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Working Paper No. 14

Assistance to Industry in West Germany
by

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by

Gerhard Fels

1. This paper has four aims: First, it surveys the assistance given to individual sectors and industries in West Germany and makes an attempt to estimate its magnitude in terms of nominal and effective rates of protection; in contrast to the previous calculations [2, 3] the estimates presented here deal with protection in a wider context by including all measures of non-tariff assistance and by relating industrial protection to protection given to other parts of the economy. The second section of the paper discusses the objectives of assistance policy from a national and an international welfare point of view. The third section proceeds with a comparative analysis of the impact assistance measures have had on factor incomes and resource allocation among industries. Fourth and finally, some conclusions are drawn with respect to restructuring assistance policy.
2. Under assistance we understand all governmental measures which favour individual sectors, industries, branches or firms more than others. The measures can take the form of direct subsidies, tax relief or other tax privileges, tariffs, non tariff barriers to trade, governmentally guaranteed minimum prices or minimum sales, or permission to cartelise markets. As to West Germany's industry, the subject of this study, assistance largely takes the form of subsidies, tax exemptions or trade protection. The other forms of assistance can be found

* Prepared as a contribution to a book on "Protection and Assistance to Industry: Britain and Germany" to be edited by Max Corden, Oxford, and Gerhard Fels, Kiel.

mainly in non-industrial sectors, especially in agriculture. Assistance to them is considered in so far as it is important to see how industrial assistance relates to non-industrial assistance.

3. What is important from an overall welfare point of view is the effect of assistance measures on inter-industrial and inter-sectoral allocation of resources. The allocative effect has an international and a national welfare aspect. Internationally, assistance measures interfere with the division of labour if they are not applied uniformly to all industries. In terms of Bhagwati's pathology¹ one can say that they hinder an equalisation of domestic and foreign rates of transformation. From a national welfare point of view, assistance to individual industries (or non-assistance to the others) can cause inequalities between domestic rates of transformation and domestic rates of substitution, thus preventing production patterns from approximating consumer preferences in a laissez-faire manner. Most assistance measures generate both the international and national type of distortion. Interventions which affect internal allocation only are relatively seldom². These distortions of the international and national markets

¹Bhagwati describes the international aspect by $FRT \neq DRT = DRS$ and the national aspect by $DRS \neq DRT = FRS$ (where FRS denotes the foreign rate of transformation, DRT the domestic rate of transformation, and DRS the domestic rate of substitution, respectively). See [1, p. 72].

²An example is the West German value added tax which is not uniform for all commodities and to which the destination principle is applied to exports and imports.

are "policy-imposed" and lead to deviations from optimal welfare, which is supposed to be achieved in a situation characterised by the non-existence of assistance, and free trade and perfect competition everywhere. The last two elements of the reference system are rather unrealistic because even in the laissez-faire case there are market imperfections. Bhagwati calls distortions which can be ascribed to these imperfections "endogenous", as distinct from "policy-imposed" ones. Both types of distortions can be classified according to the same pathologies. Since all distortions interact, the welfare effect of assistance policy depends on whether it compensates or amplifies endogenous distortions. One must bear the interaction in mind if we are talking about the welfare effects of assistance measures, although for practical economic purposes it is nearly impossible to identify and handle "endogenous" distortions.

Assistance to sectors and main industry groups

4. During the sixties, a shift occurred in West Germany's industrial assistance policy from assistance by trade barriers to assistance by domestic subsidies and tax allowances. The reason for this is obvious: trade policy has become subject to multi-national agreements in which liberalisation and significant tariff reductions have been achieved. In six GATT rounds, trade discrimination against foreign competition was largely reduced, except for a hard core of protection still upheld in favour of labour-intensive and raw material-intensive industries. Not all industries which were exposed

to freer trade were in a position to defend their original markets without governmental assistance. The government, however, intervened with only some by granting direct subsidies, tax relief, taxation of substitutes, or by initiating international (so-called voluntary) restraint agreements, while leaving alone most other branches with adjustment problems. Assistance measures have been provided to branches which produce for primary needs, and/or whose survival is closely associated with traditional ideas of an autonomous nation. Besides agriculture, these characteristics apply to coal mining, oil production, the iron and steel industries, and shipbuilding [2, pp. 3].

5. Another case for governmental assistance stemmed from the fact that West Germany's aircraft and computer industries were considered to be in a backward position vis-à-vis foreign competitors. According to widespread opinion, both industries belong to those activities which have above average growth prospects. Assistance to them has also been justified by the often quoted technological gap between the United States and Europe. It was an important objective of technology policy to close this gap. The support provided can be characterised as a mixture of growth promotion and infant-industry protection.
6. Table 1 gives an impression of assistance in percent of gross production by sectors and main industrial groups in 1970. The figures are collected from various estimates, the origins of which are described in the Appendix. A distinction

is made between assistance by trade protection and assistance by subsidies (including tax reliefs)¹. Agricultural protection is considered to be trade protection in as far as it rests upon the price effects of the Common Agricultural Policy.

The figures can be interpreted as nominal rates of protection, but in order to avoid confusion it might be advisable to talk about "nominal rates of assistance" with respect to assistance by subsidies etc. which are given both to international and domestic factors. The nominal rates of protection ascribed to the domestic sectors 7 to 12 are of hypothetical nature (as to the method of calculation compare the Appendix), for they represent only the output price equivalent of higher input prices caused by protection.

7. The figures show that three areas are protected more than 10 p.c. of gross output: agriculture, food processing, and the consumer goods industries. In all three cases protection mainly takes the form of trade barriers, in agriculture, however, it is also significantly assisted by direct subsidies. Beside agriculture, the transportation and communi-

¹Up to the beginning of the 'seventies the international sectors had been indirectly subsidised by fixed undervalued exchange rates in combination with relatively restrictive domestic demand management. While the domestic sectors often had to suffer from internal stabilisation policy, the international sectors could price their products, especially their exports, in accordance with the more inflationary foreign price trend. An attempt to quantify this kind of assistance would require a lot of heroic assumptions. For this reason, and because exchange rate policy has changed since the early 'seventies, this aspect has been neglected here.

Table 1 - Nominal Rates of Trade Protection and Direct Assistance to the
West German Economy by 12 Sectors, 1970

Sectors	Nominal rate of trade protection ^a	Nominal rate of direct assistance ^b (1)	Nominal rate of total assistance ^b (2)
International Sectors			
1. Agriculture, forestry, fishing	21.3	20.9	46.7
2. Energy and mining	0.3	2.2	2.5
3. Primary and intermediate goods industries	7.9	0.3	8.2
4. Investment goods industries	9.1	0.2	9.3
5. Non-food consumer goods industries	11.9	0.2	12.1
6. Food processing	22.0	0.7	22.9
Domestic Sectors			
7. Construction	3.4 ^c	2.2	5.7 ^c
8. Whole sale and retail trade	1.9 ^c	0.2	2.1 ^c
9. Transportation and communication	2.9 ^c	5.8	8.9 ^c
10. Banking and insurance	2.8 ^c	1.7	4.5 ^c
11. Ownership of dwellings and miscellaneous services	3.7 ^c	1.9	5.7 ^c
12. Public administration	2.7 ^c	0	2.8 ^c
Total economy	6.4	1.2	7.7

^a Source: See Appendix I. - ^b Subsidies, tax privileges etc. in percent of gross output minus subsidies, tax privileges etc. and nominal trade protection. - ^c Hypothetical values.

cation sector is highly subsidised, especially by means of public deficit offsetting in favour of mail and railroad. These subsidies are likely to have an important impact on resource allocation, because they can be considered a compensation of losses originating from mail and railroad services which have been upheld for social reasons, or as infrastructural support to backward regions. The subsidies and tax allowances in housing are difficult to ascribe to a single production branch. Partly, they favour tenants and house owners, thus not appearing in the production-oriented scheme in table 1. Partly, they may have caused over-demand in the construction sector and blown up its factor income. In the calculations, it was assumed that 50 p.c. of housing subsidies flow to the construction sector.

8. From the resource allocation point of view, effective protection matters more than nominal protection. In order to arrive at effective protective rates, two assumptions had to be made in addition to those usually underlying the concept of effective protection:

First, subsidies and tax privileges to individual industries increase the factor income of the industry without having a price lowering effect. This seems to be a realistic assumption since only support to producers is considered, the aim of which is normally the improvement of the situation of assisted industries.

Secondly, the domestic sectors not exposed to international competition are neither positively nor negatively affected by trade protection. In other words, overpriced inputs from sectors favoured by protection are fully offset through higher output prices (represented by the hypothetical nominal rates of protection ascribed in sectors 7 to 12 in table 1), so that the effective trade protection of domestic sectors remains zero. This assumption is fairly plausible because in domestic sectors foreign competition fails to be a barrier to passing on increased input prices.

The calculation of effective assistance rates (see Appendix) starts with the nominal trade-protection rates in table 1. By employing an appropriate input-output table, one arrives at the effective trade-protection rates (table 2, column 1). Direct subsidies and the equivalent of tax privileges are related to the free trade value added of each sector (table 2, column 2). The total effect of trade protection and direct assistance (column 3) is then obtained by adding the results in column 1 and 2. By switching from nominal to effective rates of assistance, the inter-sectoral profile of protection is modified; especially the peaks of assistance in agriculture, food processing and non-food consumer goods industries become

more marked¹. Energy and mining is revealed as being an unprotected sector after overpriced inputs are taken into account; but coal mining, which covers 55 p.c. of the sector's value added, is nevertheless a highly protected industry. Among the domestic sectors, the transportation and communication sector turns out to have an above average rate of assistance. Because there is no foreign competition in the domestic sectors, assistance to them affects mainly the equality between DRS and DRT. In as far as assistance to domestic sectors influences the input prices of international sectors it causes, in addition, an inequality between DRT and FRT as well as direct assistance to those sectors.

10. Besides trade protection and direct assistance dealt with above, the regional promotion programmes implemented in West Germany during the late 'sixties provide implicit assistance to industry. Within the framework of these programmes, investment premiums up to 25 p.c. can be granted

¹The effective rate of trade protection of the primary and intermediate goods industries (5.0 p.c.) turns out to be considerably lower than the rates (13.9 p.c.) arrived at by Hiemenz and v. Rabenau [3]. The cause for the difference lies, as for the other but smaller differences, partly in the fact that the highly overpriced inputs from agriculture and food processing are taken into account here. In addition, the level of aggregation used in the calculations is higher than in Hiemenz' and v. Rabenau's study. Therefore, the escalation effect is reduced due to lower nominal tariffs on intrasectoral inputs than on the sector's output.

Table 2 - Effective Rates of Trade Protection and Direct Assistance to the West German Economy by 12 Sectors, 1970

Sectors	Effective rate of trade protection ^a	Effective rate of direct assistance ^b	Effective rate of total assistance
International Sectors			
1. Agriculture, forestry, fishing	34.4	66.7	124.0
2. Energy and mining	- 5.5	5.8	0.0
3. Primary and intermediate goods industries	5.0	0.8	5.8
4. Investment goods industries	4.4	0.6	5.0
5. Non-food consumer goods industries	12.9	0.5	13.5
6. Food processing	40.5	6.1	49.4
Domestic Sectors			
7. Construction	0	4.4	4.4
8. Whole sale and retail trade	0	1.5	1.5
9. Transportation and communication	0	13.6	13.6
10. Banking and insurance	0	3.5	3.5
11. Ownership of dwellings and miscellaneous services	0	3.9	3.9
12. Public administration	0	0	0
Total economy	5.2	3.3	11.5

^aSource and method of calculation see Appendix II. - ^bSubsidies tax privileges etc. in percent of free trade value added (= actual value added diminished for effective trade protection.

to investors who build plants in regions recognised as backward and considered eligible for promotion. In 1973 these regions covered more than 60 percent of the West German total area. The objective of the programmes is to provide a more equal regional income distribution and an equalisation of living conditions in all parts of the country. As far as investors make use of regional aid, one can regard it as a kind of assistance. Whether it is necessary in order to spread economic activity over a wide space and to increase national welfare by a better use of productive potential in peripheral areas, or whether it is nothing other than a hidden subsidy to branches which invest in backward areas anyhow, can hardly be determined. A case for distortions in the inter-industrial allocation of resources, however, could be made if the regional programmes are biased either toward specific industries or a specific factor of production. Under these circumstances, regional aid would affect domestic allocation and possibly the international division of labour, too, thus becoming a reason for inequalities between DRS and DRT, and between DRT and FRT.

11. Table 3 shows a picture of the inter-industrial distribution of investment promoted by regional aid. Branches which benefitted most are the iron and steel industry, which is faced with strong import competition, and the chemical industry, which is a leading export industry. Among the others, assistance is widespread. A general bias, for instance, towards export industries or towards one or another

Table 3 Inter-industrial distribution of investment promoted by regional aid

- Cummulated data up to mid 1972 -

Iron and Steel industry	34.2
Chemical industry	14.3
Electrical industry	7.9
Tourism	7.9
Plastics industry	7.7
Energy and coal mining	6.1
Wood industry	5.9
Stones and earthen goods industry	5.3
Leather industry	4.7
Food processing	3.8
Others	2.2
Total economy	100.0

Source: Bundesamt fuer Gewerbliche Wirtschaft

declining industry can hardly be identified. It seems, therefore, that the regional programmes are rather neutral with respect to the inter-industry allocation of resources.

12. As to the influence on the factor combination, a bias arises from the fact that the aid provided is based on investment. This is a subsidy to the costs of physical capital, whereas investment in research and development - in a wider sense human capital - and in the employment of labour remains unpromoted. The implications of this bias with regard to the international division of labour are discussed in the last section of this paper.

Objectives of assistance policy

13. The objectives which the government pursues through assistance policy are neither fully transparent, nor without conflicts among themselves, nor free of contradictions with other objectives of economic policy. The main objectives of assistance policies, actual as well as potential, can be summarized as follows (with no claim of completeness being made):

First, a large catalogue of national welfare objectives could be listed, the most important being:

- the improvement of incomes in declining industries;
- the preservation of employment opportunities for less skilled or regionally immobile workers;

- the smoothening, facilitating and promoting of the adjustment of industries which are under adjustment pressure originating either from imports, from close technical substitutes or from decline in demand;
- the countervailing of assistance to branches faced with competing imports subsidised by the exporting country;
- the securing of a supply of elementary goods;
- the speeding up of industries in a backward position vis-à-vis to the standards already achieved by other countries.

Secondly, there are international welfare objectives, for instance aiming at

- an expansion of world trade to the benefit of all countries,
- the industrialisation of developing countries and their integration into the international division of labour,
- European integration, or
- the promotion of East-West economic relations.

Thirdly, non-economic objectives, more or less hidden, act as political justification for subsidies and other assistance. This category includes prestige and defense arguments and fears about too strong a dependancy of foreign factors. The rationale of these arguments, if there actually is any, lies outside the competence of an economist. Thus, the analysis will focus solely on economic welfare objectives.

14. What can be said in generalising the objectives West Germany's assistance policy is that it is more oriented to national than to international welfare and that it favours structural preservation more than structural change. Specifically the improvement of income is the main objective of agricultural policy. The preservation of employment opportunities for less skilled labour, female labour and then foreign labour is the implicit aim of trade protection in manufacturing; at least, hardly any other can be found. Security of supply arguments serve to justify assistance to agriculture, food processing and the energy sector. Support to coal mining has been provided both for job-preservation and security of supply reasons. The smoothening of adjustment may also have played a role, though this argument is not totally consistent with the two others. The main example of countervailing protection can be found in shipbuilding. Subsidies to the computer and aircraft industry, finally, have been introduced for reasons of technological backwardness.
15. The stress on national assistance objectives has raised conflicts with international objectives and with other national welfare objectives, especially overall economic growth. For a developed and important country like West Germany, international welfare objectives must be of great importance. The international aspect comes from the responsibility of the rich trading countries for maintaining an undisturbed international division of labour and for a

closer integration of developing countries into it. Along the lines of neoclassical theory, a conflict between national and international objectives does not exist, an assertion, however, which seems to be valid more for the long than for the short run. In the short run, conflict is likely to exist between the liberalising of imports from low-wage countries and the preservation of domestic employment opportunities, whereas in the long run, liberalisation combined with an efficient restructuring programme may well lead to an increase in national growth and welfare.

16. Preservation-oriented assistance violates the international division of labour because it favours branches in which the country has comparative disadvantages. By hindering market access for more competitive suppliers from other countries, international trade and the gains from it are held below the level which would be realised in the non-assistance case. Freeing trade is supposed to generate welfare losses in the form of unemployment, labour displacement, retraining costs and "premature" depreciation. This is why most countries are reluctant to exhaust the utmost gains from trade. Assistance to industry then turns out to be trade destroying because it pays a premium to immobile factors. Seen from a political point of view, it reveals a social preference in favour of short-term security and in disfavour of long-term chances.

17. The question arises, however, as to whether trade-creating forms of assistance are implementable and how they would have to be designed. Broadly speaking, trade-creating assistance can be defined as measures which promote lines of production with comparative advantages, and/or discourage productions with comparative disadvantages. But branches which have comparative advantages are without problems. It seems, therefore, unnecessary to make a case for assistance here. In West Germany, these branches belong to the investment goods and durable consumer goods industries and cover more than 70 p.c. of total exports. Assistance to them would be nothing more than export promotion, hardly advisable for a country which has to cope with chronic export surpluses. Moreover, a strategy which subsidises export branches instead of import-substitution branches would not avoid import-caused unemployment, since the workers who are likely to be displaced by liberalisation are, in general, less qualified than those required for the production of exports. In addition, industries which have up to now served import-substitution are, to a considerable extent, located in different areas than export industries. Thus, adjustment policy would have to promote the inter-professional and inter-regional mobility of labour rather than simply encourage new export activities. An adequate way would be to provide special incentives for switching from endangered to non-endangered industries.

18. In 1971, the German Federal Government tried to launch a new phase of adjustment policy when it stated that: "Structural changes caused by the increased integration of the developing countries into the international division of labour must not be held up; on the contrary, they must be supported, if necessary, by adequate measures of structural policy. Especially the outflow of labour and capital from branches in which adjustment to changed market conditions is necessary must not be hindered by preservative subsidies" [4 , p. 273, own translation]. Although well meant, nothing has changed in actual adjustment policy. Admittedly, new preservative measures to endangered industries have not been introduced. But when the EEC introduced in 1971 its tariff preference scheme considerable exemptions and limitations were conceded to productions considered "sensitive". A programme of adjustment assistance aiming at smoothening, facilitating and promoting adjustment never became urgent because adjustment was prevented by restrictive safeguards.
19. On the other hand, governmental efforts are under way to stimulate the development and implementation of new technologies. From such a programme the export industries will benefit more than import substitution industries. The Federal Minister of Research and Technology stated that with this policy international trade can be intensified without endangering domestic employment opportunities [5]. He contrasted it to a policy of further liberalisation from which a loss of jobs is feared. Since

this recent shift in assistance policy finds no justification from the balance of payments situation, it can, at best, be interpreted as a long-run measure designed to make for a better exploitation of West Germany's comparative advantages and to allow an early adjustment to changing world-market conditions. The government would not be far wrong to promote technological innovations since there is a strong presumption that a highly developed country has comparative advantages in these fields. Another question, however, is whether the programme can compensate the adverse effects of import protection. The answer to this question depends on the resolution of the mobility problem which is dealt with in the next chapter.

Assistance and resource allocation

20. Assistance policy affects income and economic growth by influencing the inter-industry allocation of resources. If assistance to branches with relatively low productivity and factor incomes prevents them from shrinking and there is no shortage of employment opportunities in more productive branches, it generates a gap between actual and potential national income. In consequence, assisted industries often produce more goods and services than necessary in order to meet effective demand. Moreover, if, as is usual, assistance is given to shrinking or slowly growing branches in a situation of full employment it harms

economic growth by limiting the expansion of rapidly growing industries. Since the West German scene has been characterised, for a long time, by over full employment, the presumed effects of assistance can serve as hypotheses for the following analysis, which begins with an investigation of the main features of protected industries.

21. The analysis concentrates on five industrial groups:

- energy and mining,
- primary and intermediate goods industries,
- investment goods industries,
- non-food consumer goods industries, and
- food processing industries.

Agriculture, which has an outstanding by high rate of assistance and deserves a study to itself, is excluded, as well as the domestic sector for which trade is just as unimportant as trade protection.

22. Among the five groups, differences with regard to nominal and effective assistance are significant. By non-agricultural standards, assistance is extremely high in the food processing industries. In this sector, a kind of consecutive protection is provided, originally justified by overpriced input from agriculture. The calculation of the effective-assistance rate reveals that far more assistance has been given than would have been necessary in order to

compensate the cost effect of agricultural protection. Apart from food processing, assistance attains a considerable level in the non-food consumer-goods industries, due exclusively to trade protection in favour of labour-intensive branches. The other three groups belong to the less-assisted sectors of the economy.

23. One may ask how the rate of protection corresponds with other characteristics of the groups. Table 4 shows a picture of raw material intensity, physical- and human-capital intensity, labour productivity, wage and salary levels, returns to capital, the share of female and foreign employees, investment behaviour, and the growth of real output. The information is rather enigmatic, since systematic relationships among the listed variables can hardly be identified. This seems to be because^{of} the fact that the aggregation level is too high. Therefore, a finer breakdown appears necessary.
24. The above calculations of nominal and effective assistance rates do not allow such a breakdown. Therefore, the analysis refers to the total effective protection figures which Hiemenz and v. Rabenau presented in their study [3] The methodology of their calculations differs only slightly from that used here. As to the food processing industries which Hiemenz and v. Rabenau excluded, the figure from table 2 is added, but in brackets, since it originates from another calculation scheme. Altogether rates of

Table 4 - Main factors of assisted industry groups, 1970

Industry Groups	Factors	Nominal rate of total assistance 1970	Effective rate of total assistance 1970	Row material intensity ^a 1966	Capital intensity		Labour productivity	Wages and salaries per employee ^c	Returns to capital ^d	Female employees		Labour savings effect of investment ^e 1964-1970	Growth of real output 1960-1970	Regional concentration
					Physical ^b	Human ^c				Percentage of total employment				
Energy and mining		0.3	-5.5	47.3	69.7 ^f	80.1 ^f	32 000 ^f	16 349 ^f	13.1 ^f	2.0 ^f	5.8	2.14 ^f	3.3	1.55
Primary and intermediary goods industries		7.9	5.0	22.1	69.9	51.4	30 779	16 835	13.5	17.9	14.2	0.63	6.9	0.50
Investment goods industries		9.1	4.4	3.4	27.3	44.4	22 234	15 002	16.2	24.9	16.1	0.48	5.9	0.27
Non-food consumer goods industries		11.9	12.9	5.6	25.1	25.1	21 257	11 841	23.9	49.4	14.2	0.71	5.1	0.40
Food processing		22.0	40.5	135.3	73.4	30.5	31 650	13 775	16.6	36.4	12.3	1.04	4.5	0.54

^aInput from the primary sectors in percent of gross value added. - ^bGross fixed capital stock per employee in thousands of 1962 DMs. - ^cGross value added per employee. - ^dIn percent of gross fixed capital stock, inclusive depreciations. - ^eRate of increase of physical capital intensity per unit of the rate of gross investment (accumulated vintages of gross fixed capital formation in percent of gross fixed capital stock of the base year). - ^fExclusive energy.

effective total protection are available for 35 individual branches. These branches are a matter for deeper consideration along the following lines:

- general characteristics of industries (table A1),
- factor income by industries (table A2),
- labour and capital absorption by industries (table A3).

25. For a first evaluation a cross-sectional approach was tried, employing Spearman's coefficient of rank correlation. Table A4 shows the rank correlation coefficient between the effective rates of total assistance on the one hand and 18 other key features of industries as collected in tables A1 to A3 on the other hand. But only few coefficients have significant values. A systematic relationship, not even in the rank order, can hardly be discovered between the rate of assistance and any of the characteristics. From this observation one may infer that assistance policy was not guided by any of the economic variables as represented by the considered features. This is no wonder when one regards the heterogeneous catalogue of assistance objectives covering such diverse economic and non-economic aims. The only correlation coefficient worth mentioning is the one with respect to raw-material intensity (0.538). It indicates that, by and large, assistance is the higher the more raw-material inputs are used. An explanation of this can be found in the mercantilistic structure of the tariff system which consists of higher tariffs on processed products than on raw materials.

26. In a further step the 9 branches having above average effective rates of total assistance and the 17 branches having above average effective rates of tariff protection were analysed separately. Within the second group a distinction was made between industries with above average raw-material intensity (8 industries) and industries with above average labour-intensity (11 industries); two industries fulfill both criteria. The method applied is pedestrian. It was simply asked how much of these highly protected industries are marked by above average and below average values with respect to the key features in tables A1 to A3. The results of this count-procedure are listed in table 5. In many cases there seems to be no correspondence between above average rates of assistance and above average values of other features. As to factor incomes in highly assisted industries no clear statement seems to be possible; nor are low income industries prevailing among the highly assisted, nor are low growth rates of factor income and productivity dominating there. The hypotheses formulated in para 20 remain unsupported by the facts, therefore. But there are also some systematic relations observable in the highly assisted industries.

27. A case of clear correspondance is between total assistance and investment behaviour in the above average group. With only two exceptions (aircraft and non-ferrous metal industries) investment was defensive in the sense that it was more labour-saving than on the average. At the same

Table 5 : Grouping of highly assisted industries around the industrial average

Grouping feature	9 highest total assisted industries		8 above average raw material-intensive industries among the 17 highest tariff assisted industries		11 above average labour intensive industries among the 17 highest assisted industries	
	above average	below average	above average	below average	above average	below average
<u>General characteristics (A1)</u>						
Raw material intensity	6	3	8	0	2	9
Physical capital intensity	5	4	6	2	0	11
Human capital intensity	4	5	4	4	1	10
Coefficient of regional concentration	3	6	3	5	5	6
Average plant size	5	4	6	2	5	6
<u>Factor income (A2)</u>						
Value added per employee	5	4	6	2	2	9
Wages and salaries per employee	5	4	6	2	3	8
Returns to capital	5	4	3	5	6	4
Change (1958-70) to						
- Value added per employee	4	4	3	5	7	3
- Wages and salaries per employee	5	5	3	5	4	7
- Returns to capital	4	4	4	4	6	4
- Labour productivity	5	4	5	4	3	7
- Capital costs per unit of output	7	1	6	2	9	0
<u>Factor absorption (A3)</u>						
Change (1958-70) of employment	4	5	3	5	4	7
Share of female employees	4	5	2	6	6	5
Share of immigrant workers	4	5	5	3	4	7
Change (1958-70) of real investment	4	5	4	4	5	6
Labour saving effect of investment	7	2	5	3	9	2

Source: Tables A1 to A3 in the Appendix

time, capital costs per unit of output increased in the highly assisted industries considerably more than on the industrial average. These observations allow the conclusion that assistance and protection to industries was associated with an above average degree of labour saving innovations which were associated, however, with an above average increase in capital costs. In particular, this holds true for industries assisted mainly by tariffs.

28. Besides investment behaviour and capital costs, further prevailing characteristics can be observed with regard to the raw material intensive industries and the labour intensive industries within the highly protected ones.

Among the 17 industries which have above average rates of effective tariff protection, the above average raw-material intensity of 8 industries coincide prevailingly (three or less exemptions) with

- above average physical-capital intensity, plant sizes, value added per employee, wages and salaries per employees, and shares of immigrant workers, but
- below average regional concentration, returns to capital, increase in value added, wages and salaries per employee and employment and share of female employees.

The 11 labour intensive industries within the highly protected ones can be characterised by having prevailingly (three or less exemptions)

- below average raw material and human-capital intensity, value added and wages and salaries per employee, and productivity increase, but
- an above average increase in value added per employee.

29. If a generalisation with respect to the resource-allocation effect of assistance is allowed at all, one could state cautiously that a cut in assistance

- to raw-material intensive assisted industries could affect relatively capital intensive, high income, but slowly growing branches which employ mainly foreign but fewer female workers,
- to labour intensive assisted industries could concern lines of production with relatively low levels of human-capital, income, and productivity, but relatively rapidly growing output.

30. Some of the highly assisted industries in manufacturing are exposed to strong import competition from developing countries. First, there are two raw-material and capital-intensive branches, the non-ferrous metal industries, and the food processing industries, which have to compete with more than sixty percent of manufacturing imports from developing countries. A second area of import competition from developing countries are highly assisted industries in the non-food consumer goods sector, especially the labour-intensive textiles and clothing industries. During the

'sixties, developing countries also gained considerable ground with other labour-intensive products like shoes, leather products, musical instruments, sporting goods and toys, the effective assistance rate of which range from 9.5 to 19.1 p.c.. It is widely undisputed that developing countries have comparative advantages in these lines of production.

From preservative assistance to restructuring assistance

31. Some policy conclusions seem worth being drawn with regard to manufacturing industry. Here we have a clear conflict case between international and national welfare objectives. The protection which still works vis-à-vis the imports from developing countries reflects a lack of adequate adjustment assistance instruments. What is needed, is a harmonisation of trade policy with internal adjustment policy in order to proceed in liberalisation. Since preservative assistance has to be regarded as access hindrance for exporters in developing countries, one has to launch policies giving special incentives which motivate entrepreneurs and workers now producing highly protected commodities to move to other highly competitive activities. On the other hand, direct assistance of trade protected activities has to be excluded in order to avoid defensive investment.

32. Such new assistance can consist of tax allowances including accelerated depreciation and investment premiums in favour of entrepreneurs who want to invest their profits in activities not endangered by imports from developing countries. Workers should be assisted by grants for retraining and for moving to other places. If they are lower paid in a new job it would be fair to compensate them for a limited period of time. For older workers who are unsuccessful in attaining new employment, an option of premature retirement should be offered.
33. The access to such kind of restructuring assistance can be tied to a simple criterion. The tariff preferences scheme which the EEC introduced in favour of developing countries recognised a lot of commodities as "sensitive" and subjected them to a safeguard mechanism the purpose of which is to limit tariff free imports. In addition, quantitative quotas are still employed for especially "sensitive" textile and clothing commodities. The catalogue of sensitive products can be interpreted as a kind of social consensus on domestic activities, the retention of which is inconsistent with the export interests of developing countries. This catalogue of products and production recognised "sensitive" in terms of trade policy can serve as a first identification of domestic activities which are eligible for restructuring assistance. If restructuring assistance is demanded for activities not recognised "sensitive", eligibility should be checked against criteria which indicate comparative advantages and dis-

advantages in the division of labour with developing countries. Applying such criteria requires a careful analysis of factor intensities, cost structures, and demand prospects.

34. Another possibility for restructuring assistance can be offered by changing the structure of incentives with regard to of factor combinations. The incentives, for instance, involved in regional programmes and structural policy are based on the amount of funds invested. Hence, the factor of production primarily subsidised is physical capital. But these incentives are not in line with relative scarcity of factors of production. A common sense consideration, which oversimplifies of course, may illustrate this. Three main factors of production are taken into account: physical capital, low skilled or unskilled labour, and human capital, which is a proxy for skilled labour and the capability to develop and apply new production and organisation techniques. In developed countries, which have at their disposal a highly educated and well trained labour force and an efficient communication system, human capital seems to be relatively more abundant than low skilled or unskilled labour. "Relatively" means here that the scarcity relation is different in developing countries. There is plenty of unskilled and unemployed labour but a significant lack of workers and technicians who can operate and manage a modern production process - despite the fact that in some countries

people with a formal university degree are unemployed. Physical capital has to be considered as the factor of production which is the most mobile between developed and developing countries. Thus what matters is to combine physical capital mainly with human capital in developed countries, and primarily with low skilled and unskilled labour in developing countries.

35. Having this rough blueprint of a better international division of production in mind, the structure of incentives has to be redirected. A developed country like West Germany requires a mechanism which diverts capital into branches in which they can maintain comparative advantages. This mechanism has to work even before the pressure of increased import competition becomes severe. Perhaps this could be achieved by domestic investment incentives in connection with regional or structural policies which are based on the skill-intensity of new projects or upon the research and development investments associated with them. At least, the latter variable is as easily manageable as the sum of physical investment is. In short, instead of hardware investment one has to encourage software investment. On the other hand, changes are also necessary in developing countries. For instance, incentives to direct investments which are related to the number of jobs created would generate more employment opportunities in these countries than the

practice of incentives according to the amount of funds invested, presently employed in most developing countries. Job-orientated incentives are more conducive to bringing an efficient reallocation of world resources and an international transfer of industrial activities.

APPENDIX

by

Gerhard Fels and Ernst-Jürgen Horn

1. To the six domestic sectors listed in table 1 hypothetical rates of nominal protection were ascribed representing the output prices equivalent of the protection component in input prices. This procedure is simply based on the assumption that the domestic sectors pass on the input price increase due to protection of other sectors. The hypothetical rates were calculated in an iterative manner according to the following formula:

$$t_j^1 = \frac{1}{1 - \left[\sum_z \alpha_{zj} + A_j - \sum_i \frac{\alpha_{ij}}{1+t_i} - \sum_x \frac{A_j \gamma_{xj}}{1+t_x} - \sum_k d_{kj} \right]} - 1 ;$$

$$t_j^2 = \frac{1}{1 - \left[\sum_z \alpha_{zj} + A_j - \sum_i \frac{\alpha_{ij}}{1+t_i} - \sum_x \frac{A_j \gamma_{xj}}{1+t_x} - \sum_k \frac{d_{kj}}{1+t_k} \right]} - 1$$

$$t_j^3 = \dots\dots\dots$$

.....

.....

$$t_j^h = \frac{1}{1 - \left[\sum_z \alpha_{zj} + A_j - \sum_i \frac{\alpha_{ij}}{1+t_i} - \sum_x \frac{A_j \gamma_{xj}}{1+t_x} - \sum_k \frac{d_{kj}}{1+t_k^{h-1}} \right]} - 1$$

$j = 1, \dots, k, \dots, 6$

h denotes the number of iterations

The symbols represent:

- t_j^h Hypothetical rates of nominal protection of sector j obtained after h iterations
- t_i Nominal rate of trade protection of international sector i
- t_x Nominal rate of trade protection of investment good originating from sector x
- A_j Depreciation coefficient of sector j
- α_{zj} Input coefficient of inputs z used in sector j
- α_{ij} Input coefficient of inputs originating from international sector i used in sector j
- α_{kj} Input coefficient of inputs originating from domestic sector k used in sector j
- γ_{xj} Share of investment originating from sector x in total investment of sector j

The iteration procedure was stopped after six rounds when t_j proved to become insensitive with respect to t_j .

2. The effective rates of trade protection were then calculated as follows:

$$E_z = \frac{1 - \sum_i \alpha_{iz} - \sum_k \alpha_{kz} - A_z}{\frac{\alpha_z}{1 + t_z} + (1 - \alpha_z) - \left[\sum_i \frac{\alpha_{iz}}{1 + t_i} + \sum_k \frac{\alpha_{kz}}{1 + t_k} + \sum_x \frac{A_z \alpha_{xz}}{1 + t_x} \right]}$$

z denotes both international sectors i and domestic sectors k

The symbols represent:

E_z Effective rate of trade protection of sectors z

α_z Share of sectors z domestic turnover in total turnover

For the other symbols see para 1.

3. The nominal rate of trade protection and of assistance as calculated in table 1 originates from the following sources and estimations:

- Trade protection of agriculture, forestry, fishing, food processing:

G. Wegge und F. Schaub, Zur Frage der "Kosten der Agrarpolitik" Agra-Europe, Dokumentation, Nr. 36/72, Sonderbeilage, Bonn, Rom, Paris, London, Brüssel, 5. September 1972.

Statistisches Bundesamt, Statistisches Jahrbuch für die Bundesrepublik Deutschland 1973, Stuttgart und Mainz, 1973.

Chapter XXIV: Volkswirtschaftliche Gesamtrechnungen.

Statistisches Bundesamt, Statistisches Jahrbuch für die Bundesrepublik Deutschland 1971, Stuttgart und Mainz, 1971: Chapter XV: Außenhandel table, 17: Zollsollerträge nach Abschnitten und Kapiteln des Zolltarifs.

Kommission der Europäischen Gemeinschaften, Zolltarif der Europäischen Gemeinschaften, Stand: 1. 10. 1971.

- Trade protection of the other international sectors:

J. B. Donges, G. Fels, A. D. Neu u.a., Protektion und Branchenstruktur der westdeutschen Wirtschaft, [2], Table 3.

- Direct assistance:

Bundesministerium der Finanzen, Vierter Subventionsbericht, Bericht der Bundesregierung über die Finanzhilfen des Bundes und der Steuervergünstigungen für die Jahre 1971 bis 1974 gemäß § 12 des Gesetzes zur Förderung der Stabilität und des Wachstums der Wirtschaft (StWG) vom 8. Juni 1967, Bundestagsdrucksache 7/1144, Bonn, 1973.

Bundesministerium der Finanzen, Bericht der Bundesregierung über die Entwicklung der Finanzhilfen und der Steuervergünstigungen für die Jahre 1969 bis 1972 gemäß § 12 des Gesetzes zur Förderung der Stabilität und des Wachstums der Wirtschaft (StWG) vom 8. Juni 1967 (Dritter Subventionsbericht), Bundestagsdrucksache VI / 2994, Bonn, 23. Dezember 1971.

Bundesminister für Wirtschaft und Finanzen, Haushaltsrechnung und Vermögensrechnung des Bundes für das Haushaltsjahr 1970 (Haushaltsrechnung 1970), Berlin 1972.

D. Zavlaris, Die Subventionen in der Bundesrepublik Deutschland. Eine Untersuchung ihres Umfangs, ihrer Struktur und ihrer Stellung in der Finanz- und Volkswirtschaft. Deutsches Institut für Wirtschaftsforschung, Beiträge zur Struktur-forschung, Heft 14, Berlin, 1970.

The calculation of the effective rates presented in table 2 is based on the 1966 input-output table of the Deutsches Institut für Wirtschaftsforschung, Berlin. For the special purpose in mind, however, there had to be done some adjustments in order to get input-output figures for the four broad industry groups within the manufacturing sector classified according to the German industrial classification and including handicraft. The input-output data originate from the following sources:

R. Krengel, J. Schintke, R. Stäglin, J.-P. Weiß und H. Wessels, Jährliche nominale Input-Output-Tabellen und Importmatrize für die Bundesrepublik Deutschland 1954 bis 1967, Deutsches Institut für Wirtschaftsforschung, Beiträge zur Strukturfor-schung Heft 21, Berlin, 1972.

R. Stäglin und H. Wessels, Input-Output-Tabelle für die Bundesrepublik Deutschland 1966, Vierteljahreshefte zur Wirtschaftsforschung, Deutsches Institut für Wirtschaftsforschung, Heft 3/1971, Berlin, 1971.

4. The characteristics of industry branches in 1970 are collected in the following tables A1 to A3. Table A4 contents Spearman's rank correlation coefficients.

Table A 1: General characteristics of industry branches (1970)

	Effective rate of total assistance	Nominal rate of tariff protection	Effective rate of tariff protection	Raw material intensity ^a	Capital Intensity ^b		Coefficient of regional concentration ^c	Average plant size ^d
					Physical	Human		
Coal Mining, Coking	128.3	0.0	- 1.4	0.78	204	177	1.57	639
Manufacture of Aircraft	73.2	6.3	(5.5)	0.02	42	188	0.89	810
Food Processing	[49.1]	22.0	40.5	1.84	183	73	0.54	91
Pulp, Paper and Paperboard Production	42.1	10.0	33.4	0.35	207	94	0.55	268
Non-ferrous Metal Foundries	39.4	11.2	34.1	0.61	127	79	0.46	231
Non-ferrous Metal Production	30.3	6.0	25.2					
Paper and Paperboard Products	27.4	15.3	23.4	0.05	64	63	0.28	105
Textiles	25.6	11.0	21.2	0.20	84	60	0.53	139
Clothing	25.1	14.7	21.5	0.10	26	23	0.43	73
Iron and Steel Production	23.8	9.8	15.7	0.81	187	110	2.06	2261
Leather Processing	19.1	12.3	15.5	0.01	27	50	1.06	54
Iron, Steel and Malleable Iron	18.7	9.8	15.7	0.09	90	84	0.65	279
Fine Ceramics Products	18.7	14.6	16.4	0.07	58	66	0.99	243
Manufacture of Wood Products	17.5	11.0	15.0	0.03	54	78	0.37	76
Chemical Products and Coal Derivatives	16.0	11.4	13.3	0.29	199	163	0.70	284
Rubber and Asbestos Goods	15.7	10.3	13.6	0.21	74	93	1.08	386
Shoes	15.1	10.0	13.2	0.03	36	85	2.15	124
Glass and Glass Products	15.1	12.6	14.9	0.09	79	100	0.61	204
Sawmills and Woodworking	13.1	5.3	11.1	1.35	118	55	0.44	28
Steel Shaping	12.3	9.4	10.9	0.06	59	72		
Leather Production	11.2	7.7	10.1	0.73	105	76	0.95	93
Iron, Steel, Sheet and Metal Goods	11.0	10.2	9.7	0.03	.	.	0.42	110
Musical Instruments, Sporting Goods, Toys	10.6	11.5	9.3	0.01	35	47	0.85	62
Plastic Products	9.5	14.0	8.7	0.05	63	69	0.47	96
Manufacture of Road Vehicles	9.4	11.2	8.3	0.04	117	142	0.64	881
Printing and Reproduction	8.3	7.2	7.3	0.01	78	97	0.60	68
Electrical Engineering Goods	8.1	9.5	6.8	0.02	57	102	0.67	352
Drawing Plant and Cold Rolling Mills	7.3	8.7	6.5	0.08	112	87	0.79	173
Precision and Optical Goods	6.9	10.2	6.2	0.02	48	86	0.68	167
Clocks and Watches	4.5							
Stone and Earthen Goods	4.4	4.4	5.0	0.12	158	82	0.53	50
Mechanical Engineering Goods	3.7	7.9	3.3	0.02	64	119	0.20	214
Structural and Light Metal Engineering Goods	3.0	5.5	2.8	0.02	46	119	0.74	138
Shipbuilding	[0]	0.7	[0]	0.03	92	151	8.08	577
Total Industry	19.3 ^e	8.8 ^e	11.9 ^e	0.18	100	100	0.77 ^f	153

^a Share of inputs from the primary sector defined according to the German input-output classification (agriculture, hunting and fishing, forestry, mining and quarrying energy and waterworks) in total inputs. - ^b Total Industry = 100. -

^c Coefficient of variation for industry shares in manufacturing and mining employment by regions. - ^d Employees. -

^e Does not include food processing. - ^f Weighted mean.

Source: J.B. Donges, G. Fels, A.D. Neu u.a., *Protektion und Branchenstruktur der westdeutschen Wirtschaft*, Kieler Studien, The Kiel Institute of World Economics, 123, Tübingen, 1973. Tables 3, 10, 15 und 16.

Table A 2 Factor income by industry branches

	Effective rate of total assistance	Value added per employee ^a	Wages and salaries per employee ^a	Returns to capital ^a	Annual growth rate of				
					Value added per employee	Wages and salaries per employee	Returns to capital	Labour productivity	Capital costs per unit of output
		1970			1970/1958				
Coal Mining, Coking	128.3	130	111.8	81	- 8.7	7.5	- 0.7	0.4	4.0
Manufacture of Aircraft	73.2	99	109.0	9.0	..	3.5	..
Food, Processing	49.1	126	94.2	102	6.0	8.9	- 4.8	4.6	5.2
Pulp, Paper and Paperboard Production	42.1	108	111.4	50	6.1	9.0	- 7.6	2.9	4.2
Non-ferrous Metal Foundries	39.4								
Non-ferrous Metal Production	30.3	136	105.1	166	- 9.4	8.4	3.5	4.2	1.7
Paper and Paperboard Products	27.4	97	85.4	181	- 9.5	9.5	- 2.8	5.3	8.4
Textiles	25.6	83	77.7	109	- 8.7	8.5	- 2.2	2.1	3.8
Clothing	25.1	58	62.2	180	7.2	8.3	- 4.5	4.5	5.8
Iron and steel Production	23.8	113	121.0	54	5.2	7.9	- 8.5	2.9	3.6
Leather Processing	19.1	72	65.6	297	8.8	8.4	- 0.3	5.0	5.2
Iron, Steel and Malleable Iron	18.7	100	108.3	98	8.4	8.6	- 1.4	5.0	4.1
Fine Ceramics Products	18.7	75	84.8	91	7.6	8.6	- 5.3	3.6	6.0
Manufacture of Wood Products	17.5	102	89.2	222	10.8	9.2	1.3	2.4	4.6
Chemical Products and Coal Derivatives	16.0	148	123.8	99	7.1	9.0	- 1.8	1.0	0.7
Rubber and Asbestos Goods	15.7	86	100.8	68	5.4	8.6	- 9.9	4.3	3.9
Shoes	15.1	60	70.7	98	7.0	8.1	- 5.8	4.7	
Glass and Glass Products	15.1	111	97.9	161	10.2	9.1	- 1.4	2.8	6.3
Sewmills and Woodworking	13.1	107	86.3	116	8.9	9.0	- 2.7	2.3	4.2
Steel Shaping	12.3	114	121.0	-	-	-	-	-	-
Leather Production	11.2	102	85.8	116	13.8	8.0		1.8	9.0
Iron, Steel, Sheet and Metal Goods	11.0	92	93.4	138	8.3	8.9	- 4.8	3.2	5.3
Musical Instruments, Sporting Goods, Toys	10.6	83	73.6	270	8.4	8.6	- 5.2	3.5	8.2
Plastic Products	9.5	93	86.3	157	6.9	9.0	- 7.7	0.3	2.4
Manufacture of Road Vehicles	9.4	112	116.6	84	5.1	9.0	- 9.9	4.8	4.7
Printing and Reproduction	8.3	122	105.0	186	9.3	8.8	0.2	4.3	4.9
Electrical Engineering Goods	8.1	81	94.2	83	6.0	8.5	- 8.8	3.1	2.6
Drawing Plant and Cold Rolling Mills	7.3	129	106.8	159	8.0	8.7	- 1.3	2.4	1.8
Precision and Optical Goods	6.9			114			- 3.7	3.8	4.9
Clocks and Watches	4.5	77	86.4	-	7.9	-	-	-	-
Stone and Earthern Goods	4.4	129	109.7	96	7.8	9.1	- 7.2	2.2	6.5
Mechanical Engineering Goods	3.7	96	107.1	109	7.2	9.0	- 5.0	2.8	5.3
Structual and Light Metal Engineering Goods	3.0	94	113.9	106	8.5	9.2	- 5.1	5.8	6.5
Ship building	(- 10.9)	..	110.0	9.5	..	4.8	..
Total Industry	19.3 ^b	100 ^c	100 ^c	100 ^c	7.3 ^c	8.7 ^c	- 3.9 ^c	3.1	3.4 ^c

^aTotal Industry = 100. - ^bDoes not include food processing. - ^cDoes not include manufacture of aircraft and shipbuilding.

Source: J.B. Donges, G. Fels, A.D. Neu u.a., *Protektion und Branchenstruktur der westdeutschen Wirtschaft*, Kieler Studien, The Kiel Institute of World Economics, 123, Tübingen, 1973. Tables 10, 17, 21. - R. Krenzel u. Mitarb., *Produktionsvolumen und -potential, Produktionsfaktoren der Industrie im Gebiet der Bundesrepublik Deutschland einschließlich Saarland und Berlin (West)*, Statistische Kennziffern, 8. und lfd. Folgen, Berlin, lfd. Jgg. - Own Calculations.

Table A 3. Labour and Capital absorption by industry branches

	Effective rate of assistance	Growth rate of total employment	Female employers in p.c. of total employee	Female workers in p.c. of total workers	Immigrant workers in p.c. of total workers	Growth rate of real investment	Labour saving effect of investment ^a
	1970	1970/1958	1970	1970	1968	1968-70/ 1956-58	1970/64
Coal Mining, Coking	128.3	- 6.8	3.0	1.4	3.36	- 5.5	2.14
Manufacture of Aircraft	73.2	13.5	18.2	11.3	6.74	9.8	0.44
Food, Processing	(49.1)	0.3	36.4	38.3	14.81	2.3	1.04
Pulp, Paper and Paperboard Production	42.1	- 0.6	19.3	16.7	12.56	5.2	0.90
Non-ferrous Metal Foundries	39.4						
Non-ferrous Metal Production	30.3	1.9	17.7	14.1	15.59	4.1	0.36
Paper and Paperboard Products	27.4	2.6	46.2	49.1	12.56	8.0	0.66
Textiles	25.6	- 1.8	54.2	58.4	13.85	1.5	0.95
Clothing	25.1	0.9	81.9	87.4	8.60	0.9	0.77
Iron and Steel Production	23.8	0.1	7.0	2.9	14.73	0.1	0.67
Leather Processing	19.1	- 0.3	61.7	65.8	13.01	- 2.0	0.72
Iron, Steel and Malleable Iron	18.7	- 0.7	10.0	6.3	22.73	- 1.7	0.70
Fine Ceramics Products	18.7	- 1.4	44.9	47.6	13.46	1.7	0.72
Manufacture of Wood Products	17.5	- 0.2	22.8	20.5	10.61	5.6	0.61
Chemical Products and Coal Derivatives	16.0	2.8	28.2	25.7	12.31	6.7	0.46
Rubber and Asbestos Goods	15.7	3.2	28.5	28.0	19.05	9.4	0.47
Shoes	15.1	- 1.5	59.5	63.2	7.57	- 0.2	0.84
Glass and Glass Products	15.1	0.9	23.9	22.1	10.29	8.6	0.65
Sewmills and Woodworking	13.1	- 1.6	14.2	11.4	17.62	4.7	1.00
Steel Shaping	12.3	1.3	22.2	19.9	-	-	-
Leather Production	11.2	- 7.7	28.5	28.2	-	-1.8	4.02
Iron, Steel, Sheet and Metal Goods	11.0	1.0	31.2	30.6	18.67	5.6	0.61
Musical Instruments, Sporting Goods, Toys	10.6	- 0.1	51.7	54.3	6.34	9.8	0.79
Plastic Products	9.5	8.3	38.3	39.5	10.27	13.5	0.54
Manufacture of Road Vehicles	9.4	5.2	15.1	12.9	14.81	7.9	0.36
Printing and Reproduction	8.3	1.7	28.3	27.4	4.61	3.5	0.54
Electrical Engineering Goods	8.1	3.5	39.4	44.8	15.54	5.1	0.43
Drawing Plant and Cold Rolling Mills	7.3	- 0.1	14.2	10.0	10.98	2.0	0.42
Precision and Optical Goods	6.3				16.97	4.0	0.51
Clocks and Watches	4.5	1.1	42.4	46.8	-	-	-
Stone and Earthern Goods	4.4	- 0.6	8.0	3.3	9.82	5.3	0.94
Mechanical Engineering Goods	3.7	2.5	15.2	9.7	14.12	5.4	0.42
Structural and Light Metal Engineering Goods	3.0	- 0.4	8.5	2.9	13.68	0.7	0.80
Shipbuilding	(- 10.9)	- 2.9	5.2	1.9	9.86	-	-
Total Industry	19.3 ^b	0.9	29.0	28.9	13.03	3.8	0.58

^a Ratio between the rate of increase in physical capital per employee from 1964 to 1970 and the rate of increase of gross fixed capital formation as given by the ratio between the accumulated capital formation vintages, 1964 - 1970, and gross fixed capital stock in the base year 1964. - ^b Does not include food processing.

Source: J.B. Donges, G. Fels, A.D. Neu u.a., Protektion und Branchenstruktur der westdeutschen Wirtschaft, Kieler Studien, The Kiel Institute of World Economics, 123, Tübingen, 1973. Tables 10, 18 and 22. - R. Krengel u. Mitarb., Produktionsvolumen und -potential, Produktionsfaktoren der Industrie im Gebiet der Bundesrepublik Deutschland einschließlich Saarland und Berlin (West). Statistische Kennziffern, 8. und lfd. Folgen, Berlin, lfd. Jgg. - Statistisches Bundesamt, Fachserie D, Reihe 4: Sonderbeiträge zur Industriestatistik, Beschäftigte nach der Stellung im Betrieb, 1970. - V. Marx, Ausländerbeschäftigung und Flexibilität des Arbeitsmarktes der Bundesrepublik Deutschland, Institut für Wirtschaftspolitik an der Universität in Köln, Untersuchungen, 23, Köln, 1972. Table A 33. - Own calculations.

Table A4 Spearman's coefficient of rank correlation between the effective rate of total assistance and various characteristics of industries

Characteristics of industries	Coefficients
<u>General characteristics</u>	
Raw material intensity	0.538
Physical capital intensity	0.278
Human capital intensity	-0.007
Coefficient of regional distribution	0.060
Average plant size	0.194
<u>Factor income</u>	
Value added per employee	0.012
Wages and salaries per employee	-0.022
Returns to capital	-0.171
Change (1958 - 70) of	
- Value added per employee	-0.025
- Wages and salaries per employee	-0.140
- Returns to capital	0.266
- Labour productivity	0.135
- Capital costs per unit of output	-0.264
<u>Factor absorption</u>	
Change (1958-70) of employment	0.017
Share of female employees	0.117
Share of immigrant workers	-0.039
Change (1958-70) of real investment	-0.201
Labour saving effect of investment	0.282

Source: Tables A1 to A3

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