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**Economic Transition in Central and East Europe,
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AGRICULTURAL TRANSITION IN THE NEW FEDERAL STATES OF GERMANY

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1. Introduction

Agricultural reforms in much of Eastern and Central Europe and the former Soviet Union were implemented under circumstances that have made adjustment difficult. Among these are falling domestic demand for food, ruptured traditional trading links, poor market access, macroeconomic instability, and a paucity of funds to cover the costs of adjustment. Germany's reunification in 1990 placed enormous demands for adjustment on the agricultural sector, but did so in an environment that removed many of the factors impeding adjustment elsewhere. The transformation of the former German Democratic Republic (GDR) through merger is unique, and it highlights aspects of the adjustment experience not seen with the same clarity elsewhere. Although none of the other countries in transition will face the particular German circumstances, the experience of the agricultural sector during and after reunification offers several important insights for other countries in transition.

This paper attempts to draw out these lessons. Part one of the paper describes the starting point of agriculture in the east before and at the time of reunification. The pressure to adjust was stronger than seen in any country of transition or in any industrialized country at any time in history. Part two characterizes the situation five years after reunification and informs on where we are in the process of transition. Comparing east and west German agriculture highlights that the evolution of agriculture in the east is unique worldwide. Part three of the paper analyses the determinants of adjustment. It will be shown that it was not mainly the transfer of capital and the subsidies which accelerated the adjustment process, but likely more so the institutional framework chosen. Policies seem to matter the most.

The transition process in eastern Germany continues, as it does throughout the region; even under German conditions, economic adjustment was not instantaneous. The German experience offers insights that may be of use to policy-makers elsewhere; this paper presents some of them. Part four summarizes the conclusions and lessons to date.

2. The Legacy: Two Parts of Germany and the different starting point

Prior to 1949, Eastern and Western Germany comprised most of pre-war territory, and thus they were subject to the same economic and social policies. According to data for the period 1935-38 labor, productivity in the eastern part of the country

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exceeded that in the west by 57%, and land productivity surpassed that in the west by 7.1 percent as yields for most crops and livestock were higher in the East². Farms in the eastern part were somewhat larger than in the west, and tended to use more advanced technology. Thirty six percent of arable land was cultivated by farms of 50 ha or more in the east as compared to 11.1 percent in the western part of Germany. The average farm size in the East was 10.5 ha and in the West 5.9 ha. Land/man ration in 1939 was 27 workers/100 ha in the east and 43 workers/100 ha in the west.

Development of agriculture in the east was highly affected by the socialist policies in the former GDR. By 1960, more than 90 percent of the land was managed in collective or state farms. This distribution of ownership remained essentially the same until 1989, collectivized except for the household plots. The proportions of collective, state and private farms in 1989 are shown in Table 1. The average size of a crop farm was 1386 ha for collective farms and 5012 ha for state farms. Livestock farms were highly specialized and had only 31 ha if they were organized as collectives and no land if they were state farms.

In contrast to these developments in Eastern Germany, West Germany's farms remained private and relatively small. The average farm size increased from 8.06 ha to 18.17 ha from 1949 to 1989, a growth of only 0.25 ha per year.

In the west German experience, the increase in farm size from 8 to 18 ha was accompanied by a significant increase in land and labor productivity. In East Germany in contrast, the increase in farm size from 8.8 ha to 4,538.3 ha³ in crop production brought only minor productivity increases over the period. After forty years of separate development, east German agriculture had lower yields per hectare and per animal than in the west, and productivity of land and labor was lower as well. The inefficiency of east German agriculture was certainly not caused by lack of capital. East German agriculture used more capital per unit produced than west German agriculture, but it is widely accepted that West Germany used much more capital compared to agriculture in other market economies with somewhat larger farm sizes.

The two Germanys officially reunited on October 3, 1990. Prior to that, however, in July 1, 1990, East Germany had already immersed its agricultural sector in the new system of rules used by the West. The restructuring of the eastern economy occurred rapidly, introducing sudden changes in a manner never experienced by the west German population. Many policy makers asserted that the people of Eastern Germany would not accept such rapid and profound changes, but in fact they did. The government adopted many policies to facilitate structural change and to ease the social costs, and the design of agricultural policy is a special case in point. Changes in Eastern Germany during the past five years have been no less than remarkable. Agriculture was one of the few sectors which could even increase production in spite of significant labor shedding (Figure 1). In contrast, industrial production dropped by nearly 60 percent within two years and was in 1996 still more than 40 percent below that in 1989 (Figure 2).

² Weber, A. (1993), *Umgestaltung der Eigentumsverhältnisse und der Produktionsstruktur in der Landwirtschaft der DDR*. Kiel p. 68. The productivity is measured in grain equivalents per labor unit and per ha.

³ 8.8 ha was the average farm size in East Germany after the land reform in 1946.

Unification of the two Germanys in October 1990 changed the political and economic environment in Eastern Germany in one stroke and gave rise to a sharp adjustment in all sectors of the economy. The pressure to adjust was heavily affected by policy decisions which changed the macroeconomic environment. The first of these decisions concerned the fixation of the exchange rate. The exchange rate chosen of 1 to 1 did not reflect purchasing power parity, which would have led to an exchange rate of 4 to 1, nor did it reflect the parity of real exchange rates, which would have led to an even greater exchange rate. Thus, agricultural prices in the former GDR dropped overnight by a high percentage (Table 2). The agricultural sector produced a negative value added at these new prices in 1990 at the time of reunification (Table 3). In addition, a political decision was made to quickly adjust wages in East Germany to the level of those in West Germany. Thus, in 1991 the unemployment benefits in real terms in East Germany were even higher than wages before unification. Therefore, the agricultural sector had to adjust to much lower prices and to higher wage rates.

However, macroeconomic conditions were not the only negative effect on the sector. It was of utmost importance that there was a social safety net to absorb the outmigrating labor force. Moreover, the stable monetary and institutional framework allowed the sector to adjust much more easily than was the case in countries where these conditions did not prevail.

Table 3 clearly shows the pressure to adjust. Net income in agriculture was negative in 1990 at prices of west German agriculture. Livestock production was under more pressure to adjust than crop production. Net value added of livestock production was even negative. This observation deserves some emphasize. A negative value added indicates that the country would have been better off without this production at that point of time. However, the advice to close down all production units which produce a negative value added would have been too hasty at that time as the evolution in agriculture after reunification indicated.

3. What has been achieved?

A similar change as that in the overall economy in East Germany has not been observed in any country. Figure 3 and 4 highlight what happened. Both parts of Germany were fairly similar in their production and employment shares in 1950, at about the time when the two Germanys started their different paths of development. At the time of reunification the countries looked quite dissimilar, structural change had been less pronounced in the east than in the west. Actually, the structure of the eastern economy in 1989 was nearly exactly that of the west in 1964, which means a 25 years time lag. However, the east economy made up very fast. Already five years after unification both parts of Germany looked very similar.

Generally, eastern enterprises were less competitive than those in the west, leading to production decline and a reduction in employment. However, agriculture was the only sector of those producing tradables that was able to adjust while maintaining stable production and shedding a relatively small amount of labor (see Figures 1 and 2).

The production performance of east German agriculture has been outstanding compared to that in other states in transition. In other countries, production dropped

significantly, while employment remained rather stable. The data for Ukraine may serve as a relevant comparison (see Figure 5). Agricultural production in Ukraine declined by about 40 percent over a five year period, while employment declined only marginally.

Agriculture in Eastern Germany not only outperformed agriculture in other transition countries, but agriculture in Western Germany as well. In 1989, one year before unification, agriculture in the eastern part of Germany employed more capital and labor per unit of output. Yields per ha and per cow were about 20 percent lower in the east than in the west. However, productivity grew quickly in the east, and had already surpassed that in the west after five years. Selected farm indicators, such as workers per 100 ha, profit per family worker and assets per unit of production (see Figures 6, 7, and 8) clearly indicate that east German agriculture became more efficient than that of West Germany.

4. Political determinants of the performance of East German agriculture

There is a widely held belief that the economic performance of East Germany was solely, or at least, mainly, based on the transfer of capital from the western part of Germany. However, it is likely that other factors were more crucial; moreover, the capital transfer from the west even had some pronounced negative macroeconomic effects. The main determinants of the eastern performance will be discussed in the following sections.

4.1 Privatization

The Government of united Germany set the rules for transition from day one, whereas the standard for the privatization of land had already been set before unification in spring 1990. Restitution was the general principle.⁴ All owners of land were free to decide how to use their properties. If there were no approved, valid claims for a given piece of land, a governmental agency (Treuhand) was in charge of managing the property. Some of this land was sold, but most was rented out. Surprisingly, the new private owners largely preferred to lease their land out rather than work on it themselves. Hence, more than 90 percent of arable land was cultivated by tenants in East Germany in 1995, even though more than 80 percent of the land was owned by private owners and only about 17 percent was owned by the state (see Table 4).

This distinction between ownership and usership of the land is crucial to explaining the performance of east German agriculture. It is true that tenants have more problems getting credit than do land owners; however, experience in German agriculture indicates that tenant operators tend to be more efficient than land owners (see Table 5). Tenants in Germany generally have a better education than the average farm owner and, moreover, they have decided to farm not because of inherited capital but due to of their personal preference and motivation for farming. Hence, it is understandable that tenants are, on average, better farm operators than land owners.

⁴ For more details see Koester, U. and Karen Brooks, cit. op.

The privatization process included the removal of any restrictions on the transfer of land and physical assets. Therefore, markets for land and assets were quick to develop in the early phases of the transition period. The emergence of these markets was supported by specific legislation. The law which demanded the dissolution of all former collective and state farms was of special importance. This is one of the main determinants affecting farms in East Germany more favorably than farms in Former Soviet Union (FSU) countries⁵.

The emerging new farm structure was partly based on private single ownership farms (which cultivated 20 percent of all agricultural land in 1995), on partnership farms (another 20 percent), and juridical entities, which were either cooperatives or corporations. It was crucial to the recovery of the farm sector that the former socialist farms were replaced by new entities which were either based on operator ownership or on a strict separation between the interests of capital owners and workers. All these new farms were significantly smaller in size than they had formerly been as collective or state farms. The single-owner full-time farms cultivated about 156 ha on average in 1995, while partnership farms had an average size of 406 ha, cooperative farms 1430 ha and corporate farms 1344 ha.

The greater farm size in the East than in the West has contributed to the fast increase in competitiveness of farms in East Germany. Table 6 clearly shows that there is a strong relation between farm size and farm performance, at least within the range of farm sizes in West Germany (see Table 6 in annex). Of course, there is no clear increasing function between farm size and farm performance. Total production costs can be decomposed into transformation costs and transaction costs. Transformation costs are the traditional neo-classical production costs which arise with transforming products in form, time and space. The second term indicates those costs which arise with exchange of products and services. The first cost element declines with size in a wide range and the second term normally increases with farm sizes above a family farm size. It can be assumed that these cost functions differ from farm to farm due to differences in technology, but also to differences in the capability of the management. Hence, it is not possible to determine a general optimal farm size. The experience in East Germany reveals that many managers who operated farms far larger than in the West still expected that the decline in transformation costs would offset the increase in transaction costs with increases in farm size. Table 4 above shows that single owner and partnership farms extended their farm size from year to year, whilst the size of corporate farms shrank over time. However, the growth in farm sizes in the East was much larger than in West Germany. Changes in the organizational form of farms has contributed to the rapid increase in farm efficiency.

It is widely accepted that the inefficiency in agriculture in former socialist countries was not only due to the planning system with all its inefficiencies, it was also caused by oversized farms and the structure of farm ownership. For instance, transaction costs in non-family farms are likely to be a significant determinant of these farms' production costs. Transaction costs, which include the costs for monitoring and enforcing labor contracts, depend on many things, such as the number of workers employed on a farm, the production pattern of the farm, the incentives for managers

⁵ Concerning the relevance of the organizational form of farms for the development of agricultural production in Ukraine see Koester, U. and S. von Cramon-Taubadel, 1996.

to monitor and enforce labor contracts, the morality of workers with regard to breaching their contracts, and the workers' opportunity costs of not shirking. It is well-known that farm transaction costs were high on state and collective farms; low labor productivity was a clear indicator of this. Moreover, theft -- a special way to breach one's labor contract -- was a generally acknowledged phenomenon, even if it was not officially recorded. The German experience indicates that labor discipline, which is negatively related to labor shirking, may improve quickly if farm managers have an increased incentive to monitor and enforce labor contracts. Such an incentive system will emerge if farm managers are either owners of their farms or are paid in relation to profit generated. If farm managers are instead elected by their workers, as is the case in the newly created collective farms of the former Soviet Union (FSU), they are likely to be less inclined to enforce labor contracts, since by being soft on their workers they may enhance their chances of reelection. Hence, it should be no surprise that labor discipline has deteriorated on the large new collective farms of the FSU.

The form of privatization of agriculture chosen in East Germany was also crucial for capitalization of the sector. There was an inflow of private capital from West Germany, as some farm managers in the west moved to the east to start larger farms or to get involved in partnerships. Private capital would not have been attracted if land markets had not been liberalized. Moreover, the inflow of private capital was accompanied by an increase of know-how available in the sector. The experience of East Germany proves that the import of know-how was instrumental for the rapid improvement in efficiency. Actually, it is hard to differentiate between those improvements stemming from pure capital and those from pure know-how. Significant increases in efficiency resulted from reorganization of the farms, use of better feeding ratios, better seed and better use of other inputs. Exploitation of these efficiency gains did not primarily depend on capital investment, but on know-how.

Improvement in human capital could lead to high efficiency gains in East Germany because the economy was opened up at the very beginning of the transition period. Hence, it was possible to build the reorganization of the agricultural sector on the basis of imported technology. Again, a comparison with FSU countries reveals the relevance of this point. These countries had not had many contacts (trading and otherwise) to market economies before transition, and most have yet to completely open up their economies. This macroeconomic environment has stimulated more capital flight than investment, in both material and human forms. Therefore, a main source of recovery for these economies remains to be exploited.

4.2 Price liberalization

East Germany benefited from the macroeconomic environment of the united Germany, which entailed a very low rate of inflation. Hence, money was accepted as a medium of exchange from the very beginning. A similar favorable macroeconomic framework has yet to come about in the FSU countries. Moreover, the German government never put any restrictions on the use of money, either as cash or with banking deposit accounts. In contrast, in the FSU countries state and collective farms as well as the new collective farms have accepted payments for products delivered to state enterprises in the form of bank deposits, but this money was restricted in its use: it could only be used after approval by government officials, and the government was able to directly withdraw money from the accounts if, for

example, an enterprise had failed to pay its taxes on time. Thus, there were two types of money in these countries, limiting the use of money and leading to segmented product markets -- one for cash payment and the other for payment through bank accounts. The consequences were: High transaction costs for enterprises, reduced division of labor in the economy, and declining overall efficiency.

The German experience indicates the importance of price formation in restructuring an economy. During the time of planning, prices were formed from the bottom up. Planners decided what to produce, and prices were based on production costs. Consumers had no direct effect on price formation. Such an economy may be called supply-constrained. In contrast, prices in a market economy should be formed from the top down. A national economy which wants to exploit its own resources to the maximum possible extent allows domestic prices for tradables to be equal to import or export prices. Prices are considered to be exogenous for domestic enterprises. Consequently, domestic producers have to decide whether the given prices cover production costs for the set of commodities they produce. If costs are not covered for some products, producers have to change the composition of their production. Such an economy is demand-driven.

As prices were set exogenously for farmers (as was the case for other producers in East Germany), the economy quickly moved from being supply-constrained to demand-driven. Therefore, farms had to change the composition of their production correspondingly quickly. In particular, the changes in the composition of regional production contributed to the overall increase in the efficiency of the farm sector. In former times, farms were supposed to fulfill the national plan which prescribed regional self-sufficiency for individual products as much as possible. Because of this, regional specialization in agriculture could not reflect regional comparative advantages. Hence, there was significant potential to change the production pattern. Specialization in potato production is a special case in point. Farms produced a lot of potatoes during the planning period because they were needed for human and animal consumption. The change to an open economy and the demolition of restrictions for imported feed, meant that there was less demand for potatoes for feed. Therefore, potato production declined sharply, but to differing degrees for individual regions, depending on a region's comparative advantage for potato production.

The process of price liberalization has been different in FSU countries, and has given rise to fewer gains in efficiency. It may take some time to develop functioning markets, but the main drawback has been that manifold governmental interference has distorted price formation up to 1996 (although this has been less distorting over time). Domestic markets have been segmented through delivery quotas, regulations concerning book and cash money and special regulations for price formation. Even if prices have officially been set free, and if buyers and sellers have been allowed to "negotiate" prices or deliver on the basis of contracts, the basis for price formation for most agricultural production has been cost-plus pricing, without taking border prices into consideration. Cost-plus pricing was even more prevalent in the prices of monopolies, which contributed a high share of market volume in most FSU countries. Monetary instability and governmental market interference made it impossible to base production decisions on realistic expected prices. Due to the lag between production decisions and market delivery in agriculture, prices failed to guide

production decisions. Therefore, it should be no surprise that the agricultural production pattern in FSU countries changed much less than it did in East Germany.

It is often claimed that price formation in the state marketing channel (which is the most distorted) gets less important over time as a higher percentage of products are sold on the free market. However, it has to be acknowledged that prices formed on these markets are affected by trade regulations and price formation in the state's marketing channel.⁶ Prices on these markets are not related to border prices and, hence, are not good indicators for pushing the sector from being supply-constrained to being demand-driven.

4.3 Financial state support of the agricultural sector

It is true that there were huge public financial transfers from West to East Germany, and one might believe that the outstanding performance of east German agriculture was mainly the result of this support. Agriculture in the east received subsidies in different forms, above and beyond those paid to west German farmers who have benefited from the Common Agricultural Policy of the EU since 1967.

First, it should be noted that east German agriculture was exposed to a price shock that was much more pronounced than that in other countries in transition (see Table 2). There is no other region where prices were changed so significantly and in one stroke. Table 3 reveals that east German agriculture was not economically viable at the new set of prices without a significant adjustment. Hence, it is understandable that the German government decided to launch a program in 1990 -- the time of the price break -- to restore the liquidity of farms. Payments per farm were in accordance to people employed. In addition, there were specific capital subsidization programs. Those who wanted to start family farms, employing one and a half people full-time, could receive a net transfer of up to 80000 DM over the life-span of their investments (normally 20 years). Even large farms could receive huge subsidies for investment. There is no doubt that these subsidies eased the adjustment of the sector. However, these subsidies mainly affected the composition of inputs, i.e. substituted labor for capital and were unlikely to have contributed significantly to the increase in efficiency. Figure 9 to 12 shows that yields increased quickly in East Germany, which contributed to the improvement in efficiency. However, increases in yields are likely to be less dependent on capital subsidization than they are on functioning markets and managers' know-how.

At any rate, the effects of capital subsidization in East Germany were, most likely, much less positive from the macroeconomic point of view than from that of the farmers who received benefits. Firstly, unemployment in East Germany was high, and there had been a lot of shedding of labor from farms; in fact, this was augmented by capital subsidization. For example, one survey found that three quarters of existing cow stables could have been made usable after some restoration, but the subsidization of capital made the building of new stables more economic from the individual point of view. The consequence of this was higher unemployment.

⁶ cit. op. p.

Secondly, farms only received capital subsidies if they submitted 'farm improvement plans' indicating that the planned investment was reasonable. However, recent research work in west Germany has shown that 'farm improvement plans' are of no help in selecting profitable investment projects⁷, i.e. the correlation between the income per worker predicted in the 'farm improvement plan' and the actual income was only 0.24. About half of all farms that received investment aids generated a negative imputed interest rate on their own capital, even after having taken advantage of the subsidized capital.

The experience with capital subsidization of farm investment in West Germany supports the expectation that a high share of subsidized investment in East Germany was not profitable from either the economic or the financial point of view. Hence, it should be no surprise that reports in 1996 revealed that one third of the newly created farms in East Germany had serious financial problems. According to Table 7, 38 percent of single owner farms had a profit of only 20 000 DM per working unit. That is certainly not enough for a viable farm.

5. Critical issues in transforming the agricultural sector

5.1 Exchange rate fixation and wage rate policy

The transformation of agriculture in East Germany was highly affected by two governmental decisions: the fixation of the exchange rate and the setting of wage rates. The decision to accept an exchange rate of one to one between the Eastern and the Western Mark was mainly political. It is true that the purchasing parity of the two currencies before unification was about 1:1⁸, but the exchange rate does not reflect the purchasing power of the currencies; rather, it has to equalize the prices of tradables. According to Sinn and Sinn the equilibrium exchange rate should have been near 5:1, i.e. 5 Eastern Marks (M) for 1 Western Mark (DM). By setting the exchange rate at 1:1, sectors producing tradables came under strong pressure to adjust. Actually, some enterprises, such as the automobile industry, became highly unprofitable overnight. The agricultural sector, which produces tradables, was one of those sectors under strong pressure to adjust. No other transition country exerted such an extraordinarily strong pressure on sectors producing tradables.

Sectors under pressure to adjust have a higher chance of succeeding and surviving if factor prices are downwardly flexible. However, these sectors in East Germany were unable to benefit from such a situation; in fact, the opposite was the case. Income per male worker in east German agriculture was M 722 per month in 1988. After unification, wages outside agriculture increased immediately to 40 percent of the level in West Germany (DM 1380), and increased to about DM 2333 in June 1995. Immediately after unification, unemployment benefits and pensions were about as high as wages earned in agriculture before unification. Hence, there was strong pressure for farms to lay off workers, and workers were pulled out of the sector, either by employment opportunities outside agriculture or by social security programs.

⁷ Striewe, L. J.-P. Loy and U. Koester, 1996.

⁸ Compare Sinn, G. and H.-W.Sinn (1993), Kaltstart - Volkswirtschaftliche Aspekte der deutschen Vereinigung. p. 65.

Of course, the wage effect was mainly determined by the currency unification at an exchange rate of 1:1 and by the decision of the German government to adjust wages in the east quickly to the level of those in the west. Had wages in the east instead remained at the purchasing power level of 1989, which was thirty percent of the western level, employment in agriculture would have been much higher. Adjustment was partly eased through investment subsidies, but was also enforced by these subsidies.

The determinants of the adjustment pressure can be analyzed with the help of the following figures. Figures 13 and 14 present the initial situation of agricultural product and factor markets as compared to that after the introduction of new product and factor prices following unification.

In the initial situation, prices for livestock products were more favorable than those for crop products as compared to western countries. As prices were based on production costs, efficiency in livestock production was much less than that in crop production. Such a situation prevailed in all socialist countries. With the given production possibility curve P_0 and the pre-unification product price ratio r_A , east German agriculture produced at point A' in Figure 13. Unification changed the product price ratio to r_B . Had the production possibility remained unchanged, the new optimal output mix would have been at B' . However, unification changed the economic environment on the farms: the reorganization of the farms reduced transaction costs, allowing greater production with the given factor endowment. Thus, the production possibility moved from P_0 to P_1 , an indication that A' was an inefficient production point. The new optimal point became C' ; hence, the pattern of production had to change from A' to C' . It should be noted that the change in the production mix was not only induced by the change in the product price ratio, but also by the increase in efficiency on the farms.

Pressure to change was even more pronounced on factor markets. Figure 14 depicts the situation. The initial situation is characterized by the isoquant Q_0 and the iso-cost curve f_0 ; the optimal factor mix is given at point A. The slope of the iso-cost curve changed with unification because labor costs went up significantly, leading to the new optimal point B. However, further adjustment was needed because of the highly subsidized use of capital, leading to the iso-cost curve f_D and the new optimal point C, which indicates less use of labor than at point B. A further push for adjustment resulted from a shift in the isoquant curves. Reduced transaction costs on the farms allowed the production of the same quantity Q_0 with a smaller input mix after unification than before. Hence, the new optimal point was at point D. The extent of the adjustment needed is visible from the data presented in Table 2. Value added at new product prices was negative. Hence, the value of products at the initial output mix A' was lower than the factor costs at the initial input mix given at point A.

It has to be noted that this situation was mainly policy-induced and only typical for East Germany. Agriculture in other transition countries would have been exposed to less pressure to adjust, even if markets had been liberalized in one stroke as in East Germany. First, the deterioration in the sectoral terms of trade would have been considerably less, as the change in the exchange rate would have been more moderate. Second, wage rates outside the agricultural sector would have gone up much less than was the case in East Germany. At any rate, the German experience

clearly proves that the agricultural sector can adjust quickly when the necessary incentives are set into place.

5.2 Valuation and distribution of assets

The privatization of non-land assets of the farms proceeded separately from distribution of the land. The first Agricultural Adjustment Act specified that the assets should be divided among three parties: those who brought assets into the collective at the time they joined (former owners), land owners (those who had a claim for restitution) and workers. The law also provided rules for valuing the assets. All agricultural enterprises had to set up an opening balance-sheet, where assets were valued at prevailing market prices rather than at their book values. Former owners of assets had the first right to compensation. Land owners had a claim to rental payments for the period of time the collective had used their land. Those who had brought into the collective assets other than land (machinery, buildings, and livestock) also had a claim for payments on the principal and interest forgone. In addition, members of the collective who had no legal claim to assets could receive parts of the collective's assets. The distribution of shares for workers and those who were entitled to land rent and interest forgone were only considered if the total value of farm assets exceeded the value of assets brought in by the former private farmers.

The Act left the question of division of residual assets up to the assembly of the collective farms. The divergent interests of the parties involved made an acceptable agreement difficult to reach. The former owners of parts of the assets (land and machinery, etc.) wanted high compensation for their capital, and the workers wanted high compensation for their labor input. Former owners who received compensation regularly withdrew their capital from the enterprise at the expense of the enterprise's liquidity. Workers tended to keep their shares in the enterprise with the expectation that this would secure their job. Each member of the assembly -- which included the former members of the collective and those who were not members but had claims for land or other assets -- had one vote, regardless of whether he/she had worked on the farm or had brought in land and assets. Since most of the members in the assembly had not brought in land and assets, they tended to overrule the former owners. Decisions differed among enterprises, but, in general, the assemblies voted for a fifty-fifty split between the workers and the former owners⁹.

The first amendment to the Agricultural Act (enacted July 7, 1991) clarified the voting rule and the distribution of assets among claimants. In cases where wealth had to be distributed, the former owners of land and non-land assets were remunerated first at fixed minimum rates. Half of the remaining value was distributed to workers, according to their working time rather than their income earned on the farm. The other half stayed with the farm and was supposed to be part of the provisions of the enterprise. The amendment of the law also favored the former owners by allowing them a block majority vote in cases where members of a collective wanted to change the status of the farm or its subdivision. The law also gave each member the right to leave the collective farm at will, requiring only proper notice -- one month for the year 1990 and three months for the years 1991 and 1992. In addition, the collective farm could dismiss workers when layoffs were needed or when workers did not

⁹ Mittelbach, H. (1995), Zur Lage der Landwirtschaft in den neuen Bundesländern. Aus Politik und Zeitgeschichte. Beilage zur Wochenzeitung das Parlament. B 33-34/95, p. 15.

perform well. However, one's membership in the collective was not affected by being laid off.

The law also clarified the conditions for settling the claims of departing members, which were divided into two groups. The first group consisted of former members who wanted to set up private farms. They received the value of the assets they had brought into the collective within one month of leaving the farm. Additional remuneration of assets and land took place after the approval of the annual closing balance by the assembly of the collective farm. The second group -- those who gave up their membership because they had never worked on the farm or had given up working on the farm -- were to be paid only after the approval of the closing balance. To those not starting private farms, the collective could offer payment in equal installment payments over a five year period if a lump sum payment would have jeopardized the liquidity of the enterprise. In reality, many departing members agreed to receive a smaller share than specified by the law. The managers of the farms tried to convince members that the viability of the enterprise and job security were at stake and offered modified packages. These were: immediate payment, but only at 70 percent of the face value; 50 percent in five yearly installments; or 100 percent over a 10 year period. The second and third alternatives were offered with a zero interest rate.

The survival of many of the enterprises which succeeded the collectives was only possible because many members accepted a share which was smaller than that foreseen by the law. Two hypotheses are offered for explanation of this behavior. First, members who had worked on the collective farm and lived in the community were possibly interested in securing jobs on the farm, even if they no longer directly benefited from the farm. Second, members may have realized that an individual might be better off asking for immediate payment, but only if the enterprise continued to function. If too many of the members had asked for immediate payment, the enterprise might have been liquidated. As the liquidation value was normally much lower than the assessed value for calculating the shares, a member could actually have been better off securing the continuation of the enterprise by accepting discounted and delayed payments of their share¹⁰.

The managers of the collective farms generally sought to retain assets and continue the operation of the farm. They had much better information about the farm's individual assets than did most ordinary members. Managers reported often undervalued assets in order to maximize the value of retained assets, and hence the shares of remaining members. In some cases, managers did not account for all their farms' assets. For example, machinery left in a field might have been excluded from inventory. In other cases, managers overestimated their farms' financial commitments and thus reduced the total value of their assets. Managers were able to undervalue assets primarily because individual members did not have access to the details of the balance-sheet of the farm's assets. More transparency in the valuation process and external supervision would have assured greater fairness in the distribution.

¹⁰ Becker, T. and H. Thiele (1994), *The Transformation of the Agricultural Sector: The Experience of East Germany*. Paper presented in the selected paper session of the Annual Meeting of the American Agricultural Association (AAEA) in San Diego, Cal. USA, Oct.10, 1994.

Rules for determining the payments for departing members often allowed managerial discretion, and this contributed to lack of equity, too. Members departing from the collective did not always know their rights. They were occasionally offered extreme alternatives, such as leaving their shares in the enterprise and thereby saving their workplace, or else losing their workplace and accepting either highly discounted cash payments or very unreliable installment payments.

The practice of undervaluing assets had both an allocative and a distributional effect. Most importantly, it prolonged the life of the relatively large farm enterprises by reducing the size of the shares shed during the exit process. It is not clear that the units created will remain in their current sizes and corporate organization, but they emerged from the first round larger than would have been the case under more equitable valuation of the shares of departing members. It also explains, to a large extent, why these enterprises tend to employ more workers per 100 ha than do partnership farms of similar size. The asset valuation also transferred wealth from departing to remaining members, many of whom were the original managers.

In the German case, the social impact of the redistribution of wealth was largely muted by complementary payments for the unemployed, retraining programs, and the reduction in the pension age to support older agricultural workers. Therefore, the redistribution did not create problems of rural poverty. No other country in transition has the resources to offer a rural social safety net as comprehensive or as generous as that of Germany, and similar problems of undervaluation of assets upon exit would in other settings be likely to generate severe rural poverty and hardship.

5.3 Creation of family farms

Family farms are the dominant farms in west German agriculture. Hence, there was a widely held belief among west German politicians that a similar farm structure would emerge in the east. Actually, the creation of family farms was highly supported by special programs. However, the experience defied expectations. In spite of the wide distribution of land amongst former owners, relatively few of these "new" owners wanted to start farming. Most preferred to sell their land or to lease it out. It seems to be difficult to transform socialist agriculture into a farming sector with land owners as operators. The German experience indicates that former collective farms have survived much longer than expected and many of them manage to improve their efficiency considerably. However, the German experience also clarifies that a significant restructuring of the sector is needed. The former collective farms seemed to be too large and adjusted their size downwards. Moreover, the change in farm structure is a continuous process which demands a flexible land market.

6. Concluding remarks

The uniqueness of the German experience suggests several observations relevant to other countries in transition.

The socialist experiment distorted German agricultural development. East German agricultural productivity was lower than in the west at reunification.

The two parts of Germany followed different paths of development after World War II. The dominant forms of organization in the east were 4,500 ha

collectives specialized in crop production and large livestock complexes dependent on purchased feed. In contrast, West German agriculture was based on privately owned farms that increased in size over the period to approximately 18 ha including part-time farms and to 26.1 ha for full-time farms immediately prior to unification. Economies of scale on the large farms and complexes in the east were expected to yield lower costs, but this was, in fact, not the case. At unification, costs of production were higher in East Germany than in West Germany, and, in the latter, costs were higher than in many market economies with lower levels of agricultural support. The economic costs of the socialist experiment in German agriculture were quite high.

Under the particular German conditions, structural change in agriculture was remarkably rapid and productivity in the East increased to surpass that in the west in five years. Sectors producing tradable goods faced the greatest adjustment during the transition. The German case indicates that agriculture can adjust rapidly when the economic signals are unequivocal, and when economic agents have incentives and opportunities to respond. Output in the industrial sector fell by 60 percent within two years and partially recovered in 1995 to less than 50 percent of its 1989 volume. In contrast, agricultural production in the east declined only marginally, and by 1994 exceeded 1989 output despite the withdrawal of 12 percent of arable land under set-aside programs of the European Union. Agriculture in East Germany has thus been a rapidly adjusting sector, in contrast to the experience in much of the CIS.

Agriculture's adjustment consisted of changes in farm structure, asset ownership, technology of production, and composition of output. The size of the farms changed significantly. New farmers or partners from the west established farms considerably larger than those in the west but much smaller than the former collective and state farms. The average size of a full-time, single-operator farm was 157 ha in 1993/94 and had increased over the five year time span after reunification. Partnership farms are even larger, averaging 436 ha in 1993/94, and are also growing in size. Although most land in the east is privately owned (about 85% in 1995), few farms are operated by the owners of their land. Ninety percent of the land under cultivation is leased, either from the state or from private owners. Individual operators farm about 20 percent of arable land, but own only part of it. Cooperatives and other successors of the collective and state farms operate 60 percent of the land (1994 data). Unlike the cooperatives and shareholding farms of the CIS, these farms differ greatly from their predecessors. The average farm size in 1993/94 was 1730 ha, which is only about one third of the former average size. These farms have been significantly reorganized, have reduced or eliminated their nonagricultural activities, invested in new technologies, and drastically reduced employment to a labor intensity less than that on average in the west.

The composition of agricultural production changed significantly. Livestock production declined whereas crop production increased. The change in commodity composition of output in favor of the crop sector has been observed throughout the region, and is variously attributed to the greater profitability of crops under the new relative prices and a scarcity of capital for investment in livestock, barns and equipment in the livestock industry. In East Germany, where capital inflows from western partners and capital subsidies through government programs have been substantial but partly constrained per farm and per farm worker, the crop sector has

still gained relative to the livestock sector. The east German experience suggests that shifts in production patterns observed throughout the region reflect the higher inefficiency in livestock production under the command system, but are also affected by the form of subsidization and the higher capital stock needed to start a livestock farm than a crop farm.

Although cooperatives have survived to date, their future viability is uncertain. Cooperatives pay low rents for the land they farm, largely due to imperfections in land markets and incomplete information on the part of landowners. Moreover, juridical entities benefited disproportionately from changes in the Common Agricultural Policy which introduced huge payments for land taken out of production and for the reduction of prices for grains, oilseeds, and beef. Despite these advantages, most cooperative farms had persistent losses, due in part to great labor intensity and concentration in livestock production. Although the future of cooperatives is uncertain, their continued presence slowed the exit of labor from the sector, and had a mitigating impact on rural unemployment and the decline of livestock production.

Despite government programs that explicitly encouraged private family farming, they did not emerge as the dominant form of enterprise in eastern Germany. Most of the former (and therefore “new”) land owners had a non-farm occupation. They may have considered the size of their new land too small to start farming, they may have not had the know-how to do it, or they may have merely preferred to remain in their non-agricultural occupation.

An open trading regime and a strong, stable currency contributed to the importation of new technologies of production and a rapid rise in yields. The east German agricultural sector benefited from the opening up of the economy by importing new technologies. Imports of inputs, such as feed and technical equipment, led to rapid gains in yields from 1989 to 1994: 28 percent for grain, 37 percent for sugar beets and 26 percent for milk.

Lease, rather than sale of land, dominated the activity on East German land markets. Leasing provided needed flexibility for adjustments in farm size, as well as lower start-up costs for new farms. Moreover, leasing served as a selection criteria for qualified management. The Treuhand-Company was cautious in decisions on divestiture of land, and thus contributed to the high proportion of leased land in eastern Germany. Treuhand leased some land out even after it became clear that no claims were likely. This caution was again reflected in the preference for short-term leases instead of longer contracts. Treuhand’s reluctance to sell agricultural land may have reduced investment in the sector. Leasing was common, however, even among private owners and operators, and well-functioning lease markets were critical to the adjustment of resource use in agriculture. In the German experience, therefore, freely functioning land markets led to relatively little sale, but active leasing.

Employment in agriculture declined by about 80% in the five years since unification, and the exodus of labor continues. The fact that this outflow of labor was possible with little or no decline in output underscores the high labor-intensity of agriculture during the socialist era. The magnitude of the exodus reflects the integration of labor markets in eastern and western Germany that came with

unification. Wages in the east rose rapidly to approach those of the west, and at these high wage rates, east German farms could not retain the large labor forces they inherited from the collectivist era. Without unification, wages would have risen much more slowly, if at all, and the outflow of labor from agriculture would have been more moderate. The east German experience is an extreme case of the impact of higher real wages elsewhere on agricultural employment. Other countries in the region have experienced less outflow of labor, and, in some cases, agriculture has absorbed labor displaced by civil unrest or industrial restructuring.

Capital subsidies built into the programs of support during the transition exacerbated the outflow of labor in East Germany. Changes in the pension programs and in social assistance payments also facilitated the outflow of labor. Establishment of a comprehensive rural safety net was essential in Germany. Without it, the combination of high wages and capital subsidies would have brought widespread rural poverty as farms released redundant workers.

Germany's decline in agricultural labor may appear to be anomalous. For example, few countries elsewhere in the region can consider programs offering capital subsidies to new family farmers of DM 70,000 annually over a period of more than ten years. Despite its uniqueness, the German experience carries an important lesson for other countries. If a country in the CIS were to adopt a program of assistance to agriculture that included guaranteed wage security for agricultural workers at wages equal to the national average, investment subsidies to assist enterprises suffering from the depreciation of their capital (albeit more modest ones than in the German case), and flexibility for enterprise managers to release redundant workers with only token payments for their shares in the enterprises, this program would approximate the conditions in East Germany that led to such massive labor shedding. Such a program or even parts of such a program should be adopted only if rural social safety nets can be put in place to cushion the social impact. The cost of social payments should be considered in evaluating this approach to adjustment in comparison with other approaches leading to more labor-intensive outcomes.

The approach to valuation and distribution of farm assets resulted in the concentration of the value of assets in the hands of a relatively small number of people, many of whom held managerial positions in the sector prior to unification. The remarkable increase in productivity in the sector may derive in part from the concentration of ownership and control inherent in the adjustment process. Those who left farm employment and sold their shares at low values were in part compensated through eligibility for the generous benefits of the German social safety net, such as unemployment payments, pensions, and retraining grants. Nonetheless, even under German conditions, when unemployment benefits exceeded the real wages of the socialist era, the concentration of ownership that emerged through restructuring has raised questions of fairness. In a country lacking generous social payments, a comparable concentration of ownership through farm restructuring would be likely to lead to rural poverty and social unrest.

The German government should have provided more transparency and oversight during the valuation and distribution of farm assets. This topic should receive particular attention in countries where privatization and farm restructuring are still in their early stages.

Land idled in eastern Germany in 1991 significantly exceeded the set-aside area in the other 11 member countries of the EU combined. The CAP reform comprised a tremendous financial gain for eastern German agriculture at a time when large areas would most likely have been idled anyway, even without the payments. Other countries in line for membership in the EU are not likely to face the same opportunities. The east German experience provides yet another indication of how fundamentally the rules of the CAP are likely to have to change to accommodate central European members at an acceptable cost.

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**Table 1: Pattern of Farms and Land Use in East Germany
in 1989**

Type of Farm	Number	Area (1,000 ha)	Percent Share of Area	Average Size ha
Collective Farms	3,855	5,343.7	86.4	1,386.2
Crop Production	1,159	5,259.9	85.1	4,538.3
Livestock Production	2,696	83.8	1.3	31.1
State Farms	465	448.8	7.3	965.2
Crop Production	79	396.0	6.4	5,012.7
Livestock Production	311	0.0	0.0	0.0
Others	75	0.0	0.0	0.0
Other Socialist Enterprises	630	34.6	0.5	54.9
Total of Socialist Enterprises	4,751	5,848.6	94.6	1,231.0
Private Enterprises ¹		333.1	5.4	
Total		6,181.8	100.0	

¹ This consisted of farm workers' household production, small gardens, part-time farms, 500 privately owned specialized small farms and farms owned by the church.

Source: *Statistical Yearbook of the DDR*, 1989.

Table 2: Agricultural Product Prices, 1988 in DM and M/dt respectively

Crop	West Germany	East Germany	East/West percent
Wheat	38.6	67.5	175
Rye	37.3	72.1	193
Brew Barley	43.1	91.9	213
Fodder Barley	35.7	63.1	176
Oats	35.3	71.7	203
Corn	35.4	63.7	180
Oil Seeds	77.8	159.8	205
Potatoes	16.6	51.0	307
Sugar Beets	11.1	16.1	145
Pork	204.0	786.7	386
Beef	297.2	1,005.7	338
Poultry	192.6	861.7	447
Eggs (in 100)	14.4	36.8	255
Milk	66.2	169.7	256

Source: Statistisches Jahrbuch der DDR - Bundesministerium für Ernährung, Landwirtschaft und Forsten, Landwirtschaftliche Gesamtrechnung. Various issues.

Table 3: Sectoral Performance Data of East German Agriculture at Prices of West German Agriculture¹ - in Mill. DM

	Crop Production	Livestock Production	Total Agricultural Production
Value of Production	13,237.7	18,921.7	32,159.4
Purchased Input	10,061.1	19,102.7	29,163.8
Gross Value Added at Market Prices	3,176.6	-181.0	2,995.6
Subsidies	515.9	208.1	724.0
Taxes	933.9	-	933.9
Gross Value Added at Factor Costs	2,758.6	27.1	2,785.7
Depreciation	1,817.4	1,305.8	3,123.2
Net Value Added at Market Prices	1,359.2	-1,486.8	-127.6
Net Value Added at Factor Costs	941.2	-1,278.7	-337.5
Wages ²	3,875.0	4,741.7	8,616.7
Interest Payments	773.2	583.2	1,356.4
Net Income	-3,707.0	-6,603.6	-10,310.6

¹ Quantities are averages of 1986-1989 and prices are of 1990. ² Inclusive wages for members of collective farms. Monetary values from M directly translated into DM at the official exchange rate of one to one.

Source: Boese, Ch., J. Welschhof, H. Neumetzler, and G. Schmidt (1991), "Auswirkungen der geänderten Rahmenbedingungen auf die Landwirtschaft der neuen Bundesländer". In: Henrichsmeyer, H., and K. Schmidt (eds), *Die Integration der Landwirtschaft der neuen Bundesländer in den europäischen Agrarmarkt. Agrarwirtschaft, Sonderheft 129, Buchedition Agrarmedia, Hamburg and Frankfurt.*

Table 4: Farm sizes and share of leases in East Germany in 1991/92 and 1993/94

	Single-owner, full-time		Partnership		Corporate	
	1991/92	1993/94	1991/92	1993/94	1991/92	1993/94
Size in ha at the beginning of the year	95	148.18	309	423	1,754	1,736
Size in ha at the end of the year	114	157.44	328	436	n/a	n/a
Lease share at the end of the year in percent	86.8	89.8	94.8	97.0	99.1	99.7

Source: Bundesregierung, *Agarbericht 1993 and 1995.*

Table 5: Relationship between share of rented area and performance in West Germany in 1981, 1990, 1995

	Share of rented area in total area cultivated in percentage									
	0%	0,1-10 %	10-20 %	20-30%	30-40 %	40-50 %	50-75 %	75-100 %		
1989/90										
Grain yield dt/ha	56.2	56.1	54.2	53.6	54.6	54.5	52.9	53.3		
Sugar-beet yield dt/ha	554	535	550	551	550	546	532	533		
Milk-yield/cow in kg	4,413	4,463	4,558	4,691	4,674	4,765	4,776	4,920		
Working unit/100 ha	5.93	5.81	6.31	6.01	5.5	5.21	4.81	3.96		
Profit plus land rent paid / family working unit in DM	36,619	37,261	37,384	39,076	40,603	42,131	43,360	48,859		
1994/95										
Grain yield dt/ha	58.9	60.9	58.7	59.1	58.9	57.5	57.2	56.6		
Sugar-beet yield dt/ha										
Milk-yield/cow in kg	4,961	5,035	5,193	5,239	5,218	5,322	5,380	5,520		
Working unit/100 ha	5.21	4.63	5.14	4.97	4.7	4.27	3.89	3.18		
Profit plus land rent paid / family working unit in DM	29,756	35,992	32,516	35,683	36,684	37,663	40,800	46,477		

Source: Bundesregierung, Agrarbericht 1982, 1991 and 1996.

Table 6: Relationship between farm-performance and farm size in West Germany agriculture

	Standardized value added under DM 30,000	Standardized value added between DM 30,000 and 50,000	Standardized value added over DM 50,000
1974/75			
Profit in DM/FAK	15,033	22,559	36,697
Farm size ha /LF	13.88	28.57	56.01
1980/81			
Profit in DM/FAK	14,089	20,152	30,846
Farm size ha /LF	14.25	24.77	43.97
1989/90			
Profit in DM/FAK	23,068	34,426	52,194
Farm size ha /LF	18.96	27.12	45.7
1994/95			
Profit in DM/FAK	18,642	26,922	41,171
Farm size ha /LF	22.95	29.8	53.98

FAK=family work unit

Source: Bundesregierung, Agrarbericht, various issues.

Table 7: Profit per farm worker for various enterprises in East Germany in 1992/93, 1993/94 and 1994/95 (in %)

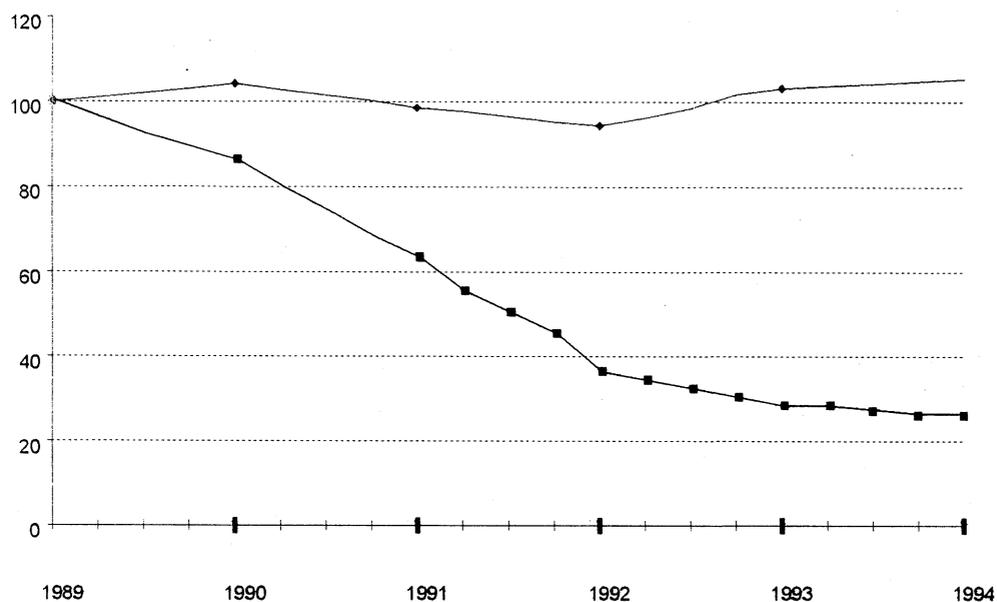
	1992/93	1993/94	1994/95
< 20.000 DM Profit/Ak			
Single Owner	38	30	36
Partnerships	18	12	19
Corporate Enterprises	18	12	19
For reference: West Germany		39	36
> 50.000 DM Profit/AK			
Single Owner	33	34	32
Partnerships	65	51	52
Corporate Enterprises	15	23	33
For reference: West Germany		16	19

Notes: Profit /AK includes wages for non-family farms - The number of representative enterprises differs from year to year due to data problems. -

For corporate farms the threshold profit is DM 40 000.

Source: Bundesregierung, Agrarbericht, various issues, Materialband, author's calculations.

Figure 1: Development of production and employment in the agricultural sector of East Germany, 1989 to 1994 (Index 1989 = 100)



Sources:

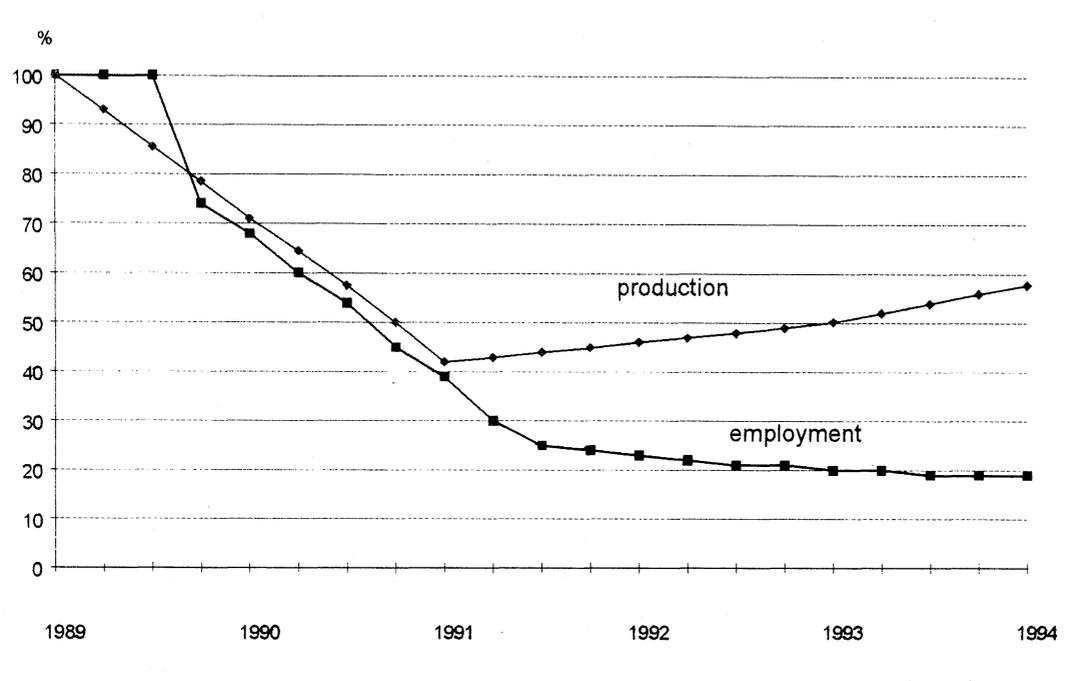
Statistisches Bundesamt, Fachserie 18, Reihe 1.3. 1994, several pages. Statistisches Bundesamt Wiesbaden, Statistisches Jahrbuch 1995, page 680 and 681. Jahresgutachten 1995/96 des Sachverständigenrates zur Begutachtung der gesamtwirtschaftlichen Entwicklung page 376 and 377, Table 25.

Data for the agricultural sector are cumulative values because of the seasonal production pattern.

Sources for employment:

Values for agriculture from 1989: Statistisches Amt der DDR, Statistisches Jahrbuch '90, Berlin . p. 215 from 1990: G. Jannemann, Die Landwirtschaft im strukturellen Anpassungsprozess auf dem Territorium der ehemaligen DDR from 1991 to 1994: Statistisches Bundesamt Wiesbaden.

Figure 2: Development of production and employment in the industrial sector of East Germany, 1989 to 1994 (Index 1989 = 100)



Sources:

Statistisches Bundesamt, Fachserie 18, Reihe 1.3. 1994, several pages. Statistisches Bundesamt Wiesbaden, Statistisches Jahrbuch 1995 page 680 and 681. Jahresgutachten 1995/96 des Sachverstaendigenrates zur Begutachtung der gesamtwirtschaftlichen Entwicklung page 376 and 377, Table 25.

Values for construction sector from: Information of DIW from August/1994. Index III. Quarter 1989.

Values for industrial sector from: Statistisches Bundesamt, Fachserie 18, Reihe 1.3. Jahresgutachten 1995/96 des Sachverstaendigenrates zur Begutachtung der gesamtwirtschaftlichen Entwicklung page 376 and 377, Table 25.

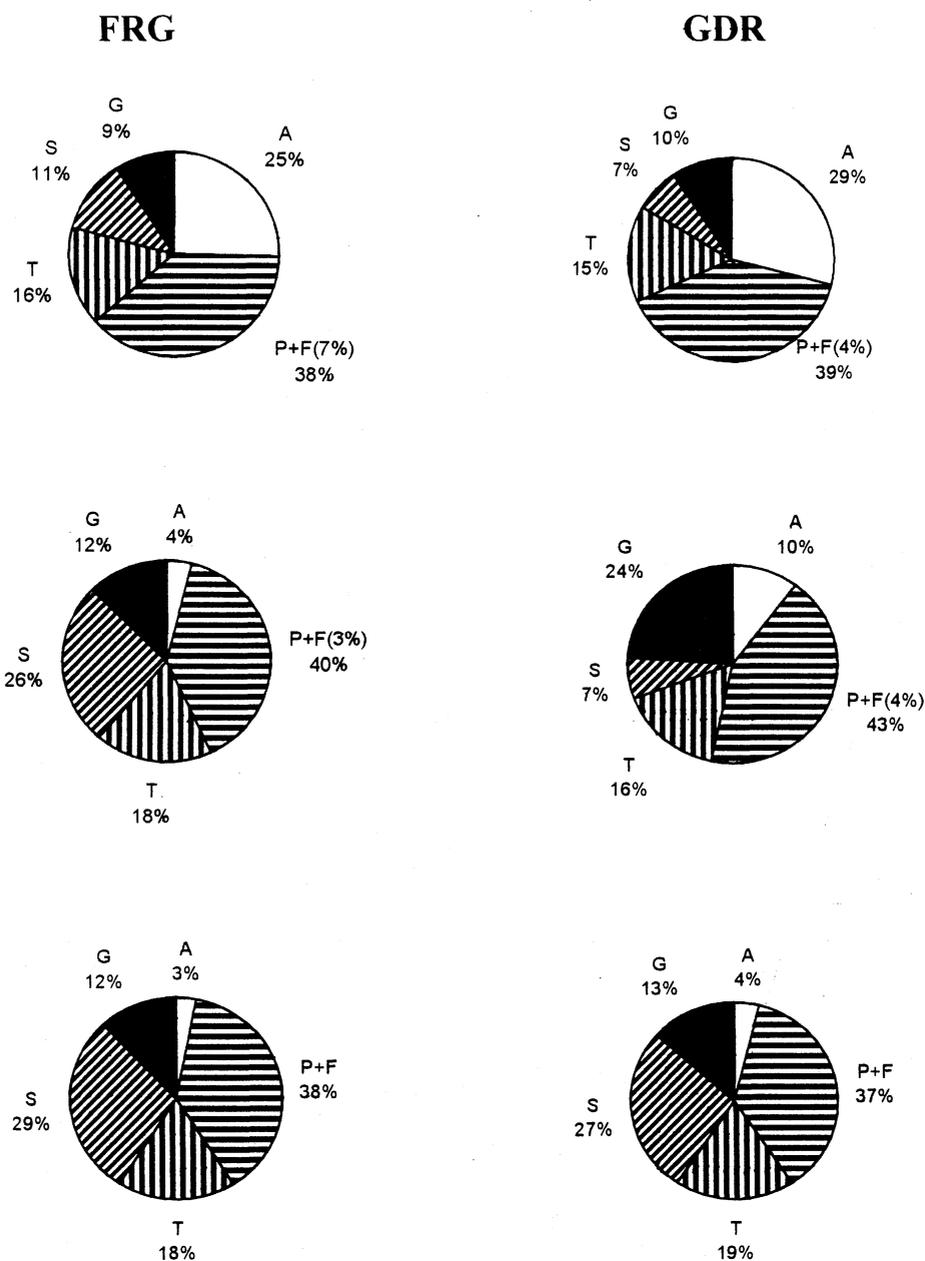
Sources for employment:

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Author's calculations.

Figure 3: Share of Labor in Various Sectors of the FRG and GDR Economies in 1950, 1989, and 1994

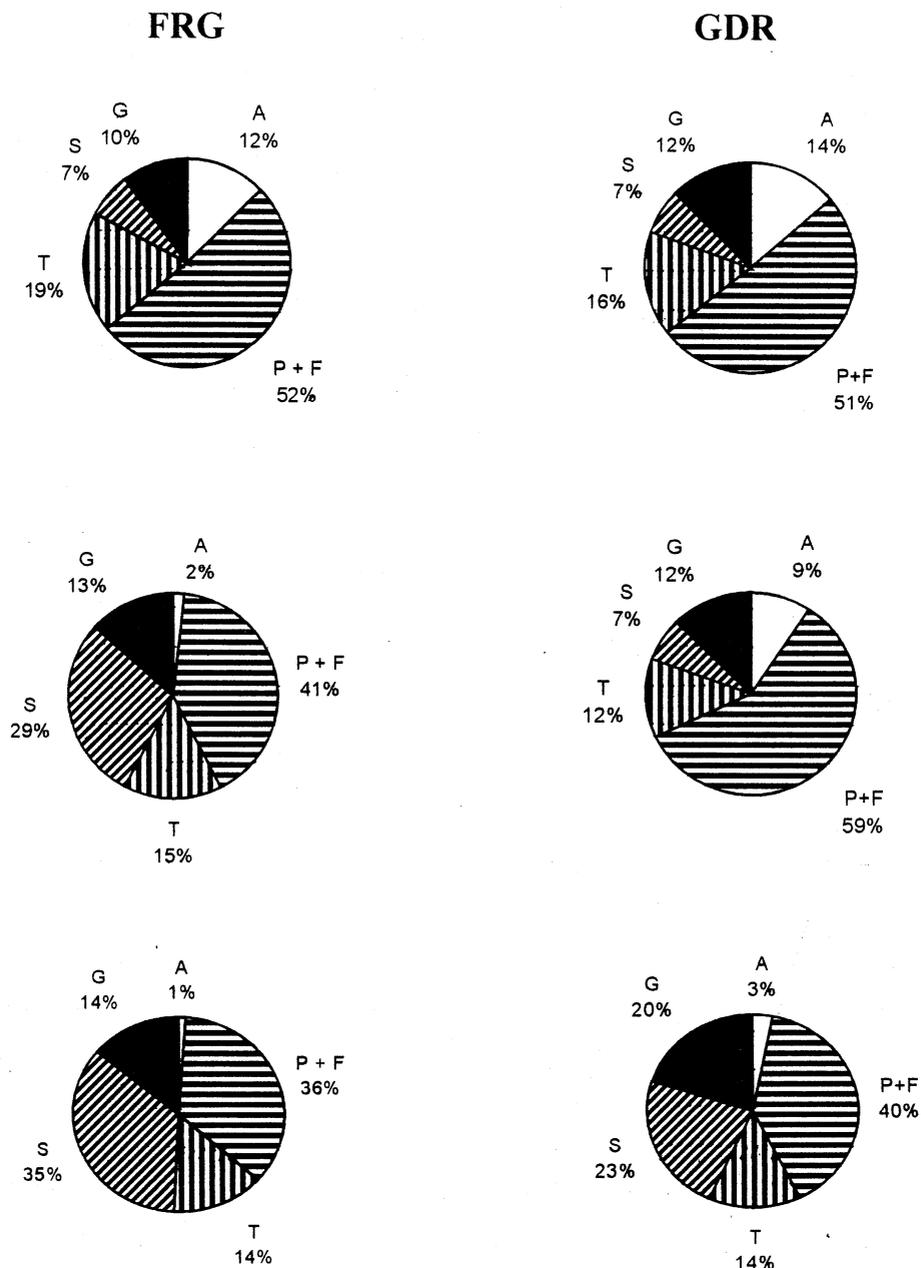


Legend - sectors of economy:

- A:** Agriculture, forestry and fishing
- F:** Food industry
- G:** Government, non-profit private organisations and private households
- P:** Processing industries plus mining etc.
- S:** Services plus credit and insurance
- T:** Trade and Transport

Source: Statistisches Bundesamt, Sonderreihe mit Beiträgen der ehemaligen DDR, Statistisches Amt der DDR (ed.), Statistisches Jahrbuch der DDR. Berlin, various issues.

Figure 4: Share of Production in Various Sectors of the FRG and GDR Economies in 1950, 1989, and 1994

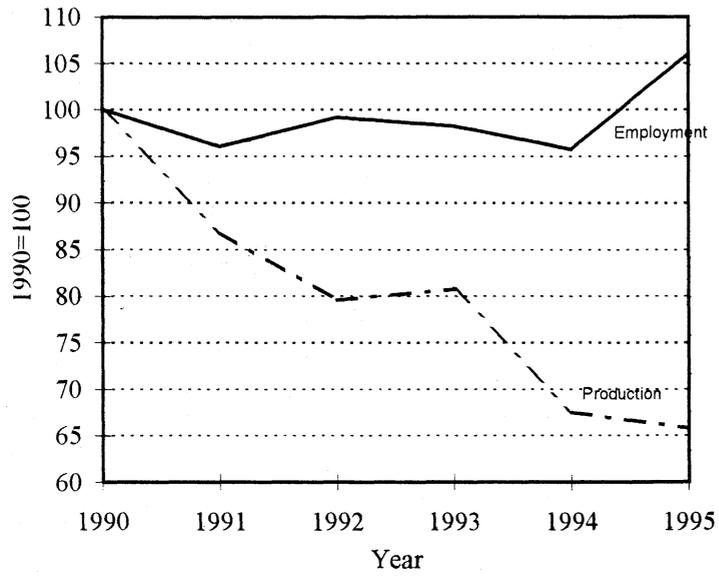


Legend -Sectors of Economy:

- A:** Agriculture, forestry and fishing
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- P:** Processing industries plus mining etc.
- S:** Services plus credit and insurance
- T:** Trade and transport

Source: Statistisches Amt der DDR (ed.), *Statistisches Jahrbuch der DDR*. Berlin, various issues; Bundesministerium für Ernährung, Landwirtschaft und Forsten (ed.), *Statistisches Jahrbuch ueber Ernährung, Landwirtschaft und Forsten*. Hamburg/Berlin/Muenster, various issues.

Figure 5: Production and Employment in Ukrainian Agriculture



Source: Statistical Office of Ukraine. TACIS Macroeconomic Department in Kiev.

Figure 6: Workers / 100 ha in East and West Germany in 1993/1994

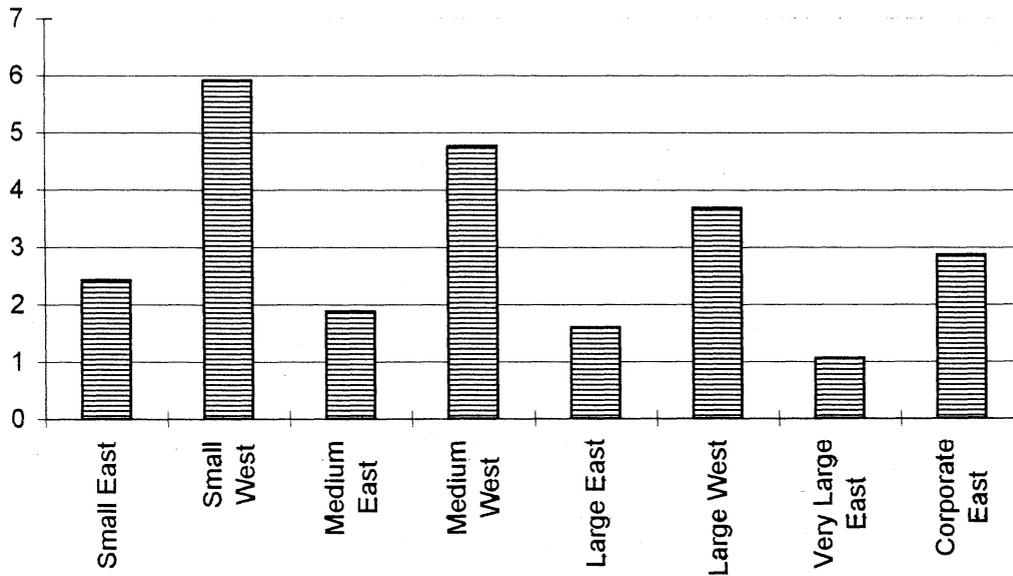
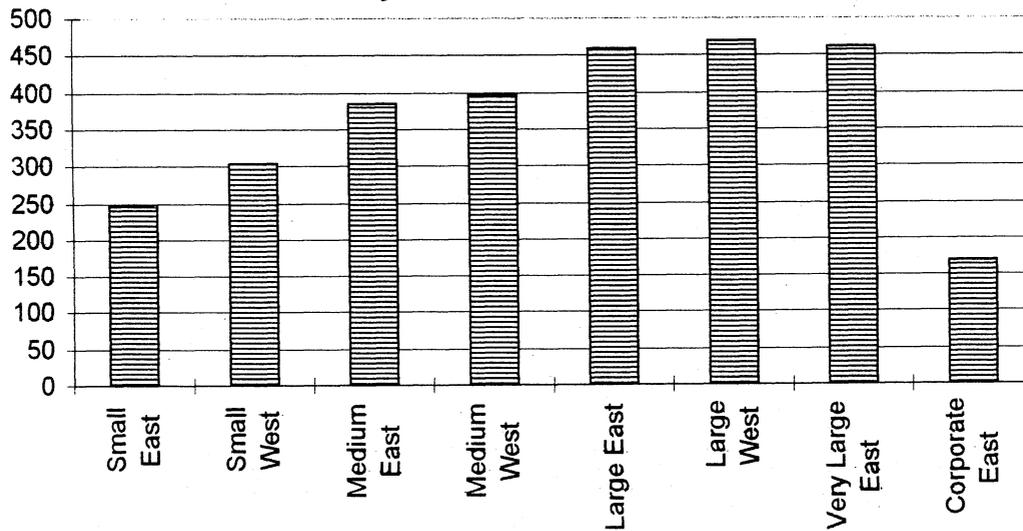
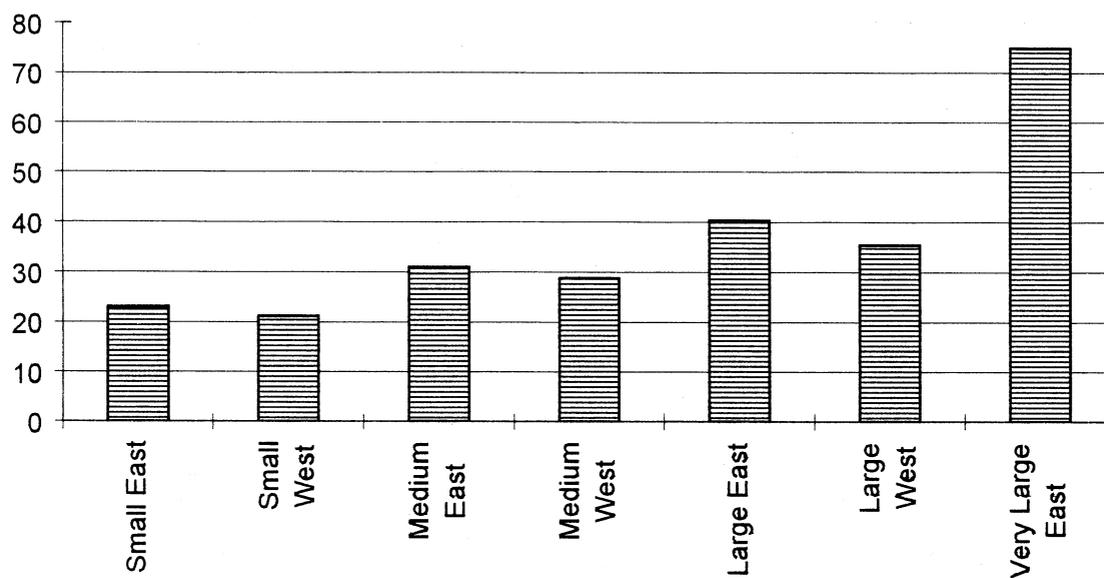


Figure 7: Capital / worker (in 1000 DM) in East and West Germany in 1993/94



Small = below 40,000 standardised value added; middle = 40,000 to 60,000 standardised value added; large = 60,000 to 100,000 standardised value added; very large = 100,000 and more standardised value added

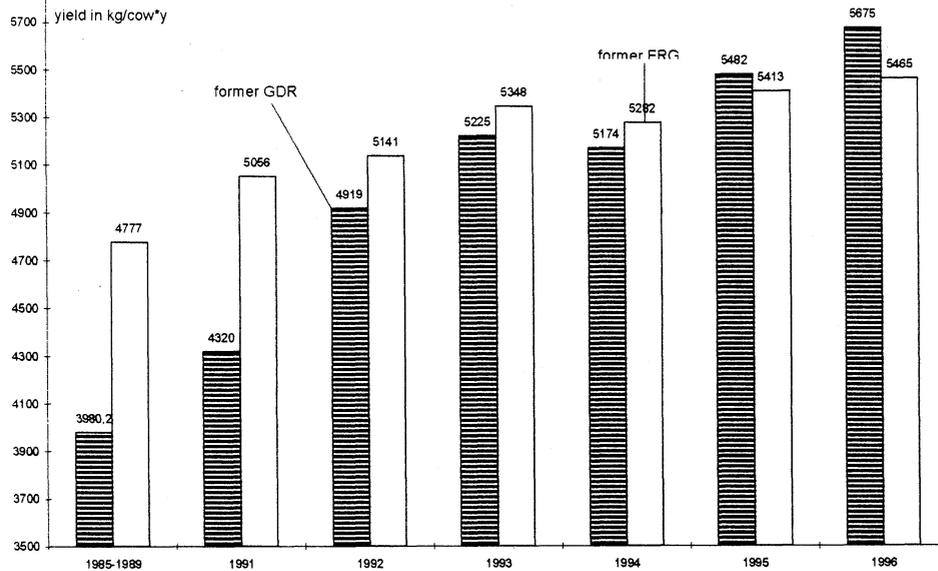
Figure 8: Profit / FAK (in DM 1000) in East and West Germany in 1993/94



Small = below 40,000 standardised value added; middle = 40,000 to 60,000 standardised value added; large = 60,000 to 100,000 standardised value added; very large = 100,000 and more standardised value added

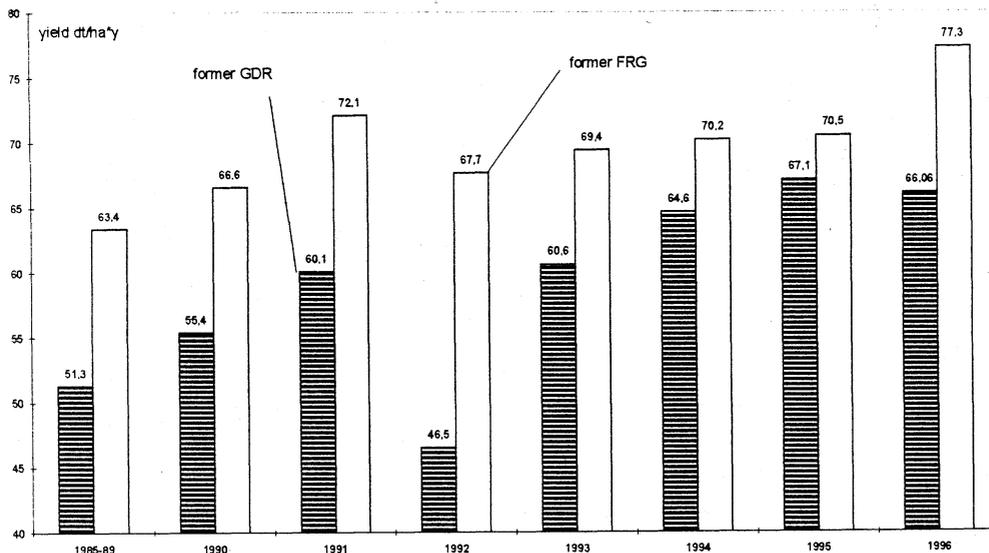
Source to figures 6, 7 and 8: Bundesregierung, Agrarbericht 1995, S.45

Figure 9: Milk yield (per cow and year in kg) in former GDR and former FRG from 1985/89 to 1996



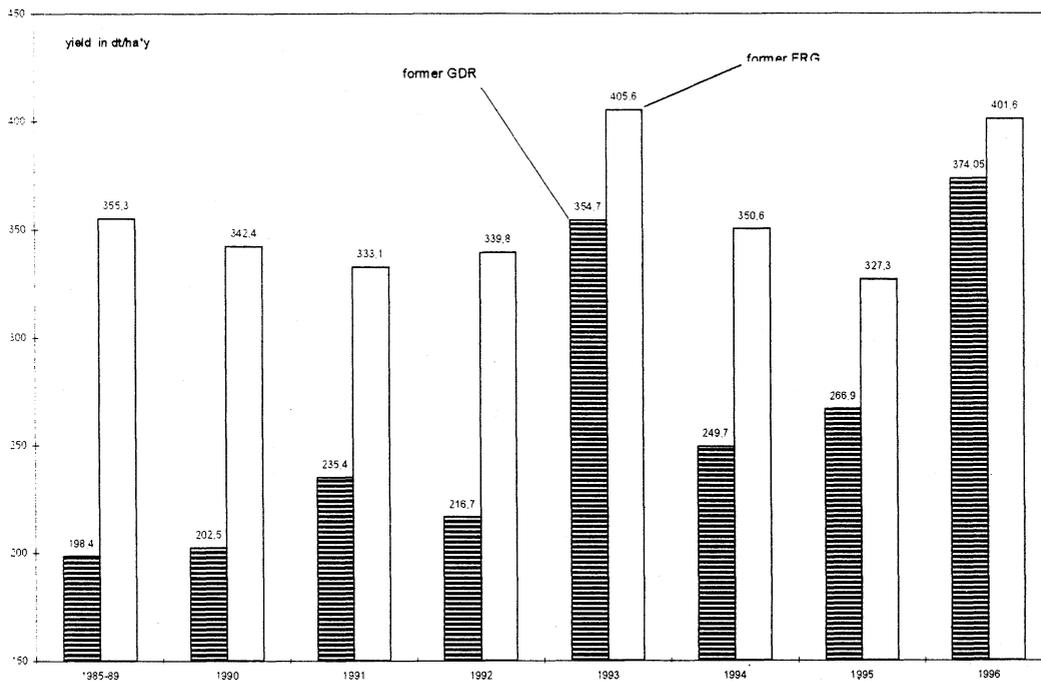
Source: Statistisches Amt der DDR, Statistisches Jahrbuch der DDR, several issues. Bundesregierung, Statistisches Jahrbuch für Ernährung, Landwirtschaft und Forsten der BRD, several issues.

Figure 10: Winter wheat yield (dt per ha and year) in former GDR and former FRG from 1985 to 1996



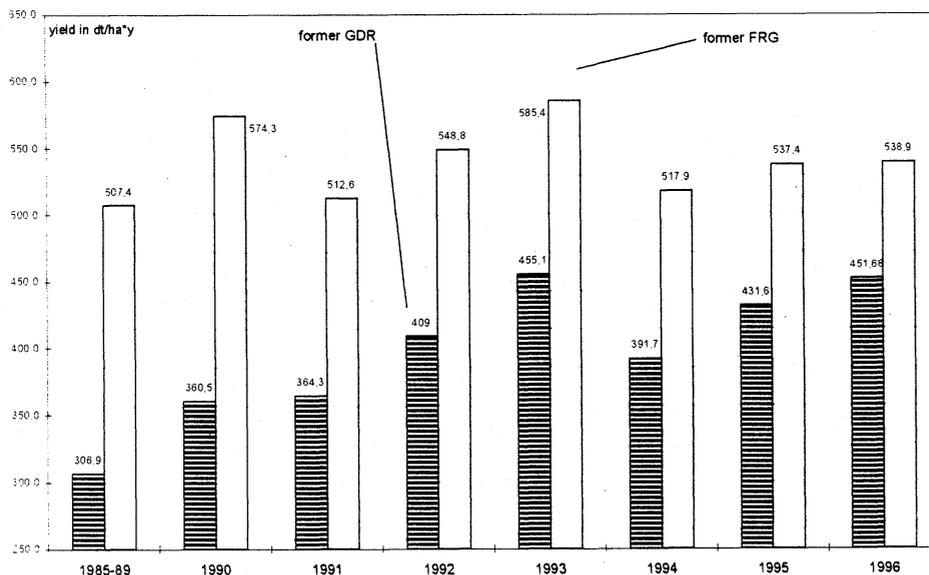
Source: Statistisches Amt der DDR, Statistisches Jahrbuch der DDR, several issues. Bundesregierung, Statistisches Jahrbuch für Ernährung, Landwirtschaft und Forsten der BRD, several issues.

Figure 11: Potato yield (dt per ha and year) in former GDR and former FRG from 1985/89 to 1996



Source: Statistisches Amt der DDR, Statistisches Jahrbuch der DDR, several issues. Bundesregierung, Statistisches Jahrbuch für Ernährung, Landwirtschaft und Forsten der BRD, several issues.

Figure 12: Sugar beat yield (dt per ha and year) in former GDR and former FRG from 1985/89 to 1996



Source: Statistisches Amt der DDR, Statistisches Jahrbuch der DDR, several issues. Bundesregierung, Statistisches Jahrbuch für Ernährung, Landwirtschaft und Forsten der BRD, several issues.

Figure 13

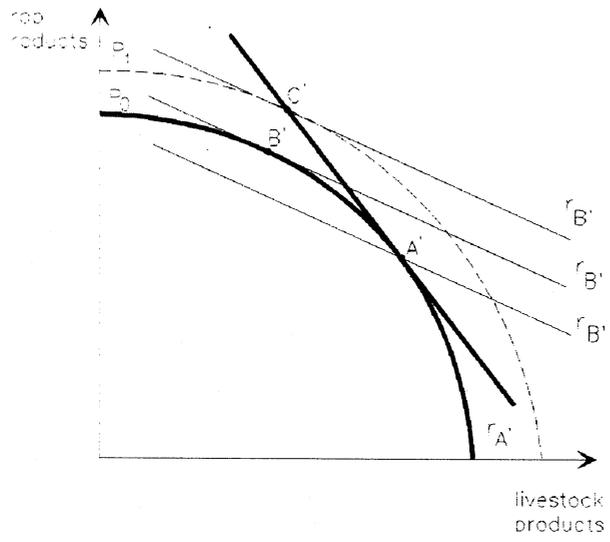


Figure 14

