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The economic integration of Germany

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K I E L D I S C U S S I O N P A P E R S

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The Economic Integration of Germany

by Horst Siebert

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1. Introduction

In the integration of the two Germanies two countries will be united which differ widely in their institutional and constitutional arrangements as well as in their monetary systems and real economic conditions. Integration therefore means

- harmonization of the institutional systems,
- introduction of a common currency and a unified monetary policy, and
- adjustment in the real economies.

In the process of integration, these three aspects of institutional harmonization, establishing a single monetary policy and bringing the real economic conditions closer to each other will overlap.

The final state of the integration process is a fully integrated economic union. In the commodity markets, the law of one price will govern for tradeables. The prices for non-tradeables such as housing and some services will differ among regions. In the factor markets, one price will prevail for any given factor that is completely mobile. Interest rates and the marginal productivity of capital will be identical everywhere. However, prices of immobile factors of production such as land and the environment will differ from region to region. Labor will be in an intermediate position. Insofar as labor is completely mobile, real wages tend to equalize; they can, however, be different when the costs of living vary over space. When labor is only partly mobile and when preferences for specific locations exist, real wages may be more differentiated. On the monetary side, there will be only one currency whose value is determined by the money supply of one central bank. The social security systems will be harmonized. The state, including the provision of public goods and the tax system, will be homogeneous, notwithstanding federal elements. Finally, the firms and the sectorial structure in the economic union will have adjusted to the new conditions, and the German Democratic Republic (GDR) will have caught up in income per head.

The author appreciates comments on sections of this paper from Alfred Boss, Bert Hofman, Rolf J. Langhammer, Michael Rauscher and Klaus-Dieter Schmidt. The report is based on information available as of May 4, 1990. New information on economic conditions, policy decisions and changes in the points of view of the policy makers due to new moods in the population may affect the underlying assumptions of the analysis.

2. The Starting Point

The starting point of the integration process can be described by the following basic facts (see Table 1):

- (i) Labor productivity in the GDR is now estimated at one-third of the West German productivity [Siebert, 1989b; 1990c; Schmieding, 1990]. On the basis of 1983 data, productivity in the GDR was originally put at roughly 50 percent of the West German level [DIW, 1987].¹ In the latter study, productivity was measured for a GDR before the wall came down. The poor quality of GDR commodities, which in many cases cannot compete on the international market, was not taken into account. The trade structure was distorted towards the COMECON. Moreover, environmental costs of production were not taken into consideration, so that productivity was lower than expressed in the numbers. This holds for environmental damages of actual production as well as for vintage damages; especially as concerns the generation of electricity (brown coal and atomic plants), the chemical industry, the steel industry and, in part, other sectors such as machinery and transportation equipment. Due to rising environmental prices, energy costs are distorted as well. The internalization of environmental and energy costs acts like an oil price shock suppressing productivity.

As a rough indicator of productivity, the "foreign currency coefficient" may be used. It is defined as costs in GDR-Marks necessary to earn one unit of D-Mark in the trade with the West. This coefficient, which is influenced of course by a distorted price structure, rose from 2.4 (1980) to 2.9 (1985) and 4.4 (1988), indicating a real depreciation of the GDR-Mark and a loss in productivity in the eighties.

- (ii) Differences in productivity are reflected in income differences. In 1989, the average wage income in the whole economy was M 1230 in the East and DM 3970 in the West.
- (iii) Differences in the income situation are the most important reason for migration. In 1989, about 340000 inhabitants left the GDR; in the first three months of 1990, the GDR lost approximately 150000 inhabitants.²

¹ Meanwhile DIW [1990] estimates that the productivity gap is somewhat larger than 50 percent.

² Prior to the election on March 18, 1990, about 2000 inhabitants left per day, in mid-April under 500.

Table 1 - Basic Data on the Federal Republic of Germany and the German Democratic Republic

	Date	Unit	GDR	FRG
Population	12/31/89	mill.	16.3	62.1
Paid employment	12/31/89	mill.	8.8(a)	24.9
Unemployment	Feb. 1990	1000	38	2153
Participation rate(b)	end 1989	percent	56	45
GDP	1989	bill. DM	200-250(a,c)	2237
Per capita GDP	1989	1000 DM	14(a)	36.5
Monthly compensation per employee (pre-tax)	1989	M/DM	1230	3970
Monthly compensation per employee (after tax)	1989	M/DM	950(a)	2111
Productivity of labor	1990	FRG=100	33(a)	100
Exports(d)	1989	percent	20-25(a)	34.8
Per capita energy consumption	1988	Gigajoule	225	185
Notes and coins in circulation(e)	12/31/89	bill. M/DM	17	147
Sight deposits	-"	-"	83(f)	304
M1	-"	-"	.	451
Time deposits	-"	-"	.	326
Saving deposits	-"	-"	176	479
M3	-"	-"	.	1255

(a) Estimated. - (b) As percentage of population. - (c) Official figure M 353 bill. - (d) As percentage of GDP. - (e) Cash in vault excluded. - (f) Public sector and business only.

Source: Sachverständigenrat [1990]; Statistisches Bundesamt [1989]; Deutsche Bundesbank [1990]; Table 2.

(iv) The present situation is also characterized by inadequate environmental quality, unsatisfactory housing and gaps in medical care.

The low level of productivity in East Germany has a number of causes:

- The capital stock in industry is largely obsolete both from the production and the demand side. Outdated technologies are used, and output is not competitive.
- Social overhead capital in transportation and communication is deficient.
- Industry is inefficient because each branch has been organized as a well protected monopoly with clearly segmented markets. The monopolies were not checked by competition. Ironically, the industrial structure is the result of a specialization philosophy similar to the strategic trade policy now being discussed in the international economics literature.

- Central planning has proved to be a failure because this system does not provide the right incentives and because it does not signal the correct information on scarcity.

The core of the problem is the low productivity in the GDR. A causal therapy must start from this point and increase productivity.¹ This can be done in two ways:

- (i) Labor productivity can be raised by an increase in capital, shifting the marginal productivity of labor curve upward. New capital embodies new technical knowledge. With an increase in productivity, wages can rise. Consequently, for an improvement to occur capital has to flow into East Germany. In a currency union, both capital and labor are mobile. In the actual case of the two Germanies, capital alone should do the adjustment job, so that people do not have to migrate. Thus, capital must flow into East Germany at such a high speed and with such a great volume that people have no incentive to move.
- (ii) Productivity will also be increased by giving up central planning and introducing the social market economy. Bottlenecks will disappear quickly. Firms will no longer need large inventories in order to reduce the risk of nondelivery of essential inputs. They will then be able to rely on punctual deliveries, thus taking advantage of the division of labor among firms. New and small firms will raise productivity. In the short and medium run, the reorganization of the state monopolies will imply the closing down of outdated and inefficient production facilities.

3. Institutional Integration

In order to integrate the two countries' divergent economic systems, the institutional setting of the two economies has to be harmonized. As in West European integration, harmonization can be done *ex ante* and from above by prior agreement or *ex post* by a process of institutional competition with response from below, in-

¹ See also Erhard [1953]: "Dies ist das eigentliche Problem, die Produktivität der Sowjetzonenwirtschaft so rasch und so energisch zu verbessern, daß der Prozeß der Leistungsangleichung auch zeitlich so kurz wie möglich bemessen werden kann." (Author's translation: "The real problem is how to improve the level of productivity in the Russian-occupied zone of Germany so quickly and so vigorously that the process of matching the economic performance with that of the western zones takes as little time as possible.")

cluding spatial arbitrage of households and firms [Siebert, 1990e]. Institutional competition of the two systems as a vehicle for integration saw the emigration of 340000 inhabitants in 1989, so that now the institutional setting of the GDR has to be changed by political decisions. Institutional reforms imply

- the abandonment of central planning and the introduction of the market mechanism, the determination of prices based on scarcities and world market prices together with the immediate abolishment of subsidies for tradeables (i.e., consumer goods) and of the government's foreign trade monopoly,
- the introduction of private property rights including ownership of land and firms,
- the privatization of state-owned firms, their reorganization and exposure to competition,
- the establishment of a two-tier banking system with private banks, of a capital market to allocate savings to the most productive investments, and of a stock exchange to evaluate assets and to control managers,
- the development of a new tax system, the design of a new social security system that includes unemployment insurance, and the specifying of a new arrangement for the labor market, including a definition of the role of trade unions.

These reforms in the institutional design of the GDR become necessary if one wants to establish a currency and an economic union. They are a *conditio sine qua non* for a monetary union; they must precede the monetary union or they must be introduced simultaneously. The government of the GDR has opted for the procedure according to Article 23 of the West German constitution. In this context, a formal treaty between the two governments is necessary in which the basic modalities of the monetary, economic, social and political union will be defined. More specifically, a transitional period is necessary in three different areas; namely, the privatization of firms, the adjustment of the tax system and the harmonization of the social security system.

The dismantling of the state-owned enterprises implies the reorganization of firms into smaller units. Organizational sub-units of state monopolies should have the option to declare themselves as independent units. Moreover, an explicit government policy should force existing monopolies to dismantle themselves into smaller organizational units. The shaping of new organizational units is intermixed with the issue of ownership of firms and of the control of managers. Firms should be privatized. The problem is by which institutional arrangement privatization can be achieved. In principle, each resident of the GDR owns a portion of the assets

of each firm (and owns a portion of the liabilities).¹ The allocation of property titles to each firm to each resident would represent an equitable solution consistent with the market economy, but it may be too complicated, causing transaction costs that are too high. Thus, more practical approaches have to be found. However, care must be taken that these institutional arrangements for privatization do not perpetuate government ownership (e.g., by giving property titles to communities), that big financial trusts with political interests (and rent-seeking activities) are not established and that the managers are not controlled by workers' councils, but by the capital market.

It may be difficult to apply the West German tax system to East Germany right away. Above all, an internal revenue service does not exist. Consequently, in a transitional period, only certain parts of the West German tax system such as the value-added tax and excise taxes may be implemented.

The level of benefits provided by the West German social security system cannot be introduced instantaneously in East Germany because it could not be financed and because it would imply such a high minimum or reservation wage that East German firms would not be competitive and labor would be unemployed. Therefore, there must be some transitional phase in which old age pensions, unemployment benefits and welfare payments differ between the two Germanies: One way of achieving this is to apply the structure of the West German social security system, but to differentiate the benefit levels. Pensions would be determined on the basis of past and actual wages in East Germany, unemployment benefits would be linked to the previous wage income, and other forms of social security would take into account the cost of living (e.g., rents for housing) in different areas. The level of social security payments would thus be different between East and West Germany.

4. Monetary Integration

There were two options for monetary integration: the transitional and the instant approach. From an economist's point of view, the transitional approach with two currencies, both possibly managed by the Bundesbank in Frankfurt, would have had the advantage of

¹ Ownership could be established by using the money overhang.

- using the exchange rate as a shock absorber for the East German firms, thus giving them competitiveness temporarily,
- easing the transitional difficulties involved in adapting the social security system and in adjusting wages,
- delegating the conversion of debt, liabilities and wages to the market exchange rate prevailing at the end of the transitional period, and uncoupling the GDR-Mark from the European Monetary System (EMS) for the transitional period.

From the politician's point of view, there may not have been enough time available for a transitional solution. Up to now, all problems associated with a monetary integration have focused on the choice of the conversion rate and on the conditions for conversion. The conversion rate for currencies, debt and wages have become a political price that was determined by the political process. The two central economic issues have been (and still are) the impact of conversion on the price level stability in the new currency area and on the competitiveness of East German firms.

According to the philosophy of a capacity-oriented monetary policy, the money supply should grow with the increase in production capacity in order to ensure price level stability. Monetary integration implies that the production capacity of East Germany is added to that of West Germany (indicated by the GNP of DM 2250 bill. in 1989 when overall capacity was highly utilized), so that the money-supply corridor can shift upward. The production capacity of the GDR is estimated at 10 percent of West Germany's.¹ Consequently, the money supply in the narrow definition, M1, (DM 420 bill. in 1989) can increase by DM 42 bill. The larger money supply, M3, (DM 1255 bill.) can increase by DM 125 bill.

Monetary assets in the GDR amount to M 253 bill. as of December 31, 1989 (coins and notes M 17 bill., savings M 162 bill., insurance contracts M 14 bill., deposits of firms at the GDR central bank amounting to M 60 bill.) (see Table 2).² Meanwhile, the budget deficit for 1990 is estimated at M 40 bill., indicating still larger money balances.

¹ The net material product of the GDR is M 273.5 bill. (1989). This number is distorted, however. With the GDR having 26 percent of West Germany's population the GDR would have a GNP of DM 600 bill. if it produced at the West German productivity level. If productivity is estimated at only one-third of the West German level, potential GNP will be roughly DM 200 bill. Since for the participation rate in East Germany is higher than in West Germany, this number will be slightly higher. Consequently, the GNP of the GDR can be put at roughly 10 percent of West Germany's.

² Cash holdings of firms are unknown.

Table 2 - Consolidated Balance Sheet of the GDR Banking System as of December 31, 1989 (in M mill.)

Assets		Liabilities	
1. Credits to domestic debtors		1. Deposits by domestic non-banks	
Total	418334	Total	259596
of which		of which	
State	46597	State	22736
of which		Firms	60375
Credits from revaluation of external		Private citizens	176485
liabilities	30751	of which	
Firms	260414	Private demand and savings deposits	162343
Residential Construction	108425	Medium and long-term liabilities	14142
of which			
Private citizens	(23208)		
Private citizens (excluding credits			
for residential construction)	2898		
2. External claims	44968	2. External liabilities	162222
a) Currency areas of socialist		a) Currency areas of socialist	
countries	11516	countries	1060
b) Currency areas of nonsocialist		b) Currency areas of nonsocialist	
countries	33452	countries	67299
		c) Provisions for specific exchange	
		rates	93863
3. Other Assets	3883	3. Notes and coins in circulation	
		(excluding cash holdings of banks)	17022
		4. Accumulated surplus/reserve fund/ liability cover	23248
		5. Other liabilities	5097
Sum	467185	Sum	467185

In principle, this amount of M 253 bill. (plus the budget deficit) should be compared to the permissible increase of M3 (DM 125 bill.). This implies that monetary assets of M 135 bill. (plus the budget deficit) must be "sterilized", for instance, by being transformed into ownership titles to apartments or firms. Note that the increase of M3 by DM 125 bill. has the high risk that depending on the time structure of M3, a consumption spur cannot be excluded. If this risk is to be excluded, parts of the remaining DM 125 bill. must also be sterilized. A temporary blocking of savings accounts, however, involves the problem that blocked accounts are near-money, and near-money can be used to finance a spur in consumption.

The agreed upon conversion of all financial assets at the rate of 2:1, except for M 4000 per head (M 6000 for people older than 59 and M 2000 for those under 15) at the rate of 1:1, implies an increase in M3 of roughly DM 158 bill. (M 64 bill. at the rate of 1:1, the rest of M 253 bill. minus 64 bill., namely, M 189 bill., at the of rate 2:1). This would seem to exceed the permissible limit for M3; it must be made sure that the increase in M3 does not imply an increase of equal size in M1. Therefore, part of the increase in M3 should be blocked temporarily.

The problem of whether the increase in the money supply will permit price level stability is analogous to the question as to what extent purchasing power will be shifted from West to East Germany. Without transforming part of the assets of GDR-Mark into property titles (privatization), the agreed upon conversion implies a transfer of purchasing power to the East. On the commodity markets, if East German demand favors West German products, aggregate demand for West German products will increase, creating inflationary pressure in the West. Due to a lack of demand for East German goods a depression in the East would be possible. We would then have a split business cycle situation.

The other issue associated with the conversion rate is the competitiveness of the East German firms. For tradeables, the law of one price applies in a currency union. This means that East German firms will have to compete with West German firms as well as internationally - given their present productivity and cost situation without having the advantage of a variable exchange rate. Consequently, the question arises how the costs of the firms, namely, wages and capital costs (via the conversion of debt), are affected by conversion.

It is clear that East Germany cannot have the same wage level as West Germany right away because low wages are in general the only basis for a comparative advantage for East Germany. One strategy in the conversion of the wage rates would have been to leave wage setting to the market, similar to the way prices for

tradeables are specified by market forces. Another approach proposed by some would have been to use a modest conversion wage¹ as a floor from which market forces would find the equilibrium wage, including the appropriate wage structure among firms, sectors, regions and occupations. Such an approach would have allowed a quick differentiation in the wage structure. Moreover, wages could have increased quickly together with the productivity gains; wages would also have been increased to attract labor into new firms (wage drift). Using a cautious conversion wage as a floor would have come close to a market process of wage formation. However, the 1:1 conversion of wages poses the problem of whether the majority of the GDR firms will be competitive.

The competitiveness of East German firms will also be affected by the conversion of firms' gross debt with the central bank (M 260 bill.). Even at the conversion rate of 2:1, the competitiveness of firms will be affected. If different rates of conversion are applied for savings and for debts, equalization claims will have to be established. These claims will be defined against the assets of the GDR, but they may eventually be an expenditure item in the West German budget.

The conversion rate defines the amount of public transfers needed to correct "structural" problems. In a scenario where one can use the exchange rate as a shock absorber for GDR industry, the political demand for government transfers will be relatively low. In a scenario of a quick monetary union with a favorable rate to the GDR saver and wage earner, the lacking competitiveness of East German industry will manifest itself in greater structural problems, including unemployment, and a more extended transfer scheme will be required. Moreover, the equalization claims arising from the different conversion rates for savings and debts might be a burden on the budget of the political union.

5. Real Economic Integration

Institutional and monetary integration will influence the economic decisions of households and firms which in turn will bring about economic integration in the real sphere of the economy. From an allocation point of view, the economic integration of the two Germanies can be viewed as the integration of two economies

¹ The proposal was the formula "1:2 plus x" where the conversion wage would have been converted on a 2:1 basis after wages in GDR-Mark had been raised by an amount x (M 200-300) to compensate for the rise in prices of subsidized products and for higher social insurance contributions [Siebert, 1990g].

which have different sectorial structures and which are at different levels of development. More specifically, economic integration can be interpreted as the addition of qualified labor, land and a partially obsolete capital stock to the West German economy. Eventually the capital stock per worker in the area of the GDR will reach the West German level and the economic structure will tend to equalize.

The paradigm to be applied for the analysis of the integration process has to include the following three elements:

- (i) From the point of view of integration theory, two economies merge and exploit comparative advantages. Trade will be created and diverted. In the context of the Helpman-Krugman approach [1985], economies of scale and product qualities influencing a firm's market share play a role.
- (ii) Mobility of capital will be an important vehicle of adjustment, which implies frequent changes in comparative advantage in the transitional period. Capital will come in all forms, such as portfolio capital, direct investment, mergers and acquisitions and joint ventures. Mobility of labor has to be included as well because migration may increase if living conditions (including employment opportunities) are too divergent.
- (iii) Starting at a low productivity level and an obsolete capital stock there will be a Schumpeterian growth process fuelled by capital and technology transfer, the founding of new firms and an organizational restructuring of industry.

The capital stock of GDR industry is largely obsolete.¹ This is due to a number of reasons. First, the capital goods (equipment and buildings) are old. According to unofficial sources, 76 percent of the equipment in industry is older than 5 years, 54.9 percent older than 10 years, and 21.1 percent older than 20 years.² In the machine producing industry, 56.3 percent of the equipment is older than 10 years. The capital stock is geared towards distorted environmental and energy costs. Vintage damages represent a high burden on the future for specific industries. Moreover, the capital stock was oriented to the COMECON, an external market with many distortions; hence many products cannot compete internationally because of their poor quality.

¹ The Institut für Internationale Politik und Wirtschaft [1990, p. 8] claims that the GDR sectors are characterized by low labor productivity and a high capital stock per employee, which implies inefficiency.

² Slightly different data are given by the Institut für Internationale Politik und Wirtschaft [1990, Table 7]. For infrastructure capital, the figures are even worse: 45.1 percent of the equipment in the postal and communication services is older than 20 years.

It is nearly impossible to calculate the capital needed to modernize East German industry. A crude procedure is to apply the West German capital/output coefficient of 2.1 for the goods-producing sectors (mining, manufacturing, construction and electricity, gas and water), and of 4.6 for the total economy (including infrastructure). Assuming that East Germany will eventually produce with the same labor productivity and a similar sectorial structure, the East German capital stock can be adjusted by correcting the capital stock of the Federal Republic by the GDR population which is only 26 percent of the population in the Federal Republic (see Table 3). Neglecting the growth process and using 1989 data, the comparable

Table 3 - Capital Stock and Investment in East Germany and West Germany

	FRG	GDR	GDR capital stock after adjustment(a)
	1989	1988	
	DM bill.	M bill.	
1. Gross domestic product			
Total	2237	346	
Enterprises (without housing)	1730	.	
Goods-producing sectors (mining, manufacturing, construction, electricity, gas and water)	896	200(b)	
2. Gross investment			
Total	462	95	
Enterprises (without housing)	289	68	
Goods-producing sectors	129	46	
Housing	121	12(c)	
3. Gross capital stock			
Total	10725(d)	1635(d)	2789
Enterprises (without housing)	4416(c,d)	1300(e)	1148
Goods-producing sectors	1917(c,d)	780(d)	498
Housing	4265(c,d)	.	
4. Capital/output ratio			
Total	4.6	5.2	
Enterprises (without housing)	2.5	.	
Goods-producing sectors	2.1	3.9	
(a) Calculated as 26 percent of the West German capital stock in 1989. - (b) Including goods-producing crafts. - (c) New construction and modernization. - (d) Evaluated at replacement costs. - (e) Capital stock at 1986 prices.			

Source: Statistisches Bundesamt [1989]; Staatliche Zentralverwaltung [1989]; own estimates.

East German capital stock for 1989 would be DM 498 bill. (FRG: DM 1917 bill.) for the goods-producing sectors, DM 1148 bill. (FRG: DM 4416 bill.) for all enterprises (not including housing) and DM 2789 bill. (FRG: DM 10725 bill.) for the total economy. In order to determine the capital requirement, it has to be estimated to what extent the existing capital stock is obsolete. If 50 percent of the stock can be used, the capital requirement for all firms would amount to DM 574 bill., in the extreme case of zero percent, the figure will be double this. It seems that investment of this size can be undertaken over a series of years and be financed by private capital.¹

The sector structure of the GDR is biased in favor of manufacturing and against services. 40.2 percent of total employment is in manufacturing and the goods-producing crafts, while this relation is 33.6 in West Germany (Table 4). Whereas the Federal Republic has reduced employment in manufacturing from 10 (1970) to 8 million (1989), the GDR has increased it from 2.9 to 3.4 million during the same time period.

The trade structure of the GDR is distorted, too. In 1988, 69.4 percent of its exports went to the COMECON countries (the figure for West Germany is 4.5; see Table 5). This is the result of the intra-bloc specialization philosophy of the COMECON. Moreover, the GDR has followed an import substitution strategy aiming

Table 4 - Employment by Sectors in East Germany and West Germany, 1988 (shares in percent)

	GDR(a)	FRG
Agriculture and forestry	10.8	4.9
Manufacturing	37.8)	33.6
Crafts	3.1)	
Construction	6.8	6.6
Trade	10.3	13.0
Transportation and communication	7.5	6.4
Miscellaneous personal services	3.0)	35.5
Nonproducing services	20.8)	

(a) The nonproducing services sector in the GDR is underestimated by 2-3 percentage points due to the exclusion of military and security personnel.

Source: Statistisches Bundesamt [1989]; Staatliche Zentralverwaltung [1989].

¹ Assuming a capital requirement of DM 1148 bill. (complete obsolescence), over a ten-year period annual investment must be DM 114.8 bill.

Table 5 - Export Shares of East Germany and West Germany by Goods and Countries, 1988 (in parentheses: trade between the two Germanies)

	GDR		FRG	
Goods				
Foodstuffs	7.0	(10.6)	4.6	(8.4)
Raw materials	15.0	(1.9)	3.3	(4.8)
Semimanufactures, producer and consumer goods	30.0	(73.6)	43.6	(49.5)
Investment goods	47.6	(14.9)	48.5	(37.3)
Countries				
CMEA countries	69.4		4.5	
Industrialized countries	26.7		85.6	
Developing countries	3.9		9.9	
Memorandum item: USSR	36.9		1.7	

Source: Statistisches Bundesamt [1989]; Staatliche Zentralverwaltung für Statistik [1989].

at establishing an industrial base similar to that of West Germany. It attempted to produce the product set of the world economy. Its structure in basic industry, which historically used to be a complement to West Germany's structure became more and more a replica of the West German mold, albeit on a less efficient level. Exports of the GDR to the market economies are biased in favor of natural resources and against manufactured and consumer goods.

The share of exports in the GNP for the GDR is estimated at 25 percent. This is low for a small open economy. If the international division of labor were given its full scope in the GDR, one would expect the GDR to have an export share similar to that of countries of comparable size, i. e., in the range of 50 percent.¹ This gap in the export shares indicates the magnitude of the transformation of the economy that has to be performed.

The GDR will experience a process of structural change similar to other European countries, only with less time available for adjustments. Ailing industries, which are no longer competitive on the international markets, such as shipbuilding and parts of the steel and textile industry, will be a policy problem. Pollution- and energy-intensive sectors will have to adjust. New products satisfying international demand will have to be developed. The underdeveloped service sector will have to expand considerably. The size of the structural adjustment needed is the result of the distortions arising from central planning.

¹ For instance, the Netherlands have an export share of 54 percent.

The impact of economic integration on intra-German trade flows will be determined by the principles of comparative advantage. In the short-term scenario the GDR will have a locational advantage for industries with lower wages for qualified labor; in the long run, its comparative advantage will result from the availability of qualified labor, technical skills and, relative to agglomeration centers in the West, the availability of space for the location of firms.

If plant-specific economies of scale and product qualities are relevant for the market share of firms [Helpman, Krugman, 1985], there is a tendency to increase production at the original location. This would imply that West German firms, being still able to reduce their average costs, have not yet reached their optimal production point. They also have an advantage because of their brand names. In the context of the theory of market entry, West German firms may have the advantage of an early market entry. These aspects point to a production bias for West German firms, at least initially.¹ Moreover, West German firms will acquire East German units so that intra-German trade has to be explained as intra-firm trade. If economies of scale are industry-specific or if they extend to the whole nation or beyond, East German firms will eventually be integrated into the division of labor among firms.

In the adjustment process, capital and technology will be transferred to the GDR, with the transfer of technology shifting the marginal capital productivity curve for the GDR, F_K^* in Figure 1, upward over time. The total German capital stock is indicated by OO^* in the initial situation, with the West German capital stock denoted by ON and the East German capital stock by NO^* . Initially, the two capital markets are segmented and the marginal capital productivity in the GDR is lower (point A^* relative to A). Point A indicates the given world interest rate. In the intermediate situation (point M), the real interest rate may be higher than initially and the world interest rate may have been driven up. In the long-run equilibrium (point A), the marginal capital productivities in the GDR and the FRG will be equated. Over time, capital will have flowed from the West (including the western world) to the GDR, increasing the capital stock of the GDR by O^*O^* .

The economic integration of the two Germanies can be considered to fuse the two endowment boxes $OAO'B$ and $O'CO^*D$ where West Germany is relatively capital abundant and East Germany relatively rich in labor (and land) as shown in Figure 2. The original points of specialization are M and N respectively, with $k_2 > k_1$,

¹ For a similar argument in another context, see Krugman, Venables [1990].

$k_i > k_i^*$, and $1/r > 1^*/r^*$. In the intermediate period, the point of specialization of the integrated economy is M' , with the wage/interest ratio falling in the West and rising in the East, thus driving down the capital intensity in the West and increasing it in the East. In the intermediate position, the real interest rate may be higher than initially, and the world interest rate may have been driven up. In the long run (point L), the capital endowment of the GDR will increase (O^*O^{**}). For simplicity it has been assumed that the same wage/interest ratio will prevail as initially. The interest rate will come down, the wage/interest ratio will rise, and production will become more capital-intensive. Relative to the initial situation, the production of commodities 1 and 2 will have increased.

It can be expected that the eastern part of Germany will quickly catch up and, with the right kind of reforms, two-digit real growth rates are likely. As a reminder, after the monetary reform of 1948 in West Germany, the index of industrial production rose by 50 percent in the first five months on an annual basis [Wallich, 1955, p. 33], and annual growth rates of real GNP reached 20 percent during the period 1949-1951.¹ Admittedly, the situation in the GDR differs in many respects from that of West Germany in 1948, but both cases are characterized by a rich pool of qualified labor and a capital shortage: in 1948, because the capital stock was partly destroyed² by the war; now, because the capital stock of the GDR is obsolete in economic and ecological terms.

Growth theory predicts, and historical experience confirms that countries with similar technical skills and technology as well as a relatively low capital stock per head have a lower output level initially, but also high growth rates [Barro, 1987]. Table 6 shows the growth rates of nine industrialized countries during the period 1950-1985 (see also Figure 3).³ Countries whose capital stock was destroyed by the

¹ See Wallich [1955, p. 34] GNP growth rates for West Germany: 1949, second half 18.7 percent; 1950, first half 13.5 percent, second half 19.6 percent; 1951, first half 20.6 percent, second half 9.5 percent. All data at constant 1936 prices; GNP-data not available prior to 1949.

² The amount of destruction of the German capital stock after the war is debated in the literature [Gundlach, 1987].

³ The growth rates of real GDP in the four industrialized countries for the period 1945-1949 are as follows: West Germany 48.3; Japan 7.7; United Kingdom 0.6, and United States -2.3. The German data are based on an index of industrial production and refer to the British and American zone only. The figure given is the average of the three annual growth rates of 12 percent (1946I-1947I), 56 percent (1947I-1948I), and 77 percent (1947IV-1948IV). The data for Germany are from Gundlach [1987, Table A1], for Japan from the Bank of Japan [1966, Table 9], for the United Kingdom from Mitchell [1988, pp. 840-841], and for the United States from the U.S. Department of Commerce [1976, Table F1-5].

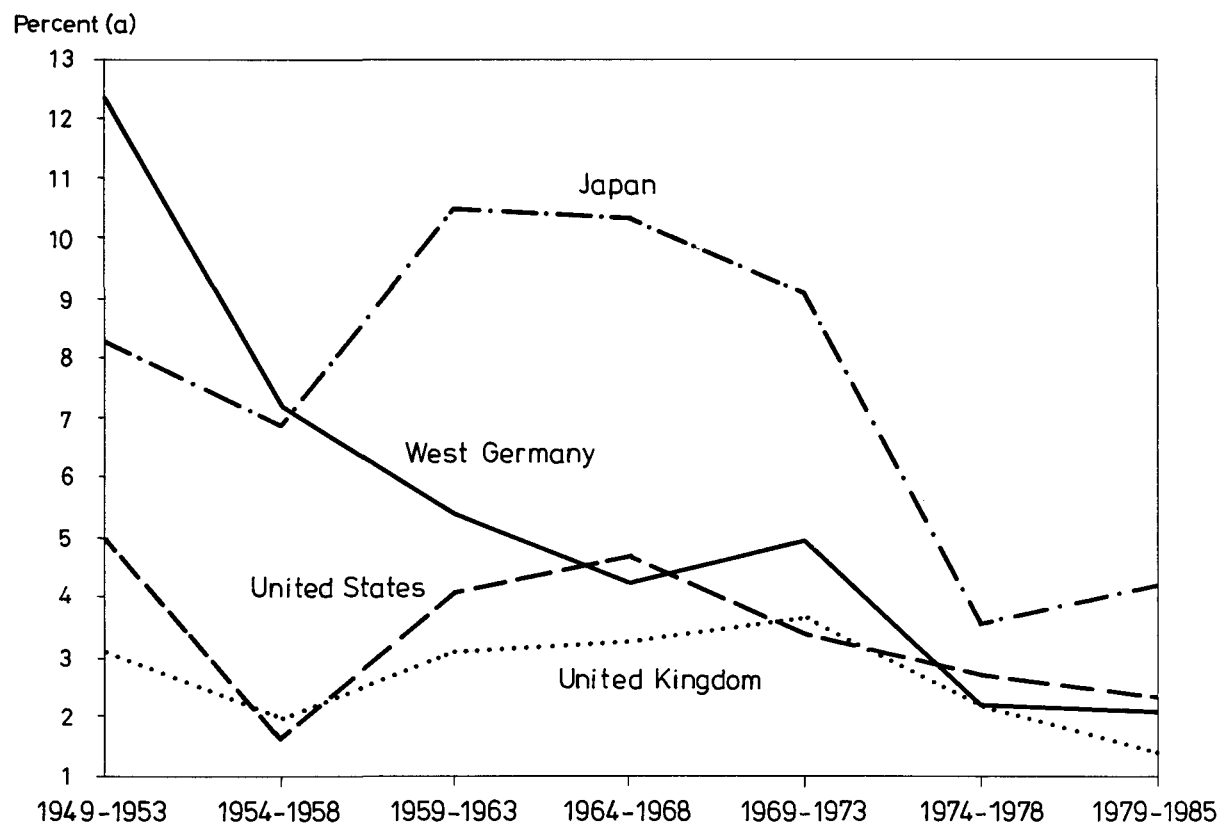
Table 6 - Growth Rates, Investment Ratio and Level of Income

		Growth rate of real GDP	Level of 1950 per capita income	Gross fixed investment/ GDP ratio
		percent per year	US = 100	period average
Austria	1950-1960	5.1		0.21
	1960-1970	4.5		0.26
	1970-1980	3.4	35	0.27
	1981-1985	2.0		0.22
Denmark	1950-1960	3.3		0.19
	1960-1970	4.5		0.23
	1970-1980	2.2	66	0.24
	1981-1985	3.2		0.20
France	1950-1960	4.4		0.19
	1960-1970	5.6		0.22
	1970-1980	3.4	47	0.23
	1981-1985	0.6		0.24
West Germany	1950-1960	7.5		0.22
	1960-1970	4.5		0.25
	1970-1980	2.6	40	0.23
	1981-1985	2.2		0.24
Italy	1950-1960	5.7		0.20
	1960-1970	5.3		0.21
	1970-1980	2.5	30	0.20
	1981-1985	0.8		0.21
Japan	1950-1960	8.1		0.24
	1960-1970	10.1		0.32
	1970-1980	4.7	17	0.33
	1981-1985	3.0		0.37
Spain	1950-1960	4.9		0.18
	1960-1970	7.1		0.21
	1970-1980	3.6	26	0.22
	1981-1985	1.2		0.14
United Kingdom	1950-1960	2.6		0.15
	1960-1970	2.8		0.18
	1970-1980	2.2	58	0.19
	1981-1985	2.3		0.15
United States	1950-1960	3.2		0.18
	1960-1970	3.8		0.18
	1970-1980	2.9	100	0.17
	1981-1985	1.8		0.21

Source: Barro [1987, p. 296]; Summers, Heston [1988].

war experienced high growth rates (West Germany 7.5 percent; Italy 5.7 percent; Japan 8.1 percent) during the period 1950-1960. High growth rates were accompanied by a high investment ratio. On the other hand, countries with a capital

Figure 3 - Annual Growth Rates for Various Countries, 1949-1985



(a) Five-year average of percentage changes over the previous year.

endowment not so much affected by the war had lower growth rates (United States 3.2 percent; United Kingdom 2.6 percent) and a lower investment ratio.¹

If West Germany's experience with high growth rates after the 1948 reform can be partially applied to East Germany, East Germany should be able to reach 50 percent of the West German per capita income level in 2.4 years and 70 percent in 6.9 years (Table 7). In order to arrive at these figures, the following assumptions were made. The GDR starts from a low GNP of DM 200 bill. - roughly one-tenth of West Germany's. This places income per head at roughly 33 percent of West Germany's.² For West Germany, a growth rate of 2 percent is assumed. In the take-off scenario A, a real growth rate of the GDR of 25 percent in the first year, 20 in the second and 15 in the third year is assumed, decreasing to 10 percent in

¹ With capital accumulation, growth rates decline.

² In 1989 the GDR population was 26 percent of West Germany's.

Table 7 - Convergence of GNP per Head

Scenario(a)	Number of years needed to reach		
	50 percent convergence	70 percent convergence	80 percent convergence
Take-off			
A	2.4	6.9	9.7
B	3.8	9.5	12.2
Intermediate growth	5.3	12.2	15.0
Slow growth	6.4	13.4	16.2

(a) The growth rates assumed for the GDR are as follows: Take-off A: 25, 20, 15, 10, 10, 9, 8 and 7; Take-off B: 15, 15, 15, 10, 10, 9, 8 and 7; Intermediate growth: 12, 12, 12, 9, 8, 7, 7 and 7; Slow growth: 10, 10, 10, 9, 8, 7, 7 and 7.

the next two years and then 9, 8 and subsequently 7 percent. For the outcome of this scenario as well as that of other scenarios the reader is referred to Table 7.

In the transitional period, unemployment in Eastern Germany is likely. Forecasts of unemployment differ widely,¹ and it is extremely difficult to estimate the potential size of unemployment. It will depend on the dynamics of the Schumpeterian growth process, especially on the speed with which new and small firms are opened up.

A caveat to the optimistic scenario should, however, be mentioned. There is a risk that the economic integration of the two Germanies will not be brought about by market forces but by the political process. There is no doubt that the political process, for instance, the negotiation of the treaty between the two Germanies, must define institutional integration. However, real economic integration should be brought about by market forces. In the case of converting the two currencies and wages, the political process has not relied on market forces to determine the conversion rate for currencies and to find the equilibrium wage, including the equilibrium wage structure. Now, there is a definite risk that the political process will dominate the privatization of firms and sectorial adjustment. Moreover, there is a stray political demand for the structural protection of the GDR industry. The aspirations of the inhabitants of the GDR are high, resulting in a political demand for quick improvements in income, environmental quality, housing, social security and physical infrastructure. There seems to be a belief that government policy can

¹ Estimates range from 970000 (DIW according to Frankfurter Allgemeine Zeitung, April 26, 1990) and 1.5 million [Institut für Internationale Politik und Wirtschaft, 1990] to 3.5 million [Hoffmann, 1990].

solve these issues quickly. In this respect, the analogy to 1948 no longer holds.¹ If these political demands are allowed to influence the course of events and if they dominate the market process, prices will be politicized. In this case, structural changes in the GDR will take place along similar lines to West Germany's experience with the sectional policy for ailing industries. Then, there is no reason for an optimistic scenario. This also holds when the increase in wages is not steered by market forces, especially by the increase in productivity, but by political bargaining.

Government transfers from West to East Germany will be needed for four different purposes:

- for building up the social overhead capital in the GDR,
- for improving the environmental situation,
- for contributing to the social security system in the transitional phase, and
- for alleviating structural problems resulting from a lack of competitiveness of the GDR industry.

It is extremely difficult to estimate the amount of transfer needed. The five major German economic research institutes have estimated the budget deficit of East Germany in 1991 at DM 43 bill. Government revenue amounting to DM 37 bill. relies mainly on the value-added tax and on excise taxes. Expenditures of DM 80 bill. include 23 bill. for government employees, 20 bill. for subsidies, mainly to agriculture, and 20 bill. for transfers to private households. Additional costs of roughly DM 25 bill. will have to be taken over by the West German budget, together with infrastructure outlays in East Germany in the range of DM 10 bill., initial financing of the social security system (old age pensions, unemployment) of DM 13 bill., thus bringing the total financial burden to DM 65-70 bill. For these calculations it has been assumed that equalization claims will be offset by the privatization of apartments and firms. In addition to transfers to East Germany, the West German budget will have to take over the GDR's foreign debt of DM 40 bill. Note that part of the financial burden on the West German budget can be financed by a reshuffling of expenditures and by an increase in tax revenue due to economic growth.² Eventually economic expansion in East Germany as well will bring about an increase in tax revenue.

¹ Nor does it hold for Poland and Hungary.

² In 1989, the increase in tax revenue was DM 47 bill. However, this was influenced by an increase in excise taxes (DM 10 bill.), whereas the 1990 tax reform will reduce the increase in tax revenue.

Public transfers may be interpreted as the cost of economic integration to the West German taxpayer, but these costs will only arise in the transitional period. For the country as a whole, especially after the transitional period, there will be benefits from an increase in the division of labor within Germany.

Unification will be a growth stimulus. Economic integration of Germany can be viewed as an investment opportunity, a new frontier in the sense of Hansen [1955] or a Schumpeterian event. The benefits expected from "Europe '92" will arise in a similar way for the two Germanies, and integration benefits will be relatively high because the potential for benefits is high due to large initial distortions.

6. International Implications

Private capital will flow into East Germany, implying that German investment in the whole will be attracted by East Germany. There will also be public transfers from the West to the East. Moreover, capital flows in Europe will be shifted to the German union in the transitional period. Capital exports from West Germany, which amounted to DM 118 bill. in 1989 (DM 120 bill. in 1988), will be reduced. It can be expected that the real interest rate will be driven up because the marginal efficiency of capital in East Germany has increased and new investment opportunities are opening up. This implies that borrowing will become more expensive elsewhere in the world.

East Germany, being a net importer of capital in the transitional period, will have a balance of trade deficit. The other side of the coin to the surplus in the capital account (i. e., of net capital imports) is the trade deficit. The trade deficit will be caused by the import of investment goods, but it will also stem from the import of consumption goods which in turn are a function of the purchasing power transferred due to the conversion of the GDR-Mark. East Germany's negative trade balance implies that the overall German trade surplus and German capital exports will be reduced.

The economic integration of the two Germanies will be a growth stimulus for both Germanies, for Europe and for the world economy. With the German trade surplus being reduced in the transitional period, Germany's demand for other countries' exports will increase. Europe, the United States and other countries will experience an increase in the demand for their exportables. The US trade deficit will be reduced; at the same time capital inflows into the United States will be smaller.

From the supply side, there should be an appreciation of the D-Mark, assuming that inflationary dangers due to conversion can be prevented. This appreciation is due to a higher marginal efficiency of capital, i.e. higher rates of return in East Germany, to a larger capital inflow (reduced capital outflow out of the D-Mark area) and to an increased demand for the D-Mark; the appreciation is a vehicle to bring about a reduction in the overall German trade surplus.

In a context of tradeables and non-tradeables, the D-Mark will appreciate as well. In such a context the price for tradeables will be given by the world market; the price for non-tradeables will rise for a number of reasons: The income transfer to East Germany will increase the demand for non-tradeables, supply-side growth will lead to an increase in income, again raising the demand for non-tradeables, and infrastructure outlays in East Germany will increase the demand for non-tradeables. All these forces will raise internal absorption. Moreover, wages and consequently production costs for non-tradeables will rise; price controls on non-tradeables will be lifted. At the same time, the transformation function between tradeables and non-tradeables will shift upward due to productivity gains and capital inflow. The bias in the shift in the transformation curve will influence the opportunity costs of producing non-tradeables. This supply-side effect may counteract the impact of the increase in absorption on the relative price of non-tradeables. It would be sufficient for an increase in the opportunity costs of non-tradeables if the shift in the transformation function is neutral or if it is biased in favor of tradeables. Then the price of non-tradeables would rise from the production side. Under this condition the relative price between non-tradeables and tradeables rises, implying an appreciation of the real exchange rate.

The German economic union should be embedded into the EC framework. This means that East Germany should participate in the free flow of people, goods, services and capital in the EC. With the EC applying institutional competition as the basic strategy for integration, the transitional period of the German integration process should not be too difficult from the European point of view. Moreover, integration benefits will be increased for the EC as a whole, with East Germany constituting part of the larger market. Within the EC, investment in East Germany will compete with investment in Mediterranean countries. Moreover, the argument that non-EC-member countries would suffer from trade diversion should be taken seriously, but not overrated. Such static effects of integration are small in quantitative terms and will soon be outweighed by positive dynamic effects from which nonmember countries will benefit, too.

On the monetary side, the GMU (German Monetary Union) should not disturb the prospects for the EMU (European Monetary Union). The tendency for an appreciation of the D-Mark will put pressure on the EMS for a realignment. Without realignment, the EMS countries will experience an increase in the interest rate. This pressure for realignment will arise from the forces in the real economy such as supply-side income growth, increased internal absorption and capital inflow into Germany.

In order to avoid additional impacts of the economic integration of the two Germanies on EMU it is important that the conversion of GDR-Mark does not violate price level stability in the new currency area. If this condition is satisfied, GMU and EMU are somewhat uncoupled, at least from the monetary side. If, however, the conversion rate and the modalities of the conversion are such that price level stability in the German economic union becomes an issue, different scenarios are possible. If the inflation rate is not controlled by the Bundesbank, the expected inflation rate will imply a depreciation of the D-Mark, counteracting the appreciation tendency from the real side of the economy for a while. If expectations are not rational and if commodity prices are sticky, a nominal overshooting in the D-Mark rate is possible in a Branson-Dornbusch context. If the Bundesbank attempts to control the inflation rate, it will have to raise the interest rate in addition to the supply-side rise in the interest rates, and there will be additional pressure for a realignment in the EMS. Moreover, there could be a severe risk of a German recession with a high interest rate.

The additional pressure for realignment in the European monetary union may make it more difficult to implement EMU more quickly. First, capital (portfolio as well as risk capital) originating from nonmember countries will move into the EC rather than into countries having a resource endowment similar to that of the GDR. Thus, the ECU will be expected to appreciate against the Dollar area, thus contributing to a reduction in the imbalances in the current account of the EC and the United States. Second, within the EC, capital will move from the Mediterranean countries and the United Kingdom (the major host for non-EC risk capital during the eighties) to Continental Europe, particularly to the GMU area, thereby exerting depreciation pressures upon the pound sterling.¹ This may fuel inflationary tendencies in the United Kingdom and impede the accession of the United Kingdom to the EMU unless the United Kingdom succeeds in reducing internal absorption.

¹ Note that the attempt of the United Kingdom to bring down the interest rate may be affected by the German situation.

One can argue from an economic point of view that the integration of all EC currencies into the EMU will be delayed rather than accelerated due to the formation of a GMU.

With economic reforms taking place in Eastern Europe, the issue arises as to what extent and in which forms the EC can open up to the Eastern European countries which are in the process of leaving the COMECON. To link the remaining COMECON countries to the EC institutionally, it is crucial to discipline any vested interests in the EMU/GMU which aim via discriminatory treatment at replacing imports from these COMECON countries with imports from the GDR. We can envision free trade agreements between the EC and individual countries for specific sectors similar to the 1973 free trade agreement with EFTA in manufacturing. Conceivably some Eastern European countries may join the EFTA [Kostrzewa, Schmieding, 1989] or form another economic union that is associated with the EC.

Economic integration of greater Europe involves a risk for the world economy that there will be a move away from multilateralism towards the concept of the world economy as a triad where strategic behavior may be a dominant characteristic. It is somewhat ironic that the liberalization process in Eastern Europe has discovered the merits of the free market and is moving away from a philosophy of planned specialization among countries by international cooperation whereas new theoretical, albeit naive, approaches in international economics from the United States seem to suggest a new era of managed trade. Our aim must be to develop a multilateral institutional arrangement for the world economy in which economic decisions are decentralized.

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