the parent companies had been asked — instead of their already established subsidiaries in Germany — they might have given more weight to trade barriers.

The promotion of sales of foreign group companies weighs less heavily with foreign MNCs' investment decisions than is the case with their German counterparts. This is mainly due to the respectable size these foreign subsidiaries have already reached, but also to the fact that some of these MNCs — and this applies especially to American ones — are less export-minded than German MNCs. For the *export basis* factor the valuation is admittedly somewhat higher. However both valuations in connection with foreign trade give but an insufficiently clear picture of the intensive foreign trade ramifications of the foreign MNCs.

The German subsidiaries of foreign MNCs are frequently integrated with European sister companies or the parent company into a system of mutual division of labour, each specializing in certain production lines. This applies especially to MNCs operating in the field of chemicals, electrical engineering and the metal-working industry. The specialization practiced by these MNCs is reflected by the high share of their output being exported — 29 p.c. (without oil) of the turnover and the far above-average import quota of 21 p.c. (also without oil). Roughly 75 p.c. of this external trade is with companies abroad belonging to the same MNC. Particularly the import side is heavily swollen by the receipt of inputs.

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## Multinationals and Structural Changes

by Mathias Lefeldt and Manfred Holthus, Hamburg \*

**The effects of the activities of multinational corporations on the economy of the Federal Republic of Germany have hardly ever been examined empirically. The role of the multinational corporations (MNCs) in the process of structural change had not been studied either until an enquiry was recently undertaken for the Federal Ministry of Economic Affairs<sup>1</sup>. The following article is based on the expert report which deals with this and other aspects for the first time and is to be published shortly.**

**T**he growth process of the economy of the Federal Republic has always been attended by structural changes. These have been reflected by relative changes in the contribution of individual sectors and industries to the total product of the German economy. The enquiry focused on the structural changes within the manufacturing industry and the relevance of the existence and

activities of multinational corporations in regard to these changes.

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<sup>1</sup> Cf. Rolf Jungnickel, Mathias Lefeldt, Henry Krägenau, Manfred Holthus, *Der Einfluß multinationaler Unternehmen auf Branchenstruktur und Außenwirtschaft der Bundesrepublik Deutschland, Gutachten erstellt im Auftrage des Bundesministeriums für Wirtschaft* (The influence of multinational corporations on the inter-industrial structure and external economic relations of the Federal Republic of Germany, Report on an enquiry on behalf of the Federal Ministry of Economic Affairs), to be published shortly by Verlag Weltarchiv, Hamburg.

Let us look first at the structural changes as ascertained for the enquiry period (1966–1973). The real net product of the manufacturing industry of the Federal Republic amounted in 1966 to just under DM 190 bn (in 1962 prices). In the following seven years it increased by almost 50 p.c. The individual industries did not however participate in the growth process in equal measure. By 1973 the inter-industrial structure had therefore altered. The following structural trends had emerged<sup>2</sup>:

- The steel construction, machinery and vehicle, leather and clothing, and food, drink and tobacco industries carried less weight in relation to the total net production of manufacturing industry. Stones and earths also lost in relative importance.
- The chemical and electrotechnical industries were prominent among manufacturing industries of growing weight. Starting from a rather low position, the rubber, plastics and asbestos manufacturing industry also improved its economic importance substantially.
- The process of structural change left the wood, paper and printing, precision engineering, optical and iron, sheet and metal goods industries, petroleum processing and ferrous and non-ferrous metals production relatively unchanged (cf. Table 1).

Table 1

The Structure of the Manufacturing Industry in 1966 and 1973: Net Production Values at 1962 Prices

Industry	1966		1973	
	DM mn	p.c.	DM mn	p.c.
Chemical industry	21,982	11.6	44,518	15.7
Petroleum processing	6,588	3.5	9,617	3.4
Rubber, plastics and asbestos manufacture	5,845	3.0	11,508	4.1
Stones and earths	11,546	6.1	14,742	5.2
Ferrous and non-ferrous metals production	18,018	9.5	25,970	9.2
Steel construction, machinery and vehicles	39,694	21.0	54,121	19.1
Precision engineering, optical and iron, sheet and metal goods	11,825	6.3	16,326	5.8
Electrotechnical industry	17,570	9.3	33,197	11.7
Wood, paper and printing	15,537	8.2	23,350	8.2
Leather, textiles and clothing	17,187	9.1	19,775	7.0
Food, beverages and tobacco	23,719	12.5	30,310	10.7
Manufacturing Industry	189,316	100	283,430	100

Source: DIW: Produktionspotential und -volumen, Produktionsfaktoren der Industrie, Statistische Kennziffern, Berlin 1974, p. 5.

The observed structural changes are thus the outcome of dissimilar growth conditions in individual industries. Of particular interest in connection with the enquiry are conditions of growth which can be affected by differences between particular enterprises, for from such conditions alone can specific influences of multinational corporations on the structural change be deduced. This means that the general structural change of demand for

instance cannot be a criterion for the enquiry because it is equally relevant for MNCs and national enterprises.

Susceptible to influences emanating from the enterprises are primarily the conditions of growth which determine the development of supply. The enquiry therefore focused on the following criteria:

- Changes in productivity,
- Research and development activities,
- Investment attitudes,
- Capital procurement,
- Marketing strategy.

Differences in growth between the various types of enterprises may be expected insofar as these criteria can be observed to apply differently to national and multinational enterprises, but such differences alone would not warrant conclusions about the contribution of the MNCs to the structural change since the decisive question is whether the relationship between the two types of enterprises in regard to growth is substitutive or complementary. It is, however, certainly possible for the MNCs to make a greater contribution to structural change than can be discerned from the difference in growth if they have a stimulating impact on the national enterprises. This is why an evaluation of the ascertainable differences in growth cannot be related to the different types of enterprises unless the underlying differences in regard to the mentioned criteria are also examined.

The productivity is commonly used as a yardstick for the determination of the efficiency of factor input and combination. In view of the limitations of the available data the enquiry had to be restricted to the labour productivity with respect to sales. Using the productivity *level* of all MNCs compared with the whole of manufacturing industry as a starting point, it is found that the MNCs had in 1966 an advantage of nearly 40 p.c. By 1973 their lead was however down to half this figure. Correspondingly the productivity *trend* of the MNCs in 1966–1973 was below average. The individual industries show certain diversities:

- As far as the productivity *level* in 1973 is concerned, the MNCs appear in a surprisingly strong position in the mineral oil industry; rubber, plastics and asbestos manufacture; steel construction, machinery and vehicles; timber, paper and printing; and drink and tobacco. So do the foreign MNCs

<sup>2</sup> The enquiry period of seven years is really too short to allow general deductions about trends of structural change. The findings are however in accord with other structural analyses covering longer periods. Cf. Kurt Wand, Zum Zusammenhang zwischen technischem Fortschritt und wirtschaftlichem Strukturwandel in der BRD 1950-1970 (On the connection between technical progress and change of the economic structure in the FR Germany in 1950-1970), HWWA Report No. 27, Hamburg 1974.

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**Table 2**  
**Level and Development of Sales-Related Labour Productivities**

Industry	Level in 1973: In DM 1,000				Development in 1966-1973: In p.c.			
	Industry	MNCs <sup>1</sup>	German MNCs <sup>2</sup>	Foreign MNCs <sup>3</sup>	Industry	MNCs <sup>1</sup>	German MNCs <sup>2</sup>	Foreign MNCs <sup>3</sup>
Chemical industry	118	118	118	92	86.2	46.8	42.2	67.3
Petroleum processing	815	1,109	—	1,109	96.3	144.8	—	144.8
Rubber, plastics and asbestos manufacture	69	94	—	94	60.5	34.3	—	34.3
Stones and earths	79	70	—	70	79.5	84.2	—	84.2
Ferrous and non-ferrous metals production	99	97	97	—	86.8	34.7	34.7	—
Steel construction, machinery and vehicles	76	99	97	104	65.2	54.7	56.5	50.7
Precision engineering, optical and iron, sheet and metal goods	62	71	64	73	67.6	61.4	263.1	55.3
Electrotechnical industry	67	67	60	92	81.1	91.4	78.5	130.0
Wood, paper and printing	72	121	121	—	67.4	41.1	41.1	—
Leather, textiles and clothing	58	60	60	—	56.8	49.5	49.5	—
Food, beverages and tobacco	168	232	238	229	55.6	45.0	15.0	60.1
Manufacturing industry	37	107	91	161	70.6	62.1	54.2	78.9

<sup>1</sup> Based on 56 enterprises; <sup>2</sup> Based on 30 enterprises; <sup>3</sup> Based on 26 enterprises.

Sources: Statistisches Bundesamt: Fachserie D, Industrie und Handwerk, R. 1, II. Unternehmen; HWWA-Institut für Wirtschaftsforschung, Questionnaire on MNCs (unpubl.); Company reports and other information collected by the Company Archives of the HWWA-Institut für Wirtschaftsforschung-Hamburg.

in the Federal Republic in particular; the German MNCs are – with the exception of those in the food, drink and tobacco industry – closer to the average for their industries.

□ Considerable differences between individual industries and the MNCs in them also emerge in regard to the productivity trend. They are especially marked in ferrous and non-ferrous metals production where the productivity trend in general was above-average but the MNCs experienced an opposite trend. In the mineral oil industry on the other hand the MNCs achieved a far above-average rise in productivity.

□ The productivity differential between German and foreign MNCs widened during the enquiry period: the productivity gain of the foreign MNCs exceeded that of the German MNCs even though they had already been ahead in 1966. A look at the individual industries reveals an extremely diversified picture. Details are shown in Table 2.

In toto it can thus be said that the MNCs show superior overall productivity, and this fact emerges even more clearly if allowance is made for methodological and data-related distortions. The differences between German and foreign MNCs cannot be attributed entirely to inadequacies of statistical information. On the contrary, it can be assumed that the two groups differ in some industries in regard to the technology employed and the degree of mechanization and rationalization reached<sup>3</sup>.

<sup>3</sup> As the productivity rates used here are related to sales, allowance must be made for influences arising from the vertical production range of an enterprise. Taking an overall view, it may be assumed that this range is larger in the case of MNCs than in the (smaller) national enterprises. This results in a tendency to underrate the productivity of the MNCs, especially the German MNCs.

As for the effect of increasing productivity on the growth of sales, it may be stated that – with the exception of the electrotechnical and petroleum processing industries and, to a lesser degree, precision engineering, optics, and iron, sheet and metal goods – the MNCs did not base their sales growth to the same degree on the productivity trend as did the national enterprises.

Research and development (R&D) are thought to be assuming increasing importance for economic growth; some observers are going so far as to treat R&D as a production factor. The quantification of R&D results calls however for highly complicated methods, and these require more comprehensive data than are currently available. R&D expenditures are therefore substituted for R&D results. In the Federal Republic they are concentrated on a few industries: steel construction, machinery and vehicles (37.6 p.c.), electrical

**Table 3**  
**Research Intensity<sup>1</sup> of MNCs and All Enterprises in 1971**

Industry	total	MNCs		Industry total
		German	foreign	
Chemical industry	5.6	5.8	2.4	4.1
Steel construction, machinery and vehicles	3.0	2.6	3.4	2.5
Electrotechnical industry	7.0	7.6	4.0	4.0
Others	0.2	0.2	0.2	0.2
Manufacturing industry	4.4	6.2	1.2	1.5

<sup>1</sup> Research and Development expenditure in per cent of sales.

Sources: Helga Echterhoff-Severitt, Forschung und Entwicklung in der Wirtschaft 1971 (Research and development in the private sector 1971), Essen 1974, p. 40/41; HWWA-Institut für Wirtschaftsforschung, Questionnaire on MNCs (unpubl.); Company Reports and other information collected by the Company Archives of the HWWA-Institut für Wirtschaftsforschung-Hamburg.

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industry (26 p.c.) and chemicals (27 p.c.). There are correspondingly large differences in the research *intensity*<sup>4</sup> of the individual industries.

Multinationals are playing a dominant role in R&D. They account for about 88 p.c. of all R&D expenditure in German industry, and this is reflected by their research intensity which is in some industries far above the average (cf. Table 3).

There are remarkable differences in research intensity between German and foreign MNCs. The fact that the German MNCs engage in much more extensive R&D activities – except in steel construction, machinery and vehicle production – must not however be interpreted as evidence of technological inferiority of the foreign MNCs; the balance of royalty payments of the latter shows that most of them are drawing on R&D findings of their parent companies. On enquiry 12 out of 20 foreign MNCs in the Federal Republic stated that their manufacturing activities were largely or wholly based on the technological know-how of their parent company.

It may be assumed that the R&D work of the MNCs exercises an indirect influence on their respective industries in the Federal Republic, in addition to its direct effects. For national firms in industries in which MNCs operate will also carry out more R&D work and use the results of the MNCs in order to stay competitive. The empirical evidence which points to a low level of R&D activities by national firms rather suggests the latter. The R&D

work of the MNCs is thus acting as a “technological multiplier”<sup>5</sup> in promoting the growth also of national enterprises.

The investment policy can be important for structural change in three respects. First, the quantitative increase of investments has to be regarded as an input factor. Secondly, the investments are an instrument for the effectuation of technical progress. Finally, locational advantages can be turned to account by geographical dispersal of the investments, especially if it goes beyond national borders.

The *quantitative increase* of the input factor “capital” is measured in two ways – by reference to the average annual growth rate of the investments and by the investment quotient, i.e. the ratio of investments to sales. Both show that – except in the oil processing industry – the investments of the MNCs were above the average in the enquiry period. This MNC attitude to investment activities is not however reflected by both yardsticks throughout. The investment quotients are shown in Table 4.

How the investments helped to implement the *technical progress* can best be determined by a comparison using capital intensity, capital-output ratio and labour productivity as indicators. For lack of suitable statistical data the marginal figures had to be used for this purpose instead of the average coefficients. The MNCs were found to have carried out larger linear capacity extensions by means of their investments than the national enterprises while the latter were more inclined towards raising their productivity level through rationalization. Several MNCs with for-

<sup>4</sup> Ratio of R&D expenditure to sales.

<sup>5</sup> John H. Dunning, *Technology, United States Investment and European Growth*, in: Charles P. Kindleberger (ed.), *The International Corporation*, Cambridge, Mass., and London 1970, p. 144.

**Table 4**  
**Average Investment Quotients<sup>1</sup> in 1966–1973**

Industry	All Enterprises		All MNCs		German MNCs		Foreign MNCs	
	p.c.	Index <sup>2</sup>	p.c.	Index <sup>3</sup>	p.c.	Index <sup>3</sup>	p.c.	Index <sup>3</sup>
Chemical industry	9.2	153.3	10.5	114.1	10.6	115.2	9.2	100.0
Petroleum processing	4.6	76.7	4.5	97.8	—	—	4.5	97.8
Rubber, plastics and asbestos manufacture	7.8	130.0	20.2	258.9	—	—	20.2	258.9
Stones and earths	9.2	153.3	6.8	73.9	—	—	6.8	73.9
Ferrous and non-ferrous metals production	6.7	111.7	6.1	91.0	6.1	91.0	—	—
Steel construction, machinery and vehicles	5.5	91.7	6.7	121.8	6.3	114.5	8.2	149.1
Incl.: Road vehicles	7.0	116.7	7.7	110.0	7.6	108.6	7.9	112.9
Precision engineering, optical and iron, sheet and metal goods	4.9	81.7	11.3	230.6	—	—	11.3	230.6
Electrotechnical industry	5.4	90.0	6.9	127.8	5.3	98.1	11.3	209.3
Wood, paper and printing	6.5	108.3	9.9	152.3	9.9	152.3	—	—
Leather, textiles and clothing	4.2	70.0	—	—	—	—	—	—
Food, beverages and tobacco	4.5	75.0	3.6	80.0	—	—	3.6	80.0
<b>Manufacturing Industry</b>	<b>6.0</b>	<b>100.0</b>	<b>7.1</b>	<b>118.3</b>	<b>7.2</b>	<b>120.0</b>	<b>7.0</b>	<b>116.7</b>

<sup>1</sup> Gross fixed investments in p.c. of sales; <sup>2</sup> Manufacturing Industry = 100; <sup>3</sup> All enterprises = 100.

Sources: Company Reports and other information collected by the Company Archives of the HWWA-Institut für Wirtschaftsforschung-Hamburg.

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**Table 5**  
**Cash Flow (CF) and Gross Investments in Selected Manufacturing Industries in 1966–1972**

Year	Chemical industry				Ferrous and non-ferrous metals production				Road vehicles				Electrotechnical industry			
	All enterprises		All MNCs		All enterprises		All MNCs		All enterprises		All MNCs		All enterprises		All MNCs	
	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF	CF in p.c. of sales	Gross investments in p.c. of CF
1966	19.9	56.9	19.3	73.1	11.5	28.0	6.7	73.0	15.2	48.1	17.0	55.0	12.3	33.3	10.1	56.2
1967	18.7	45.5	20.8	51.3	11.5	43.8	7.8	60.6	15.4	40.4	15.8	49.3	11.9	44.2	11.1	49.4
1968	18.1	43.2	21.3	41.9	10.7	55.1	8.2	47.0	14.0	50.0	16.2	38.2	10.8	59.5	11.5	39.6
1969	17.8	54.3	20.0	59.0	11.8	57.4	7.8	80.0	14.4	46.2	15.5	49.8	10.9	60.0	10.4	62.7
1970	14.8	95.2	15.2	89.4	11.4	63.2	6.9	197.6	11.0	74.6	11.7	84.9	10.5	75.9	8.9	74.2
1971	13.4	64.1	15.2	63.2	8.6	88.0	5.9	127.3	10.0	66.1	10.4	86.3	9.4	84.7	7.9	67.8
1972	13.9	62.8	16.3	49.6	8.3	85.4	6.5	91.7	11.6	45.1	11.6	57.6	10.8	40.5	9.7	46.0

Sources: Deutsche Bundesbank, Jahresabschlüsse der Unternehmen in der Bundesrepublik Deutschland 1965–1972 (Annual accounts of the enterprises in the Federal Republic of Germany 1965–1972), special print of Deutsche Bundesbank, Frankfurt 1975; Company Reports and other information collected by the Company Archives of the HWWA-Institut für Wirtschaftsforschung-Hamburg.

oreign parent companies however also concentrated on investment for rationalization.

The *direct investment policy* of the MNCs has had relatively little effect on the German inter-industrial structure. Analysis of the motives for and enquiries into the effects on exports of the direct investments revealed that the investment activities of German MNCs in the Federal Republic are not impaired by their direct investments abroad. The investments of foreign MNCs in Germany are to an overwhelming part of a substitutive nature.

It has to be borne in mind that direct investments have production-technical repercussions as well as direct effects. The rationalization brought about by intra-groupal division of labour in German MNCs has not gone very far. Only of the foreign MNCs in the Federal Republic it can be said that their in part greater productivity advances and higher productivity levels are to a significant extent due to the rationalization effects of intra-groupal division of labour.

Considerable importance is attached to the financing policy of the MNCs and especially to the financing of their investments. It is assumed that the technical and competitive superiority of the MNCs enables them to earn larger financial surpluses in the operation of their businesses than do national firms. Whether the MNCs have by their economic activities acquired a better growth and regeneration potential than national enterprises can be determined approximately by using the *cash flow*<sup>6</sup> as an indicator.

<sup>6</sup> This is an indirectly calculated Gross Cash Flow. On the methods of calculation and relevance of cash flow cf. L. Lachnit, Die betriebswirtschaftliche Kennzahl Cash Flow (Cash flow as an indicator for management), in: Wirtschaftswissenschaftliches Studium, ed. E. Dichtl, O. Issing, Year 1975, No. 5, p. 219 ff.

The available empirical data (cf. Table 5) show that – except in the chemical and electrotechnical industries – this is not the case even if, as in the road vehicle industry, the ratio of cash flow to sales is above the average. That local operations leave a low financial surplus in relation to investment activity may however, apart from statistical inaccuracies, be due to the international nature of the MNCs. The outlays of foreign MNCs may contain hidden profits made possible by “internal pricing” (fees for management services, licences and know-how), and the German MNCs may have incurred expenditures connected with productions abroad which are not matched by commensurate earnings because funds have to be retained in other countries.

The thesis that the MNCs enjoy easier access to the international capital markets and are therefore able to raise capital in the countries where it is cheapest and to employ it where it earns the highest profit is closely connected with the fact that MNCs for financing purposes often set up so-called intermediate companies in other countries. The available empirical evidence shows that loan issues via financing companies have played a relatively unimportant role in the case of German MNCs. Furthermore, it appears from the financial contributions of the MNCs to the balance of payments that surpluses derived from the cash flow generated abroad have probably not been used to any significant extent as a source of finance for investment by domestic divisions of German MNCs. Foreign MNCs however appear to have made more use of such financing opportunities.

The analysis of the division of labour in the sphere of investment finance likewise does not

provide any real evidence calling for a modification of the observations about the effects of direct investments on investment attitudes in the Federal Republic, either for German or for foreign MNCs.

The distinctive feature of the business activities of the MNCs in the marketing sphere is that they are probing the world markets constantly for new opportunities. Their market research findings are the basis of a "marketing mix strategy" which determines the combination of the major marketing instruments (product planning, pricing, distribution, advertising) for the individual subsidiary companies and regional divisions and the group as a whole<sup>7</sup>. A question which arises in this context is what scope there is for worldwide standardization and thus also central coordination of the marketing strategy. Marketing is still the most decentralized functional sphere of the multinational corporations but there are signs of a tendency towards increasing standardization which opens the door to a centrally organized marketing policy.

Multinational corporations enjoy specific advantages in the marketing sphere. Enterprises confined to one country would often not find it worth their while to spend so much money on evolving a marketing technology as the MNCs do. This is a point which has special application to marketing research. Comprehensive and largely computerized marketing information systems however are often regarded as indispensable for successful competition in the world market<sup>8</sup>.

Their worldwide presence gives a decisive advantage to the multinationals. Thanks to their comprehensive knowledge of the markets they can introduce and test new products in the most suitable markets for the particular purpose and then adapt them step by step to the requirements of the other markets, thereby minimizing the "aggregate cost of introduction"<sup>9</sup>. National firms have to rely on their home market and are consequently less well protected against failure.

The long-term influence of MNCs' marketing strategies on the development of individual industries and more particularly the question whether other firms are ousted by their competition or not cannot be judged in isolation from the other growth factors.

The analysis of the background factors which have a bearing on growth showed the MNCs to be some-

<sup>7</sup> Cf. W. Dymnsza, *Multinational Business Strategy*, New York 1972, p. 109 ff.

<sup>8</sup> Cf. *Business International S.A., Managing the Multinationals*, London 1972, p. 134: "A firm that fails to use computers for improved information gathering, storage, analysis etc., and therefore more effective planning and decisionmaking, will not survive tomorrow's competitive battle for world markets."

<sup>9</sup> E. J. Koide, *The Multinational Company*, Toronto 1974, p. 32.

**Table 6**  
**The Increase in Sales of the MNCs and Total Industries in 1966-1973**  
(in p.c.)

Industry	Industry total	total <sup>a</sup>	MNCs		Other enterprises
			German <sup>b</sup>	foreign <sup>c</sup>	
Chemical Industry	77.7	94.8	99.3	51.2	61.0
Petroleum processing	145.6	117.6	-	117.6	201.7
Rubber, plastics and asbestos manufacture	111.6	573.6	-	573.6	105.5
Stones and earths	74.8	120.7	-	120.7	73.1
Ferrous and non-ferrous metals production	68.1	61.2	61.2	-	69.4
Steel construction, machinery and vehicles	80.9	84.5	85.9	80.3	78.8
Precision engineering, optical and iron, sheet and metal goods	72.1	54.8	476.7	36.2	72.7
Electrotechnical industry	114.8	115.9	86.0	173.2	113.6
Wood, paper and printing	81.1	92.5	92.5	-	80.8
Leather, textiles and clothing	28.0	64.3	64.5	-	27.1
Food, beverages and tobacco	56.9	63.3	48.4	71.3	55.4
Manufacturing industry	76.3	92.8	87.1	104.1	70.7

<sup>a</sup> Based on 56 enterprises; <sup>b</sup> Based on 30 enterprises; <sup>c</sup> Based on 26 enterprises.

Sources: Statistisches Bundesamt, Fachserie D, Industrie und Handwerk, R. 1, II. Unternehmen; HWWA-Institut für Wirtschaftsforschung, Questionnaire on MNCs (unpubl.); Company Reports and other information collected by the Company Archives of the HWWA-Institut für Wirtschaftsforschung-Hamburg.

what superior to national enterprises. Accordingly their sales grew in 1966-1973 by 20 p.c. more than those of manufacturing industry as a whole. The MNCs recorded above-average growth rates in all industries except petroleum processing, ferrous and non-ferrous metals, precision engineering, optical and iron, sheet and metal goods although there were differences. The growth rates of the German MNCs were only slightly above the average, and an analysis of the individual industries shows very wide variations (cf. Table 6).

The differences in growth between multinational and national enterprises do not, as has been indicated, permit deductions about the impact of the MNCs on changes of the inter-industrial structure. For such deductions it is necessary to take the intra-industrial growth relations of the two groups into account. Complementary growth relations were assumed to exist between the two types of enterprises whenever the ratio of sales to productivity is identical, and conversely it was assumed that there are substitutive growth relations between them when a more favourable ratio is indicated for MNCs than for national enterprises. In addition, the possible repercussions of import substitution and export expansion on the part of

MNCs on the development of individual industries are taken into account<sup>10</sup>.

The following analysis is confined to industries in which multinational corporations are of a certain importance for the market (market share of > 10 p.c.). The following results were obtained for the six major industries in question:

□ In the chemical industry the MNCs imparted positive impulses to the industry as a whole in spite of certain substitutive growth relations between national and multinational enterprises. This is to a significant part due to the fact that the direct investments helped on balance to expand exports. Otherwise the growth rate for the whole chemical industry would probably have been 10–15 percentage points lower (65 p.c. instead of 77.7 p.c.).

□ The effect on the petroleum processing industry is particularly difficult to assess. As the vertical concentration of the enterprises in this industry is of special importance, it is doubtful whether national oil companies of the Federal Republic could have provided a full substitute for the functions and growth dynamics of the MNCs. The estimate that on the alternative assumption the growth rate of the petroleum processing industry would have been about 100 percentage points lower (50 p.c. instead of 145.6 p.c.) takes only a minimum influence of the MNCs into consideration.

□ In regard to the growth in the ferrous and non-ferrous metals production considerable substitution relations were observed between national and multinational enterprises. The sales of the MNCs expanded substantially at the expense of the potential growth of the national enterprises, especially in the domestic market. The sales opportunities of the MNCs in foreign markets exercised at best a small influence only on the growth of this industry as a whole (65 p.c. instead of 68.1 p.c.).

□ In steel construction, machinery and vehicles production substitutive growth relations were also noted between the two groups of enterprises. The MNCs exercised positive influences through their interest in foreign markets. Besides it is doubtful whether national enterprises would have been willing and able to enlarge their plant capacities as required. On balance the MNCs had therefore a positive influence of about 1–2 percentage points (79 p.c. instead of 80.9 p.c.).

□ On the growth of the electrotechnical industry the MNCs exercised a very strong positive influ-

ence. The growth relations between national and multinational enterprises in this field may be regarded as predominantly complementary. The large increase of the exports evidently made for "peaceful coexistence" of the enterprises in this industry. Without the influence of the MNCs the growth rate of this industry would probably have been 15–20 percentage points lower (97 p.c. instead of 114.8 p.c.).

□ In the food, beverages and tobacco industry conditions are different. There exist strong substitution relations between the national firms and the (predominantly German) MNCs. It may be assumed that the MNCs have had relatively little influence on the growth of this industry as a whole (56 p.c. instead of 56.9 p.c.).

The alternative developments in the individual industries taken together – and with sales figures transformed into net output values – indicate an alternative real production structure for 1973 on the assumption that the multinational enterprises would have behaved like national firms. The contribution of the MNCs to the structural change emerges from the juxtaposition of the actual and alternative production structures in Table 7. Insofar as the influence of the MNCs reinforced development trends, it is regarded as positive, and insofar as it impeded them, as negative.

**Table 7**  
**Actual and Hypothetical Structural Development and Contribution of the MNCs to the Change in the Structure of Production**

Industry	Production structure in 1966 in p.c.	Production structure in 1973 in p.c.		Contribution of MNCs to the structural change in p.c.
		hypothetical	actual	
Chemical industry	11.6	14.9	15.7	+ 19.5
Petroleum processing	3.5	2.8	3.4	- 500.0
Ferrous and non-ferrous metals production	9.5	9.3	9.2	+ 33.3
Steel construction, machinery and vehicles	21.0	19.5	19.1	+ 21.1
Electrotechnical industry	9.3	11.2	11.7	+ 20.8
Food, beverages and tobacco	11.5	11.0	10.7	+ 37.5
Other industries	33.6	31.3	30.2	+ 32.4
Manufacturing industry	100.0	100.0	100.0	

Sources: DIW, *Ibid.*, p. 5; Calculations by the HWWA-Institut für Wirtschaftsforschung-Hamburg.

Apart from the mineral oil industry which is subject to special problems, the MNCs are seen to have had a generally positive influence on the structural change. Whether these structural developments in the manufacturing industry are to be judged economically desirable is another question.

<sup>10</sup> It is impossible to give here more than a rough outline of the methodological concept. For details see: Rolf Jungnickel, Mathias Lefeldt, Henry Krägenau, Manfred Hoithuis, *Ibid.*, Part D, Chapter 4, para. 2, section a.