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**Why Germany Has Such a Weak Growth Performance**

**by**

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## **Why Germany Has Such a Weak Growth Performance**

*Abstract:*

Germany has had an extremely low growth performance since 1995. The paper looks at the long-run reasons for this loss of economic dynamics besides German unification: These include leaving labor idle, a declining share of investment in GDP, a weaker innovative activity, an ineffective system for human capital formation with the exception of vocational training and an erosion of the export position with a reduced attractiveness for foreign direct investment. The issue is raised whether Germany belongs to a new category of economies, the NDCs, the Newly Declining Countries.

*Keywords:* Economic growth, labor and human capital, capital accumulation, innovation, export performance, foreign direct investment, enterprise sector, sectorial change.

*JEL classification:* E0, F0, J0, L0, O0

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## **Why Germany Has Such a Weak Growth Performance**

Germany has had a low GDP growth rate in the last decade. Whereas the stagnation in the years 2001-2003 was strongly influenced by the worldwide decline of economic activity, the poor growth performance for the whole period since 1995 has to be traced to other factors. It seems that the German economic engine has lost its dynamics. The labor force is not fully utilized, the rate of capital accumulation is slower than in the past, innovation is centered on improving existing products along traditional trajectories but not on new technical horizons, human capital formation is not organized efficiently, and economic growth comes from existing firms but not through new ones. The export position is weakening, and German firms invest abroad instead of at home. The social security system, so to say a superstructure of the economy, has a negative impact on the economic basis with its unsolved structural problems. Moreover, German unification has affected the performance of the economy.<sup>1</sup>

### **The loss of economic dynamics**

After the unification boom of the early 1990s with GDP growth rates of 5.7 and 5.1 per cent in 1990 and 1991 respectively, Germany has had a weak growth performance with a relatively low growth rate of GDP of 1.5 per cent in the period 1995 - 2003. Since 1994, the German growth rate has been lower than the EU average in each year, and since 1998 Germany and Italy are the tail-light of the European Union in terms of growth. The forecast for 2004 indicates the same story. In the period 1995-2003, Germany's growth rate has been nearly 2 percentage points lower than that of the United States (Table 1). The economic engine of the largest

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<sup>1</sup> I appreciate critical comments by Eduard Herda and Tim Schmidt-Eisenlohr.

economy in Europe, contributing a quarter of the EU's output, is stalling (Siebert 2002a).

Table 1: GDP Growth Rates <sup>a</sup>

	1970-1980	1980-1990	1991-2003	1991-1995	1995-2003 <sup>b</sup>
Germany <sup>c</sup>	2.8	2.3	1.4	1.3	1.4
France	3.3	2.4	1.9	1.0	2.3
Italy	3.6	2.3	1.5	1.2	1.6
European Union-12 <sup>d</sup>	3.2	2.4	1.9	1.3	2.1
United Kingdom	1.9	2.7	2.5	2.6	2.5
United States	3.2	3.2	3.1	3.1	3.2

<sup>a</sup> Calculated as an exponential growth rate. - <sup>b</sup> 2003 Forecast - <sup>c</sup> 1969-1990 Western Germany; since 1991 with data for Unified Germany. - <sup>d</sup> EU 15 excluding United Kingdom, Denmark and Sweden.

*Source:* OECD Economic Outlook, No. 73, June 2003

This picture does not change in substance if additional factors are taken into consideration. It still holds if we look at the GDP growth rate per head of population, although population growth was somewhat higher in the countries of the Euro area used for comparison<sup>2</sup> and consequently the growth differential is somewhat lower if population growth is taken into consideration. The difference is also lower with respect to the Euro area if countries with a high convergence rate (Greece, Ireland, Portugal and Spain) are excluded from consideration; these countries are catching up. Statistical methods to measure real output, i.e. the hedonic approach used in the United States (by which a product such as a computer is evaluated by its parts), also contribute to the growth differential with respect to the

<sup>2</sup> See Table 49 in Annual Report 2002/2003 of the German Council of Economic Advisers (2002).

United States, but they explain only a minor part of that difference; these methods, however, are not relevant with respect to European countries<sup>3</sup>.

In comparison with some European countries it can be argued that some of these countries like Italy and France had to be restrictive in their fiscal policy in the early 1990s in order to satisfy the Maastricht criteria and, after the European Monetary Union was founded, could enjoy the advantage of their efforts in terms of a less burdening debt load and in terms of interest rates much lower than in the past. This meant weaker growth for them in the early 1990s but stronger growth later on. Germany did not experience a similar tilt in its growth rate, although it now, in the euro area, has the advantage of no longer being confronted with the depreciations of European currencies like the Italian lira in its exports markets. Of course, this argument is not valid for the growth differential with respect to the United Kingdom and the United States.

In order to analyze whether there is a more or less permanent loss of economic dynamics in Germany, the question has to be answered to what extent the low growth performance is the result of the business cycle situation or whether Germany has indeed moved to a much lower growth path. There is no question that the stagnation in the period 2001- 2003 is partly due to the impact of the worldwide downturn which has an effect in a country that is especially open to international trade. The methodological difficulty is that we cannot easily distinguish the business cycle situation from the growth path empirically. The growth path has to be measured by an increase in the production potential, i.e. by the potential growth rate. This, however, cannot be directly observed but has to be determined indirectly. One approach would be to specify the production potential by a

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<sup>3</sup> In France, the hedonic approach plays some role.

macroeconomic production function; then the difficulty arises to what extent such a function can be estimated by econometric methods satisfactorily. An alternative approach is to use a filter such as a Hodrick-Prescott filter to estimate the growth trend. But this is more or less an ad hoc method with the value of the trend depending on the smoothing factor and the value of the trend for the most recent period being a function of the quality of the forecast for future years. Although we have to be cautious with a conclusion on the extent of a more or less permanent loss of economic dynamics in Germany, the long period of a low growth rate when other countries did much better is sufficient justification for the hypothesis that weakness of economic growth is one of the characteristics of today's Germany. This hypothesis is not falsified, when a recovery takes place after 2003; for it to be refuted, there must be a longer period on a higher growth path.

Let us look now at the factors that can be expected to have an impact on the growth process and that may explain Germany's low growth rate. Ideally, we would have an econometrically tested model of growth expressing the precise relevance of each growth determinant. Then, for each factor we would be aware of its exact contribution to the GDP growth rate in a given period. For instance, we would know the production elasticities of all the factors of production, labor, physical and human capital, technology as well as of institutional arrangements.<sup>4</sup> I will here follow a less demanding approach in discussing factors that may represent a cause of weakness or of strength.

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<sup>4</sup> For such an approach compare German Council of Economic Advisers, Annual Report 2002, p. 205 on.

## **German Unification**

Unification is a first factor that comes to mind as a specific condition influencing the German growth rate. In principle, unification was a new frontier in economic growth or a positive supply shock, i.e. an investment opportunity, adding labor and an unfortunately obsolete capital stock to the German economy and promising a catching up process with high growth rates that would stimulate economic dynamics in the whole of Germany and augment the overall German growth rate. In practice, it did not turn out that way. Too many mistakes were made. These were exchanging the East German mark 1:1 to the West German mark, raising wages out of line with productivity growth, applying the West German institutional arrangement, for instance of the labor market, of product market regulation, of the university system and of taxation, to a transformation economy, generating an over-expansion of the construction sector by public subsidies for housing, office space and factories which eventually had to be corrected and relying mainly on consumptive transfers.

From the point of view of economic growth, there are positive signals in Eastern Germany. In a historic context quite a progress has been achieved. The East German region including Berlin was at 62.7 per cent of the West German level in GDP per capita in 2002 after having started out at 33.6 per cent in 1991<sup>5</sup>. Taking into account that other German Länder such as Rheinland-Pfalz, Niedersachsen and Schleswig-Holstein are at 80 to 85 percent of the West German level, Eastern Germany has reached a remarkable level of GDP per capita. The public infrastructure has been rebuild, it is more modern than in quite a few parts of West Germany.

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<sup>5</sup> Excluding Berlin. East Germany excluding Berlin was at 61 per cent in 2001.

Strolling through the beautified old cities of Weimar, Dresden, Neustadt or Leipzig, the visitor will indeed see a “blossoming landscape”.

The main concern, however, is that unemployment is at 17.9 per cent in 2003<sup>6</sup> and that since 1997 and until 2002 the growth rate of Eastern Germany has been below the German rate<sup>7</sup>. This means that the convergence process has stopped and that we indeed have divergence. This is partly due to a decline in the construction industry as a correction to an earlier over-expansion in that sector due to public subsidies. As examples for a successful regional restructuring and for a successful quick convergence process like Ireland and Pittsburgh show, an important prerequisite for regional growth is that initiative and an optimistic mood prevail. Such a mood, although it exists in quite a few groups and in some regions, is not the overwhelming sentiment in Eastern Germany, and the PDS, the follower of the previous communist SED, alludes to people’s feeling of being deprived as second class citizens and still collected up to 20 per cent of the votes in the Länder elections until 2002.

German unification required and still requires annual public transfers from the West to the East of three to four percent of German GDP. The transfers within the governmental system, between the federal level and the Länder as well as among the Länder, were mainly financed through credits, the other transfers to a large part through contributions in the social security system. It is quite apparent that these transfers have had their impact. The transfers of the government, implying a doubling of government debt, have affected Germany’s fiscal policy stance negatively. The manoeuvring

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<sup>6</sup> April 2003 forecast of the German Institutes.

<sup>7</sup> It may be a bit higher in 2003.



space for tax reductions is severely reduced by the interest load for new debt. Thus, even after the 2001-tax reform the tax rates for German firms are still high relative to the other EU countries. The transfers within the social security systems, financed by higher contributions, meant an increase in the tax on labor, with a negative impact on employment in Germany as a whole. The attempt to control the increase in the contributions by using the receipts of the eco-tax to finance the old-age pensions means that distortions and negative effects arise somewhere else since the eco-tax has a negative impact on productivity.

In addition, there was a real appreciation of the deutsche mark as a consequence of unification in the early 1990s affecting Germany's competitive position in the world market (see below). This follows from a model with tradeables and non-tradeables; transfers to East Germany increased domestic absorption and implied a rise in the price of non-tradeables relative to tradeables.<sup>8</sup> An appreciation also results in a context with exportables and importables since consumptive transfers to Eastern Germany meant an increase in the absorption of goods that would have been exported otherwise.

There is no doubt, that German unification has been — in economic terms — a shock to the German economy. West Germany is partly inhibited by financing the transfers. But it would be misleading to assume that this is the only reason for the poor growth performance. German unification came in an environment in which long-run trends were going on leading to unresolved severe structural problems. West Germany cannot unfold enough economic dynamics for a strong carry over to East Germany. Let

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<sup>8</sup> Eastern Germany itself has experienced a “Dutch-Disease” phenomenon. Due to transfers, the relative price for non-tradeables expanded reducing the attractiveness of tradeables (industry).

us now look at these issues in some detail. More specifically, we have to ask how the traditional growth determinants, among them labor, physical capital, technology and human capital shaped the process of growth.

### **Leaving Labor Idle**

In the period 1995 - 2002, Germany's labor force has increased with an annual rate of 0.3 per cent when measured in heads due to an increase in the years 1998 to 2001, but it declined with a rate of 0.3 per cent when measured in total hours worked. Looking at total hours worked, this means a (slightly) negative GDP growth rate from this factor of production assuming a given labor productivity.

The change in the labor force is mainly steered by two factors, population growth and the incentives defined by the institutional arrangement of the labor market. Population growth from some twenty years ago, which becomes relevant for the increase in the labor supply today, stagnated in the 1980s; consequently there is no increase in the labor supply in the first decade of the 21st century from that potential source. Immigration since 1995 is likely to have a direct effect on the labor supply; it was at 400 000 persons in 1995 when calculated net (immigration minus emigration) and then declined to 270 000 persons in 2000. Accounting for less than 1 per cent of the labor force, it was not a stimulating factor for growth in the last years. The participation rate, another relevant aspect of the labor supply, remained constant in the 1990s with the participation rate of women falling in the East and increasing in the West. Of course, the main issue is that Germany does not fully use its labor force and leaves labor idle. About 4.5 million are out of work in 2003, in addition 1.7 million are in governmental schemes, i.e. in hidden unemployment according to the

concept of the German Council of Economic Advisers. If 6.2 million were fully employed in the first labor market and if they had only half the average productivity of the employed<sup>9</sup> and if they only would work half time, GDP could be higher by 2 per cent. Of course, this would be one-time effect, not an increase in the growth path every year. But it would augment the flexibility of the economy and improve the conditions for investment; this would influence the growth rate positively.

Over the three decades since 1970, the labor force more or less stagnated when calculated in heads (except for the increase with 1 per cent in the 1980s) and it fell with a rate of 0.5 per cent per year when measured in total hours worked. Assuming constant labor productivity, the sheer number of workers has not contributed to the GDP growth rate and total hours worked imply negative growth. In contrast, other countries, for instance the United States, show an increase in the total hours worked so that there is some growth even if there were no increase in labor productivity. Note that in the above rates, the one-time increase due to German unification is not included.

In an international comparison, Germany has a relatively low level of effective annual working hours per worker (including the self employed). Germany's 1443 hours are the lowest among the industrial countries (in 2000), 6 per cent lower than in France, 14 per cent lower than in the United Kingdom and 20 per cent lower than in the United States and Japan. The average for the dependently employed is at 1361 hours. The norm is the now the 35 hour work week. Germany enjoys many holidays, most of them religious. Holidays occurring on a day in the middle of the week, especially religious ones occurring on Thursday, will be used to have a

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<sup>9</sup> Here assumed with 28 000 € (average labor cost) per person employed.

long weekend. The legal minimum number of leave days is 24 week-days (not counting Sundays as weekday). In the labor contracts as a rule 30 working days are paid as leave days. It has become customary, that Germans take two two-week vacation trips per year.

### **A declining share of investment**

Since 1995, the share of investment in GDP has fallen from 23 per cent to 18 per cent in 2002. Investment is an important engine of growth, as empirical studies show.<sup>10</sup> Assuming a production elasticity of 0.3 and a capital output ratio of 2.5, a fall in the investment share by 5 percentage points leads to a lower growth rate of three to four tenth of a per cent.<sup>11</sup> To look at such a short period may be misleading in the case of investment. One reason is that the early 1990s represented an investment surge due to German unification so that the level of investment was extraordinarily high. Another reason is that the low investment share in the years 2001-2003 reflects the stagnation in that period.

In a longer run perspective of the last four decades, the investment ratio fell from 26.5 per cent of GDP in the 1960s to 19.4 in 2000-2003.<sup>12</sup> Clearly, there is a trend of a declining investment ratio. This trend is consistent with the convergence hypothesis. According to this approach, a country catching up exhibits high growth rates when its capital stock is still small and when consequently the marginal productivity of capital is high. With more capital being accumulated, the marginal productivity of capital

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<sup>10</sup> Council of Economic Advisers, Annual Report 2002/03, p. 299.

<sup>11</sup> This follows from  $\hat{Q} = \alpha \frac{I}{Q} \frac{Q}{K}$  where  $\hat{Q}$  is the GDP growth rate,  $\alpha$  is the production elasticity of capital, I is investment, Q output and K the capital stock.

<sup>12</sup> 24 per cent in the 1970s, 21 per cent in the 1980s and 22.5 per cent in the 1990s.

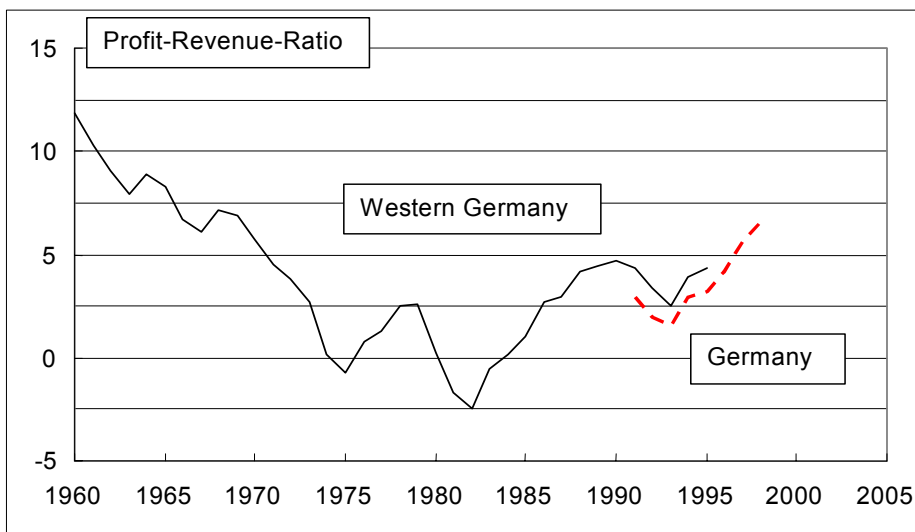
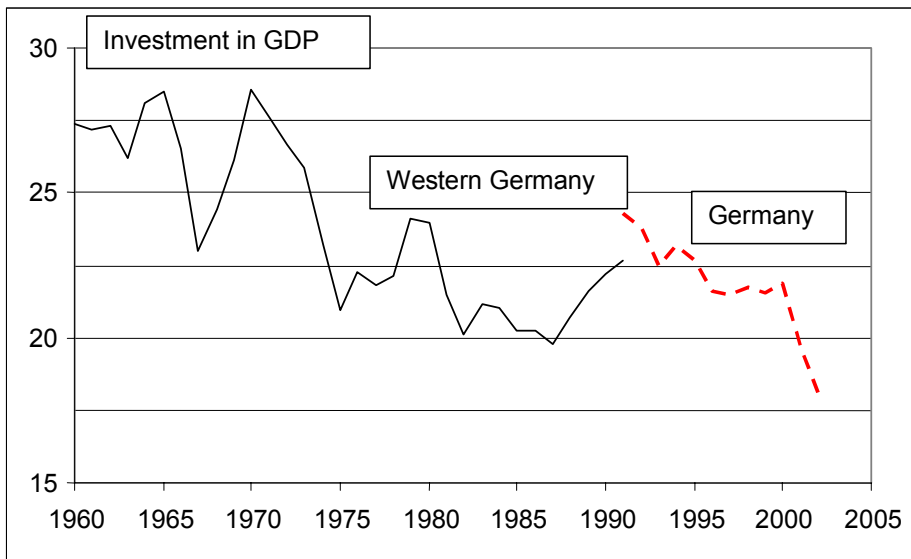
and the growth rate fall. The country moves down its marginal productivity of capital curve. This approach applies very well to Germany where the capital stock, partly destroyed after World War II and way too small for the huge influx of refugees in the 1950s, had to be rebuilt promising a high return initially. It should be noticed, however, that Germany's actual share of investment in GDP is not too different from that of other industrialized countries, for instance that of France and Italy; it is two to three percentage points higher than that of the United States and of the United Kingdom, but lower than that of Japan.

An indicator of the profitability of capital is the profit-revenue ratio as calculated by the German Council of Economic Advisers.<sup>13</sup> It was 8 per cent in the 1970s and fell to around 2.5 per cent in the 1990s, and this in spite of German unification as an investment opportunity. Thus, the poor growth performance and the weakness of investment are two sides of the same coin. It fits into this picture that the annual increase in labor productivity per hour declined in the last 40 years from 5.4 per cent in the 1960s to 1.5 per cent since 1995 (see below). This indicates a decline in productivity increase.

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<sup>13</sup> Annual Report 1996/97, p. 301.

Figure 1: Investment in Per Cent of GDP 1960-2002 and Profit-Revenue-Ratio<sup>a</sup>



<sup>a</sup> 1960-1998

Source: German Council of Economic Advisers, Annual Report 1996/97, updated.

Looking at the components of investment, the share of investment in buildings has remained constant since 1970 with the exception of a surge due to German unification; it is now not too different from 1970. Investment of the government, that is investment in buildings and equipment, fell from 4.8 per cent of GDP in 1970 to 1.7 per cent in 2001, receding about one percentage point per decade. The relatively high share in the 1970s can be explained by the expansion of the government sector under the social-democratic and liberal-democratic government; the fall in the last fifteen years reflects that part of government activity such as telecommunication and the postal service was privatized. Nevertheless, there is a sizable change in the investment share. With respect to infrastructure in transportation and telecommunication, where the public and the private sector overlap, Germany has modernized its infrastructure in Eastern Germany; this also applies to communication for the whole of Germany. However, there have been only minor attempts to modernize the transportation infrastructure, for instance by new railroad tracks between Cologne and Frankfurt.

### **The Innovative Performance**

Another possible factor in Germany's low growth performance may be a lacking dynamics of innovation. Technological progress, that is new products, new processes of production and new methods of organization, has been shown in empirical studies to be an important factor in growth.<sup>14</sup> In order to discuss the impact of innovations on growth, the productivity increase has to be measured. This, however, runs into difficulties for a number of reasons. First, a higher productivity may be embedded in the factors of production such as labor and capital so that a factor-neutral

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<sup>14</sup> Annual Report 2002/2003, p 209.

technical progress does not fully reflect the innovative performance. Second, factor-augmenting technical progress is faced with the difficulty of separating the increase in the quantity of a factor, for instance capital accumulation, from a change in its quality. Third, a macroeconomic production function is needed in order to measure factor-neutral or factor-augmenting technical progress, but only too often has technical progress been interpreted as a residual, i.e. as a contribution to growth that cannot be explained otherwise. Moreover, the difficulty is to quantitatively determine the initial level of technological knowledge from which the rate of progress can be calculated. Partly, technological knowledge is embedded in another factor of growth, human capital (see below). We therefore have only a limited basis to evaluate Germany's innovative performance and link it to economic growth.

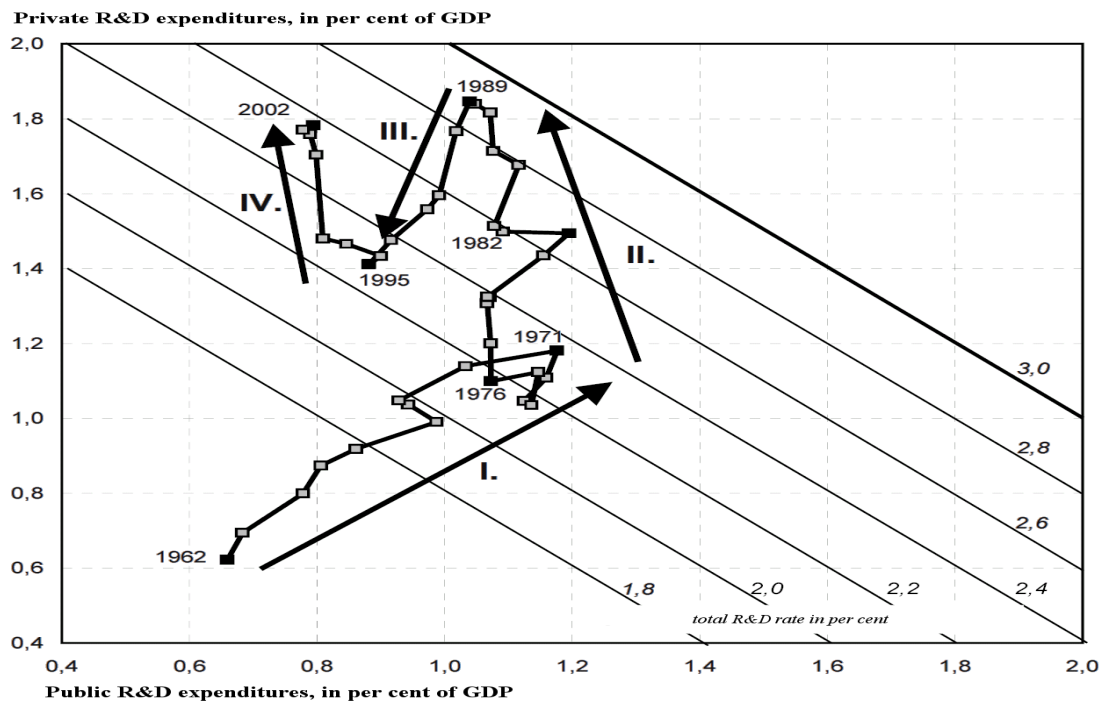
Patent statistics, which may be considered a possible output measure, does not show a disadvantage for Germany; it has the same intensity of trade patents, i.e. those registered in the United States, in Europe and in Japan, per inhabitant or per employee as the United States ranking somewhat lower than Japan but above the other larger European countries (Bundesministerium für Bildung und Forschung 2003, Table 4-2). Unfortunately, patents do not sufficiently measure the contribution to growth.

A different approach, this time input-oriented, is to analyze how much of GDP was spent for research and development. Germany's expenditures for research and development amount to 2.5 percent of GDP (in 2001), somewhat less than those of the United States (2.8) and of Japan (3.0), but more than those of France (2.2) and the United Kingdom (1.9). The share was 2.8 per cent in the late 1980s and fell to 2.3 in the mid 1990s for six



years, but with 2.5 it has reached the same ratio as in the early 1980s. Germany did not manage to keep its high share of the late 1980s whereas for instance Japan increased its share in the last twenty years by 0.7 percentage points.<sup>15</sup> Moreover, the share fell in the mid 1990s. The first part of the 1990s was a period in which both public and private spending for R&D fell, public by 0.2 percentage points, private by 0.4 percentage points (phase III in Figure 2). Since 1997 (phase IV), private spending increased again whereas public spending no longer declined. Since the mid 1970s and in the 1980s (phase II), private spending had risen with public spending remaining constant, whereas in the 1960s (phase I) both public and private R&D expenditures have risen.

Figure 2 : Phases of R&D Expenditures <sup>a</sup>



<sup>a</sup> Data since 1999 is preliminary.

Source: Bundesministerium für Bildung und Forschung 2003, Table 4-2. Fier (2002).

<sup>15</sup> France increased its share slightly, the share in the UK fell.

Other approaches to portray the innovative performance use additional indicators. Looking at technical progress from the product side, Germany's technology-based industry is strong in innovation in its main industrial export sectors machine building, automobiles and chemical products (see below on export performance). Outside these traditional technological areas, the innovative capacity is less pronounced (Siebert und Stolpe 2002). Thus, comparative advantage exists in the upper segments of mature technology; there is a comparative disadvantage in high-tech products (see below on the export position). Germany's balance of payments for technological services is negative (see also below).

The typical pattern of technological development in Germany are incremental improvements along established trajectories, mainly in the above mentioned export-oriented industries. This means a technological sophistication of a broad range of continuously upgraded engineering-based products and of production processes. New internationally available technologies like IT are quickly applied to the existing product set. Germany's approach has been compared to the optimization of existing rail road tracks that were laid in the 19<sup>th</sup> century. Similarly, the four important export sectors of today, machine building, automobiles, chemical products and electro-technical goods have their roots in the academic achievements of German universities in the 19<sup>th</sup> century. Clearly, this paradigm does not represent a technological leap-frogging with a shift to a completely different and new technology. Incidentally, the same approach of marginal improvement was also applied to the problem of bringing Eastern Germany to the West German level.

Examples that a technological leap-frog did not succeed are the Siemens-Nixdorf saga in computers and the early foray of Hoechst into

biotechnology. German producers of mainframes were ill prepared when the PCs arrived. And there is the anecdotal story that a forerunner of the fax was invented by Hell in Kiel already in the early 1970s, long before the Japanese invented the fax. When Siemens, then dominant in teletypes, acquired Hell in 1981, it did not recognize the potential of the new technology, a rival to its well-selling product.

The approach of incremental technological improvement is reflected in Germany's institutional set-up. Germany's capital market is bank-based and relies on intermediated products. Commercial banks have a close relationship with their customer-firms as *Hausbanken* and shy away from financing large risks, most of the risk-prone R&D funding of the private sector typically comes from retained earnings. The venture capital market is less developed than elsewhere. The institutional setting of the capital market is thus geared to a technological development along traditional lines.

Other aspects of the institutional set-up are also not conducive to innovation. Codetermination and workers councils are rather inclined to search a consensus on the firm's established technological trajectories, but may find it more difficult to leapfrog to a new technology. These consensus approaches are seen as an alternative to competition, they can be expected to have slowed the implementation even on a given trajectory. Lacking labor market flexibility is yet another case in point. Finally, the university system is less and less competitive and does not seem to generate enough new technological knowledge (see below).

Public attitudes towards new technology have an impact on the choice of the technological trajectory. It is a fact that today's Germany is less

inclined than other countries to experiment with new technologies and to take on technological risks. This holds, for instance relative to France where an underlying readiness, even preference, for new technological solutions can be observed. Germany seems to be averse against unfamiliar technologies. Public techno phobia and a very strict law on genetic engineering placed narrow constraints on experiments so that several projects were halted in the courts and firms moved elsewhere with their research. Product market regulation (for instance with respect to the licensing of new pharmaceutical products) represents an impediment to growth. The exit from atomic energy in which Germany was internationally competitive with a closing plan for the existing power plants over two decades is yet another example of the political preferences with respect to technological risks.

In addition, compensations for taking risks in terms of higher risk premia are put in question in a public discussion in which the issue of “a distorted income distribution” (*Schieflage*) pops up regularly. In the public mood, profits are judged ex-post when they have arisen and when the risks that were taken are already forgotten or when the risks simply have not materialized. Such a mood is not conducive to investment and innovation. In contrast, profits should be evaluated ex ante when the risks are still apparent.

The regulatory approach described above is part of the government’s technology policy. Other aspects of technology policy relate to the “making” of new technologies, to subsidies, to the conditions for the generation of new technological knowledge and to the organization of diffusion. Two of the missionary technologies of the state, the fast breeder nuclear reactor and the Transrapid, have been a failure, the Transrapid at

least so far. The coal industry is heavily subsidized, albeit on a declining scale. Here tax money is spent for an old industry. Environmental-friendly energy generation, for instance windmills, are also strongly supported by the government. Here tax money is spent for what is thought by quite a few to be a good cause, similarly as it was the done thing some decades ago to support coal. The German approach of the government organizing the conditions for basic research and the universities is wanting (see section below).

Diffusion of new technology from public research to firms is a central aspect in German technology policy. The incentives for persons to move from the public sector to private research are less pronounced than in other countries. This may be due to a preference of having a secure job in government. Moreover, returning from the private sector to the public sector is unusual. Taking basic research to market is less developed. The system is less prepared to accept entrepreneurial activities as a sideline job of researchers. Under these condition, it is understandable that German technology policy provides public institutions for missing market transactions in the diffusion of knowledge and technology (Siebert and Stolpe 2002, p.117).

Another important mechanism for diffusion is training on the job which equips the work force with new technological knowledge. In this aspect of diffusion, German firms have been quite successful. They even succeeded to integrate the guest workers to German standards and German work ethics. The approach mainly consists in enhancing technology-specific and firm-specific knowledge of workers. In this context, life-time employment is instrumental. Again, this corresponds to improving the existing technology.

There were some changes in the institutional conditions in the last fifteen years. The role of business start-ups was recognized, and political preferences moved somewhat in the 1990s.

The government started a Bio-Regio contest in 1995. In this contest, regions compete for government funding; 77 million euro are scheduled for the three winners who also have preferential access to the biotechnology program of the Federal Research Ministry (Dohse 2000). Regions can apply in a joint effort by firms, research institutes and universities, chamber of commerce and municipalities. This induces them to develop a joint effort. 17 regions participated in the contest. This approach can be seen as an attempt to help regions identify their interest and find a common target. It improves communication in a region and is instrumental in establishing a network. It may also help in speeding up permits as far as regional authorities are involved since they are alerted to the interest of the region. The winners are picked by a jury. This raises the question whether the criteria are right and the overriding issue whether committees and the government have sufficient information to pick the winner.

Overregulation of the markets which did play a role in 1980s in biotechnology seem to be partially overcome. Another important change is a new institutional framework for the network industries allowing more competition instead of government influence, namely in telecommunication, the postal service, public enterprises of municipalities, airlines, airports, railroads, electricity, gas and water. Here efficiency gains were realized.

## Human Capital

To look at the the augmentation of labor, the accumulation of capital and technological progress in order to understand Germany's slow growth performance would be sufficient according to the paradigm that underlies the traditional theory of economic growth. This approach, relevant for the industrial society and also the service economy, no longer holds, however, for the information and knowledge society where human capital becomes the major determinant of growth and where traditional labor (excluding human capital) may only have a production elasticity between 0.3 and 0.4 whereas human capital, together with physical capital, may reach an elasticity between 0.6 and 0.7 according to international panel studies (Minkiw, Romer and Weil 1992)<sup>16</sup>. In any case, even in the traditional approach of economic growth, the quality of labor is a decisive factor.

Similarly as with technological knowledge, an issue of measurement arises. A potential indicator of human capital may be seen in labor productivity which has fallen from 5 per cent in the 1960s and 4 per cent in the 1970s to 2 per cent after 1980 and to 1.5 per cent after 1995. However, these data reflect many other factors, such as the slower pace of the convergence process with a reduced rate of capital accumulation, possibly less technological progress coming forward, a loss of economic dynamics according to the governance system or even an erosion of the competitive position. Similarly as with technological progress, we have to look for other, unfortunately softer factors. Thus, the number of students in engineering and natural sciences, 693 per 100 000 of the population in 1999, is only half that of France and of the United Kingdom and much lower than in Japan and the United States (Bundesministerium für Bildung

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<sup>16</sup> 0.37 for the OECD countries, 0.28 worldwide.

und Forschung 2003, Table 2-7). The number of engineering graduates in machine building has nearly halved in the 1990s, and the number in electrical engineering has fallen considerably.<sup>17</sup>

Another approach to evaluate Germany's human capital formation is to look at the inputs and the institutions of that process. The German system of preparing the young for their practical professions, both in the apprenticeship system of the crafts and also in industry, deserves good marks in human capital formation. This dual system is a combination of practical training on the job and vocational schooling. Although systems always can be improved and made more responsive to change, the German approach equips the young with the necessary technological knowledge and qualifications, it provides them with the norms of work ethic and also represents an important vehicle of social integration. It is part of the German approach of a broad dissemination of knowledge and transfer of experience between the generations. In addition to this approach for the young, firms train their work force on the job. Both approaches lead to a broad qualification of the work force. This qualification seems to be centered to some extent on the dissemination of the existing technology and to its marginal improvement. It also relies on firm-specific knowledge.

The two other institutions of human capital formation, schools and universities, are wanting. The international comparisons of German schools as in the TIMMS and PISA study have been disappointing. Econometric analysis of the conditions influencing the quality of schooling indicates that the institutional incentives for the school system are at the root of the problem (Wößmann 2002). It seems that the attempt to use the schools to produce equal, that is non-differentiated, qualifications instead

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<sup>17</sup> Bundesministerium für Bildung und Forschung 2003, Figure 2-7.



of providing equal starting conditions and then allowing a differentiation of results has taken efficiency out of the system. Thus, even the inadequacy of the German school system has to do with the equity target or the social market economy, i.e. with some ideological position of the political parties and society.

The university system is deficient. It is a public, tax financed system with some private universities now arising at the fringe of the system. The basic approach for this government-run system is one of administrative planning at the *Länder* level with some federal restraints and some mixed financing between the federal and the *Länder* level. Who has obtained the “Abitur” at the end of the German “gymnasium” has the right to enter a university. There are no admission fees, and students are allocated to the universities by a set of administrative procedures such as capacity norms (determining the maximum student load for a university), admission norms (determining what happens if more students want to go to a specific university than student slots are available) and historically-oriented budget allocations to the universities. It may be hard to understand internationally that the right to a student slot, by some even derived from the constitution, lead to a central allocation procedure where all students for a specific discipline like medicine apply to a national office. The scarce student slots then are allocated according a set of criteria, among them – besides quality - social aspects and the geographic distance. Germany has not dared to deregulate that system and to use competition as the guiding principle for the university system.

Moreover, universities and the research institutes operate according to the labor market regulations and the rules of codetermination. This is a severe impediment to an innovative environment. The complete institutional set-

up, i.e. the procedures steering the universities and the labor market rigidities, implies inertia relative to the United States and does not allow the academic institutions to keep up with the international pace. Yet, politics is not prepared to open the system for competition.

### **Sectorial Change and Digesting Shocks**

Sectorial change is a mechanism of growth. Old sectors die away, new ones are born. It has been postulated that the service sector has a lower productivity growth than industry and that sectorial change towards a service economy means lower overall growth for a country. Such a hypothesis, however, seems outdated for the modern information society. In any case, the hypothesis does not hold for Germany where the productivity increase is the same for industry and the service sector since 1973 (Klodt 1994, p. 125); this study uses a wide delineation of the service sector. In another analysis, the stunning result has been reached that in the 1990s industry has not contributed positively to the German growth rate (Sachverständigenrat 2002<sup>18</sup>); its contribution to the growth rate was slightly negative. This is consistent with another observation. German industry, nearly equivalent to the export sector, has lost 2.5 million jobs from 1991 to 2001. This is a sizable loss relative to the 7.8 million employees actually in that sector. The reduction of jobs occurred in the main pillars of the German export sector, in the electro-technical industry, in machine construction and in the chemical industry. West German industry has lost 1.75 million jobs<sup>19</sup> relative to the 5.6 million employees (in plants with 20 employees and more) actually in that sector<sup>20</sup>.

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<sup>18</sup> Table 19

<sup>19</sup> Structural break in the data.

<sup>20</sup> Germany has 6.2 million employees in that category.

Admittedly, part of this adjustment is caused by the outsourcing of service activities such as firm-owned transportation, cafeterias or cleaning services. Nevertheless, there is a sizable structural change away from industry.

In another aspect of structural change, over-expansion of the construction sector in East Germany is a case in point. Housing and office space were heavily subsidized after unification which led to an over-expansion early on. When the overcapacity became apparent and when prices fell, the over-expansion had to be corrected by laying off workers. The adjustment crisis contributed negatively to the growth rate of Eastern Germany. Moreover, the structural issues of construction firms affected enterprises in West Germany as well where in addition to these problems a decline in demand occurred (including governmental demand), having a negative impact on the construction industry.

Shock absorption is another aspect that affects growth in the sense that the economic system takes longer to digest an economic shock. This holds for labor demand which in the 1990s needs more time to pick up after a recession than in the 1970s and the 1980s. It seems that the institutional set-up together with changed economic conditions has reduced the system's capacity to absorb a shock.

### **The Enterprise Sector**

Dynamics in the enterprise sector can be a clue to the growth performance of the economy. In a highly dynamic enterprise sector with a high market exit and a high market entry rate, strong productivity growth can be

expected. Market exit of obsolete firms means that untenable positions are given up and that inefficiency is reduced. But in order to have growth, high entry rates have to compensate for the loss of activity indicated by high exit rates. When we compare market entry rates with market exit rates for Germany in the 1990s, where the rates are defined as the number of entry or exit in relation to the number of the firms, the sketchy data do not suggest, to put it mildly, a strong dynamics in the enterprise sector.<sup>21</sup> It looks more like stagnation or even decline. Market entry, measured as the number of new firms per 10 000 workers in the economy (employed plus unemployed), takes place in consumer-related services, in retail and construction. Since 1993, entry in technology- and knowledge-oriented services has increased up to 2000 and declined in the years of economic stagnation 2001-2003. Entries in the research-based industries declined. Insolvencies, again measured per 10 000 workers, have increased in East and West Germany since 1992. They relate mostly to construction, retail and consumer-oriented activities.

In absolute figures, insolvencies somehow tell the story of Germany's historic development. The number of insolvencies has continuously fallen since 1955. They started to rise after the first oil crisis from their annual level of 3000 to 4000 to 10 000 in 1981 and to 19 000 in 1985. Having fallen again in the second part of the 1980s, they increased markedly from a level of 13 000 in the united Germany in 1992 to 37620 in 2002 (Creditreform 2003).

Unfortunately, we do not have sufficient data on the net entry of firms over a longer horizon. A specific problem is that the figures on exit and entry should be weighted, for instance or by revenue or by the people employed.

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<sup>21</sup> See the innovation panel of the ZEW, Rammer 2002..

Comparisons with the United States indicate that relative to Europe entrants there are more open to experiment, that the entering size of firms is smaller, that labor productivity is lower and that employment expansion is much stronger in the initial years when entrants are successful (Scarpetta et al 2002). This is consistent with the empirical observation that German entrants have difficulty in surpassing an employment threshold; employment in newly established firms is under-proportional. This is due to the regulations of the German labor market. Moreover, product and capital market regulations have a negative impact on entry (see below).

Besides market entry and exit, internal growth of firms is an indicator of dynamics in the enterprise sector. Unfortunately, we do not have sufficient information on that topic. If we take into account anecdotic evidence, it is difficult to find examples of German garage firms that recently have become large players. One of them is SAP, the provider of business software.

There are, however, a few examples where German firms have reinvented themselves by performing a market exit in a traditional product line and a market entry in a new product. An example of such a metamorphosis is Mannesmann, a typical German industrial firm of the Ruhr area with a focus on steel pipes for the oil and gas industry, that transformed into a mobile telephone company and then was taken over by Vodafone, the British communication firm. Another case is Preussag, a steel firm, that became a tourist company under the new name of TUI. In both cases, a structural change from industry to the service sector was performed. As a rule, however, technological change is taken place within existing firms. Thus, the German export producers in the machine building industry have implemented new technologies such as electronics and IT-software into

their traditional investment goods being, or instance, now able to rectify some of the defects in the operations of the world-wide running machines from a command post in Germany. Or, a firm like Siemens has restructured internally within the given shell. Other enterprises such as AEG, a well-established household name for white technologies in all sorts of household appliances, have disappeared from the market; this can be seen as a reflection of international competition in the “volume business” of the electro-technical industry. Restructuring of firms has been going on in other areas. One example is the merger of Thyssen and Krupp which has to be interpreted as an attempt to improve efficiency in a declining sector, namely steel. A reorganization also has taken place as a response to changes in product market regulation and in privatization. Thus, EON was formed out of VEBA, the energy supplier, which gave up its oil business and took over Ruhrgas, the natural gas provider.

In the context of an internal change of firms, the take-over by the heirs, i.e. the intergenerational transformation in ownership, is an important aspect especially under the German conditions, where in the small and medium-sized firms of the Mittelstand the principal owner tends to be the driving force of a firm. It cannot be taken for granted that the heirs are willing or capable to perform the same role. They may be tempted to exit to living as a rentier in Mallorca if they feel mobbed by politics with respect to taxation or regulation. Or they may simply not be prepared to put up the same energy as their father or mother. Generational change within the firms therefore is a constant topic in Germany’s economic policy.

## **An erosion of the Export Position?**

Germany continues to be the world's second largest exporter behind the United States. Its export share in GDP is about one third. Of course, in a changing world market with fierce competition, such a position of Vice Champion in world exports is always under threat. However, there are some signs that the position is somewhat fragile and may be changing (Siebert 2002c). Let us take a closer look at Germany's competitive position.

Germany's world market share, calculated in US-dollars, has declined since 1990 by 2.5 per centage points from 12.0 to 9.5 per cent in 2002; this is below the long-run average of 10.6 per cent for the period 1975-1989 (Figure 3a). Of course, it is normal that the industrial nations lose world market share when developing countries successfully integrate themselves into the international division of labor. However, the United States succeeded to hold on to its world market share. Germany's share of industrial goods exports of all OECD countries is receding also relative to France and the UK in the same period, especially in the early nineties. It should be noted that the above results hinge on calculating German exports in dollar terms. This implies that a high valued US-dollar will artificially reduce German exports by sheer conversion, although it will make German exports cheaper and thus stimulate them. This artificial reduction happened in the first part of the 1980s and also in the 1990s.

If we measure the share of exports in real terms dividing nominal exports by export unit values, the loss of market share in the 1980s disappears (Figure 3b). But the decline in world market share in the first part of the 1990s remains also in this calculation. Export unit value as calculated by

the IMF is a quantity-weighted ratio of actual prices of German commodity exports to prices of a base year.<sup>22</sup> It is thus the value of exports in constant terms and indicates to what extent the world market is willing to pay previous prices. The base year is 1995. The quantity weight for the country series is the 1995 value of exports (in US dollars). Apparently, Germany has indeed lost world market share after unification. This is consistent with a reduction in the export share in GDP from 31.5 per cent in 1989 to 26.3 per cent in 1991 and to a further decline to 22.8 per cent in 1993; the export share is back to 35.5 per cent in 2002. West German firms were keen to sell their products to the new East German market at their door step instead of shipping them to the global market. Internal demand for German exportables increased so that the relative price of export goods rose. This means that there was a real appreciation of the deutsche mark in the first part of the 1990s as a consequence of German unification; this appreciation hurts exports. The inverse of the real exchange can be used as an indicator of price competitiveness. This indicator is illustrated in Figure 3c where a downward movement means a decrease in price competitiveness due to the inverted scale (and a real appreciation measured by the effective real exchange rate). Competitiveness is here measured against 19 other industrial countries on the basis of the nominal exchange rates and consumer prices. As already mentioned, this result also is obtained in an alternative approach in which tradeables and non-tradeables are distinguished instead of exportables and importables; then consumptive transfers also lead to a real appreciation of the deutsche mark.

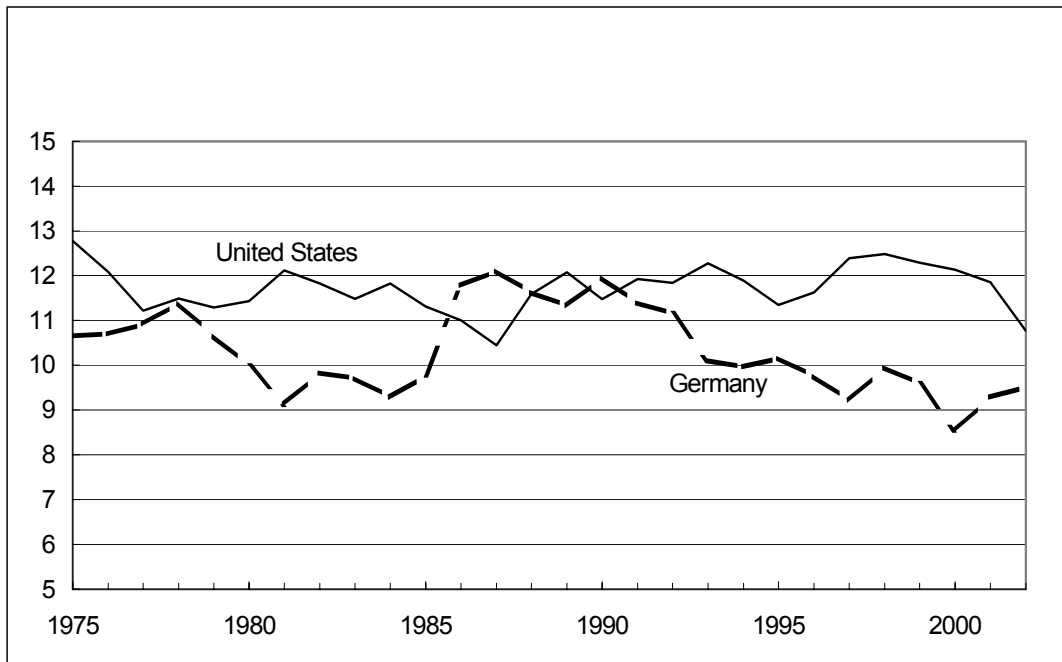
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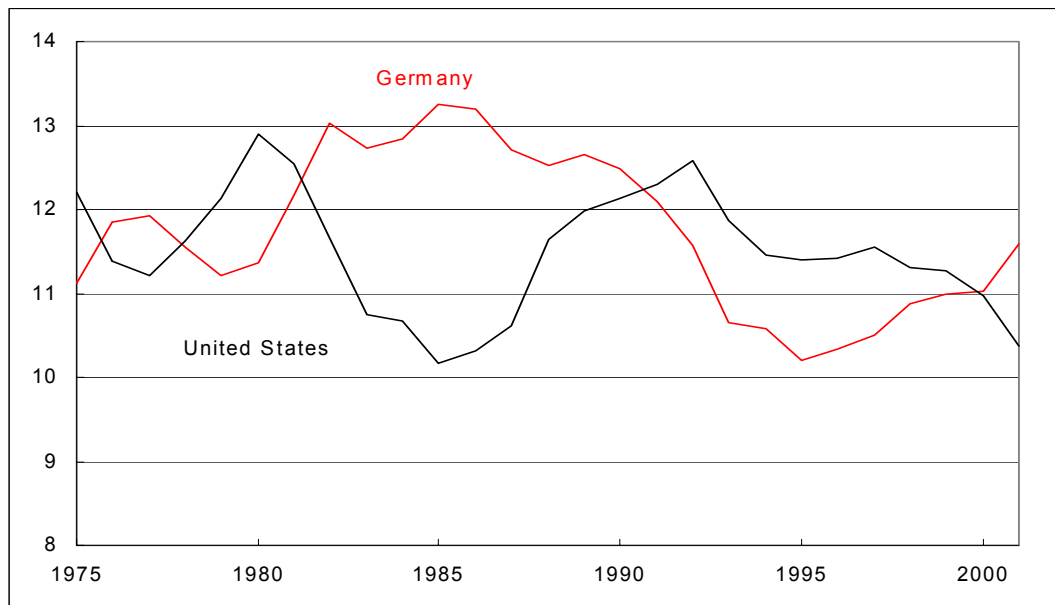
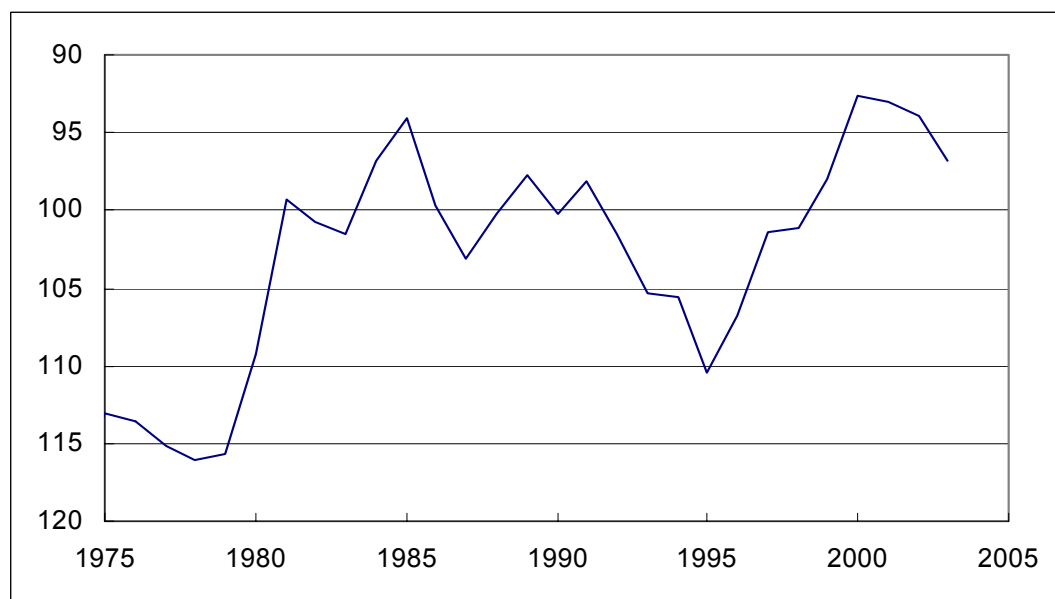
<sup>22</sup> Export Unit Value is a Laspeyres index  $\frac{\sum p_t q_t}{\sum p_0 q_0}$ .



Figure 3: Germany's Share of World Exports and Competitiveness, 1975-2001

a) World Market Share in US- Dollar (nominal)<sup>a</sup>



b) World Market Share in Constant Prices<sup>b</sup>c) Price Competitiveness<sup>c</sup>

<sup>a</sup> Current prices and exchange rate. - <sup>b</sup> Nominal exports divided by export unit values with 1995 equal to 100 for export unit value. - <sup>c</sup> Index of German price competitiveness relative to 19 industrial countries on the basis of consumer prices.

*Source:* For market shares, IMF, International Financial Statistics, Data Stream July 2003; for price competitiveness, Deutsche Bundesbank Zeitreihe YX900D.

Another indicator of competitiveness is the manoeuvring space for profits and cost-pass through. Germany traditionally has had a quality edge in its products implying a low price elasticity of demand. That is, German firms could charge a higher price without losing export volume. However, anecdotic evidence has it that a sector like the electro-technical industry was complaining about falling export prices. For instance, Siemens with a total revenue of 40 billion euro claimed an annual revenue loss of 2.5 billion euro in some years in the late 1990s. Indeed, the index of export prices of commercial products has only increased with 0.8 per cent per year in the period 1991- 2002<sup>23</sup>; it rose with 2.7 per cent in the 1980s. Export unit value, the value of German commodity exports in constant prices (as defined above), fell by 26.5 per cent in the period 1990-2002. Export unit value has continuously risen from the 1960s to 1992, even in the recessions of the 1960s and 1980s. With the exception of a small decline in the 1970 recession, this variable has not seen such a fall so far, especially not such a drastic one. According to a recent study, Germany's export prices have remained fairly constant since 1987 setting them equal to 100 in 1975, whereas relative unit labor costs increased (Brauer 2003, Figure 22). And unit labor costs rose more in the 1990s (until 1998) in Germany than abroad, and they increased more than the domestic price (Brauer 2003, Figure 14). A similar picture holds for Japan including a loss of world market shares, whereas the relative unit labor costs and the relative export price of the United States fell and world market share increased. All this indicates a narrowing manoeuvring space for product prices and for shifting costs, i.e. for pass through. The relative decline of foreign unit labor costs corresponds to the appreciation of the deutsche mark. When relative unit labor cost rise more than the relative export price, this means a

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<sup>23</sup> Council of Economic Advisers 2002/03, Table 56\*.

squeeze on profits; firms react by scaling back investment and labor demand.

Additional insight into Germany's export position is obtained by looking at the product structure of exports. Manufacturing with 23 per cent of employment and of gross value added in the German economy produces 89 per cent of Germany's exports (2001). Four sectors of manufacturing account for 59 per cent of total exports, machine building goods (18.1 per cent), cars (17.7 per cent), chemical products (12.4 per cent) and electro-technical products (11.1 per cent). Services contribute only 10 per cent to German exports whereas they make up 28 per cent of the US exports.<sup>24</sup>

Germany is traditionally strong in some important branches of the manufacturing sector. Looking at RCA-Coefficients<sup>25</sup> with which we can measure comparative advantage (a positive value indicates an advantage), machine building, car production and the chemical industry have a high comparative advantage (Table 2). This also holds for measuring instruments and medicinal goods. Small and medium sized technology based firms, but also somewhat larger family-owned or family-dominated enterprises, have established themselves in niches of the world market giving them manoeuvring space for cost pass through, such as Linde (refrigeration), Stihl (saws) and Triumph (investment goods). But in the last three decades, the electro-technical industry (electrical machinery,

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<sup>24</sup> A similar percentage applies to the UK (28.4 in 2000); 19.9 per cent of the exports of France are in services.

<sup>25</sup> Revealed comparative advantage. The RCA-Coefficient  $r_i$  represents revealed comparative advantage for sector. It measures a sectors exports relative to imports against the sum of all exports relative to the sum of all imports. Positive values indicate an advantage revealed by trade, negative values a disadvantage. The

coefficient is defined as 
$$r_i = \log \frac{x_i^G / M_i^G}{\sum_i x_i^G / \sum_i M_i^G} \cdot 100.$$

apparatus and appliances), the production of telecommunication instruments and the optical industry, including photographic apparatus and watches, have lost their comparative advantage, photographic apparatus early on in the 1970s and also already in the 1960s. In the electro-technical sector, the so-called volume business, i.e. mass production of electronic and household appliances (for instance the “white products”), has more recently migrated to the developing countries whereas comparative advantage for large-scale industrial machines (power generation) and more complex products has been retained. The pharmaceutical sector seems to be eroding so that Germany no longer can claim to be the pharmacy of the world. BASF has sold its pharmaceutical branch to Abbot Laboratories; Hoechst has ended up in the new international firm Aventis with its seat on France. The traditional chemical sector does not seem to be able to participate in the technological race for the pharmaceutical products of tomorrow based on biotechnology. The new innovative IT and bio-technical products have to be imported.

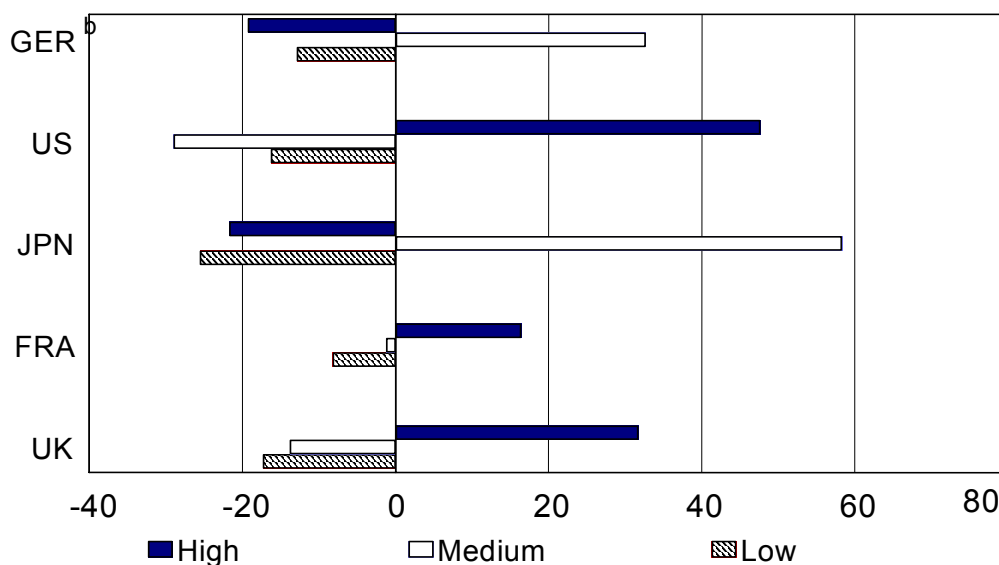
Table 2: Trends in Germany’s Comparative Advantage<sup>a</sup>

	1970	2000
54 Medicinal and pharmaceutical products	48.9	16.4
59 Chemical material and products	37.7	49.0
72 Machinery specialized for particular industries	89.3	99.0
74 General industrial machinery and equipment, parts	59.8	56.9
76 Telecommunications and sound recording apparatus	25.5	-16.3
77 Electrical machinery, apparatus and appliances	8.5	-6.8
78 Road vehicles	76.0	60.8
88 Photographic Apparatus, optical goods, watches	8.7	-17.1
<sup>a</sup> RCA-Coefficients		

Source: Own Calculation

Germany has a strong comparative advantage in medium-technology products whereas it exhibits a comparative disadvantage in high-tech goods relative to the US, France and the UK, again using RCA-coefficients (Figure 4). In this approach, the level of technology is defined in terms of R&D expenditure relative to the product price. German firms including the medium-sized firms of the “*Mittelstand*” have been successful with sophisticated and human-capital intensive medium technology in niches of the world market, especially in machine building. With respect to the technology intensity of exports, Germany has a similar pattern of specialization as Japan.

Figure 4: Competitiveness according to technology-intensity<sup>a</sup> 2001



<sup>a</sup>RCA- Coefficients according to technology-intensity. — <sup>b</sup>2000

This result is consistent with other observations. Germany's share in R&D-intensive products in total world exports has fallen from 18.5 per cent in 1991 to 15 per cent in 2002 (Bundesministerium für Bildung und

Forschung 2003, p. xvii). The balance of payments for technological services including patents, R&D services, engineering services and data processing is negative by 5.9 bill euro (2002).<sup>26</sup> It has been negative in each year of the 1990s. Anecdotal evidence has it that a new telephone for a German multinational produced was completely engineered in China, and a new dialysis instrument in Lahore, India.

So far, Germany has fared well with its exports. But there are some signs that the manoeuvring space for price setting and for the pass through of costs has been reduced. It is an open question whether the existing comparative advantage in medium-technology products will be sufficient to compensate for the lack of competitiveness in the new sectors as a propellant for investment, growth and employment.

### **Investing abroad**

Accumulating capital abroad can be viewed under two opposing angles in the context of economic growth. On the one hand, it is a sign of strength that a country runs a current account surplus which can be used to invest elsewhere. It can also be seen as a sign of future strength, since subsidiaries will mean future exports of intermediate goods so that foreign direct investment and future exports are complementary. On the other hand, investing abroad may be interpreted as an alternative to investing at home; then foreign direct investment is a substitute for future exports. In any case, a distinction has to be made between the point of view of the firm and the point of view of an economy. From the firm's point of view, having a portfolio of investments in different countries opens up options,

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<sup>26</sup> Deutsche Bundesbank 2003, time series EU 2069-EU 2071.

reduces costs, increase the profit potential and spreads risks. From an economy's point of view, capital exports may be seen as a normal process: a mature economy uses its current account surplus to find investment opportunities with a higher marginal productivity of capital. As a compensation for supplying capital now it later receives dividends. The exit of capital may, however, also be viewed in the context of locational competition according to which countries compete for the mobile factors of production (Siebert 2000b). A country losing capital or not being able to attract capital has a lower production potential and a lower labor productivity. In this context, the outflow of capital has negative implications. Employment is affected negatively.

In this debate with contradicting views the magnitude of the outflow may be a relevant aspect. It is amazing that outbound foreign direct investment of German industry is relatively strong. In the period 1995-2000, outbound foreign direct investment of German industry made up 39.1 per cent of annual gross investment of industry; the inflow was relatively weak (Table 3). German industry has 13.4 per cent of its capital stock abroad. For some sectors, the gross outflow relative to gross investment at home is even higher, for instance 80.3 per cent for metal products and machine construction, 70.3 per cent in vehicle construction and 55.9 per cent in the chemical industry in the period 1995-1999.



Table 3: Foreign Direct Investment of German Industry in Per Cent of Gross Investment<sup>a</sup>

	Outbound	Inbound
1991 – 1995	11.5	-0.5
1995 – 2000	39.1	7,5
1996 – 2000	42.8	8.6

<sup>a</sup> For data see Siebert (2002b)

Admittedly, foreign direct investment in vehicle construction was strongly influenced by the Daimler-Chrysler merger in 1998, and there is strong inflow of investment in the chemical industry. Moreover, foreign direct investment does not represent greenfield investment but overwhelmingly equity investment. Whereas greenfield investment increases the capital stock directly and also has a direct capacity effect in the country where investment takes place (and a more or less direct withdrawal effect in the country where investment is not forthcoming), equity investment brings new management and organization as well as a new technology. This has a more indirect effect on the production potential of an economy. Nevertheless, German firms have a portfolio of locations abroad, and they can react to changes in their environment, including policy-induced new conditions in Germany, by reallocating production and investment world wide. They can avoid national policy measures. Larger German firms now have half of the employees abroad. Out of the ten million cars produced by German firms in 2002, 4.5 million units were produced abroad. Even the smaller and medium-sized firms of the *Mittelstand* have diversified their locations through subsidiaries abroad. Foreign direct investment may very well reflect the structural change that we have discussed, i.e. the relative loss in importance of industry and the possible erosion of the export position. If this trend continues with the same magnitudes, the hypothesis

of foreign direct investment bringing forth exports in the future is questionable.

Taking the competitive position on the product markets and German direct investment abroad together, one can conclude that German industrial firms are efficient and competitive, but that the same statement does not apply to industrial jobs in Germany. As already mentioned, 2.5 million jobs have been lost in industry in the 1990s so that, definitively, there is an erosion of the job basis.

### **The Role of government**

Government absorbing about half of GDP as in Germany exerts, without any doubt, an influence on the growth performance of the economy through a set of measures. With respect to the size of governmental absorption, it can be argued that the GDP growth rate is a function of the size of government in the economy, i.e. of its share in GDP. Under *ceteris paribus* conditions, we can expect an inverted u-shaped curve. Starting from a low level of government activity, the GDP growth (on the vertical axis) can be expected to increase with a larger share of government in GDP (on the horizontal axis), for instance by spending on internal security or on infrastructure. But from a threshold on, the growth rate of a country declines with an increasing share of government in GDP. It may well be that a share of government activities of 50 per cent in GDP as in Germany is an impediment to growth.

Besides the size of expenditures, the type of governmental absorption plays a role. Panel studies of the industrialized countries show that governmental

investment has a positive impact on growth<sup>27</sup>. This holds for investment in infrastructure such as roads, airports and harbors. A declining share of governmental investment as in Germany means a lower growth impact. Surely, the transportation infrastructure has been modernized to some extent; this means the improvement and extension of existing facilities. But except for German unification, examples for completely new infrastructure facilities are hard to find; one is the airport in Munich which took thirty years to get built from its inception, another one is the new railroad track between Cologne and Frankfurt. Unlike in France with the TGV, there is no technological leapfrogging in the German infrastructure. It should be noted that governmental investment has a much lower productivity and contribution to the growth rate than private investment.

Governmental consumption, the overwhelming part of governmental expenditures, although having a short-run positive effect on the demand side, withdraws resources from the private sector and has a negative impact on growth. It is the withdrawal effect through taxation that affects growth. Specifically, subsidies can be expected to have a retarding influence. Subsidies require sizable financial resources and imply distortions and efficiency losses. They tend to protect and favor old and declining sectors, for instance agriculture, coal and shipbuilding, and they impede structural change. Their financing puts a burden on the other sectors of the economy. According to a survey of the Kiel Institute (Boss and Rosenschon 2002) using a wide delineation, subsidies account for 156 bill € per year, that is 7.5 percent of GDP or 35 percent of total tax revenues.

Government also exerts an influence on growth through the financing side. Taxes have a negative impact, mostly through their effect on private

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<sup>27</sup> For a detailed analysis see German Council of Economic Advisers, Annual Report 2002/03, p. 209.

investment. Indirect taxes have a weaker negative effect than direct taxation. Germany's tax share in GDP remained relatively stable over forty years, but had risen to 25.4 per cent in 2000; it was at 23 per cent in 2002. Social security contributions have a negative impact as well; social absorption does not have a direct productivity effect. Contributions represent a take wedge, they are a disincentive for effort. They have increased considerably over time. Moreover, the budget deficits and the level of public debt show a negative impact in empirical studies; public debt also has gone up. Thus, the financing side of government has had a negative effect on economic growth.

In addition, the government has an influence on growth by defining the institutional design of the economy. A regulation - growth linkage shows up in empirical studies for the OECD countries with economy-wide indicators of regulation and privatization and industry-level indicators of entry liberalization exhibiting a positive impact on multifactor productivity. (Nicoletti and Scarpetta 2003). Strict product market regulation is a candidate for the lower growth performance. Moreover, the institutional arrangement of the university sector is a factor that contributes to the low growth rate.

### **A Newly Declining Economy?**

There are quite a few factors that come to one's mind when one looks at potential causes of Germany's low growth performance. Among the hypotheses there are temporary factors and there are long-run phenomena.

A first hypothesis is that German unification has changed the economic data set, especially the fiscal policy stance, and that this is the reason for

the slow growth performance. Accordingly, the intensity of the problem eases over time and the issue will fade away. There is no doubt that the transfers weaken growth, but this is not the overriding reason of the poor performance. Moreover, the hope that the issues will disappear by themselves is misleading.

A second explanation is that Germany is a mature economy, and mature economies grow with a slower pace. In that interpretation, Germany can be compared to Japan. It meanwhile has a similar pattern of export specialization with respect to the technology-intensity of products, new avenues of specialization are not opened up, and capital accumulation finds less and less investment opportunities.

A third explanation, the erosion hypothesis, goes further. Low growth is linked to high unemployment and the failure of the labor market as well to the unsolved problems in the systems of social security. These issues were already there before German unification. It seems that the superstructure of the “social market economy” itself affects the economic base negatively in that the set incentives represent distortions and lead to efficiency losses, to a loss of economic dynamics and to high unemployment. This is a systematic problem, it is a structural issue and it will not fade away. The superstructure has been developed at the end of the 1960s and in the 1970s in a situation of strong growth rates and a high productivity increase which now no longer prevail today. Together with regulation of the product markets, the capital market and the system of human capital formation as well as the governance system of the economy and the political processes the impact of the superstructure implies that the economic base of the economy cannot expand as in the past. The economic base is weakened. External shocks to the economy are harder to digest. The factors

endogenous to growth become weaker. There is an erosion of economic strength as discussed by Olson (1982). In that interpretation there is a similarity with Japan. This also holds for the governance system which relies heavily on consensus in both countries. A major difference, however, should be noted, namely that Japan had to come to grips with a financial bubble that burst in 1989 and that messed up the balance sheets of banks, insurance companies and firms in the producing sector (Siebert 2000a).

A fourth hypothesis, that of a newly declining countries, puts Japan and Germany into the historical category of countries that have fallen back in their economic development. They would then be a newly declining country, so to say companions of Sweden in the two decades of the 1970s and 1980s, the United Kingdom in the three decades after the Second World War and Argentina in the 19<sup>th</sup> century. In this view, a mature economy can no longer solve the major economic policy issues, it becomes immobile with respect to institutional modernization. Its structures become so rigid that institutional adjustment can no longer take place. The political process lost its problem-solving capacity.

To what extent the fourth hypothesis may be valid is too early to tell. But the third hypothesis seems to be fitting. Accepting that idea, the future development is not predetermined, it can be shaped by economic policy. But apparently, the three issues of low growth, high unemployment and unsustainable social security systems are intertwined in a tangled up knot. To solve them needs an institutional big bang.

## References

- Boss, A. and Rosenschon, A., 2002. Subventionen in Deutschland: Quantifizierung und finanzpolitische Bewertung, Kiel Discussion Paper 392/93, Kiel.
- Brauer, H. (2003). The Real Exchange Rate and Prices of Traded Goods in OECD Countries, Kiel Studies No. 322. Springer, Berlin.
- Bundesministerium für Bildung und Forschung (2003). Zur technologischen Leistungsfähigkeit Deutschlands 2002. Bonn.
- Creditreform (2003). Insolvenzen, Neugründungen, Löschungen 1. Halbjahr 2003. Neuss.
- Creditreform (2003). Insolvenzen, Neugründungen, Löschungen 1. Halbjahr 2003. Neuss.
- Dohse, D. (2000). Technology Policy and the Regions – the Case of the BioRegio Contest, *Research Policy*, 29, 1111-1133.
- Fier, A, (2002), Staatliche Förderung industrieller Forschung in Deutschland, *ZEW-Wirtschaftsanalysen Band 62*, Nomos, Baden Baden.
- German Council of Economic Advisers (1996). Reformen voranbringen. Annual Report 1996/1997. Metzler-Poeschel, Stuttgart.
- (2002). Zwanzig Punkte für Beschäftigung und Wachstum. Annual Report 2002/2003. Metzler-Poeschel, Stuttgart.
- Klodt, H. et al (1994), Standort Deutschland: Strukturelle Herausforderungen im neuen Europa, Tübingen, Mohr Siebeck.

- Mankiw, N. G., Romer, D. and Weil, D. N. (1992). A contribution to the empirics of economic growth. *The quarterly journal of economics*, vol. 107, p. 407-437.
- Nicoletti, G. and Scarpetta, S. (2003). Regulation, Productivity and Growth: OECD Evidence, World Bank Policy Research Working Paper 2944. January.
- OECD (2003), OECD Economic Outlook No. 73, June 2003. OECD, Paris.
- Olson, M. (1982). *The Rise and Decline of Nations*. Yale University Press, New Haven.
- Rammer, Ch. (2002). Unternehmensdynamik in forschungs- und wissensintensiven Wirtschaftszweigen, ZEW Studien zum deutschen Innovationssystem Nr. 13- 2003.
- Scarpetta, S. et al (2002). The Role of Policy and Institutions for Productivity and Firm Dynamics: Evidence from Micro and Industry Data, OECD Working Paper No. 329.
- Siebert, H. (2000a). The Japanese Bubble: Some Lessons for International Macroeconomic Policy Coordination, *Aussenwirtschaft*, 55. Jahrgang, 233-250.
- (2000b). Zum Paradigma des Standortwettbewerbs, Walter Eucken Institut, Beiträge zur Ordnungstheorie und Ordnungspolitik 165, Mohr Siebeck, Tübingen.
- (2002a). The Stalling Engine in *Wirtschaftswunder*-Land: Germany's Economic Policy Challenges, Kiel Discussion Paper No. 386, Mai.
- (2002b) Verliert der deutsche Industriestandort? [www.uni-kiel.de/ifw/pub/siebert/siebess.htm](http://www.uni-kiel.de/ifw/pub/siebert/siebess.htm)
- (2002c). Verliert die deutsche Wirtschaft Wettbewerbsfähigkeit? [www.uni-kiel.de/ifw/pub/siebert/siebess.htm](http://www.uni-kiel.de/ifw/pub/siebert/siebess.htm)



Siebert, H. and Stolpe, M. (2002). Germany, in: Technological Innovation and Economic Performance (Ed. Benn Steil, David G. Victor, Richard R. Nelson) A Council on Foreign Relations Book, Princeton University Press Princeton and Oxford, 112 – 147.

Wößmann, L. (2002), Schooling and the Quality of Human Capital, Kiel Studies 319, Berlin, Springer.