

Why Has Potential Growth Declined? The Case of Germany

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Since the 1950s, economic growth rates in industrialized countries have declined. Whereas the per capita growth rate of gross domestic product in industrial countries was 3.7 in the 1950s and 4.2 in the 1960s, the growth rate came down to 3.0 in the 1970s and to 2.1 in the 1980s (Table 1). This picture of declining growth rates is even stronger when the growth rate is not expressed on a per capita basis.

However, we do not observe a uniform picture for the industrial countries (Chart 1). There is no major decline for the United States in terms of the per capita growth rate. France, Germany, Italy, and Japan reduced the gap in per capita income to the United States, but they experienced a strong decline of their growth rate whereas the low rate of the United Kingdom remained rather stable. A similar picture as in Chart 1 for the Eastern European countries shows a steep decline in the 1970s and the 1980s.

I would like to analyze more closely the case of Germany, where the growth rate of gross domestic product (GDP) per capita has come down considerably over the last 40 years, somewhat picking up in the late 1980s (Chart 2).

A perfect explanation would require a multifactor approach (Madison 1987) that analyzes the change in productivity, the augmentation of factors as well as a set of supplementary conditions including structural change, the availability of natural resources, foreign trade, and economic policy.

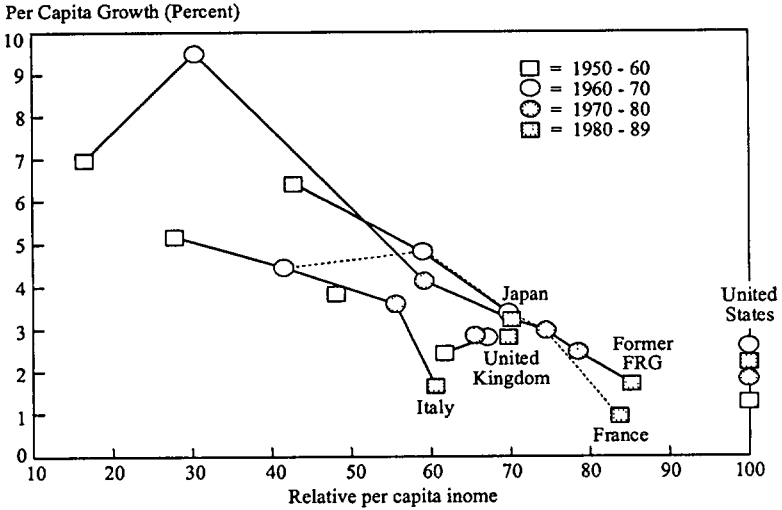
Table 1
Economic Growth (a) in Industrial Countries, 1950-1991
 (in percent)

Country	50s	60s	70s	80s (b)
Austria	5.4	4.1	3.5	2.1
Belgium	2.4	4.4	3.2	2.2 (c)
Canada	1.3	3.4	2.9	1.2
Finland	4.0	4.3	3.1	2.5 (c)
France	3.7	4.7	3.2	1.5
FR Germany	6.8	3.6	2.8	2.1
Italy	5.3	4.5	3.6	1.8 (c)
Japan	7.1	9.4	4.0	3.7
Netherlands	3.3	4.0	2.7	1.1 (c)
Norway	2.8	3.6	4.6	1.8
Sweden	2.6	3.7	1.8	1.5
United Kingdom	2.1	2.4	2.4	2.3 (c)
United States	1.4	2.5	1.9	1.5
Mean	3.7	4.2	3.1	1.9
Coefficient of Variation	52.5	40.7	25.0	37.2

^a Average growth rate of GDP per capita in international dollars of 1980. (b) 1980-91. (c) 1980-90.

Source: Robert Summers and Alan Heston (1988); International Monetary Fund (various issues); own calculations.

Chart 1
Growth Rates of Industrial Countries

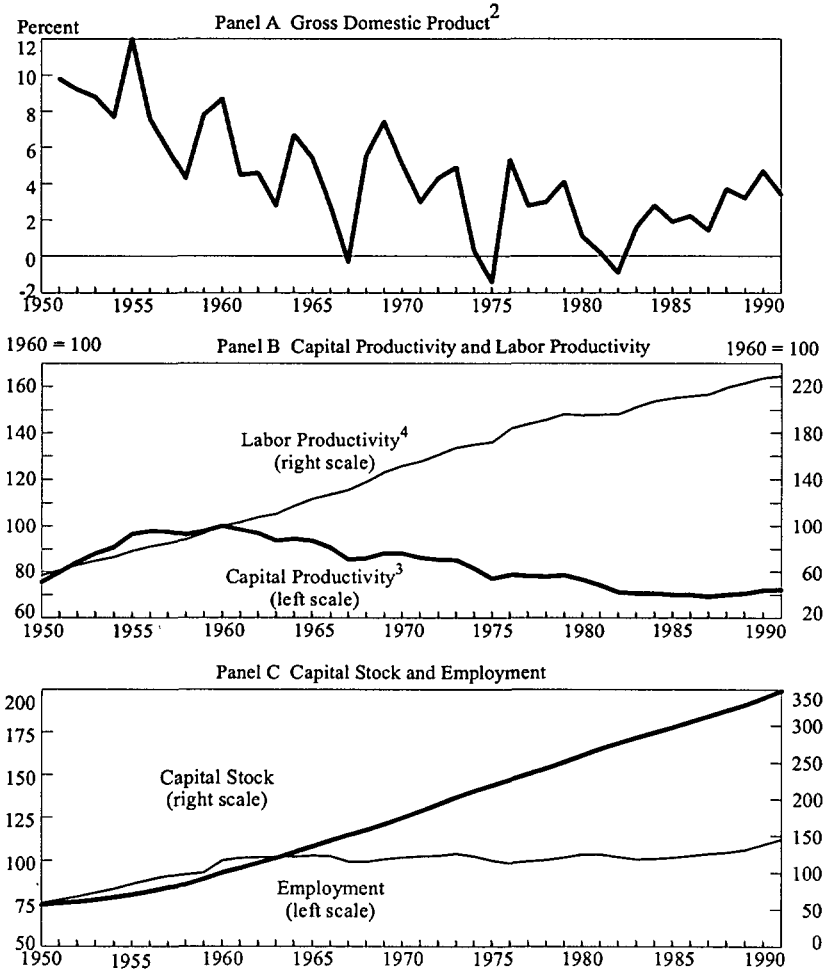


A first approach is to look at the development of factor productivities. In the German case, both labor and capital productivity increased in the 1950s, but after 1960, both productivities follow a diverging trend.

Labor productivity rises with a lower rate of increase in the early and late 1980s. Capital productivity exhibits a negative trend in the 1960s and 1970s, reaching 72.3 percent of the 1960 level in 1991. In the 1980s, capital productivity remains constant with some slight improvement in the late 1980s. Total factor productivity exhibits a falling trend (4.8 percent in the 1950s, 2.4 percent for 1960-73, 0.6 percent for 1973-82, and 1.2 percent for 1982-91).¹

The 1950s can be characterized as a period in which the production capacity has continuously increased. Both capital and labor (measured as persons engaged, that is, persons employed, including self-employed persons) are augmented considerably with the capital stock nearly doubling. In this period of capital widening, capital and labor are not really moving down their respective marginal productivity

Chart 2 GDP and Productivity in West Germany¹



¹ 1950 - 1959 excluding West Berlin and Saarland
² In 1985 prices; percentage change over previous year.
³ Gross Domestic Product (in 1985 prices) divided by Capital Stock (in 1985 prices)
⁴ Gross Domestic Product (in 1985 prices) divided by Employment

curves. These curves shift outward due to the augmentation of the other factor and due to technical progress.

In the 1960s, 1970s, and early 1980s, the work force remains stable in spite of an active immigration policy in the 1960s. The capital stock nearly triples in real terms. In this period of capital deepening, the capital intensity rises, and capital productivity falls while labor productivity increases. Capital is working its way down the falling marginal productivity curve.

In the late 1980s (since 1987), capital productivity starts rising again. The labor force increases by roughly 3 million between 1982 and 1991. The capital stock also grows. On a more moderate scale than in the 1950s, capital widening takes place.

This analysis leads to a rather simple conclusion: it is favorable for economic growth when both capital and labor increase and when capital and labor productivity rise simultaneously. Unfortunately, in most cases, the real world is more complex in that one factor remains constant and has to be substituted by another factor. This does not preclude that growth may take place in the more complex case when only one factor such as capital is augmented. Increasing only one factor, however, means moving down the marginal productivity curve unless there is technological progress.

An alternative approach to explain the 1950s is that augmentation of labor went together with a catching up to the pre-war situation. During the 1930s and during the war, the international division of labor was severely restricted. This distortion of the German economy implied that there was an unusual growth potential. In addition, part of the capital stock was destroyed during the war. Thus, catching up explains part of the West German growth story in the 1950s and the 1960s (Heitger [1982], Fischer [1988]). A similar argument applies to France, Italy, and Japan.

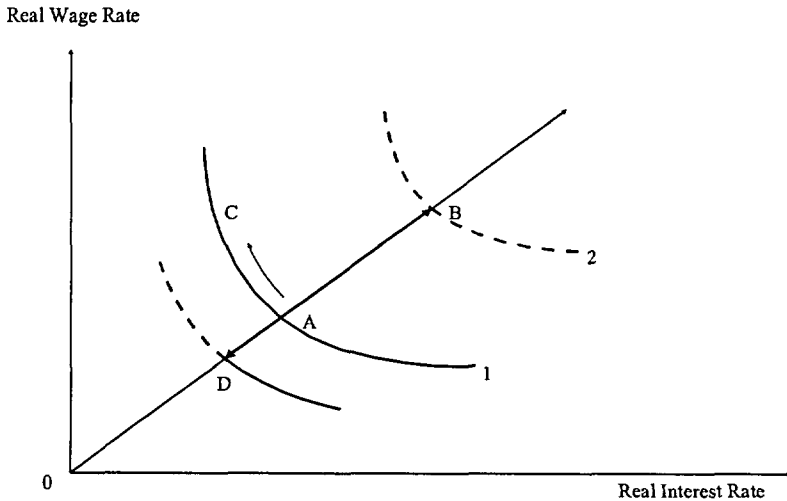
Productivity changes and variations in factor supply are difficult to distinguish. As a rule, capital accumulation goes hand in hand with an increase in technology if a more recent vintage of capital is added to the capital stock (embodiment effect). In addition, there is learning by

doing with accumulated investment. In the German case, capital formation was associated with a modernization of the capital stock.

Human capital, built up by education as well as by training on the job, may be a rather important variable in explaining growth. Whereas the German university system is deficient in producing an academic elite as the U.S. system does, it generates a broad group of educated persons. Moreover, the German vocational system represents an asset.

In Figure 1, the factor price frontier denoting the maximum possible real factor prices illustrates some of the points made. If both factors grow and technology remains constant, real factor rewards and productivities do not change. The economy remains in point A. Growth simply takes place by increasing inputs quantitatively. With technical progress, for instance when labor quality improves, the economy moves to a higher factor price frontier (Movement AB). The central issue of empirical growth analysis is to distinguish factor augmentation and productivity growth.

Figure 1



A third case is factor deepening, for instance, a higher capital intensity implying a fall in the real interest rate and an increase in the real wage (Movement AC). Again this case may be linked to an increase in technical knowledge through modernization of the capital stock.

The two oil crises of 1973-74 and 1979-80 represent cases of factor shortening or factor reduction. Marginal productivity schedules of capital and labor as well as the factor-price-frontier shift to the left (Movement from A to D in Figure 1).

The existing capital stock is made partially obsolete because it no longer corresponds to the new price vector. For both oil shocks, capital productivity declines, and the increase in labor productivity is reduced.

For the United States, Jorgensen (1988) concludes that the climb in real energy prices "provides part of the solution of the problem of disappointing U.S. economic growth since 1973." Griliches (1988 p. 9) looking at the research and development explanation of a productivity slowdown sees "the most likely direct causes of these pervasive declines in the growth rates of productivity" in the oil price hikes.

Factor shortening also occurs in the case of environmental protection. The environment as a third or fourth factor of production is made more scarce by environmental legislation. Roughly 1 percent of GNP was spent on environmental protection in Germany and in the industrial nations since the early 1970s. Of course, environmental expenditures constitute factor income, but the new environmental constraint increased the opportunity costs of traditional production and may well have reduced the growth rate of traditional GNP. The increased scarcity of nature as a sink has played a similar role as the reduced availability of energy, albeit in a more continuous pattern. Of course, this raises the question of how we measure growth.

The analysis presented so far has an interesting implication for the transition process of East Germany. The metamorphosis from a central planning system to a market economy means that a new price vector governs and that the existing capital stock oriented toward the old prices becomes largely obsolete. There is an ample supply of qualified

labor, and capital accumulation is needed to equip the labor supply with machines. With nearly 3 million of the East German labor force of 7 million either unemployed or in the second labor market or commuting, labor augmentation can take place by drawing labor to the first labor market. Thus, labor augmentation and capital widening can occur simultaneously. The potential gains from participating in the division of labor with the industrialized countries point to the same direction. This should represent a positive scenario for East Germany. In terms of Figure 1, the given factor price frontier of East Germany reflects the obsolete capital stock, and a movement from A to B is possible.

With an export share of 33 percent of GNP (Japan, 15 percent; United States, 8 percent), Germany can be expected to have benefited from the integration into the world economy after 1945 and into Western Europe. Openness matters in economic growth. Intensifying the international division of labor acts similarly as technical progress; it is a factor of economic growth operating perpetually over time. It is hard to pin this determinant down statistically,² but as a policy matter, it is worthwhile to take into account that a positive environment of free trade contributes to growth in the world economy as well as in individual countries.

Another implication of the German story is that attitudes of people, institutions, and economic policy matter. This can be clearly seen by the difference in economic performance between West and East Germany. But it is also illustrated by the experience of West Germany. In the 1950s, West German economic policy was focused on rebuilding the country and integrating more than 12 million refugees who came before 1950. People were prepared to put in work effort to improve their personal lot, and economic policy set the incentives in the appropriate way.

In the 1950s, the social market economy protecting the individual by a social net was slowly developed. In the 1970s, the social net was extended considerably. Equity issues became more prominent. Internationally, the social market economy with its social net has been interpreted as a consensus economy (or the “*modele rhenan*”) in which the efficiency loss due to social safety is the price to be paid for social

stability. Looking more closely, however, the opportunity costs of the social net are high, and they affect people negatively who supposedly are to be protected. Legislation of the 1970s included improved benefits in the case of unemployment and retirement for the individual, but protection also crept to specific sectors and firms. Labor market regulations aiming to protect the individual worker through layoff restraints and social closing plans established new exit conditions without understanding that implicitly the rules for market entry were changed. Whereas in the 1950s, competition as a guiding principle of the economy was more easily accepted, protection of the individual became more important in the 1970s. In the period 1973-83, Germany lost 800,000 jobs, whereas in the same period, 18 million jobs were created in the United States and 5 million in Japan. Germany was a prototype of Eurosclerosis.

This argument is in line with an explanation of the slowdown as the result of institutional hysteresis. Introducing rules to protect the insiders of the labor market and the existing firms means that the set of constraints relevant for decisionmaking of individuals and firms becomes more binding. Restraints become more powerful by partitioning (Siebert 1982). Rent-seeking of interest groups introduces additional constraints. The economy loses its efficiency as well as its flexibility to react to real shocks (Olsen 1982, 1988; Lindbeck 1983). The behavior and attitudes of individuals change to a less entrepreneurial pattern. Germany of the 1970s is of this type.

In the 1980s, Germany slowly followed a different line of policy. Some institutional rules of the labor market were slightly changed; some restrictions on market entry were reduced. Institutional competition arising from the Cassis-de-Dijon-verdict of the European Court and from the completion of the internal market served as a can opener for some West German regulation. Institutional competition was allowed to overcome vested interests to some extent. One lesson is that from time to time, you have to rattle the institutional boat in order to keep the economy flexible. Part of the story of the 1980s was that fiscal policy brought down the budget deficit from 4 percent of GNP in 1982 to zero in 1988—in sharp contrast to the advice given by some American economists. It is not surprising that the growth rate of GDP per capita, capital productivity, and employment show a more positive

picture in the late 1980s.

Besides labor market regulations and institutional conditions of market entry and exit, taxation and the relative size of government also may seem to have played a role in determining economic growth. An increased share of government spending seems to be associated with lower growth rates once a certain level of the government share of GNP is surpassed. Taxes disturb allocation, and as a rule, they represent a negative incentive for work effort, saving, and investment (Boskin 1988). There is an optimal size of government being determined by the benefit of providing public goods such as infrastructure and by the burden of taxation. In Germany, the share of tax and social security revenue in GNP has increased from 29.5 (1950) to 42.2 (1989);³ the share of government spending in GNP has risen from 31.1 (1950) to 48.9 (1991). On the whole, the tax burden in European countries has increased, reaching, for instance, 56.1 in Sweden (1989) and 46.0 in the Netherlands, in contrast to 30.1 in the United States and 30.6 in Japan (Heitger 1992).

The policy issue here is to specify the optimal mix between the provision of public goods and the tax burden, the optimal structure of the tax system, that is, which type of taxes is less distortive (for example, the consumption tax), and the optimal structure of government, that is, which governmental level should provide which public goods and to what extent so-called public goods can be privatized by appropriate institutional arrangements.

The policy answer is that countries are not only involved in competition in the commodity market but also in the factor markets if factors are mobile. Institutional or locational competition is a beauty contest of the immobile factors for the mobile factors. The institutional arrangement of the world economy has to be inductive to strengthen institutional competition.

Finally, another suspect that we should look at in a Schumpeterian tradition (Griliches 1988) or in the interpretation of new growth theory (Romer 1986) as a candidate for a slower growth would be a slowdown in the rate of creation of new knowledge and its application. The data on total factor productivity (Table 1) indicate a decline, but they are

questionable. Unfortunately, I have no evidence on the level of research and development (R&D) activity, on R&D investment, or on the flow of new knowledge. One may raise the question to what extent the contestability of markets has changed over time—for instance, in the announcement period of the single market—and to what extent an impact on new knowledge and its implementation can be traced. With some caution⁴ the policy strategy is to increase the contestability of markets and to promote conditions that represent an incentive to intensify the search for new technical knowledge and its implementation.

Looking for policy conclusions, a long-run orientation of economic policy aiming at strengthening the supply side is the right approach for economic growth. Such an approach puts emphasis on the contestability of markets, on an open economy being integrated in the international division of labor, on open markets including labor markets with free access of outsiders, and on incentives to find new technical knowledge. Economic policy should not generate distortions between sectors of the economy, and it should not produce distortions over time, that is, intertemporal inconsistencies. Economic policy should be steady, stressing institutional arrangements; it should be “Ordnungspolitik” defining the appropriate frame of reference for private activities, and it should refrain from “Prozesspolitik” by attempting to influence economic activities ad hoc and reacting to changes in the policy situation and to popular demand. Last not least, the government should see its role in providing public goods, taking into account the opportunity costs that taxes create in the private sector. Growth policy needs a long breath.

Appendix 1 GDP, Capital and Labor Force, West Germany, 1950-1991

Year	Capital Stock		GDP ^a		Capital Productivity		Labor Force (Employment)		Labor Productivity		Growth Rate of GDP	Increase in Total Factor Productivity (Percent)
	Capital ^a Stock	(Middle of Year)	1960=100	GDP ^a	Productivity	1960=100	(Employment)	1960=100	Productivity	1960=100		
1950	1674.00	1704	56.2	367.84	.2197	75.4	19570	75.1	.0188	57.2	9.8	6.62
1951	1733.44	1765	58.2	404.02	.2331	79.9	20091	77.1	.0201	61.2	9.2	6.44
1952	1796.86	1833	60.5	441.23	.2456	84.2	20522	78.7	.0215	65.4	8.8	5.83
1953	1868.24	1913	63.1	480.15	.2570	88.1	21074	80.9	.0228	69.3	7.7	4.24
1954	1957.48	2008	66.3	516.91	.2641	90.6	21671	83.1	.0239	72.6	12.0	7.11
1955	2058.99	2122	70.0	579.03	.2812	96.5	22500	86.3	.0257	78.3	7.6	3.61
1956	2184.58	2254	74.4	623.10	.2852	97.8	23154	88.8	.0269	81.9	5.9	2.56
1957	2322.67	2392	78.9	659.96	.2841	97.5	23683	90.9	.0279	84.8	4.3	1.79
1958	2460.79	2533	83.6	688.58	.2798	96.0	23895	91.7	.0288	87.7	7.8	5.09
1959	2605.44	2772	91.4	742.20	.2849	97.7	24171	92.7	.0307	93.4	8.7	5.68
1960	2937.59	3031	100.0	856.48	.2916	100.0	26063	100.0	.0329	100.0	4.5	1.58
1961	3124.24	3224	106.4	895.19	.2865	98.3	26426	101.4	.0339	103.1	4.6	2.33
1962	3324.03	3428	113.1	936.28	.2817	96.6	26518	101.7	.0353	107.4	2.8	.76
1963	3531.31	3635	119.9	962.24	.2725	93.5	26581	102.0	.0362	110.2	6.7	4.83
1964	3739.65	3856	127.2	1026.34	.2744	94.1	26604	102.1	.0386	117.4	5.4	3.02
1965	3973.09	4095	135.1	1081.45	.2722	93.4	26755	102.7	.0404	123.0	2.8	1.26
1966	4216.46	4338	143.1	1111.96	.2637	90.5	26673	102.3	.0417	126.9	-3	.41
1967	4459.51	4569	150.7	1108.75	.2486	85.3	25804	99.0	.0430	130.8	5.5	3.85
1968	4678.53	4790	158.1	1169.99	.2501	85.8	25826	99.1	.0453	137.9	7.4	4.76
1969	4902.41	5026	165.8	1257.09	.2564	87.9	26228	100.6	.0479	145.9	5.1	2.90
1970	5149.55	5285	174.4	1321.40	.2566	88.0	26560	101.9	.0498	151.4		

	Capital Stock		GDP ^a		Capital Productivity		Labor Force (Employment)		Labor Productivity		Growth Rate of GDP	Increase in Total Factor Productivity (Percent)
	Capital Stock	(Middle of Year)	1960=100	GDP ^a	1960=100	1960=100	1960=100	1960=100	1960=100	1960=100		
1971	5420.63	5364	183.6	1361.16	.2511	86.1	26668	102.3	.0510	155.3	3.0	.98
1972	5707.39	5853	193.1	1419.12	.2486	85.3	26774	102.7	.0530	161.3	4.3	2.43
1973	5999.15	6143	202.7	1488.19	.2481	85.1	27066	103.8	.0550	167.3	4.9	2.49
1974	6286.05	6409	211.5	1492.08	.2374	81.4	26738	102.6	.0558	169.8	3	.00
1975	6532.70	6645	219.2	1471.22	.2252	77.2	26020	99.8	.0565	172.1	-1.4	-0.1
1976	6757.75	6873	226.8	1549.80	.2293	78.7	25682	98.5	.0603	183.6	5.3	5.26
1977	6988.91	7108	234.5	1593.91	.2281	78.2	25919	99.4	.0615	187.1	2.8	1.22
1978	7226.50	7350	242.5	1641.64	.2272	77.9	26130	100.3	.0628	191.2	3.0	1.32
1979	7473.00	7606	250.9	1709.17	.2287	78.4	26568	101.9	.0643	195.8	4.1	1.95
1980	7738.45	7873	259.8	1727.51	.2232	76.6	26980	103.5	.0640	194.8	1.1	-0.1
1981	8007.74	8130	268.2	1730.52	.2161	74.1	26951	103.4	.0642	195.4	.2	-0.1
1982	8252.56	8363	275.9	1714.14	.2077	71.2	26630	102.2	.0644	195.9	-9	-0.1
1983	8473.19	8587	283.3	1740.90	.2055	70.5	26251	100.7	.0663	201.8	1.6	1.75
1984	8699.84	8810	290.7	1789.35	.2057	70.5	26293	100.9	.0681	207.1	2.8	1.93
1985	8919.18	9027	297.8	1823.18	.2044	70.1	26489	101.6	.0688	209.4	1.9	.53
1986	9135.08	9248	305.1	1863.77	.2040	70.0	26856	103.0	.0694	211.2	2.2	.52
1987	9360.42	9475	312.6	1890.28	.2019	69.3	27050	103.8	.0699	212.7	1.4	.21
1988	9589.04	9710	320.4	1959.41	.2043	70.1	27261	104.6	.0719	218.7	3.7	2.39
1989	9830.89	9963	328.7	2022.78	.2058	70.6	27631	106.0	.0732	222.8	3.2	1.42
1990	10095.07	10244	338.0	2118.75	.2099	72.0	28433	109.1	.0745	226.8	4.7	1.80
1991	10392.35	10555	348.2	2191.05	.2108	72.3	29173	111.9	.0751	228.5	3.4	.79

^a In 1985 Prices

Source: Statistisches Bundesamt

Endnotes

¹Estimates based on Table 1 in the appendix are my own calculations. Total factor productivity growth is calculated as the residual not explained by labor and capital growth. Weights used are 0.7 for labor and 0.3 for capital.

²For developing countries compare the analysis of Edwards (1992). Dornbusch (1992) is rather skeptical about these results. Benefits from trade vary with the size of a country. A large country is likely to experience smaller distortions in autarky and consequently, benefits less from trade in relative terms.

³The share of social security contribution in GNP has risen from 8.5 percent in 1950 to 17.1 percent in 1991.

⁴Technological leadership does not automatically guarantee economic leadership. Audretsch (1992) suggests that the same industrial organization that generates a large flow of new technical ideas, that is, a very competitive environment, may not be conducive to the manufacturing of new products.

References

- Audretsch, D.B. in H. Siebert, ed., *Economic Growth in the World Economy*, Symposium 1992, Tübingen, forthcoming.
- Barro, R.J. "Government Spending in a Simple Model of Economic Growth," *Journal of Political Economy*, Vol. 98, (1990), pp. 103-25.
- _____ and X. Sala-i-Martin. "Convergence," *Journal of Political Economy*, Vol. 100, No. 2, (1992), pp. 223-51.
- Boskin, M.J. "Tax Policy and Economic Growth: Lessons From the 1980s," *The Journal of Economic Perspectives*, Vol. 2, No. 4, (1988), pp. 71-97.
- Darby, M.R. "The U.S. Productivity Slowdown: A Case of Statistical Myopia," *American Economic Review*, Vol. 74, No. 3, (1984), pp. 301-17.
- Dornbusch, R. "The Case for Trade Liberalization in Developing Countries," *The Journal of Economic Perspectives*, Vol. 6, No. 1, (1992), pp. 69-85.
- Edwards, S. "Trade Orientation, Distortions and Growth in Developing Countries," NBER Working Paper # 3716, (1991).
- Fischer, S. "Symposium on the Slowdown in Productivity Growth," *The Journal of Economic Perspectives*, Vol. 2, No. 4, (1988), pp. 3-7.
- Griliches, Z. "Productivity Puzzles and R & D: Another Nonexplanation," *The Journal of Economic Perspectives*, Vol. 2, No. 4, (1988), pp. 9-21.
- Heitger, B. "Government, the 'Tax State' and Economic Dynamics," The Kiel Institute of World Economics, (1992), mimeo.
- Jorgensen, D.W. "Productivity and Postwar U.S. Economic Growth," *The Journal of Economic Perspectives*, Vol. 2, No. 4, (1988), pp. 23-41.
- Lindbeck, A. (1983), "The Recent Slowdown of Productivity Growth," *The Economic Journal*, Vol. 93, 13-34.
- Lucas, R.E. Jr. "On the Mechanics of Economic Development," *Journal of Monetary Economics*, Vol. 22, (1988) pp. 3-42.

- Maddison, A. "Growth and Slowdown in Advanced Capitalist Economies: Techniques of Quantitative Assessment," *Journal of Economic Literature*, Vol. XXV, (1987), pp. 649-98. OECD. *Economic Outlook*, (June 1992).
- Olson, M. *The Rise and Decline of Nations*. New Haven, London, 1982.
- _____. "The Productivity Slowdown, the Oil Shocks, and the Real Cycle," *The Journal of Economic Perspectives*, Vol. 2, No. 4, (1988), pp. 43-69.
- Romer, P.M. "Increasing Returns and Long-Run Growth," *Journal of Political Economy*, Vol. 94, (1986), pp. 1002-37.
- Sala-i-Martin, X. Lecture Notes on Economic Growth: (I) "Introduction to the Literature and Neoclassical Models," NBER Working Paper #3563, (1990). (II) "Five Prototype Models of Endogenous Growth," NBER Working Paper #3564, (1990).
- Schmidt, L. "Reproduzierbares Anlagevermögen 1950 bis 1992," *Wirtschaft und Statistik*, No. 2, (1992), pp. 115-124.
- Siebert, H. "The Partitioning of Constraints," *Journal of Institutional and Theoretical Economics*, Vol. 138, No. 1, (1982), pp. 109-17.
- _____, ed. "Economic Growth in the World Economy," Symposium 1992, Tübingen, forthcoming.
- Summers, R. and A. Heston. "A New Set of International Comparisons of Real Product and Price Levels Estimates for 130 Countries, 1950-1985," *The Review of Income and Wealth*, Vol. 34, No. 1, (1988), pp. 1-25.
- Williamson, J.G. "Productivity and American Leadership: A Review Article," *Journal of Economic Literature*, Vol. XXIX, (1991), pp. 51-68.