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Industrial policy and repressed structural change in West Germany

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INDUSTRIAL POLICY AND REPRESSED STRUCTURAL CHANGE IN WEST GERMANY

by

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Contents

> As wiser Physicians tamper not
> excessively with their Pa-
> tients, rather observing and
> complying with the motion of
> nature, then contradicting it
> with vehement Administrations
> of their own; so in Politicks
> and Oconomicks the same must
> be used.
>
> Sir William Petty, A Treatise
> of Taxes and Contributions
> (1662)

I.   Introduction*

In retrospective, the sixties appear just like the "golden age" of the West Germany economy. Growth rates were high and stable, inflation was low, and unemployment was almost un-known. This favourable macroeconomic performance was accompanied by rapid structural change that showed up in sub-stantial shifts of output and employment between shrinking and expanding industries. It is the central hypothesis of this paper, that structural change in those days was not just a by-product of strong growth, but rather the result of a high adjustment flexibility, which was essential for taking advantage of rich growth potentials.

In recent years, several attempts have been made in order to identify possible determinants of the slowdown of economic growth in West Germany and other industrial countries since the early seventies. The most cited impediments to faster growth in the seventies and eighties include the two oil-price shocks, declining ratios of capital formation, ex-hausted technological opportunities, increased real wage pressure, monetary shocks, intensified competition from abroad, and environmental restraints (for a survey see Bom-bach, 1985; Maddison, 1987). It is increasingly recognised, however, that the deterioration of economic performance might also be attributed to changing institutional condi-tions.

According to this view, the economic stability of the six-
ties gave rise to the establishment of powerful interest
groups, which increasingly objected to changes of relative
income positions and hence reduced the adjustment flexibi-
lity of the whole economic system (Olson, 1982; Giersch,
1985). Hence, obsolete activities were probably not aban-
doned quickly enough and the growth potential of promising
new activities were not fully exploited.

Successful lobbying of interest groups will in general show
up in policy measures supporting these groups. As was ana-
lysed elsewhere, the activities of sector-specific interest
groups in fact explain the sectoral pattern of internal and
external protection in West Germany (Witteler, 1986; Weiss
et al., 1988). The importance of the institutional hypothe-
sis can be evaluated, therefore, by an analysis of the
impact of industrial policy on structural change.

In recent years detailed statistical information on the sec-
toral structure of the West German economy and on government
interventions became available. The main sources are the
Federal Statistical Office and the economic research insti-
tutes engaged in periodical "reports on structural change"
(Strukturberichterstattung). In what follows, these data are
applied in order to examine the nature and significance of
the slowdown of structural change.

The paper is organised as follows. In section II the slow-
down of structural change in West Germany is described and
some possible determinants of this development are discus-
sed. Section III focusses on distortions in the direction of
structural change across different types of industries. In
section IV the impact of industrial policy on the speed of
structural change is analysed at a disaggregated level. In
the final section the consequences of reduced structural
change for aggregate employment are discussed.

II. The slowdown of structural change in West Germany

At a sectoral level, structural change shows up in shifting shares of output and factor inputs across industries. The analyses presented in this paper are focusing on labour input for the following reasons: Firstly, insufficient adjustment of employment is closely related to the central weakness of the West German economy - the stubbornly high level of unemployment. Secondly, special attention shall be paid to the implications of internal protection (government subsidies) and external protection (trade barriers) for sectoral rigidities. These government interventions are protecting inputs, not outputs. Since the price of rather immobile factors (labour) is in general more affected by protection than the price of internationally mobile factors (capital), government interventions will primarily result in distortions of labour input (Basevi, 1966; Neary, Ruane, 1985).

In this context, structural change is defined as shifts of employment shares between different industries. Its speed will be measured by an indicator originally proposed by Schiavo-Campo (1978)[1], which is nowadays applied in many empirical studies (see, e.g., Lawrence, 1984; Donges, Glismann, 1987)[2]. It is calculated as follows:

$$SC = \frac{1}{2j} \sum_i \mid a_i^1 - a_i^0 \mid$$

where a_i denotes the percentage share of industry i in total employment, the superscripts 0 and 1 denote the beginning and the end of period and j gives the number of years covered. This coefficient measures net annual shifts of employ-

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[1] A rudimentary description of this concept was already presented by Salette (1968).

[2] Different concepts of measuring structural change were extensively discussed at the beginning of the "Struktur-berichterstattung" in West Germany (Breithaupt et al., 1979; Krengel, Filip, 1981). See also Schatz (1974).

ment between different industries as a percentage of total
employment.

Evidently, this concept is sensitive to the level of aggre-
gation. Comparing the speed of structural change in differ-
ent periods or different countries is impossible, therefore,
if the level of disaggregation is not held constant. More-
over, it seems appropriate to calculate this index for peak-
to-peak periods in order to avoid confusion of structural
trends and cyclical swings.

Within the system of West German national accounts, employ-
ment data for 50 different industries of the business enter-
prise sector are available since 1960. The speed of struc-
tural change can be calculated, therefore, for five complete
business cycles (table 1). Apparently, structural change was
much faster in the sixties than in the seventies and has
further slowed down in the eighties. With the declining
speed of structural change the average rates of output
growth also slowed down.

Table 1 - Structural change and output growth in West
          Germany(a) 1960-1986
          (percent changes at annual rates)

Period	Structural change	Gross value added(b)
1960-65	1.08	4.85
1965-69	1.06	4.06
1969-73	0.96	4.03
1973-79	0.91	2.30
1979-86	0.68	1.44

(a) Business enterprise sector, excluding real estate. -
(b) At 1980 prices.

Source: Statistisches Bundesamt(a); own calculations.

Cross-country comparisons can reveal, whether the slowdown of structural change is a common attribute of reduced economic growth. Actually, corresponding data for several OECD-countries show a very similar pattern. The reduction of output growth since 1973 was almost everywhere accompanied by a slowdown of structural change (see table A1 in the appendix)[1].

Apparently, structural change and economic growth are mutually interdependent. On one hand, there are several reasons, why high rates of growth will bring about rapid structural change. For example, income elasticities of demand for different goods in general deviate from unity (Engel-curve effects), the rate of technical progress is uneven across industries (productivity bias), and the possibilities of adjusting to changing relative factor prices are sectorally different (substitution bias)[2]. In this context, a limited potential of overall economic growth will reduce adjustment requirements.

On the other hand, structural change could also act as a stimulus to economic growth. In open economies income opportunities are continuously shifting. Tastes of consumers are not unaltered even at constant income levels, new competitors are entering the market, and mature products are substituted by new ones. In general, a high degree of structural change is required in order to take advantage of new growth potentials. In this view, insufficient adjustment flexibility will reduce economic growth.

The alternative hypotheses, that the slowdown of structural change since the early seventies has mainly been

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[1] Similar results for an international comparison of structural change and growth in the fifties and sixties are presented in Schatz (1974).

[2] On the impact of these biases on structural change see Bhagwati (1977; 1984). For an empirical application to the West German economy see Klodt (1988).

- a consistent consequence of declining growth potentials, or

- an important impediment to faster economic growth

are observationally equivalent. They differ, however, with respect to sectoral adjustment requirements. If structural change is rather a consequence of economic growth, the slow-down of structural change would simply reflect a reduced pressure for adjustment. If, however, economic growth is hampered by insufficient sectoral flexibility, required adjustments would exceed actual structural change.

At first glance, the pressure for structural change in the West German economy appears to be much greater in the period since 1973 than in previous years. The oil-price shocks of 1973 and 1979 have required sectoral shifts at the expense of oil-intensive industries, the fierce competition from Japan and from the newly industrialised countries of South East Asia was concentrated on specific consumer goods industries, and extreme shifts of real exchange rates were altering the competitive position of industries producing tradeables against nontradeables industries. In addition, the wage-push of the early seventies was most inflictive to labour-intensive industries and the exposure to environmental constraints was sectorally different[1].

This evidence suggests that the slowdown of structural change resulted rather from artificial impediments to sectoral adjustment than from decreased pressure for structural change. The importance of one of these impediments - government protection - shall be analysed in detail. In the next section, it is examined in which industries the slowdown of adjustment is most distinct and to which extent these industries participate in government support.

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[1] These topics were discussed in detail in several reports on structural change. See, e.g., Breithaupt et al. (1979); Fels, Schmidt et al. (1981); Schmidt et al. (1984); Schmidt, Gundlach, Klodt (1986); Donges, Schmidt et al. (1988).

III. Distortions in the direction of structural change

Appropriate protection data are available for the "international sector" of the West German economy, namely agriculture, mining and manufacturing. With respect to adjustment requirements, this sector is divided into three categories[1]. Industries of the first group (Schumpeter industries) are characterised by a high level of human-capital intensity and a high research intensity. These industries take advantage of those production factors with which highly developed economies normally are relatively well endowed. This group includes chemistry and allied products, petroleum refineries, machinery, office equipment and computers, motor vehicles, aircraft and aerospace, electrical equipment, and instruments. Production in the second group (Ricardo industries) is tied to specific areas because of the location of natural resources or climatic and other regional properties. This mainly applies to agriculture, mining, basic metals, and shipbuilding. The remaining industries (Heckscher-Ohlin industries) are either labour intensive or physical capital-intensive[2].

In international perspective, a permanent shift of employment towards Schumpeter industries can be observed (Rothwell, Zegveld, 1981, 1985; Freeman, Clark, Soete, 1982; Lawrence, 1987). This not only applies to advanced industrial countries, but also to many less developed countries, especially to the dynamic region of South East Asia. A high-wage economy like West Germany has to keep pace with this development in order to avoid a deterioration of its relative and absolute income position (Krugman, 1979). Hence, one would expect increasing shares of Schumpeter industries and correspondingly declining shares of Ricardo and Heck-

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[1] For an extensive discussion of these categories see Giersch (1978, 1979).

[2] For a similar classification see Krieger, Thoroe, Weskamp (1985).

scher-Ohlin industries. In the case of Ricardo industries, the discovery of new deposits of natural resources and improved production techniques abroad gave rise to further comparative disadvantages of the West German economy in this area. Moreover, these industries are facing a low income-elastic demand.

Figure 1 - Employment shares(a) by type of industry
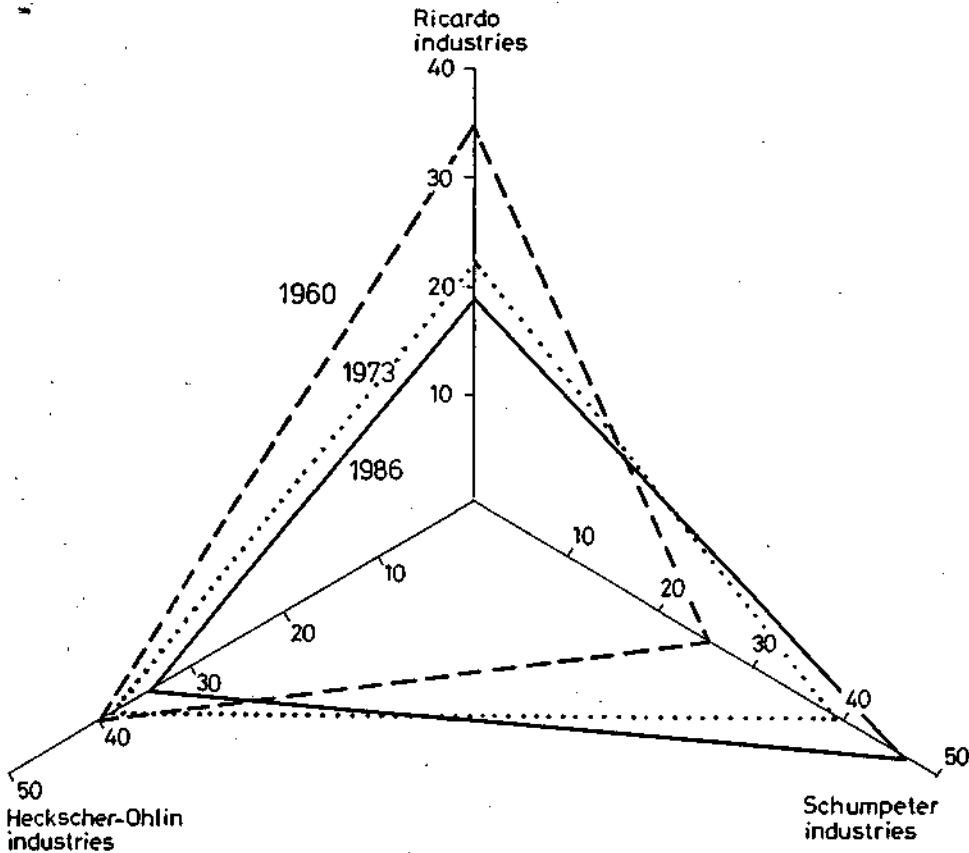
(a) Percentage shares in total employment of agriculture, mining and manufacturing. For each year, the shares of the three industry types add up to 100 percent.

Source: Statistisches Bundesamt (1987); own calculations.

Actually, sectoral shifts in West Germany were in accordance with this pattern in the sixties and early seventies (figure 1). In the period following 1973, however, the relative decline of Ricardo industries was almost stopped. The decline of Heckscher-Ohlin industries, on the other hand, was even more pronounced, which might primarily be attributed to the increased real wage pressure since 1973/74. The shift

towards Schumpeter industries, finally, was less distinct than in previous years.

This evidence suggests, that the reduced speed of adjustment in Ricardo industries plays a vital role in the overall slowdown of structural change in West Germany. This development did obviously not result from an improved competitiveness of these industries. On the contrary, the gap between domestic production costs and world market prices in agriculture is continuously widening, profitable West German coal deposits are almost exhausted, and in basic metals and shipbuilding various highly competitive foreign producers have entered the market[1].

Table 2 - Government subsidies and subsidy rates in West Germany 1973, 1984

Industry	Subsidies (DM million)		Subsidy rate (a)	
	1973	1984	1973	1984
Ricardo industries	12260	28312	28.8	46.8
Agriculture	10174	19700	44.3	77.7
Mining	1686	5797	22.0	34.9
Basic metals	170	2202	1.4	13.6
Shipbuilding	230	613	11.1	25.2
Heckscher-Ohlin industries	1791	3208	1.6	2.0
Schumpeter industries	3995	6954	2.8	2.6
Total(b)	18046	38474	6.0	7.9

(a) Subsidies as a percentage of net value-added. -
(b) Agriculture, mining, manufacturing.

Source: Donges, Schmidt et al. (1988); Jüttemeier (1984); Statistisches Bundesamt (1987); own calculations.

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[1] For a detailed analysis of the competitive position of Ricardo industries in West Germany see Schmidt et al. (1984).

In fact, the conservation of Ricardo industries was mainly achieved by government intervention. On the whole, these industries are receiving about three quarters of all subsidies which have been granted to agriculture, mining and manufacturing, whereas their share in output and employment of this sector is less than one quarter. And, more relevant for structural change, the level of subsidisation of Ricardo industries increased significantly since 1973. In agriculture and mining, subsidy rates almost doubled; in basic metals and shipbuilding they increased even more (table 2).

A quantitative assessment of the impact of industrial policy on structural change requires a concept for the measurement of distortions in labour input. In the next section, such an approach is derived from the concept of effective protection.

IV. Potential, actual, and repressed structural change

The effective rate of protection is defined as the ratio of actual net value-added at domestic prices to net value-added at world-market prices (Hiemenz, Hoffmann, Rabenau, 1971). Protection rates do not indicate, of course, the definite structure of output that would emerge in the absence of protection. Such an analysis would require a sectorally disaggregated general equilibrium model, which includes supply and demand functions of domestic and foreign subjects as well (Deardorff, Stern, 1985). Nevertheless, effective protection is a well established and widely accepted concept of measuring structural distortions in production.

Under two specific assumptions, these distortions are equivalent to distortions in employment. The first assumption is an intersectoral wage-link. If the rates of change of nominal wages are equal in every industry, shifts in the sectoral structure of labour input are equal to shifts in labour income. The second assumption is concerned to changes of sectoral labour shares. If these rates of change are identical across industries, shifts in the distribution of labour income are equal to shifting shares of value-added. This would point to sectorally invariant elasticities of substitution, which might be attributed to an intersectoral technology-link. As a consequence of the wage-link and the technology-link, shifts in sectoral shares of output are very similar to shifts in labour input.

The empirical validity of these assumptions was examined by a correlation analysis. It covers 44 industries of the business enterprise sector in West Germany[1]. As information on net value-added is not available for the whole period, the

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[1] The number of observations is determined by the availability of data on compensation of employees.

respective calculations refer to gross value-added. The results presented in table 3 are highly supportive to the assumption, that sectoral shifts in employment shares are closely related to shifts in output[1].

Table 3 - Correlation of employment, compensation of
employees and value-added 1960-1985

Variables(a)	Correlation coefficient		
	1960-85	1960-73	1973-85
Employment /compensation of employees	0.97	0.97	0.93
Compensation of employees /value added	0.94	0.92	0.79
Employment /value added	0.94	0.88	0.82
(a) Rates of change of sectoral shares.			

Source: Statistisches Bundesamt(a); own calculations.

An appropriate data-base for estimating the sectoral structure of effective protection in West Germany was generated by several research projects carried out at the Kiel Institute of World Economics. The results were published in various studies: Comprehensive estimates of public aids by industry since 1973 are presented in Jüttemeier (1984) and Donges, Schmidt et al. (1988). Data on effective trade protection covering the period from 1958 to 1972 are provided by Donges, Fels, Neu et al. (1973). And data on trade protection for more recent years are included in Weiss et al. (1988) and Donges, Schmidt et al. (1988). In addition, the

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[1] This consistency of structural change in nominal output and labour input is, by the way, a common result of empirical studies concerned to the so-called three-sector hypothesis. For the West German economy see, e.g., Fels, Schatz, Wolter (1971), Donges, Klodt, Schmidt (1986). For a survey of international studies see Norton (1986).

latter publications provide estimates of total effective
protection resulting from both subsidies and trade bar-
riers[1].

In this paper data on total effective protection have been
calculated for the year 1973, which marks the end of the
period of rapid structural change in West Germany. These
calculations are derived from data for subsidies and net
value-added for the year 1973 and effective tariff rates for
1978. As nominal tariff rates imposed on West German imports
were almost unchanged between the Kennedy-Round and the
Tokyo-Round and sectoral input coefficients are rather
stable over time, the 1978 effective tariff rates probably
provide a suitable approximation of effective tariff rates
in 1973. Equivalently, total effective protection in 1984
was calculated from subsidies and net value-added of 1984
and effective trade protection of 1985. The figures are
shown in table A2 in the appendix.

Originally, the concept of effective protection was proposed
as a measure of allocative distortions in domestic produc-
tion. Due to the above described strong correlation between
changes in sectoral output and employment the concept can
also be used as an approximate measure of distortions in
labour input. As sectoral productivity levels differ, dis-
tortions of production and labour input are not equal. Dis-
tortions in output show up in a deviation of the actual out-
put structure from the structure of deflated output, where
the sectoral effective protection rates are the respective
deflators. In turn, the structure of employment "deflated"
by protection rates provides a measure of an undistorted
employment structure.

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[1] According to Corden (1971) total effective protection is
the sum of effective tariff protection and effective
internal protection. Internal protection is calculated as
the ratio of subsidies to net value-added at world market
prices.

These data can be applied for an assessment of the impact of industrial policy on the speed of structural change. For this purpose, the sectoral distribution of employment in 1973 is compared to the structure of protection-adjusted employment in 1984. The resulting Schiavo-Campo Index shows potential shifts to an undistorted structure of labour input. The difference between this index and actual structural change indicates the extent to which sectoral adjustments were repressed by means of industrial policy. Similar calculations have been carried out for the period 1960 to 1973.

Apparently, structural change in the seventies and early eighties was much more hampered by tariffs and subsidies than in previous years (table 4). In absolute terms, the amount of repressed structural change almost doubled; as compared to potential structural change it increased from 17 to 44 percent.

Table 4 - Potential, actual and repressed structural change in West Germany 1960-1984(a)

Period	Potential	Actual	Repressed
	Structural change		
1960-73	1.502	1.247	0.255
1973-84	1.000	0.562	0.438
(a) For the method see text. For the sample of industries see table A2 in the appendix.			

Source: As table 2.

It should be kept in mind, that these calculations only refer to subsidies and tariffs as impediments to structural change. It can not be concluded, therefore, that the whole reduction of potential structural change is reflecting a decrease of adjustment requirements. This reduction might also be influenced by other impediments to structural change

like restrictive labour market laws or shifts in the be-
haviour of unions and employer organisations. On the impor-
tance of these topics for labour markets in West Germany see
Donges, Schatz (1986); Burda, Sachs (1987); Soltwedel
(1987).

As structural change slowed down in almost all industrial
countries (see table A1 in the appendix), it was examined
whether the increase of subsidisation is also an interna-
tional phenomenon. For this purpose, the average share of
subsidies in gross national product was calculated for those
countries, for which data on structural change in the
periods before and after 1973 are available[1]. Of course,
these subsidy rates are affected by many defaults, since in
national accounts statistics government subsidies are rather
narrowly defined. For example, they do not cover preferen-
tial tax treatments of R&D, of investment and the like. As
the systems of subsidisation differ between countries, an
international comparison of aggregated subsidy rates seems
inappropriate. With respect to the rates of change over
time, however, these data appear to be more reliable. As the
structure of the subsidy system within countries is in
general not subject to fundamental revisions, data derived
from national accounts probably provide suitable information
on changing intensities of government intervention in dif-
ferent countries.

According to these calculations, subsidisation was intensi-
fied in most countries in the seventies and early eighties
as compared to previous years (table A3 in the appendix). In
this respect, the West German economy is obviously no spe-
cial case.

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[1] International statistics on effective trade protection and
on the sectoral structure of subsidies are not available.
It can be expected, however, that increased aggregate sub-
sidy rates are in general associated with increased sec-
toral discrimination. According to Curzon Price (1981)
industrial policy measures are concentrated on Ricardo
industries in most industrial countries.

It could be concluded, therefore, that the speed of structural change in the OECD area was substantially affected by extended public aids to economically obsolete activities.

Evidently, a reduction of structural change by government interventions will reduce aggregate output. Scarce production factors are bound to inefficient industries and the expansion of profitable industries is hampered. These inefficiencies are equivalent to output losses. The consequence of repressed structural change for total employment is less obvious. In mainly depends on the flexibility of real wages. This topic is discussed in the final section.

V.   Structural change and sectoral wage dispersion

The interdependence of structural change, wage dispersion and selective protection can be illustrated in a two-sector model of the labour market[1]. Figure 2 presents labour demand functions for an expanding industry (D_e) and a shrinking industry (D_s) with the respective origins in O_e and O_s. Total labour force is given by $O_e O_s$. In the initial situation, labour demand is determined by D_e^O and D_s^O and full employment is achieved at a uniform wage level for both sectors (w^O).

Figure 2 - Structural change in a two-sector labour market
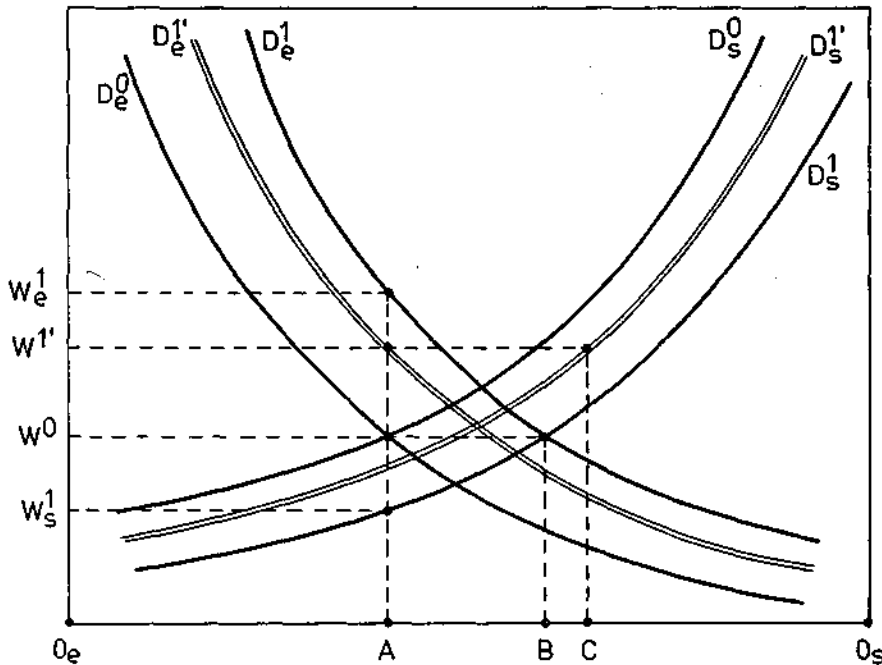
In the course of economic development, the labour demand functions are assumed to shift from D_e^O to D_e^1 and from D_s^O to D_s^1. In the absence of protective government interventions two different full employment equilibria are possible: Under

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[1] The graphical presentation of this model was originally proposed by Mussa (1974). For an application to West German labour markets see Burda, Sachs (1986).

the assumption of sectoral flexibility in labour input employment of the expanding industry will rise from O_eA to O_eB and employment of the shrinking industry will decline from AO_s to BO_s. For simplicity, the equilibrium wage level is assumed to remain constant at w^o. Under the alternative assumption of extreme rigidities in labour input the expanding industry is unable to attract any additional employees. In consequence, wages in this sector will rise to w_e^1. In the shrinking industry, wages must fall to w_s^1 in order to avoid unemployment.

If real wages are equal to marginal productivity of labour in each sector, the latter situation is obviously incompatible with Pareto optimum. Due to the divergence of marginal productivity in different sectors aggregate welfare is reduced. With respect to full employment, however, sectoral wage dispersion and labour mobility are perfect substitutes.

The picture is different, if protective government interventions and an intersectoral wage-link are taken into consideration. Protection of the shrinking industry will result in an upward shift of D_s^1, say to $D_s^{1'}$. Due to budget constraints of government, an additional tax must be imposed on the expanding industry in order to finance the subsidies, thus the respective labour demand function is shifted from D_e^1 to $D_e^{1'}$. If employees are unwilling or unable of sectoral adjustments, employment of the expanding industry will remain constant at O_eA and wages in this industry will rise to $w^{1'}$. With uniform wage contracts all over the economy, $w^{1'}$ determines the wage level in the shrinking industry as well.

As a result, real wages exceed their full employment level and total employment is reduced. Under the specific assumptions of figure 2, the decline of employment in the shrinking industry is even more pronounced than what would have occurred under the conditions of no government interventions

and adjustment flexibility of labour input. All in all, it can be concluded that government protection is an inappropriate measure of compensating employment effects of insufficient labour mobility. Unemployment resulting from rigidities in labour input can only be avoided by a sectoral dispersion of real wages. If the sectoral wage structure is sufficiently flexible, on the other hand, no subsidies and tariffs to shrinking industries are required in order to maintain full employment.

In this view, structural unemployment is interpreted as unemployment resulting from insufficient adjustments of the sectoral structure of labour input and wages. This definition is much broader than the definition of most other authors. In general, structural unemployment is measured by discrepancies between unemployment and vacancies (Layard, Nickell, Jackman, 1985; Franz, König, 1986; Jackman, Roper, 1987). In these studies, changes in structural unemployment are identified by shifts of the "Beveridge-curve". Such "mismatch-analysis" ignores, however, the impact of repressed structural change on job offers in discriminated industries.

Evidently, some basic assumptions of the two-sector model can be applied to the West German economy in the seventies and eighties. As described above, government support is heavily concentrated on declining industries (table 2). And the sectoral wage structure was almost invariant since 1960 (table 3)[1]. The growing importance of repressed structural change was obviously not taken into account in wage contracts.

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[1] For similar results on intersectoral wage differentials in West Germany see Vogler-Ludwig (1985); Gundlach (1986). For an international comparison of wage dispersion see Blanchard et al. (1985); Klau, Mittelstädt (1985); Krueger, Summers (1986); OECD (1987).

In table 3, the intersectoral wage-link was calculated, however, on a highly aggregated data base. Notably sectoral differences in skills of employees were ignored. This approach was appropriate for an assessment of protective distortions in labour input. For an analysis of wage dispersion a further disaggregation is required. Corresponding information on wages by qualification levels of employees is presented in table 5. In addition to total industry the three most protected industries are considered (no skill-specific data are available on wages in agriculture).

Industries facing a comparative disadvantage should pay lower wages than others in order to stimulate voluntary shifts of employment. As structural change slowed down since the early seventies higher wage differentials were required in 1986 than in 1973[1]. Actually, average wages in Ricardo industries still exceed the wage levels in other industries. The same applies to most skill and sex specific sub-groups. Especially white-collar workers in mining are paid considerably above average (for details see table A4 in the appendix).

Presumably, such wage contracts would have been impossible without government support to declining industries. The sheltered Ricardo industries in West Germany often are not laggards, but leaders in wage bargaining. It can be argued, therefore, that industrial policy in West Germany has contributed to insufficient wage dispersion and increasing structural unemployment.

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[1] For an assessment of interindustry wage dispersion and labour mobility in the early sixties see Sachverständigenrat (1965).

VI. Conclusions

The evidence presented in this paper gives support to the institutional hypothesis, according to which a substantial part of the slowdown of structural change since the early seventies can be attributed to successful lobbying activities resulting in sector-specific government support. Officially, industrial policy in West Germany is dedicated to the reduction of frictional unemployment[1]. In fact, this policy yielded the opposite result. Massive government support to Ricardo industries could not prevent a decline of employment in absolute terms. Instead, it reduced the adjustment flexibility of the whole economic system and gave rise to a widening gap between potential and actual structural change.

Within the system of industry-specific government support, trade protection is of reduced importance. Nowadays, the conservation of declining industries is mainly pursued through public subsidies. Most of these measures were already initiated in the sixties or even the fifties. For instance, the first programme of government assistance to shipbuilding was launched in 1962 and protection of agriculture dates back to the early fifties. In the aftermath of 1973, however, government interventions were significantly intensified. On average, subsidy rates in Ricardo industries almost doubled and sectoral shifts of labour input from shrinking to expanding industries were increasingly repressed. In consequence, industrial policy was reducing both incentives for, and capabilities of, faster economic growth.

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[1] The principal design of sector-specific government measures is documented in Deutscher Bundestag (1968), which is still the official guideline of industrial policy in West Germany.

The growing importance of repressed structural change would have required higher intersectoral wage differentials in order to avoid structural unemployment. But also the flexibility of wages was reduced by industrial policy measures. It can be argued, therefore, that aggregate unemployment would presumably be lower in the absence of protective government interventions.

This analysis is mainly concerned to the international sector of the West German economy. An extension to service industries would require a different approach. In services, public aids are in general of minor importance (with the outstanding exception of rail transport). Instead, protection of services is achieved by a complex system of regulations[1]. In this case, protected industries are not prevented from shrinking, but from expanding. As the share of services in total employment will rise in the course of economic growth (Kuznets, 1957, 1971; Chenery, 1960; Fuchs, 1981), these regulations are hampering structural change as well. Further research on government interventions and sectoral rigidities should concentrate on this aspect of repressed structural change.

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[1] For an extensive survey of regulations in West Germany see Soltwedel et al. (1986) and Donges, Schatz (1986). For an international comparison of regulations in service industries see GATT (1985).

Table A1 - Economic growth and structural change of employment in
19 OECD-countries 1965-1985 (per cent)

Country	Structural change (a)	Growth of real GDP (b)	Country	Structural change (a)	Growth of real GDP (b)
West Germany 1965-73	0.527	4.1	Iceland 1965-73	0.428(c)	4.4
1973-85	0.484	2.0	1973-84	0.694(c)	3.6
United States 1967-63	0.796	3.1	Ireland 1965-71	.	4.5
1973-85	0.653	2.4	1971-85	0.783	3.6
Canada 1965-73	.	5.3	Italy 1965-73	1.183(c,d)	5.4
1973-85	1.209	3.6	1973-85	0.978(c,d)	2.4
Japan 1967-73	1.525	9.1	Netherlands 1965-75	.	4.2
1973-85	0.711	4.1	1975-85	0.778	1.6
Australia 1965-73	1.102(c)	5.6	Norway 1965-73	0.984	4.1
1973-85	0.872(c)	3.0	1973-85	0.766	4.1
New Zealand 1965-73	0.305(c)	3.5	Spain 1965-73	.	6.5
1973-85	0.228(c)	2.0	1973-85	0.746	2.4
Austria 1969-74	1.397	5.4	Sweden 1965-73	0.693	3.5
1974-85	0.480	2.2	1973-85	0.652	1.9
Belgium 1965-73	1.063	4.9	Switzerland 1965-73	0.755	3.9
1973-85	0.885	2.0	1973-85	0.554	0.9
Denmark 1965-73	0.851	3.7	United Kingdom 1965-73	.	3.1
1973-85	0.641	2.0	1973-85	0.893	1.8
France 1965-73	1.004	5.4			
1973-85	0.792	2.4			

(a) Calculated for 8 sub-sectors for the business enterprise sector
according to the Labour Force Statistics of the OECD. - (b) Average
annual rate. - (c) 7 sub-sectors. - (d) Calculated from National
Accounts statistics.

Source: OECD (a, b, c); own calculation.

Table A2 - Effective protection by industry in West Germany, selected years

Industry	Net value-added		Government subsidies		Effective tariff protection		Total effective protection (a)	
	1973	1984	1973	1984	1978	1985	1973	1984
	DM million				per cent			
Agriculture	22990	25350	10174	19700	0.0	0.0	44.3	77.7
Mining	7680	16610	1686	5797	0.0	0.0	22.0	34.9
Chemicals	24800	48270	605	871	16.2	9.8	19.0	11.8
Petroleum refineries	4450	4240	168	126	10.7	10.7	14.9	14.0
Plastic products	5960	12080	130	247	15.8	7.1	18.3	9.3
Rubber products	3410	6060	46	55	12.7	8.0	14.2	9.0
Stone, stone products	10100	11870	114	205	8.7	6.1	9.9	7.9
Clay products	1510	2150	24	52	7.3	5.6	9.0	8.2
Glass, glass products	2670	3550	33	70	10.6	7.8	12.0	9.9
Iron and steel	9610	11610	99	2049	9.9	9.7	11.0	19.6
Non-ferrous metals	2220	4550	71	153	12.1	11.2	15.7	14.9
Foundries	3570	5320	36	66	11.6	7.6	13.7	8.9
Rolling mills	8710	11410	35	90	7.7	6.1	8.1	6.9
Steel construction	5850	9240	124	160	4.8	3.1	7.0	4.9
Machinery	33320	55580	806	1812	2.6	1.6	5.1	4.9
Office equipment, computers	4180	7890	251	114	8.1	9.8	14.6	11.4
Motor vehicles	25420	55320	381	582	10.3	12.7	12.0	13.9
Shipbuilding	2070	2430	230	613	-7.1	-1.2	3.2	23.7
Aircraft and aerospace	1500	3990	582	715	15.6	14.1	60.5	34.5
Electrical equipment	32260	60650	952	2219	8.6	5.1	11.8	8.9
Instruments	5770	9830	75	213	7.2	5.2	8.6	7.5
Fabricated metal products	10750	16430	122	269	7.9	5.7	9.1	7.4
Jewelry, cuttlery etc.	1950	3320	15	39	8.3	8.9	9.1	10.2
Wood, wood products	1930	2420	24	65	21.7	16.1	23.2	19.2
Furniture and fixtures	9730	13020	86	168	12.7	6.5	13.7	7.9
Pulp and paper	1790	3710	41	59	19.3	14.2	22.0	16.0
Paper products	3960	5940	59	184	27.9	19.8	29.8	23.5
Printing and publishing	6740	11350	265	509	2.0	0.9	6.0	5.4
Leather, leather products	2670	3130	11	29	9.2	7.2	9.6	8.2
Textiles	9230	10730	115	203	18.9	13.3	20.4	15.4
Clothing	6950	8250	83	140	31.4	23.2	33.0	25.3

(a) Sum of effective tariff protection and percentage share of subsidies in net value-added at world market prices.

Source: Donges, Schmidt et al. (1988); Jüttemeier (1984); Statistisches Bundesamt(a); own calculations.

Table A3 - Average subsidy rates in 14 OECD countries
1965-85 (per cent)

Country	Subsidy rate(a)	Country	Subsidy rate(a)
West Germany		Denmark	
1965-73	1.698	1965-73	2.572
1974-85	2.020	1974-85	3.186
United States		France	
1967-73	0.484	1965-73	2.128
1974-85	0.439	1974-85	2.655
Japan		Iceland	
1967-73	1.072	1965-73	4.131
1974-85	2.416	1974-84	3.971
Australia		Italy	
1965-73	0.903	1965-73	1.682
1974-85	1.494	1974-85	3.000
New Zealand		Norway	
1965-73	1.039	1965-73	4.871
1974-85	1.990	1974-85	6.834
Austria		Sweden	
1969-74	1.816	1965-73	1.761
1975-85	2.969	1974-85	4.245
Belgium		Switzerland	
1965-73	2.855	1965-73	0.953
1974-85	3.990	1974-85	1.328

(a) Average annual ratios of subsidies to gross domestic
product.

Source: OECD(a); own calculations.

Table A4 - Salaries and wages by qualification group in selected industries(a) 1973, 1986 (DM)

| Industry | Monthly compensation of salaried employees(b) | | | | | | | | | | Total |
| | Male | | | | | Female | | | | | |
	II	III	IV	V	Total	II	III	IV	V	Total	
1973											
Total	2585	2018	1509	1295	2110	2025	1563	1142	964	1310	1784
Mining	2895	2391	1981	1619	2535	2234	1739	1343	1123	1600	2423
Iron and steel	2537	2114	1501	1336	2302	2148	1641	1227	998	1457	2119
Shipbuilding	2684	2018	1473	1169	2108	2184	1626	1133	915	1287	1959
1986											
Total	5395	3978	2874	2380	4374	4315	3207	2332	2020	2793	3783
Mining	5871	4526	3907	3349	5125	4272	3429	2740	2604	3346	4884
Iron and steel	5050	3957	2810	2960	4686	4204	3132	2374	2111	3087	4347
Shipbuilding	5315	3927	3123	.	4318	4582	3280	2303	.	2775	4060

| | Hourly compensation of wage earners | | | | | | | | Total |
| | Male | | | | Female | | | | |
	1	2	3	Total	1	2	3	Total	
1973									
Total	9.35	8.35	7.47	8.76	6.75	6.28	5.98	6.16	8.23
Mining	9.28	7.91	6.56	8.64	.	.	.	.	.
Iron and steel	9.57	8.95	8.35	9.10	7.60	7.10	6.18	6.48	9.04
Shipbuilding	9.18	7.69	6.60	8.91	8.13	6.73	5.72	6.63	8.88
1986									
Total	18.74	16.99	15.14	17.85	14.33	13.29	12.68	13.04	16.99
Mining	19.90	16.62	14.22	19.19	.	.	.	.	.
Iron and steel	19.23	17.81	16.62	18.39	15.70	14.09	12.92	13.74	18.32
Shipbuilding	18.78	15.66	13.96	18.56	16.90	14.41	12.23	14.78	18.54

(a) All data refer to gross earnings in October. - (b) Salaries of qualification group I are not available.

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