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The transition to the service society: prospects for growth, productivity and employment

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Kiel Working Papers

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**The Transition to the Service Society:
Prospects for Growth, Productivity and Employment**

by

Henning Klodt

October 1997



Institut für Weltwirtschaft an der Universität Kiel
The Kiel Institute of World Economics

Kiel Institute of World Economics

D — 24100 Kiel

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Abstract

The paper explores the basic features of structural change towards services for OECD countries in general and for Germany in particular. The determinants of sectoral shifts are analytically decomposed into the demand-bias and the productivity-bias.

The demand-bias, which prevails in all OECD countries, mainly reflects the spread of service-based new technologies and related shifts in intermediate demand. The productivity-bias is valid for most countries, but not for Germany, where service sector expansion concentrated on highly productive disembodied services. This anomaly in structural change restricted the capacity of the German service sector to absorb dismissed industrial workers.

JEL: L80; O50; J21.

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I. Introduction*

The "industrial countries" are by no means industrial any more. In the OECD on average, employment in the industrial sector accounts for less than 40 per cent of total employment; in the United States this share has even fallen below 20 per cent. And structural change towards services is still going on. This development has raised many concerns about future economic prospects for highly developed countries which are losing their industrial base. The opportunities for technological progress are supposed to be rather low in services, and a rising share of services is regarded as an impediment to aggregate growth (see, e.g., Kaldor, 1996; Bluestone, Harrison, 1982; Cohen, Zysman, 1987; Dornbusch, 1990; Thurow, 1992; Tyson, 1992). However, the deindustrialization debate has paid rather

* The results presented here are mainly based upon a research project under the "Reports on Structural Adjustment" (Strukturberichterstattung), which are commissioned by the Federal Ministry of Economics. I would like to thank Rainer Maurer and Axel Schimmelpfennig for helpful suggestions and comments. I am also grateful to Hideyuki Suzuki and other members of the Economic Research Institute of the Economic Planning Agency in Tokyo, where an earlier version of the paper was presented.

limited attention to the basic determinants of structural change towards services and to the growth potentials of newly emerging service industries as compared to the manufacturing industries.

This paper tries to explore the major reasons for the rise of the service sector and evaluates the implications for aggregate growth and employment performance. For this purpose, sectoral shifts from industry to services are explained in the framework of a simple two-sector model, which is confronted with some basic empirical facts (section II). Subsequently, the service sector itself is examined with respect to its capability of providing an adequate base for self-sustained growth (section III). Finally, the implications of structural change for labor markets and structural unemployment are considered (section IV). The empirical evidence for the different hypotheses and explanations is mainly derived from OECD statistics and - for more detailed analyses - from national statistics about the German economy.

It is the central finding of the paper that structural change between industry and services can not be regarded as a general threat to the growth prospects of the economy, but rather as a challenge to the flexibility of labor markets. The service society provides ample opportunities for output and employment

expansion, but taking advantage of these opportunities requires significant adjustments of the labor force which may be hard to achieve.

II. The Basic Model and Some Basic Facts

1. The Three-Sector-Hypothesis

According to the well-known "three-sector-hypothesis" of Alan Fisher (1939), Colin Clark (1940) and Jean Fourastié (1949) the share of the primary sector (agriculture and mining) tends to decline in the process of economic development, whereas the share of the secondary (industrial) sector increases at early stages of development and then decreases as the economy matures. The tertiary sector (services) increases its share in economic activity during the whole process of development. It has repeatedly been shown that this hypothesis is quite powerful in explaining cross-country variations of sectoral shares in nominal output and employment (Kuznets, 1957; Chenery, 1960; Fels, Schatz, Wolter, 1971; Donges, Klodt, Schmidt, 1989; Franzmeyer, 1994; Rowthorn, Ramaswamy 1997):

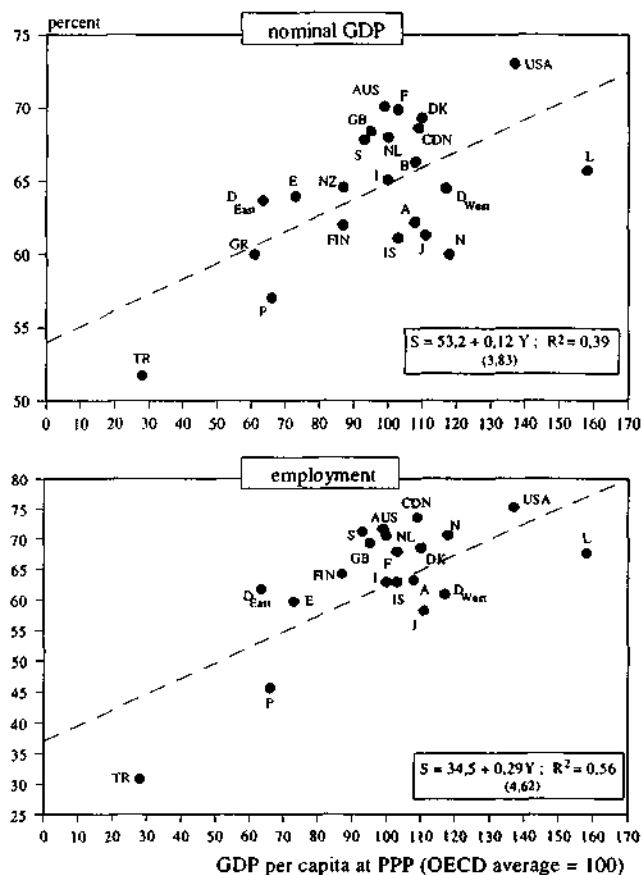
The empirical evidence on the development of sectoral shares in real output is less unequivocal. In some countries for some periods of time it rises; in others it falls; in many cases it does not exhibit any significant trend at all. If one looks for the stylized facts of structural change in real terms, the assertion of constant sectoral shares seems to be most appropriate (Kravis, Heston, Summers, 1983; Lawrence, 1984; Rowthorn, Ramaswamy, 1997).

Figure 1 presents the statistical evidence on the three-sector-hypothesis for the OECD countries.¹ It reveals that there exists a positive relationship between service sector shares and the stage of economic development, which appears to be somewhat stronger for employment than for nominal output. The construction of a similar diagram on real output shares from national accounts statistics would not make much sense, because national statistical offices are calculating real output by deflating nominal output with the national price structure of a base year. Even if the base years were identical for all countries, international comparisons would be impossible, as services tend to be more expensive in highly developed countries. Hence,

¹ Countries are identified by car-plate signs.

international comparisons of service shares in real output would tend to exaggerate the size of the service sector in rich countries.

Figure 1 — Service Sector Shares in Nominal GDP and Employment 1994(a)



(a) Or latest available year.

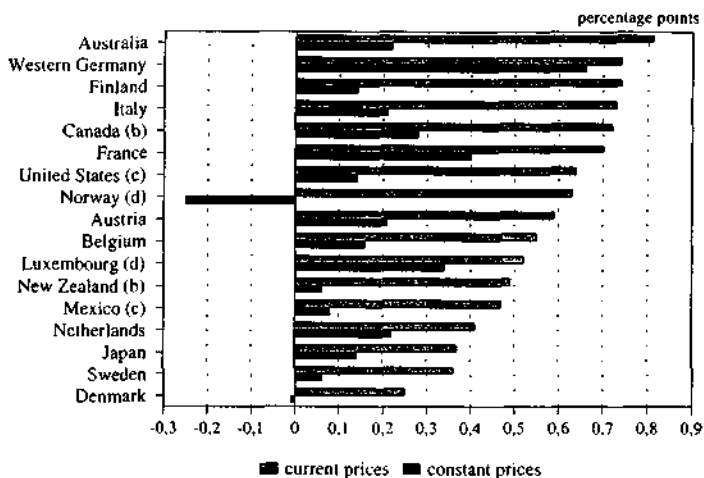
Source: OECD (a, b).

A probable way for identifying the relationship between real output shares and economic development is the analysis of time series for individual countries, which can be derived from OECD statistics (Figure 2). In almost all countries real output shares increased only very moderately and to a much lower extent than nominal shares. Germany is the only case where the increase in real share exceeded 0.5 percentage points per year and almost reached the increase in nominal share. This anomaly will be examined in greater detail in the following sections, because it hints at specific adjustment problems in the German labor market. At the present stage of analysis, however, it shall not be examined further. All in all, the empirical evidence presented in Figure 2 is taken as supportive evidence for the assumption that real output shares of the service sector do in general not rise as fast as nominal shares.

2. A Parable of Structural Change

Theoretical explanations of shifts in sectoral shares always have to start from differences between sectors either on the supply side or on the demand side. In the literature on structural adjustment, supply-side effects are primarily ascribed to the "productivity-bias", i.e. the higher potential for

Figure 2 - Service Sector Shares in OECD Countries (a)



(a) Average annual change 1980-1994. — (b) 1980-92. — (c) 1980-93. — (d) 1980-91.

Source: OECD (b); own calculations.

capital deepening and for implementing new technologies in industry than in services.² If wage rates are uniform across industries, the relative price of services as compared to industrial goods will rise in the course of economic

² The productivity bias was introduced into the literature by the seminal articles of Balassa (1964) and Samuelson (1964). For a reappraisal of the Balassa-Samuelson model see Asea and Corden (1994).

development.³ With normal price elasticities of demand and with homothetic preferences, i.e. with income elasticities of demand of unity both for industrial goods and services, the change in relative prices will induce a decline in the share of services in real output. The impact of the productivity bias on sectoral shares in nominal output and employment is indeterminate, because the lower expansion of real output in services is accompanied by a relative price increase and a lower decline in labor input per unit of output.

In addition to these supply-side effects resulting from the productivity-bias, demand-side effects must be taken into account. Most observers agree that the demand for services is in general more income-elastic than the demand for industrial goods, especially at higher stages of economic development. If households get richer, home-cooked meals are more often replaced by restaurant meals, cultural and recreational activities become more important, and the demand for financial services or insurances rises. These shifts in the structure of demand give further support to the increase of the relative price

³ If it is further assumed that sectoral labor shares are constant (the Cobb-Douglas case) and product and factor markets are perfectly competitive, there will be a strict inverse relationship between relative prices and relative productivity performance of sectors.

of services. In addition, they make it profitable for producers to increase the share of services in real output. Hence, the demand-bias tends to increase the share of services in nominal and real output and in employment.

With these considerations in mind, the above-described stylized fact of constant service shares in real output can be interpreted as the combined effect of the productivity bias (which reduces the share) and the demand bias (which increases the share). As both biases are raising the relative price of services, service sector shares in nominal output and employment will rise when the share in real output is constant.

These results can be reproduced by a simple two-sector model with labor as the only production factor.⁴ It is assumed that real output (x) per worker (l) in services (s) and manufacturing (m) grow at constant rates over time, with the increase in service productivity as a constant fraction (r) of the increase in manufacturing productivity (λ). For convenience, it is assumed that the productivity levels at $t=0$ are equal in both sectors.

⁴ A similar model was already proposed by Baumol (1967) for explaining the poor growth performance of cities as compared to rural areas.

$$\frac{x_m(t)}{l_m(t)} = Ae^{\lambda t} \quad (1)$$

$$\frac{x_s(t)}{l_s(t)} = Ae^{r\lambda t} \quad 0 < r < 1 \quad (2)$$

With identical wages across industries and competitive markets, the relative price of services will increase by the following rate:

$$\frac{p_s(t)}{p_m(t)} = e^{\lambda t(1-r)} \quad (3)$$

The demand side is introduced into the model by the assumption that the impact of the productivity bias on real output shares is completely compensated by the demand bias, i.e. the share of services in real output is assumed to be invariant over time

$$x_s(t) = c(x_m(t) + x_s(t)) \quad 0 < c < 1 \quad (4)$$

When the price of manufactured goods is taken as the numéraire, the share of services in nominal output can be calculated as follows:

$$\frac{p_s(t)x_s(t)}{p_s(t)x_s(t) + p_m(t)x_m(t)} = \frac{1}{1 + \left(\frac{1}{c} - 1\right)e^{(r-1)\lambda t}} \quad (5)$$

This share will rise with increasing t .

Since this model does not allow for monopoly rents and for other production factors than labor, the share of services in nominal output as described by (5) also determines the share of services in total employment. Hence, the model completely reproduces the above-described stylized facts of structural adjustment, namely the relative price changes (equation 3), the constant real output shares (equation 4), and the rising shares in nominal output and employment (equation 5).⁵ A further result can be derived from the model: as the share of services in employment increases over time and the productivity performance is lower than in manufacturing, the transition to the service society will be accompanied by a declining rate of aggregate growth. The growth rate of per-capita income (\hat{y}) equals the weighted average of productivity growth in both sectors.

$$\hat{y}(t) = \frac{l_S(t)}{l_M(t) + l_S(t)} r\lambda + \frac{l_M(t)}{l_M(t) + l_S(t)} \lambda \quad (6)$$

⁵ The basic results would also hold for a model with more than one production factor, if the output elasticity of labor input is constant over time. In this case, the shares of services in nominal output and employment may exhibit different levels, but their change rates over time would still be identical.

Hence, a highly industrialized economy with a very small service sector will start with an aggregate per-capita growth rate of almost λ and will end up with a growth rate of $r\lambda$ as it matures.

Of course, this model is only a parable about the basic developments of structural adjustment in developed countries. Nobody would expect from a parable to be literally true, but to furnish an instructive story. The next section will show that the two-sector model in fact provides a fairly authentic description of the basic patterns of structural adjustment, but leaves out several important aspects, which are essential complements for understanding the process of transition from the industrial to the service society.

III. A Closer Look at the Stylized Facts

1. Productivity Bias

At first glance, it seems obvious that the potentials for productivity growth are lower in service industries than in manufacturing. Industrial robots, computer-integrated manufacturing and fully automated production lines are hard to imagine in traditional service industries such as barber shops,

lawyer's offices or retail stores. In this context, William Baumol (1967, p. 416) once wrote: "A half-hour horn quintet calls for the expenditure of 2½ man-hours in its performance, and any attempts to increase productivity here is likely to be viewed with concern by critics and audience alike."

According to Bhagwati (1984a), the limited potential for productivity improvements in services mainly results from limited opportunities for capital deepening. When the capital-labor ratio of the economy as a whole is rising in the course of economic development, the disparity between the capital intensity of the industrial sector and the service sector will enlarge, and so will the disparity between the levels of labor productivity.

The assertion of low capital intensity is not confirmed, however, by statistics on the case of Germany. On average, the capital-labor ratio in service industries even exceeds the ratio in manufacturing (Table I). Capital intensity is extremely high in communication and in transport. Running a telecommunications system or driving a truck or a train requires much higher capital input than working on an assembly-line. There seems to be no reason, therefore, for the concerns that the service society would be short of investment opportunities and would provide lower incentives for capital accumulation than the industrial society.

*Table 1 — Capital Intensity (a) by Industry in Western Germany
(DM at 1991 prices)*

Industry	1970	1980	1990	1994	1970-94(b)
Total services(c)	131850	179555	220974	237584	2.5
Trade	70797	98907	116185	132552	2.6
Transport	294054	389593	412350	415000(d)	1.4
Communications	165356	321191	535145	610000(d)	5.6
Banking, insurance	138794	192570	243262	272965	2.9
Business and personal services	112902	183372	254705	270424	3.7
Government services	1465488	170331	198541	214697	1.6
Private households, pnp	179039	193762	182401	170860	-4.6
Manufacturing	91213	141160	163219	199316	3.3

(a) Gross capital stock per person employed. — (b) Average annual increase (per cent).
— (c) Excluding real estate. — (d) Own estimate.

Source: Statistisches Bundesamt (a); own calculations.

A second approach for explaining the productivity bias rests upon the assumption that technological progress were concentrated on the industrial sector. In this case, capital deepening in the service sector would eventually result in diminishing rates of return and not in productivity increases. As a matter of fact, this presumption is also not supported by statistics. The productivity disadvantage of the service sector in Germany, which can be observed for the 1970s, has almost disappeared in recent years. In the two sub-periods of 1980 to 1990 and 1990 to 1994 productivity growth in services was almost as high as in manufacturing (Table 2).

Table 2 — Levels and Growth Rates of Labor Productivity by Industry in Western Germany

Industry	1000 DM per employee at 1991 prices				annual growth rate (per cent)			
	1970	1980	1990	1994	1970-80	1980-90	1990-94	1970-94
Total services	60.0	65.9	77.6	82.8	0.9	1.6	1.6	1.4
Trade	40.7	50.0	58.5	59.9	2.1	1.6	0.6	1.6
Transport	50.2	61.5	76.5	80.0(a)	2.1	2.2	1.1	2.0
Communications	41.2	69.5	107.7	120.0(a)	5.4	4.5	2.7	4.6
Banking, insurance	90.2	120.1	148.5	163.5	2.9	2.1	2.4	2.5
Business and personal services	74.9	82.9	99.7	105.6	1.0	1.9	1.4	1.4
Government services	57.6	60.4	62.0	65.0	0.5	0.3	1.2	0.5
Private house- holds, pnp	46.1	48.8	48.8	48.7	0.6	0.0	-0.1	0.2
Manufacturing	53.9	72.1	85.3	91.1	3.0	1.7	1.7	2.2

(a) Estimate.

Source: Statistisches Bundesamt (a); own calculations.

The disappearance of the productivity bias in the German economy can probably be ascribed to two developments:

- Firstly, the service sector itself is far from homogenous, and some service industries have never been low-productive industries. The prospects for introducing productivity enhancing technologies in banking and insurance or in communication services, for instance, are much better than in most

personal services. Structural adjustment within the service sector is dominated by significant shifts from traditional, low-productivity activities to modern activities with rich opportunities for productivity improvements.

- Secondly, technical progress has probably lost its traditional bias in favor of the manufacturing sector. In a broad sense, many service activities are concerned with generating, collecting and disseminating information. Designers and sales-promotion agents create new information about products, financial institutions collect and distribute information about capital markets, lawyers provide information about the legal system, and the PTTs ship information from one place to the other. All these activities are strongly facilitated by modern, microelectronics based information and communication technologies which became broadly available with the advent of the personal computer. The microelectronics revolution is far from being over and will probably continue to reduce the productivity disadvantage of service industries in the years to come.

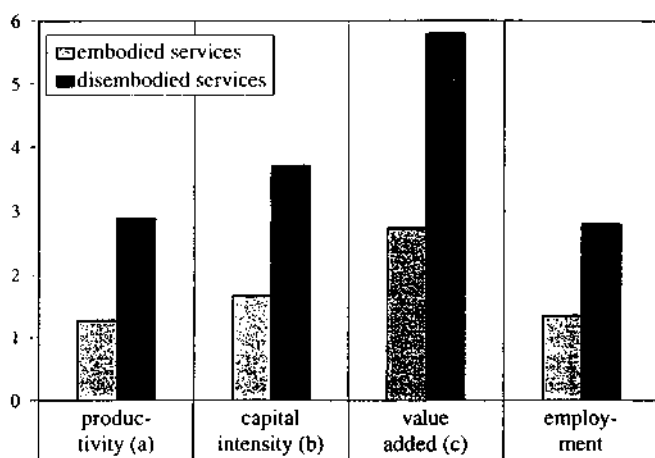
The disparate productivity potentials of different service industries can be apprehended by the distinction between embodied and disembodied services, which was proposed by Bhagwati (1984b): In *embodied* services, a

physical proximity between producers and consumers is essential for the quality of the service provided. This applies to many personal services such as hair-cuts, window-cleaning or medical care, but also to retail trade or taxi driving. In these areas the potential for productivity increase is limited, because the quality of the service often directly depends on the time spent by the service provider. *Disembodied* services, by contrast, can be shipped across long distances without a substantial loss of quality. Examples are financial and insurance services, legal advice by lawyers, weatherforecasts, and structural analyses by economists. This type of services is faored most by information and communication technologies and will probably exhibit substantial productivity gains in the years to come.

According to this classification scheme trade, transport, personal services, private households and pnp services can mainly be regarded as embodied services, whereas communication, banking, insurance and business services can by and large be regarded as disembodied services. As indicated in Figure 3, actual productivity growth rates in service industries are well in line with the predictions about the relative performance of these two types of services. The diminishing of the productivity bias in the German economy can therefore mainly be ascribed to (1) the rising productivity potential of

disembodied services due to new information and communication technologies, (2) structural shifts within the service sector towards disembodied services. To a certain degree, intrasectoral shifts towards disembodied services can also be observed for other OECD countries, but to a much lesser extent than in Germany (see Table A1 in the appendix).

Figure 3 — Indicators for Embodied and Disembodied Services in Western Germany 1975-1994 (average annual growth rates)

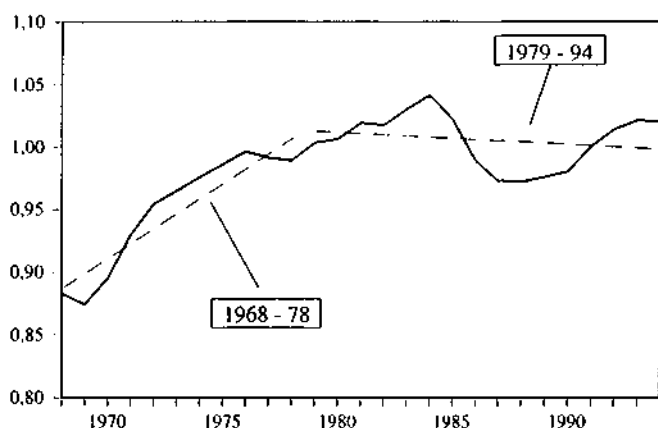


(a) Value-added at 1991 prices per employee. — (b) Gross capital stock at 1991 prices per employee. — (c) Value-added at 1991 prices.

Source: Statistisches Bundesamt (a); own calculations.

The disappearance of the productivity bias in the German economy also shows up in the development of relative prices between services and other types of (Figure 4). Although the long-term price trends are strongly disturbed by cyclical fluctuations, the data strongly indicate a structural break around 1975, with a continuously rising relative price of services in the 1960s and early 1970s and no significant time trend in the years thereafter. Apparently, the disappearance of the productivity bias and the parallel development of nominal and real service sector shares in Germany (as reported above) are two sides of the same coin, because productivity differentials are the main determinants of relative price differentials.

Figure 4 — Relative Price of Services (a) in Western Germany



(a) Ratio of value-added deflator in services to value-added deflator in the primary and secondary sector (at 1991 prices).

Source: Statistisches Bundesamt (a); own calculations.

The different patterns of structural change in Germany and other countries suggest that the service sector provides rich opportunities for the enhancement of highly productive and less productive activities as well. The productivity bias seems to be no "natural" phenomenon which would inevitably restrict the growth and productivity prospects of the service society. In most OECD countries, all types of service activities were expanded in the past - with the result of a diminishing, but not disappearing productivity bias, a persisting trend of relative price increases of services, and a sustained differential in the development of nominal and real output shares of the service sector. In Germany, by contrast, the expansion of services was mainly concentrated on the highly productive segment of the service sector, which brought about a disappearance of the productivity bias, a structural break in relative price trends, and a synchronized increase of nominal and real output shares of services. In the framework of the model of section II, structural change in the German economy since the mid-seventies can be described by a situation where the demand bias is predominant, because the coefficient r (the productivity bias coefficient) has reached a level of unity.

2. Demand Bias

In the context of the model of part II, rising service sector shares are ascribed to non-homothetic indifference curves of consumers, i.e. an income elasticity of demand for services above unity. However, the model ignores intermediate demand which constitutes a significant fraction of total demand. An empirical investigation of changing demand patterns would be highly incomplete without explicitly taking into consideration intermediate demand.

Unfortunately, the data base for identifying sectoral shifts in intermediate demand is rather small, because consistent input-output tables for Western Germany are available only for the period of 1978 to 1990.⁶ For identifying intra- and intersectoral flows of goods and services, the tables for 1978 and 1990 have been aggregated by sector (see Tables A2 and A3 in the appendix).

⁶ For 1991, an input-output table for Germany as a whole is available from the Federal Statistical Office. A similar table for 1993 is under preparation.

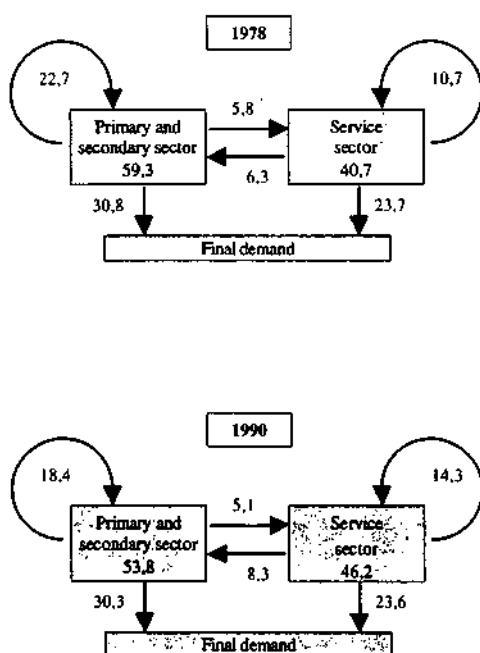
Figure 5 presents a brief sketch of input-output flows in the Western German economy.⁷ It reveals that the primary and secondary sector still dominate the deliveries to final demand, which comprises private and government consumption, investment, and exports. In addition, it shows that most deliveries of intermediate goods take place within sectors, not between sectors. Finally, it demonstrates that the service sector is less intermediate goods-intensive than the primary and secondary sector.

For explaining structural change, the most interesting information is derived from the comparison of the 1978 and the 1990 patterns. The changes in the percentages shares of different components of total deliveries are summarized in Table 3. The relative size of the primary and secondary sector has declined by 5.5 percentage points (from 59.3 per cent to 53.8 per cent), and the service sector expanded its share by the corresponding rate. The expansion of the service sector share was completely fed by increased shares in the deliveries of intermediate goods. The strongest increase can be observed for intrasectoral shipments within the service sector, but also shipments to

⁷ Real estate services provided to final demand are excluded because these services mainly consist of imputed rents of house-owners, which do not reflect production activities.

the primary and secondary sector were significantly expanded. In 1990, about one third of intermediate inputs of the primary and secondary sector were delivered by the service sector, whereas primary and secondary inputs accounted for only one quarter of intermediate inputs of the service sector.

Figure 5 — Flows of Goods and Services in Western Germany (a)



(a) Total output of all sectors = 100 (excluding deliveries of real estate to final demand).

Source: Calculated from Tables A2 and A3 in the appendix.

Table 3 — Changes of Sectoral Shares by Demand Components in Western Germany 1978-1990 (percentage points)

Share in ...	Primary and secondary sector	Service sector
Total output (a)	-5,5	5,5
Final demand	-0,5	-0,1
Intermediate demand		
Total	-5,0	5,6
of the primary and secondary sector	-4,3	2,0
of the service sector	-0,7	3,6

(a) Excluding deliveries of real estate to final demand.

Source: Calculated from Figure 5.

According to these results, the rising service intensity of the whole economy is the major driving force behind the transition to the service society. The shift towards services is not dominated by the replacement of industrial goods through services in final output, but by a replacement of less service-intensive goods through service-intensive goods.

Increasing the service intensity of production has turned out as an indispensable prerequisite for customer-oriented product differentiation and for raising the technological sophistication of products (Klodt, Maurer, Schimmelpennig, 1997). It is often argued that the expansion of services would be not much more than a statistical artefact, because it would

basically reflect an outsourcing of service activities from manufacturing companies. An empirical examination of the outsourcing hypothesis is feasible by statistics on the structure of employment by types of professional activity. Such data are collected under die "Mikrozensus", which is based upon a representative sample which covers 1 per cent of the total German labor force. In the questionnaires, workers are asked (among other things) about their professional activity and about the industry where they are engaged in. There is a broad distinction between: the primary sector (agriculture), the secondary sector (mining, manufacturing, utilities and construction) and the tertiary sector (services), and the respective activities such as farmers, metal workers, clerks, etc.⁸

If the outsourcing hypothesis were true, there should be a structural shift from industry to services in sectoral statistics on output and employment, but no significant shift in the type of activities of workers. For instance, an outsourcing of software production from industrial companies to independent software houses increases the share of the service sector in the aggregate economy, but the software engineer still remains a software engineer. As a

⁸ A list of professional groups arranged by primary, secondary and tertiary activities is available from the author upon request.

matter of fact, structural change towards services was not confined to the distribution of workers across sectors, but also shaped the distribution across professional activities (Table 4). The tertiary sector expanded its share in total employment by about 13 percentage points from 1976 to 1995, whereas tertiary activities gained about 8 percentage points.

Table 4 — *Employees by Sector and Occupation in Western Germany 1976-1995 (per cent)*

	Sector of Employment			Type of Occupation(a)		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
	West Germany					
1976	8,3	54,5	48,2	6,3	33,8	58,8
1980	7,3	43,3	49,4	5,4	34,0	59,4
1985	6,7	39,8	53,6	4,8	31,5	61,5
1989	5,5	39,1	55,4	3,5	30,4	63,1
1991	5,1	39,1	55,8	3,6	29,4	64,2
1993	4,8	37,6	57,6	3,3	27,8	65,2
1995	4,0	35,0	61,0	3,1	26,8	67,1
1976-1995(b)	-4,3	-8,5	12,8	-3,2	-7,0	8,3

(a) The shares do not add up to 100 per cent, because some employees cannot be assigned to sector-specific occupations. — (b) Percentage points.

Source: Statistisches Bundesamt (c) — own calculations.

Structural change at the level of profession activities does not only reflect an expansion of the service sector itself, but is reinforced by an increased service intensity of industrial production processes. Within manufacturing, typical industrial activities are continuously losing importance and are replaced by service activities. In 1995, 38 per cent workers of the secondary sector were engaged in service activities, whereas it were 27 per cent in 1976.⁹

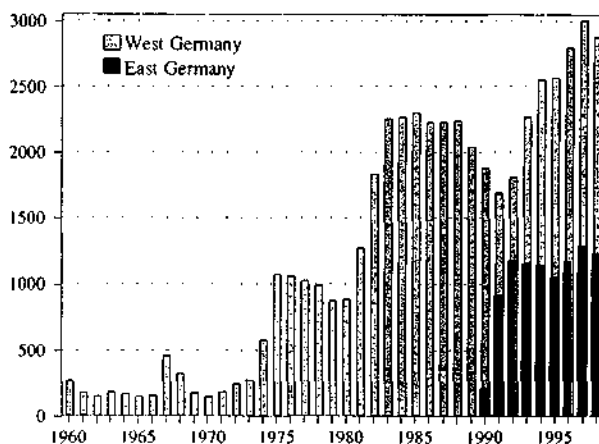
IV. Services and the Labor Market

1. Structural Change and Structural Unemployment

Total unemployment in the Western German economy has reached its present size in three major steps. The large increases during the recessions of 1975, 1982 and 1993 were only partly removed in the subsequent cyclical upswings (Figure 6). Since 1990, a substantial amount of unemployment emerged also in Eastern Germany.

⁹ Calculated from Statistisches Bundesamt (c).

Figure 6 — Registered Unemployment in Germany 1960-1998



Source: Statistisches Bundesamt (a); Boss et al. (1997).

There is a lively debate among labor economists about the reasons of the strong increase and high persistence of unemployment in Germany, but most observers agree that the major part is structural unemployment.⁸ This view is supported by the fact that the risk of becoming unemployed is closely related to the level of formal training (Table 5). Obviously, the individual employment problems are mainly associated with inadequate qualification. There is a substantial gap between the qualification requirements of labor demand and the qualifications actually provided by labor supply.

⁸ See, e.g., Franz (1992), Nickell (1997), and Siebert (1997).

Table 5 — Unemployment Rates (a) by Formal Qualification in Germany in April 1995 (per cent)

Qualification level	Western Germany 1994	Eastern Germany 1992
Without completed formal training	14.2	23.8
With completed formal training	6.6	15.6
Apprenticeship	7.2	18.7
Technical school	4.5	10.5
College	5.0	9.5
University	4.9	7.5
Total	8.4	16.6

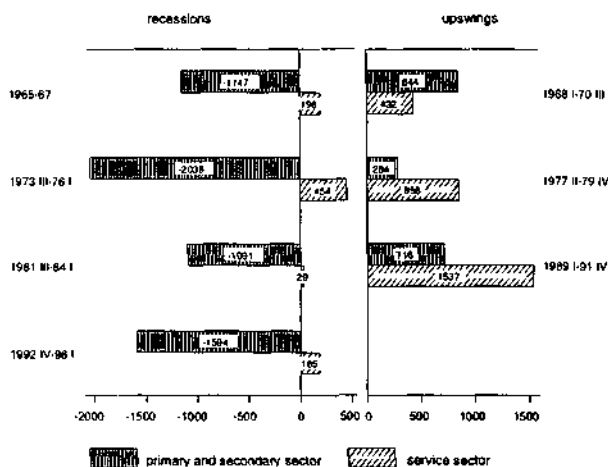
(a) Unemployed per employee of the respective qualification group.

Source: Statistisches Bundesamt (c); own calculations.

Changes in qualification requirements of labor demand are closely related to sectoral shifts from manufacturing to services. The expansion of service activities took place in a rather smooth manner, whereas the reduction of industrial employment was concentrated on phases of recession. Since the 1970s, there is a pronounced sectoral asymmetry between job losses during recessions and job creation during subsequent booms (Figure 7). Hence, it can be argued that the stepwise increase of total unemployment was mainly

fed by the dismissal of industrial workers whose qualifications were rather unsuitable for expanding service sector activities.¹⁰

Figure 7 — Sectoral Changes of Employment at Different Stages of the Business Cycle in Western Germany (1000 persons)



Source: Statistisches Bundesamt (a); own calculations.

The stepwise increase of total unemployment during recessions may at least partly reflect the basic employment strategies of manufacturing firms, which tend to concentrate their restructuring and rationalization processes on peri-

¹⁰ This structural determinant of unemployment is only imperfectly reflected in conventional mismatch-indicators, because statistical information about the sectoral structure of previous occupations of the unemployed is highly deficient (Paqué 1991).

ods of weak economic activity. Large lay-offs are less difficult to achieve if employers can argue that cost-cutting strategies are unavoidable due to reduced production and market potentials. In this case, legal rules on job protection and financial compensation entitlements of dismissed workers are much less restrictive in the regulatory framework of the German labor market.

The implications of this view for the future of Western German labor markets are rather unpleasant. There appears to be only limited hope that a substantial part of the 1.6 million industrial workers, who have been dismissed in the past recession, will be reintegrated in the active labor force during the ongoing economic recovery. If the current business cycle will follow previous patterns, new jobs will again be created mainly in service industries, where the employment opportunities for industrial qualifications are low. Hence, structural unemployment may even be worsening in the years to come.

3. Good Jobs - Bad Jobs - No Jobs

At this stage of analysis the central problem of the German labor market is identified as the limited capacity of the service sector to absorb those workers who are dismissed from the industrial sector in the process of structural change. The German service sector has created a significant amount of new jobs over the past decades, but this development did not prevent the rise in structural unemployment, since new jobs were more or less unsuitable for persons who lost their jobs in the industrial sector.

In the 1950s and 1960s, when structural change required a shift of workers from the declining primary to the expanding secondary sector, this adjustment did not impose serious problems: the speed of structural change was high also in those days, but aggregate unemployment rapidly declined in the 1950s and remained low in the 1960s. Changing the sector of employment appeared to be an attractive opportunity for workers, because the qualification requirements of new jobs were not too high and payment was often higher than in the primary sector.

In the 1970s and afterwards, sectoral adjustment continued, but now it mainly required a shift of the labor force from the secondary to the tertiary

sector. Labor mobility in this direction seems to be much harder to achieve. High-wage service jobs usually require specific qualifications which are rare among industrial workers. For workers without any formal training or with industry-specific qualifications, employment opportunities in the tertiary sector are mainly restricted to low-productivity and low-wage services.

In the United States many workers were forced to accept such jobs, because the social security standards are rather low. In the German economy, by contrast, the creation of low-productivity service jobs is prevented by the relatively high reservation wages of industrial workers, which are backed by rather generous unemployment benefits. And every person without own income is entitled to receive social aid, which often exceeds labor income that could be earned in low-productivity service jobs.

Table 6 presents some evidence on this issue for two typical low-productivity service industries, where the labor income of the lowest wage group is compared to the claims upon the system of social aid. Apparently, there is no financial incentive to work for married persons with more than one child, because disposable income would be lower than social benefits. Although there is no minimum wage legislation in Germany, the system of social security establishes significant factual minimum wages.

Table 6 — *Low-wage Income and Social Benefits in German Service Industries 1995 (a)*

	Hotels and restaurants			Retail trade		
	Single	Married		Single	Married	
	no children	one child	two children	no children	one child	two children
Gross monthly earnings	1947	1947	1947	2510	2510	2510
Income tax	99	-	-	267	122	-
Social security contrib.	394	394	394	508	508	508
Child support	-	200	400	-	200	400
Housing benefits	12	143	378	-	73	270
Disposable income	1465	1896	2331	1735	2153	2672
Social aid income	1095	1823	2753	1095	1828	2753

(a) The data on gross earnings and social aid refer to Hesse in 1995. The difference between gross earnings and disposable income is calculated according to the laws of 1996, which are more favorable to low-wage earners than previous laws.

Source: Deutsche Bundesbank (1996, p. 65).

In this context, the comparably high productivity growth rate in the German service sector, which was identified as a German anomaly in structural adjustment in sections II and III, can mainly be attributed to the social security system that prevented the emergence of a low-productivity service sector which could prevent the rise of structural unemployment by absorbing low-qualified workers. Not every dismissed industrial worker fits into the newly created "good jobs" in services; the creation of "bad jobs" is ham-

pered by social security standards; therefore an increasing share of the labor force is facing "no jobs" as the only available alternative.

V. Summary

Analytically, the determinants of sectoral shift from industry to services can be decomposed into the demand bias and the productivity bias.

The *demand bias* is valid across all OECD countries, as can be concluded from the rise in the share of services in nominal output and employment. Contrary to widespread conceptions, shifts in sectoral demand patterns are not predominated by shifts in consumers' demand which would replace purchases of industrial goods by purchases of services. Changes in private consumption patterns are simply too slow for explaining the substantial shifts in production patterns.

The transition towards services is mainly driven by shifts in producers' demand, which are motivated by an innovation-oriented strategy of raising the service intensity of production across all industries. Hence, public concerns about an erosion of the industrial base, which might destroy invest-

ment and innovation opportunities, appear to be misconceived. The industrial base is not destroyed, but improved by a rising service intensity.

The *productivity bias* cannot be regarded as an exogenous determinant of structural change. Sectoral productivity developments are strongly influenced by the development of wages. In the U.S. economy, where labor mobility is high and the wage structure is flexible, dismissed industrial workers have entered into the service sector at its low-productivity end, which generated a strong increase in wage inequality, but prevented the emergence of significant structural unemployment.

In the German economy, low-qualified or mis-qualified workers were not ready to accept relative wage cuts. As a consequence, the low-productivity segment of the service sector is almost non-existent. For the service sector as a whole, average productivity growth was much faster in Germany than in the United States. As a result of these international differences in the response to the challenges of the service society, the traditional productivity bias between industry and services still prevails in the United States (and many other OECD countries), whereas it disappeared in Germany.

In the light of these considerations, labor market flexibility and the qualification of the labor force are the decisive determinants of the implications of structural change for unemployment. If a significant rise in wage dispersion is regarded as socially undesirable for the German society, the improvement of the qualification of workers appears to be the most important part of a far-sighted strategy for fighting structural unemployment.

Table A1 — Share of Disembodied Services in Total Employment of the Service Sector in OECD Countries (a) (per cent)

	1980	1994(b)	1980-94(c)
West Germany	32,0	36,7	4,7
Canada	26,8	29,7	2,9
United States	31,3	33,8	2,5
Denmark	38,7	42,5	3,8
Finland	30,0	32,9	2,9
France	28,4	31,6	3,2
Iceland	36,3	39,6	3,3
Netherlands	35,0	30,4	-4,6
Sweden	29,2	33,3	4,1
All Countries	32,0	34,5	2,5

(a) Excluding government, private households, pnp — (b) Or latest available year — (c) Percentage points.

Source: OECD (b); own calculations.

Table A 2 — Consolidated Input-Output Table (a) for Western Germany 1978 (million DM)

Supply from	Total output	Supply to:				
		Final demand	International demand			
			Total	Agri- culture	Industrial Sector (b)	Service Sector
Agriculture	65318	11190	54129	7314	41558	5256
Industrial sector	1341460	720510	620950	16669	471850	132431
Service sector	1060852	657914	402938	5621	143539	253778
Trade	201207	129905	71302	2003	49059	20240
Transport	74581	34525	40056	1490	24815	13751
Communication	32234	14420	17814	82	6571	11161
Banking, insurance	77368	18537	58831	386	2744	55701
Real estate	115073	96942	18131	2	1953	16176
Hotels, restaurants	44740	29000	15740	25	5735	9980
Education, science	27662	17233	10429	35	2380	8014
Health care	39348	7658	31690	690	139	30861
Other services	128829	35448	93381	678	44232	48471
Government services	287400	260451	26949	200	5813	20936
Private households, pnp	32410	13795	18615	30	98	18487
Total	2467630	1389614	1078016	29604	656947	391465

(a) Domestic production at factory prices. — (b) Mining, manufacturing, construction, utilities.

Source: Statistisches Bundesamt (b); own calculations.

Table A 3 — Consolidated Input-Output Table (a) for Western Germany
1990 (million DM)

Supply from	Total output	Supply to:				
		Final demand	International demand			
			Total	Agri- culture	Industrial Sector (b)	Service Sector
Agriculture	65318	11190	54129	7314	41558	5256
Industrial sector	1341460	720510	620950	16669	471850	132431
Service sector	1060852	657914	402938	5621	143539	253778
Trade	201207	129905	71302	2003	49059	20240
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Private households, pnp	32410	13795	18615	30	98	18487
Total	2467630	1389614	1078016	29604	656947	391465

(a) Domestic production at factory prices. — (b) Mining, manufacturing, construction, utilities.

Source: Statistisches Bundesamt (b); own calculations.

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