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Industrial policy and the East German productivity puzzle

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Industrial Policy and the East German Productivity Puzzle

by

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Abstract

Catching-up of East German productivity to West German levels has completely faded out since the mid 1990s. The remaining productivity gap cannot be attributed to an inferior capital endowment. Instead, it appears to be the result of an inappropriate design of industrial policy which fostered the specialization of East German industry on capital intensive smoke-stack industries. These industries are absorbing a large share of factor inputs, whereas their contribution to aggregate output is rather limited. East Germany will have to face, therefore, another wave of painful structural adjustment when public subsidies will further be reduced.

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I. Introduction

Ten years after the launch of the German Economic, Monetary and Social Union, East and West Germany are still far from being economically united. For most observers, the slow speed of catching-up came as a surprise and a disappointment. A much more rapid closing of the income and productivity gap against West Germany had been expected, because East Germany could immediately implement the well-established rules and institutions of West German market economy and had access to substantial financial support for infrastructure improvements and industrial restructuring.

Few observers have asked, however, whether the close relationship to its Western neighbor really constituted an economic advantage for East Germany or should rather be regarded as part of the misery. It is an open question, for instance, to what extent the complex regulatory framework of West Germany was actually suitable for the transition of East Germany into a market economy, and whether generous financial support actually fostered or hampered industrial restructuring.

This paper concentrates on one specific aspect of support from West Germany, namely on the impact of subsidies for East German firms on the speed and direction of structural adjustment. No doubt – the immediate collapse of the East German economy after unification would have been even more dramatic in the absence of such subsidies. The paper presents some evidence, however, that they may have impeded the long-term pros-

pects for the evolution of viable industrial structures in East Germany. Hence, the sickness itself may probably not completely be independent of the remedies which were intended to cure it.

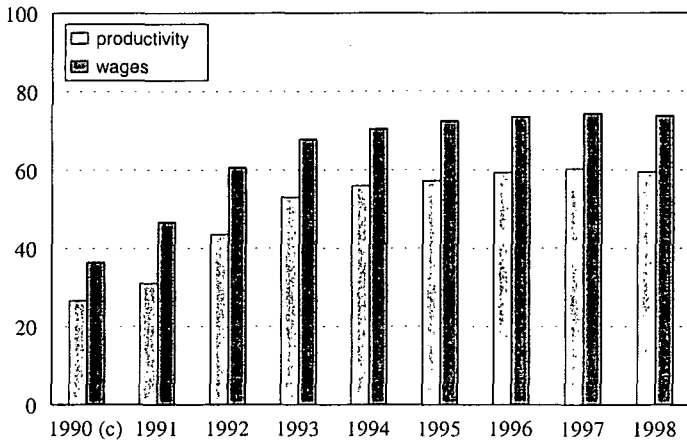
Part II of the paper provides some aggregate statistics on the East German economy and tries to quantify different components of the productivity gap. Part III discusses the impact of public subsidies on structural change in the light of neoclassical production theory. Part IV examines structural distortions in East German industry, and Part V concludes.

II. The East German Productivity Puzzle

The catching-up process of East against West Germany has significantly slowed down since the mid 1990s and completely faded out in the recent past. In the second half of the year 1990, East Germany started with a productivity level of about 25 per cent of West Germany, whereas relative wages were at a level of 35 per cent. These gaps rather rapidly narrowed in the first years after unification: in 1992, productivity and wages reached about 45 per cent and 60 per cent of the respective West German levels. If this speed would have continued (in terms of percentage point reduction), the productivity gap would have been completely closed in 1998 and the wage gap would have been closed even in 1995. As a matter of fact, labor productivity in East Germany is still less than 60 per cent of the West German level and relative wages stagnate around three quarters (Figure 1).

According to recent business cycle forecasts, the picture will not brighten in the years to come.

Figure 1 Relative Labor Productivity(a) and Relative Wages(b) in East Germany (West Germany = 100)



Source: DIW, IfW, IWH (1999).

(a) Gross domestic product per person employed. (b) Wages and salaries (including non-wage labor costs) per employee. (c) 1990: Second half only.

In the light of conventional growth theory, the fading out of catching-up comes as a surprise. Fixed capital investment in East Germany is much higher than in West Germany, and the capital intensity of East German working places has reached about three quarters of the West German level (Table 1). It could be expected, therefore, that the productivity level would

be well above three quarters of the West German level.

Table 1 Gross Fixed Capital Formation per Head and Capital Intensity in East Germany (West Germany = 100 per cent)

	Gross fixed capital formation (a)		Capital intensity (b)
	Equipment	Buildings	
1991	63.6	67.2	46.0
1992	75.3	100.9	.
1993	99.5	130.8	.
1994	111.5	163.7	62.0
1995	110.2	174.5	.
1995	111.3	178.4	.
1997	102.1	175.4	73.0
1998	94.2	162.1	.

(a) At current prices. – (b) Gross capital stock at 1991 prices per employee.

Source: DIW, IfW, IWH (1999).

A brief back-on-the-envelope calculation based on simple assumptions may help to assess the quantitative size of the East German productivity puzzle. The first assumption is the prevalence of a Cobb-Douglas technology both in East and West Germany. Of course, the word is surely not literally Cobb-Douglas, but empirical work on growth accounting has repeatedly shown that the CD assumption is a fairly good approximation of reality if the research interest lies in rough estimates of output effects of factor input changes.

The second assumption refers to the output elasticity of capital, which should be in the range of the share of profits in total national product. In East Germany, the profit share is still extremely low, whereas it reaches a level of about 20 per cent in West Germany. As the experience of growth accounting has taught us, direct estimates of the output elasticity of capital tend to yield somewhat higher values than those derived from national accounts statistics on the profit share. Hence, an output elasticity of 30 per cent may be regarded as a reasonable guess.

Under the additional assumption of identical technologies in East and West (no worry: I shall come back to this assumption soon), the potential relative productivity level of East Germany as compared to West Germany can be calculated as follows:

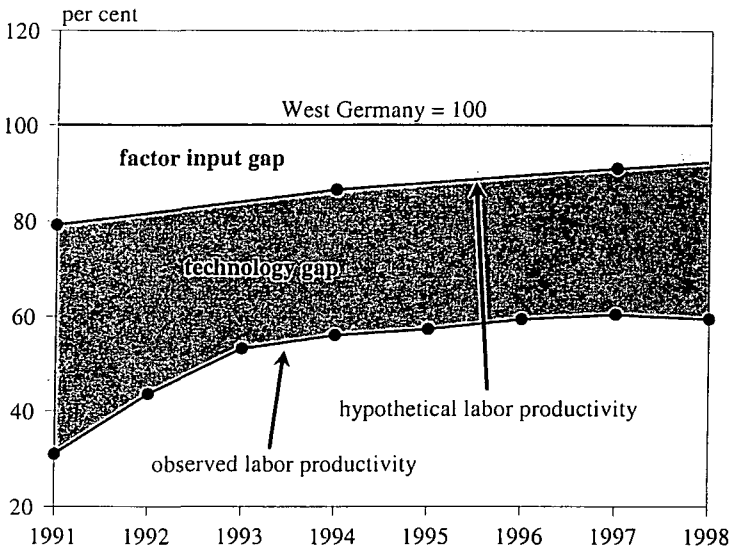
$$y_E / y_W = (k_E / k_W)^\alpha$$

where y denotes labor productivity, k denotes capital intensity and α denotes the output elasticity of capital. The subscripts E and W represent East and West Germany.

The required data on capital intensity can be taken from Table 1. As Figure 2 displays, theoretically predicted productivity in East Germany is not far below the West German level in 1997, whereas actual labor productivity is only 60 per cent. This result is quite robust with respect to alternative assumptions about the output elasticity of capital: with an elasticity of 40 per cent the hypothetical relative productivity level reaches 88 per cent, with an elasticity of 30 per cent (as shown in Figure 2) it reaches 91 per

cent, and with an elasticity of 20 per cent it reaches 94 per cent.

Figure 2 Hypothetical and Observed Relative Labor Productivity in East Germany (West Germany = 100)



Source: Data from Table 1 and Figure 1; own calculations.

A similar conclusion can be drawn for the robustness with respect to the CD assumption. If the CD function were replaced by a CES function, the relative productivity gap would depend on the size of the elasticity of substitution. With an elasticity above unity, hypothetical productivity would even be higher than in the CD case. With an elasticity below unity, the opposite would be true, but one would have to assume an extremely low elasticity in order to substantially reduce the difference between hypo-

thetical and observed productivity levels of East Germany.

In the context of a CD framework, the whole difference between hypothetical and observed labor productivity must be ascribed either to differences in the quality of factor inputs or to differences in technology. There appears to be no substantial difference in the qualification of the labor force, because formal training levels in the former GDR even exceeded the corresponding levels in West Germany (Klodt 1990). As East German workers are increasingly integrated into modern, market oriented production structures, it can be expected that also their informal qualification is more or less equal to West German standards (Bellmann, Brussig 1998).

It could be expected that the East German capital stock would largely consist of outdated equipment inherited from central planning. However, high investment rates over the past ten years have led to a rather rapid modernization of East German production facilities. According to calculations of the Federal Statistical Office, the average age of the capital stock declined from 32.6 years in 1991 to 25.3 years in 1994 (the latest available year)¹. As the high speed of fixed capital formation kept on after 1994, the present-day average age of the East German capital stock does probably not differ significantly from the one in West Germany (1994: 21.3 years).²

¹ Cited from DIW, IfW, IWH (1999, p. 7).

² This view is supported by the fact that an equal share of firms in East and West Germany (two thirds) are reporting that their capital equipment represents the latest available technological level (Bellmann, Brussig 1998, p. 654).

It would be misleading, therefore, to ascribe a significant part of the East German productivity puzzle to the quality of factor inputs. For this reason, the entire gap between hypothetical and actually observed labor productivity in Figure 2 is labeled as technology gap.

Of course, the term "technology" is a quite comprehensive catch-word in a production theoretical framework. It not only refers to the technological sophistication of products and production processes, but also to all other determinants of productivity which are not directly covered by the above-discussed factor inputs. It can be expected that the technology gap in a narrow sense is not too large because the East German economy has almost unrestricted access to technology from West Germany and other regions. In the privatization process after unification, many East German firms were bought up by West German firms which brought their production techniques and often even their products with them. There appears to be no substantial difference between the West German and the East German stock of technological knowledge.

The problem is that also most other explanations are not very convincing (Ragnitz 1997). Some authors have stressed the heterogeneity of capital endowment of East German firms (Dietrich 1997), and their difficulties in getting access to bank credits (Ragnitz 1998), others have pointed to small firm sizes as compared to West Germany (Beer, Ragnitz 1997) or to East-West differences in the sectoral structure of the economy (Rothfels 1997), and several authors have analyzed the consequences of managerial and organizational deficiencies (Mallok 1996; Müller, Rothfels, Wölfl 1998; Bellmann, Brüssig 1998). All these studies have in common, however,

that they are able to explain only a limited part of the observed productivity gap between East and West Germany. Hence, economic research is still confronted with an East German productivity puzzle.

Quite sure, the puzzle will not be solved in the remainder of this paper. However, it will try to explore one specific component of it, namely the impact of an ill-designed industrial policy on aggregate productivity growth.

III. Industrial Policy: Which Factor Should be Subsidized?

Gross financial transfers from West to East Germany add up to a total of about 190 billion DM per year. As the federal government collects about 50 billion DM taxes and other contributions, net transfers amount to about 140 billion DM (Table 2). The major part of transfers is spent on social security, because expenditures on unemployment benefits and old-age pensions strongly exceed East German social security contributions.

In these statistics, government subsidies for private enterprises appear to be rather small in size. This impression is misleading, however, because the data of Table 2 only refer to specific subsidy programs and do not include tax credits and preferential depreciation for investment in East Germany. According to other statistical sources, total subsidization of East

Table 2 Public Transfers to East Germany (billion DM)

	1991	1992	1993	1994	1995	1996	1997	1998
Gross Transfers	139	151	167	169	185	187	183	189
Social security payments	56	68	77	74	79	84	81	84
Subsidies	8	10	11	17	18	15	14	16
Investment	22	23	26	26	34	33	32	33
Other	53	50	53	52	54	55	56	56
Federal Revenues	33	37	39	43	45	47	47	48
Net Transfers	196	114	128	126	140	140	136	141
not included:								
Deficit of the Treuhand	9	14	24	24	–	–	–	–

Source: Deutsche Bundesbank (1998, p. 53).

German firms by the federal government adds up to 60 billion DM (Edler et al., 1998, p. 83). In addition, the East German states are engaged in subsidizing private firms. If all these activities are taken into account, it can be concluded that industrial restructuring in East Germany is not left to anonymous market forces, but it is strongly influenced by government intervention.

A significant part of this intervention is directed at conserving a limited number of jobs in capital-intensive ailing industries such as basic chemicals, oil refineries, steel mills and shipyards. Other subsidy programs are concerned with prestigious high-tech projects such as the Siemens chip factory near Dresden which also requires substantial capital input for a handful of jobs. Moreover, there is a large variety of general support programs which range from tax credits for fixed capital investment over preferential depreciation rules to regional programs which are co-financed by the European Union, the federal and the respective state government. All these industrial policy instruments have in common that they are directed at fixed capital formation. In general, investment in physical capital is a precondition for getting access to subsidies.³

³ According to Sinn (1995), capital costs for investment in East Germany have even been negative due to massive public supports. A concentration of public support on labor input rather than on capital input was recommended, for instance, by Akerlof et al. (1991), Begg and Portes (1992), and Klodt (1990, 1992).

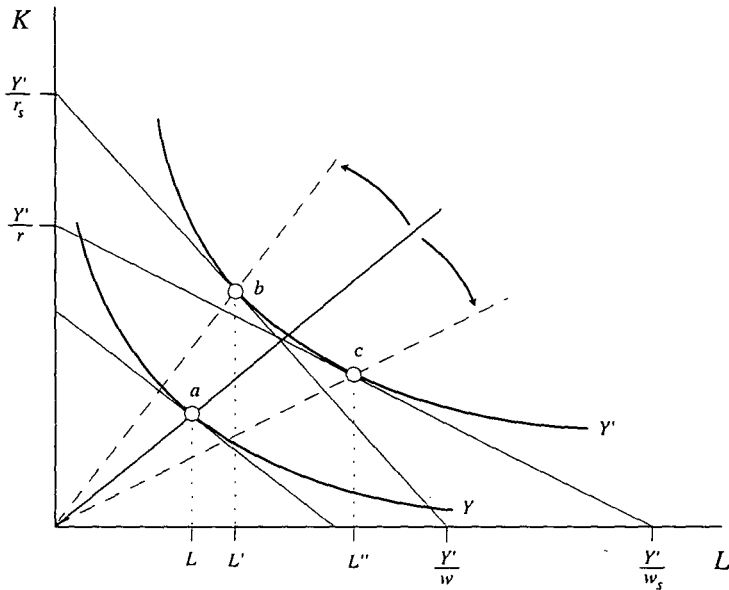
Originally, this emphasis was chosen because the old capital stock inherited from the GDR had largely to be scrapped due to the exchange rate shock and the sharp increase of real wages after unification. Policy-makers were convinced that modernizing the East German capital stock were a precondition for the creation of future-oriented production structures and jobs. From an economist's view, however, it is much less convincing why industrial policy should reduce the relative price of the scarce factor (capital) and implicitly raise the relative price of the abundant factor (labor). There are severe doubts whether the subsidization of capital is really the right policy response to economic problems which are dominated by high and stubborn unemployment.⁴

The general effects of different types of industrial policy measures are illustrated in Figure 3. The isoquantiles Y and Y' are derived from an underlying production function which describes the available production technology in East Germany. This technological relationship should not be misinterpreted as the production possibility frontier of a closed economy, because East Germany has unrestricted access to West German and to a high degree also to international capital markets. A production function in the conventional form, which is interpreted as the relationship between output and available factor inputs, does not make sense in a world of inter-

⁴ It should be noted, however, that simple models of wage subsidization are also affected by severe drawbacks. The most serious problem results from their impact on wage negotiations, because the labor market pressure on the unions would be reduced (Siebert 1993, p. 140, 1998, p 269; Fuest, Huber 1997).

national factor mobility. Hence, Figure 3 does not illustrate which factor prices would emerge under a given factor endowment, but allows to identify the factor intensities chosen by profit-maximizing firms under different factor price regimes.

Figure 3 The Impact of Subsidies on Capital Intensity and Employment



Source: Sinn, Sinn (1992, p. 189); Klodt (1996, p. 164).

In any case, it can be assumed that the real rate of return on capital is exogenous to the East German economy, because it is determined on world capital markets or at least on German capital markets as a whole which is dominated by West Germany. In the initial reference situation represented

by point a on isoquante Y, no subsidies are paid. It is further assumed that the reservation wage of East German workers is above its full-employment level. Hence, labor demand L is lower than labor supply, and unemployment prevails.⁵

If the East German economy has access to subsidies paid from outside (from West Germany), its isoquante shifts outwards to Y', because it becomes profitable to employ additional production factors. Additional capital flows come in from West Germany or from abroad, and additional workers can be recruited from East German unemployment. The size of the employment effects crucially depends on the type of subsidization:

- If capital input is subsidized, the real interest rate for East German producers declines from r to r_s ; the factor price line becomes steeper; and the production equilibrium is in b with an employment level of L'.

⁵ Under strict neoclassical assumptions, it is difficult to substantiate how an unemployment equilibrium such as point a can be achieved under the assumptions of exogenous factor prices and perfect interregional capital mobility. With linear-homogenous technology, it would be predicted that there is either full employment or no employment at all. With mobile capital, unemployment can only occur if (1) the production function exhibits decreasing returns to scale, (2) a third, regionally immobile production factor exists, or (3) labor input is sufficiently heterogenous which makes the employment of higher qualified workers profitable, whereas the marginal product of less qualified workers falls short of the uniform reservation wage (for a formal presentation of this line of argument see Lorz, 1996).

- If labor input is subsidized, producer real wages decline from w to w_s ; the factor price line is flattened; and the production equilibrium moves to c with an employment level of L'' .

Irrespective of the specific properties of the production function, L'' will always exceed L' as long as the isoquantes are convex. The reason is that subsidization not only creates a level effect, but also a substitution effect which results from changes in the capital intensity of production. If subsidization is tied to physical capital, firms get an incentive to substitute labor intensive production processes by capital intensive ones. This reduces the job creation effect of subsidization. If the curvature of the isoquantes is rather flat (i.e. if the elasticity of substitution is high), the substitution effect may even exceed the level effect. Hence, L' may even be lower than L .⁶

It can be argued, therefore, that the heavy support of fixed capital formation in East Germany is distorting the production structure towards an inefficiently high capital intensity. In addition, the maintenance of East German working places is unnecessarily costly, because subsidization requirements per worker would have been significantly lower under a regime of wage subsidization or a neutral regime of uniform subsidization

⁶ Industry-specific labor demand functions estimated by Gerling (1998) have demonstrated that such an over-compensation have actually occurred in some East German industries. Such industries would have realized a higher employment level if the government would have completely refrained from subsidization.

of value-added (for instance by a reduced VAT level for East German products).

Some observers argue that the distortion of factor intensities is limited, because firms would anyhow expect a fading out of subsidization in the long run and because they would not invest in the development of specific capital intensive technologies for East Germany. This argument may be true with respect to the development of production technologies within industries and within individual firms. However, it ignores the potential impact of relative factor price distortions on the development of structural change between industries, i.e. on the relative size of capital intensive and less capital intensive industries. The next section will present some evidence on this issue.

IV. Allocative Distortions in East German Industry

Against the background of the previous chapter, it should be expected that the emphasis of industrial policy on fixed capital formation would result in an oversized share of capital intensive industries in East Germany. The empirical examination of this proposition is hampered, however, by two major obstacles.

The first obstacle is the above-mentioned lack of appropriate national accounts statistics for East Germany. As these statistics on the sectorally disaggregated level only refer to Germany as whole, one has to rely upon industry statistics which are mainly concerned with the manufacturing sec-

tor. The shortcomings of official statistics are further aggravated by the fact that they do not provide information about capital stocks of industries. Fortunately, such data are supplied by three research institutes which are engaged in periodical reports on structural adjustment in East Germany on behalf of the federal German government. This chapter heavily relies on these reports – especially on the last one (DIW, IfW, IWH 1999), which is also the final one, because the project has expired.

The second obstacle is a methodological one. It is concerned with the difficulties of defining a reasonable empirical yardstick for the term "oversized". It has been discussed at length whether the appropriate reference measure for evaluating the structure of the East German economy can be found in the corresponding structures in West Germany. On the one hand, it is argued that East and West Germany are both exposed to identical political and social institutions, are constituting an almost perfectly integrated capital market and will eventually face more or less identical factor prices (see, e.g., Hoffmann 1992). On the other hand, it is argued that there are large industry structure differences even across different states within West Germany. There would therefore be no reason for East Germany to perfectly mimic West German structures (see, e.g., Lammers 1994).

Despite these considerations, the following analysis will rest upon East-West-comparisons, because no sound alternative is available for evaluating the industrial structure of East Germany and because the major indicators of successful transformation are all related to the relative position of East

against West Germany. When interpreting the results, however, the above-mentioned caveats should be kept in mind.

First of all, it can be observed that the capital intensity in East German manufacturing on average even slightly exceeds the West German level (first two columns in Table 3).⁷ However, there are large differences across industries. In oil refineries or in the motor car industry, for instance, capital endowment of working places exceeds the respective West German endowment by more than 50 per cent, whereas in electrical machinery or in apparel it lies below 50 per cent of the West German level.

In order to identify similarities and differences in industrial structure, individual industries have been arranged into three groups, where industries of the high capital intensity group are distinguished by a capital intensity above 400.000 DM per employee and industries of the low capital intensity group by a capital intensity below 200.000 DM per employee. As the third and fourth columns of Table 3 show, the share of highly capital intensive industries is about four percentage points higher than in West Germany. Keeping in mind that East Germany should have a comparative advantage in labor intensive industries, the actually observed specialization on capital intensive industries can most likely be ascribed to the fixed capital formation bias of public subsidies. The flip side of the coin is the low share of labor intensive industries, especially in non-electrical and in electrical

⁷ As discussed above (see Table 1), the relative capital intensity for the economy as a whole is 73 per cent.

Table 3 *Industry Structure of Capital and Output in East and West Germany 1997(a)*

	Capital intensity(b)		Share in capital stock		Share in output	
	East Germany	West Germany	East Germany	West Germany	East Germany	West Germany
High capital intensity	x		46.0	42.9	33.1	42.3
Oil refineries	2554		5.6	1.7	3.2	6.3
Basic metals	556	439	8.2	7.1	5.2	4.6
Chemicals	492	449	10.6	13.6	7.4	10.9
Motor cars	433	278	6.6	12.1	6.7	15.3
Paper and paper products	431	391	2.9	3.5	2.2	2.3
Stone, clay and glass	401	359	12.1	4.9	8.4	2.9
Medium capital intensity	x		34.9	29.1	39.9	27.7
Printing and publishing	393		1.9	3.0	3.5	3.4
Leather and leather products	359	308	0.5	0.5	0.2	0.4
Tobacco	342	580	0.3	0.4	1.5	1.4
Food and beverages	311	378	15.0	10.3	19.4	9.9
Computers, office machines	305	414	0.5	1.2	1.3	1.3
Wood and wood products	285	240	2.5	1.6	2.1	1.4
Textiles	277	376	3.0	2.8	1.8	1.4
Other transport equipment	251	233	5.8	1.8	3.9	1.6
Plastic and rubber products	217	232	3.6	4.8	4.1	4.2
Media electronics	205	310	1.8	2.7	2.1	2.7
Low capital intensity	x		19.1	28.0	27.0	30.0
Non-electrical machinery	161	179	7.0	10.7	9.4	12.6
Metal manufactures	157	193	6.1	6.2	7.2	5.9
Furniture, toys etc.	145	167	2.1	2.3	2.7	2.5
Precision instruments	114	183	1.4	2.4	2.3	2.4
Electrical machinery	97	201	2.2	5.4	5.0	5.5
Apparel	91	196	0.3	1.0	0.4	1.1
Total manufacturing	285	280	100	100	100	100

Source: DIW, IfW, IWH (1999, p. 30); Statistisches Bundesamt (1998, p. 196f.); own calculations.

machinery. As a matter of fact, these industries are not only labor intensive, but also technology intensive. Hence, the relative factor price bias of industrial policy not only helps to conserve old, capital intensive structures, but also impedes the evolution of modern, innovation-oriented and technology intensive production structures.

The most striking empirical observation, however, is the fact that the share of capital intensive industries in East Germany in total manufacturing output is substantially smaller than in West Germany (columns 5 and 6 of Table 3). It can be concluded that capacity utilization rates in capital intensive industries must be extremely low. Presumably, a certain amount of these capacities have not been established in order to serve market demand, but were strongly motivated by promising prospects for gaining public subsidies.

As discussed above, capital-oriented subsidization schemes for East Germany are vindicated by many observers because high wage claims of East German workers would require high productivity levels which in turn could only be achieved by high capital intensities. The low rate of job creation in capital intensive industries inevitably had to be accepted, because it would be preferable to create a few highly productive and competitive jobs rather than to subsidize many jobs in low-productive, labor intensive structures.

If this line of arguments would be valid, industries with relatively high capital intensities should be characterized also by relatively high productivity levels. However, the empirical pattern does not confirm this pre-

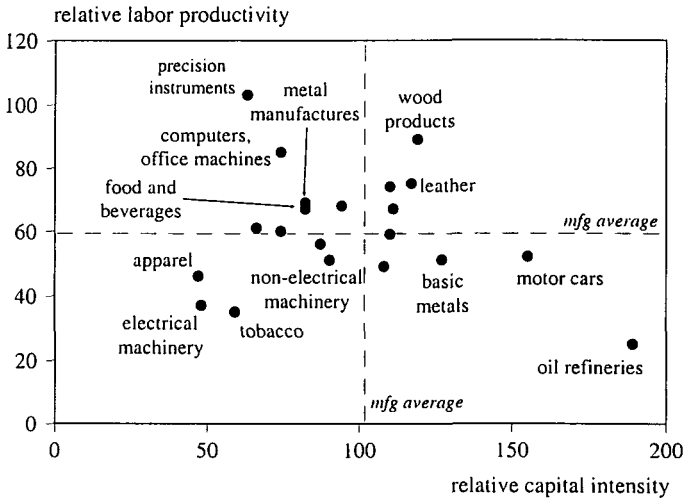
sumption. The industry with the highest relative capital intensity as compared to West Germany, oil refineries, does not achieve the highest, but the lowest relative productivity level (Figure 4).⁸ Relative productivity is also quite low in basic metals and in the motor car industry, which come next in relative capital intensity. Across all manufacturing industries, there appears to be no systematic relationship between these two variables.⁹

All in all, the emphasis on fixed capital formation in public subsidy schemes has obviously not fostered structural adjustment of the East German economy. Instead, it has encouraged the establishment of excessively capital intensive structures which are nowadays suffering from idle capacities. This mis-specialization can be regarded as one explanation of the East German productivity puzzle, because the contribution of capital intensive industries to the numerator of East German labor productivity is extremely low.

⁸ In order to avoid double counting, subgroups of manufacturing industries are omitted.

⁹ The Pearson correlation coefficient of -0.177 for the data presented in Figure 4 even indicates a negative, although statistically insignificant relationship.

Figure 4 Relative Capital Intensity and Labor Productivity in East German Manufacturing Industries (West Germany = 100)



Source: Table A in the appendix.

V. Conclusion

Catching-up of East German productivity to West German levels was rather rapid in the first years after unification, but has come to a complete halt since the mid 1990s. The productivity gap is still in a range of 40 per cent. Simple growth accounting reveals that only a minor fraction of the gap can be attributed to an inferior capital stock. Unfortunately, most other hypotheses also fail to explain the persistence of the East German productivity gap.

The productivity puzzle is even more striking for the case of manufacturing, where capital intensity is as high as in West Germany, but where the productivity gap is of a similar size as in the East German economy as a whole. Presumably, part of this puzzle is explained by distortions in the sectoral composition of East German manufacturing, which are effected by the heavy emphasis of industrial policy on fixed capital formation.

This bias gives rise to the establishment of an excessively capital intensive production structure in East Germany. The large size of capital intensive industries is not reflected, however, in the structure of output. Labor productivity in capital intensive industries is much lower than expected. Presumably, investors in East Germany were guided not only by market potentials, but also by prospects for receiving public subsidies when they made their decisions about appropriate factor input ratios for newly established production sites.

East Germany had to cope with a huge wave of structural adjustment right after unification. It must be feared that another wave of painful structural adjustment will turn up when public subsidies will gradually be reduced and when those capacities which rely upon subsidized capital input will no longer be sheltered from market competition. In the light of this evidence, part of the adjustment problems resulting from this second wave must be ascribed to an inappropriate design of industrial policy, which too heavily rested upon subsidizing capital input.

References

- Akerlof, G., A. Rose, J. Yellen, H. Hessenius (1991). East Germany in from the Cold: The Economic Currency Union. *Brookings Papers on Economic Activity* (1): 1-87.
- Beer, S., J. Ragnitz (1997). Betriebsgröße und Arbeitsproduktivität im ost-deutschen Verarbeitenden Gewerbe. *Wirtschaft im Wandel* 3 (16): 11-13.
- Begg, D., R. Portes (1992). *Eastern Germany since Unification: Wage Subsidies Remain a Better Way*. CEPR Discussion Paper 730. London.
- Bellmann, L., M. Brüssing (1998). Ausmaß und Ursachen der Produktivitätslücke ostdeutscher Betriebe des Verarbeitenden Gewerbes. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung* 31 (4): 648-660.
- Deutsche Bundesbank (1998). Zur Wirtschaftslage in Ostdeutschland. *Monatsberichte* 50 (4): 41-54. Frankfurt.
- Deutsches Institut für Wirtschaftsforschung, Institut für Wirtschaftsforschung Halle, Institut für Weltwirtschaft (1999). *Gesamtwirtschaftliche und unternehmerische Anpassungsfortschritte in Ostdeutschland. Neunzehnter Bericht*. Kiel Discussion Papers 346/347. Kiel.

- Dietrich, V. (1997). Kapitalausstattung und Produktivitätsrückstand im ostdeutschen Unternehmenssektor. *Wirtschaft im Wandel* 7: 5-9. Halle.
- Edler, D. et al. (1998). Deutschland im Strukturwandel –Strukturbericht-
erstattung 1997. *Beiträge zur Strukturforschung* H. 197. Berlin.
- Fuest, C., B. Huber (1997). Die Effizienz von Kapitalsubventionen bei Unterbeschäftigung – eine theoretische und finanzpolitische Analyse zur Förderpolitik in den Neuen Bundesländern. *Finanzarchiv* 54 (3): 355-373.
- Gerling, K. (1998). *Transfers and Transition: The Impact of Government Support on Factor Demand and Production in Eastern Germany*. Kiel Working Papers 878. Institute of World Economics, Kiel.
- Hoffmann, L. (1992). Integrating the East German States into the German Economy: Opportunities, Burdens and Options. P.J.J Welfens (ed.), *Economic Aspects of German Unification*: 49-71. Berlin, Heidelberg, New York, Tokyo.
- Klodt, H. (1990). Arbeitsmarkt in der DDR. *Die Weltwirtschaft* 1: 78-90. Tübingen.
- Klodt, H. (1992). German Support for Restructuring the East German Economy. P.J.J Welfens (ed.), *Economic Aspects of German Unification*: 261-285. Berlin, Heidelberg, New York, Tokyo.
- Klodt, H. (1996). West-Ost-Transfers und Strukturprobleme in den neuen Ländern. *Die Weltwirtschaft* 2: 158-170. Kiel.

- Lammers, K. (1994). Regionale Struktur- und Wachstumsunterschiede in der Bundesrepublik Deutschland – Wo steht Ostdeutschland? *Die Weltwirtschaft* 2:177-193. Tübingen.
- Mallok, J. (1996). *Engpässe in ostdeutschen Fabriken: Technikausstattung, Technikeinsatz und Produktivität im Ost-West-Vergleich*. Berlin.
- Müller, G., J. Rothenfels, A. Wölfl (1998). Determinanten der Produktivitätslücke in Ostdeutschland. Ergebnisse einer Tagung am IWH – Teil II. *Wirtschaft und Wandel* 4 (2): 15-21.
- Ragnitz, J. (1997). Zur Produktivitätslücke in Ostdeutschland. *Wirtschaft im Wandel* 7: 3-4. Halle.
- Ragnitz, R. (1998). Zur Situation im ostdeutschen Unternehmenssektor: Ein buntscheckiges Bild. *List Forum* 24 (3): 326-343. Baden-Baden.
- Siebert, H. (1993). *Das Wagnis der Einheit. Eine wirtschaftspolitische Strategie*. Stuttgart.
- Siebert, H. (1998). *Arbeitslos ohne Ende? Strategien für mehr Beschäftigung*. Frankfurt, Wiesbaden.
- Sinn, G., Sinn, H.-W. (1992). *Kaltstart: volkswirtschaftliche Aspekte der deutschen Vereinigung*. Tübingen.
- Sinn, H.-W. (1995). Factor Price Distortions and Public Subsidies in East Germany. CEPR Discussion Papers 1155. London.
- Statistisches Bundesamt (1998). *Statistisches Jahrbuch für die Bundesrepublik Deutschland 1998*. Stuttgart.

Table A Relative Capital Intensity and Labor Productivity in East German Manufacturing Industries (West Germany = 100)

	Capital intensity	Labor productivity
Total manufacturing	102	59
Apparel	47	46
Electrical machinery	48	37
Tobacco	59	35
Precision instruments	63	103
Media electronics	66	61
Textiles	74	60
Computers, office machines	74	85
Metal manufactures	82	69
Food and beverages	82	67
Furniture, toys etc.	87	56
Non-electrical machinery	90	51
Plastic and rubber products	94	68
Other transport equipment	108	49
Paper and paper products	110	74
Chemicals	110	59
Stone, clay and glass	111	67
Leather and leather products	117	75
Wood and wood products	119	89
Basic metals	127	51
Motor cars	155	52
Oil refineries	189	25

Source: DIW, IfW, IWH (1999, p. 160).

Ich bitte um Erteilung einer laufenden Nummer für das o.g. Arbeitspapier.