INTRODUCTION

In the light of about eight years of transition experience in the Central and Eastern European countries (CEECs), it remains a challenging task to look back to their original situation prior to the beginning of the agricultural transformation process, to compare targets and expectations with the outcome and to seek a fuller understanding of what has happened. At the beginning of the transition period and during the process itself, a great deal of advice was being given, though it was quite clear that there was no prior theory of transition that could help in the formulation of commonly accepted guidelines. Examples of successful radical transformation of distorted economies in the past were also rare. Even now most published papers in the mainstream literature treat the development of the economies in individual countries in a somewhat descriptive way, although certain aspects, like reform strategies, macroeconomic stabilization or alternative ways of privatization, have been discussed theoretically.

The intention of this paper is to provide an overview of the main problems that occurred during the transition period and to discuss their causes and attempted solutions. A key aspect for the progress of transition is the institutional change that provides the organizational infrastructure for the formation of a market economy. Hence the focus of this paper is on institutional aspects affecting the agricultural sector which will take centre stage after a preliminary discussion of the macroeconomic situation. The crucial question will concern the optimal form of farm organization, which will be discussed with the help of two models which incorporate essential elements of the new institutional economics, namely the problem of moral hazard and the principal–agent conflict.

The starting point of the paper is the objectives of the transformation process. In that respect, there is some agreement on the nature of the desired results, but how to get there is a matter of controversy, since the main pitfalls are not well understood. A central issue in the discussion which follows is the role of institutional design both as a determinant of past failures and as a key element shaping the future. It is a subject which can only be discussed with the help of conclusions derived from economic theory and particularly from the new institutional economics. The messages which emerge should be

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understood to be somewhat stylized in the sense that they abstract from the particular circumstances of individual CEE countries. However, the conclusions drawn will be confronted with the experiences of East Germany in order to provide some deeper insights into the complex interactions involved in real situations.

Last, but not least, a careful examination of the agricultural transition process in East Europe and East Germany is not only useful for further developing an efficient policy and institutional framework in former socialist countries but could also be useful in transforming farm policies in Western countries. Although some experience with agricultural transition programmes has already been obtained (in New Zealand and the United States) most countries still heavily rely on numerous command and control elements in their policies. In addition, reform and transition programmes to date have concentrated largely on the operational level (Hartmann et al., 1991) and often exclude institutional and organizational adjustments in the agrifood sector. This accounts for the failure of some reforms, such as the European Union changes of 1992, to make domestic agriculture competitive in a world context.

In the paper, ‘institutions’ are defined as rules of the game in a society where personal behaviour and human interaction are rule-bound, not rule-determined (North, 1990, p. 3). Hence institutions reduce uncertainty by providing a cost-minimizing structure for transactions. A structure for human interaction can also be provided by ‘organizations’, which are groups of individuals bound by some common purpose to achieve objectives. They are players in the game. Against that background ‘transition’ or ‘transformation’ implies a more or less time-consuming and cost-intensive move to a new set of institutions and organizations.

TRANSITION IN CEECS: EXPERIENCE AND FIRST IMPRESSIONS

The main objectives of a successful transformation from a centrally planned system to a market economy can be summarized under a number of broad headings (Dewatripont and Roland, 1996; World Bank, 1996): (1) allocative efficiency, (2) competitive markets, (3) stabilized macroeconomy, (4) privatization and (5) institutional change. These features are closely related. For instance, without the necessary institutional background the protection and legal certainty of property rights will not be guaranteed, hence private investment as the engine for economic development is likely to be slowed down. The targets also have to be reached in a process that may take time and give rise to problems. In that respect, it was always anticipated that an economic recession could result during the shift from central planning towards a democratic market system, though in the event the duration of the recession has been much longer than expected and the economic and social costs of the transition have therefore been much higher. The agricultural sector, in particular, was adversely affected by the set of macroeconomic and sectoral problems which are listed below.
Substantial decline in the gross domestic product

Decline was a feature of all post-socialist countries, at least in the first two years of transition. To provide examples, Figure 1 shows the change in gross domestic product (GDP) from 1989 to 1996 for Bulgaria, the Czech Republic, Hungary and Poland. In each case, the worst years of dramatic decline were 1990 and 1991, though from 1992 deterioration became less marked in three cases, and had already given way to positive growth in Poland, through the emergence of new enterprises. Recovery eventually began to occur in Hungary, Bulgaria and the Czech Republic, although their GDP is still below the pre-transformation level. Rosati (1994) described the behaviour of output during the first stages of transition as an L-shaped, rather than a U-shaped, pattern in terms of the cumulative change in GDP from 1989 to 1993. The situation looks far worse for the CIS (Commonwealth of Independent States) and some Baltic countries. The largest countries in the CIS (Russia and Ukraine) still await the initial appearance of positive growth, whereas eight of the smaller CIS countries realized increases in industrial output in the first half of 1996 (Bartholdy, 1996).

That, however, is less promising than it might appear, since it is important to consider the current account of the balance of payments as well. In the Czech

FIGURE 1  Changes in gross domestic product in selected CEE countries (%)

Republic, Poland, Romania, the Slovak Republic, Slovenia and the three Baltic countries, there was a sharp deterioration in the current account in 1995 and 1996. This indicates that strong expansion of domestic demand has tended to favour foreign producers, not least those in agriculture.

**High levels of unemployment**

Unemployment has risen substantially. From the figures in Figure 2 (again for the four illustrative cases) it can be seen that the percentage rates of unemployment have become larger than the percentage decreases in GDP. Furthermore, while the worst year for total production was 1991, unemployment continued to rise into 1993. This was very obvious in Poland and Bulgaria, which both reached a rate of 16 per cent. However, there is some variability; Poland has remained the unemployment black spot, Bulgaria and Hungary have experienced some recovery, while in the Czech Republic the unemployment rate rose only by small amounts and tended to hover around the very low level of 3 per cent. A recovery in the employment situation is especially important for rural and agricultural development.

![Graph showing unemployment rates in selected CEE countries](image)

**FIGURE 2**  *The development of unemployment in selected CEE countries* (%)

Inflation/hyperinflation

The rate of inflation has varied considerably in individual CEE countries since the beginning of the transformation process (Figure 3). In Poland, an enormous increase, to more than 500 per cent, was experienced in 1990, though after successful stabilization programmes the rate was driven back to 20–30 per cent. Experience has been similar in Bulgaria, with a time lag of one year. Other than in the Czech Republic, the inflation rate in CEE countries is still very high compared with the Western economies and thus contributes to a deterioration of the commodity terms of trade for agriculture. For Russia, the largest country of the CIS, inflation has declined gradually over the last five years, from over 800 per cent in 1993 to 50 per cent in 1996 (Bartholdy, 1996).

FIGURE 3    The development of the annual average inflation rate in selected CEE countries (%)  


Reductions in the volume of agricultural output

Agriculture is far more important in the economies of the CEE countries than it is on average in the EU member states; in 1993, the shares in GDP were 7.8 per cent and 2.5 per cent, respectively. With regard to the share of employees in agriculture the difference, 26.7 per cent in the CEE countries and 5.7 per
cent in the EU in 1993, is even more significant (Wissenschaftlicher Beirat, 1997, pp. 4-11).

Figure 4 demonstrates that, in comparison with the decline of GDP, the fall in agricultural gross product is less strong in the first two years. The massive breakdowns appear in 1992 and 1993 which, at 10 to 20 per cent, are even more dramatic than the highest reductions of GDP in 1991. Poland is the exception. After a decline of more than 10 per cent in 1992, there was a very sharp recovery in 1993, when a positive growth rate of 8 per cent was reached; it is true that there was a drop in 1994, though the rate then exceeded 10 per cent in 1995. A similar quick recovery in growth from minus 18 per cent in 1993 to plus 2.5 per cent took place in Bulgaria one year later.

In Poland, Hungary and the Czech Republic, there was success in establishing convertibility, which allowed some transmission of world prices to domestic producers and consumers. The starting level of distortions in these countries was therefore lower than in the former Soviet Union (FSU), and they were supported by being allowed some market access to Western Europe (Brooks, 1993).

As in the case of GDP, the agricultural situation in the FSU and the Baltic countries is not promising. In all of them agricultural gross output is still decreasing, although less then in the first years. An important reason for these

![Graph showing the development of total gross agricultural output in selected CEE countries (1989-1995)](image)

**FIGURE 4**  *The development of total gross agricultural output in selected CEE countries (%)*

differences lies in the slower progress in privatization, which will be discussed in more detail later, and in the problems of the Russian food sector (von Braun et al., 1996).

Explanations of the problems

The reasons underlying transition problems have obviously been widely discussed (Schmieding, 1993; Rosati, 1994; Horn, 1996). Theoretically derived suggestions can be based on neoclassical explanations involving lack of resource mobility and factor price rigidities which result in lack of response to new opportunities and particularly those due to currency devaluation. Some authors mention the uncertainties caused by less than sufficient macroeconomic stabilization policies, while others focus on the tightening of credit conditions in underdeveloped and distorted financial markets, which lead into Keynesian approaches based on demand deficiency. Institutional factors have also been stressed. For example, by using regression analysis, Köhne (1997) was able to show that the importance of economic variables, such as price distortions and sector-specific taxes, is matched by that of political indicators, notably lack of political stability, in accounting for reductions in economic growth.

Most economists agree that the combination of various factors, rather than a single cause, is responsible for the problems which have been observed. However, there is one very common view which appears as an ingredient in most of the attempts at explanation; this is the ‘lack of market argument’. Many of the problems occurring during the transformation process can be put down, to some extent, to the institutional vacuum in which the first reforms have been attempted. There are serious problems in creating new institutions in countries in transition (Koester, 1995). Though the implementation of the liberalization policies was quite straightforward, any institutional restructuring is a far more complicated process. This can now be discussed, though without too much country-specific detail, by considering the restructuring of the agricultural sector in order to show how the ‘new institutional economics’ can help to formulate guidelines for organizational design.

EXPLAINING THE AGRICULTURAL TRANSFORMATION CRISIS

Institutional deficits for restructuring

The main hypothesis is that the institutional vacuum which follows the collapse of socialism represents an essential cause of the transformation crisis. Following the neoclassical explanation, it can be argued that the structure of production had previously been distorted and resources had not been allocated according to their marginal value. Instead, overindustrialization was emphasized and infrastructure neglected. Consequently, the original GDP was far below the level it could have been. Why then has there been a further
worsening in the position after an apparent correction has taken place, and is it the result of difficulties in adaption? Rigidities could consist of insufficient mobility of factors or inflexible factor prices, and could be exacerbated by the fact that structural adjustment needs time. Our view is that this is not the way in which to approach the issue and that there is more promise in an institutional approach, based on a belief that ‘the economy’ consists of more than the ‘market mechanism’. With the growth of specialization in production, and the increasing complexity of the division of labour, it is not the market directly, but the organizational structure, that effectively allocates resources and reduces transaction costs. The institutions in what are now transition economies were designed to meet the needs of the socialist system. That did not stress decentralized decision making and the coordination of demand and supply through market prices. Far from it! Production decisions, and hence the allocation of resources, were centrally planned and consequently the design of the institutions was aligned to reducing the costs of central control and the prevention of incentives for individual actions. The main way to achieve these objectives was through state ownership of the means of production. The collapse of the socialist system brought the need for creation of a completely new institutional design, or at least one which was new to the countries concerned (Schmieding, 1993, p. 235, Wissenschaftlicher Beirat, 1997, pp. 72–5). That system had to

- introduce, define and protect private property rights to accompany the privatization process and create the environment for competitive incentives and structures;
- establish new information systems to report on prices and market developments;
- install a functioning banking and finance sector;
- facilitate risk dispersion and thus encourage private initiative; and
- create a social security system.

However, the conception and establishment of new institutions takes time. The attempt to stabilize the post-socialist economies with market-oriented macroeconomic measures could hardly be expected to be successful in the absence of a properly functioning market mechanism. Policies leading towards liberalization and stabilization could be introduced quite quickly, but new behaviour patterns emerge only gradually. The slowest part of the process is the development of trust, among economic agents, in all new institutional forms, as well as the accumulation of the necessary institution-specific human capital. The additional transaction costs of the establishment and acceptance of the new institutions have been larger than the positive effects of the switch from a planned to a market economy. Until the new institutions are functioning, information uncertainty hinders the coordination of economic activity. In fact, Schmieding (1993) argues that, even if new institutions could have been created quickly, unfamiliarity with new laws and arrangements would still have prompted investors to wait until institutional uncertainty had diminished over the course of time, and only to conclude immediate contracts on a costly, private and self-enforcing, basis.
The formation, as well as the use, of new institutions requires a certain mental attitude, incorporating a set of accepted norms of business behaviour, which can only be acquired with experience (Koester, 1993). The central plan is replaced by a cluster of contractual relations. This demands, on the one hand, experience in the formulation of contracts, and on the other the willingness to be bound by them. The development of such an attitude is a time-intensive process that is not completed, or even induced, by the declaration of market-oriented principles. Indeed, non-compliance with contracts has been a common feature in the CEECs. For example, 81 per cent of contracts in coal production and in the chemical industry, as well as 19 per cent in the food sector, were broken in 1990/91 (ibid., p. 432). Part of this was due to failures on the production side, though the major reason was opportunistic behaviour leading to the acceptance of more attractive alternatives. Thus, while a suitable institutional environment is in the process of being built up, it is possible for production to fall below the pre-transition level as this is being done.

Obstacles to successful privatization

In shaping an optimal organizational structure, privatization and the reform of property rights are a central element in the transformation process which are especially relevant for agriculture since land plays such a key role. The motivation for privatization can be summarized in three categories (Van Brabant, 1991, pp. 29–39): (1) improvement of the use of scarce resources through their efficient allocation within competitive structures; (2) obtaining fiscal receipts to reduce budgetary deficits; and (3) representing an essential element of an ideology associating freedom and liberty with private ownership. The reorganization of ownership and the creation of certainty in property rights has been the urgent precondition for the transformation of agriculture.

When transformation commenced in 1989, agriculture in the CEE countries was characterized by large-scale farms under state control, except in a few countries, such as Poland and Slovenia, where individual family farming had persisted throughout the communist period. During the transformation, state ownership has been transferred, posing questions about how to develop a market-oriented and competitive agricultural structure. Decisions have to be made concerning the distribution of the ownership of land, the form of reorganization of farms, the optimal firm size and the integration of the farming sector into the whole agribusiness sector (Ellman, 1991). Western experience appears to demonstrate the superiority of family farms, so is family work also a suitable model for CEE countries, and should land privatization be aiming to lead in that direction?

The starting point for privatization differed between the FSU, which had so much large-scale farming in state ownership, and the CEE countries, where land was never nationalized and collective farms dominated (Csaki and Lerman, 1997). The decollectivization of farms in the CEECs has been a far more straightforward task than the privatization of state farms. One reason for this is that most of the land used by collective farms remained privately owned during
the socialist period and only had to be transferred to its owners (OECD, 1996, pp. 11–12). The process is far more complicated for state farms, where the privatization procedure is a two-stage process, transferring ownership from the state to the collective and then promoting individual ownership by distribution of land share certificates.

In both the CEE countries and the FSU, large-scale units are not necessarily divided into small family farms as a result of privatization. The new landowners frequently prefer to stay within the collective structure. Hence successor organizations to the state farms remained as large-scale farms, although the state property had been transferred in private shares to the former employees or owners. Figure 5 shows the division of agricultural land in the collective and private sector in 1995 for some CEE countries. It is striking that there is so much diversity. Agriculture in Albania, Latvia and Poland is characterized by highly fragmented structure, but large-scale farming dominates the picture in the Czech and the Slovak Republics. In Albania, nearly all agricultural land is managed by farms smaller than five hectares in size, whereas more than 90 per cent in the Czech and Slovak Republics is occupied by farms with more than 100 hectares (OECD, 1996, p. 11). The structures in the latter countries, however, are more characteristic of the situation in Central and Eastern Europe and in the FSU where, although 85 per cent of land had been privatized by 1996,

![Figure 5: Agricultural land in the collective and private sector in CEE countries in 1995](image)

**FIGURE 5** Agricultural land in the collective and private sector in CEE countries in 1995

Agricultural Transformation Process

Agricultural Transformation Process

The theory of optimal farm organization

Models of organizational structure in agriculture

A crucial point concerning the land privatization process is setting the optimal scale of ownership. One could argue that market forces will resolve this question automatically over time, so that after a period of structural adaption an equilibrium structure will be stabilized. But this process could take several
years and involve large transaction costs. Moreover, many imperfections in the market, due to institutional failures already mentioned, would hamper the achievement of a satisfactory result.

Experiences of transformation in developing countries offer only limited insight into the particular issue of farm reorganization in Eastern and Central Europe because only a few countries have operated large-scale farm enterprises (Braverman and Guasch, 1990). In addition the role and size of the public sector in most developing countries are not comparable with those of Eastern and Central Europe. The often quoted example of China is a useful means of comparison between different forms of transformation and privatization strategies. This is the key question of the slogan, ‘gradualism versus the big bang’, which is often discussed, in various ways, in the theoretical literature. Roland (1994) formalizes the two alternatives by considering expected gains and losses in decision tree models; Xu (1996) simulates alternative reform proposals with a computable general equilibrium (CGE) model for China; Rausser and Simon (1993) present a game-theoretical approach that models the process of transition from centrally planned to market economies in a general conceptual perspective.

Generalization, here, will have to be limited, since there are many avenues of approach. Several alternative organizational forms, such as family farming, large-scale farms with hired workers or agricultural cooperatives, are imaginable. To give recommendations for the optimal size and organizational structure of an enterprise, the standard model derives the optimal size as the minimum of the long-run average cost function. This is generally assumed to be U-shaped, since it contains components which rise and some which decrease with additional scale of output. Typical decreasing cost elements consist of economies of scale in production, whereas internal coordination and control costs rise.

The theory of the new institutional economics goes one step further. Firms are no longer regarded as homogeneous units with no need for further exploration, while the production decision is not reduced to being a matter of technology. Instead, the new institutional economics focuses on transaction costs, human behaviour and the shaping of contract and coordination relations within and between firms. According to these new perspectives, farm structures can be analysed with the help of the transaction cost approach, the principal–agent issue and the theory of property rights. Pollak (1985) extends these considerations from the firm to families and households.

The next step will be to discuss the most efficient type of farm organization from the perspective of the new institutional economics and to take up the controversy of large-scale versus family farming. The common arguments can be listed prior to considering two stylized simple models.

Pollak (ibid., p. 585) groups the advantages of family farming into the categories relating to incentives, monitoring, altruism and loyalty. The advantages of family farming can then be summarized as:

- cost reduction, if the costs of organization and coordination rise progressively with an increase in size;
- reduction of internal transaction costs;
avoidance of a principal-agent conflict, so that costs of control and supervision are avoided;

improvement in the use of social capital (mutual trust, common values, social and political engagement, motivation) that is necessary for a competitive economy.

The advantages of large-scale farming are to be found in:

• economies of scale and the resulting reduction in costs;
• saving in labour, since with given equipment an increase in production can lower the average total costs if capacity is not fully exhausted;
• better choices of methods of production, with easier switches to those which offer lower costs per unit of output;
• economies of learning, with specialization allowing comparative advantages to be developed;
• enhanced bargaining power with regard to downstream and upstream firms;
• ability to finance and construct infrastructure projects;
• privileges of normal employees such as regular working hours, regular holidays, social security and fixed income.

Among the types of large-scale farming, two different forms, which are both highly relevant in the transformation process, can be distinguished: hierarchically structured farms with hired labour or cooperatives. In a hierarchically organized enterprise, the entrepreneur makes the decisions and gets the surplus. It is the farmer, in this context, who negotiates contracts with workers, in such a way as to maximize the farmer's gains by ensuring that any incentives for shirking on the part of workers are minimized. In a cooperative, decisions are made by voting, with the surplus being divided between the owners. In this case there will be costs of control, necessary to prevent 'free-riding'. The types can be modelled, in order to get deeper insights, a start being made with the overview in Figure 6. At the most basic level it can be said that family management is preferred in those farms where cost degression is very low, especially if control and supervision are difficult.

Schmitt (1992) proclaims the superiority of family farms, using the argument that the internal transaction costs, for coordination and control, are larger than the cost savings, stemming from the more effective employment of resources, associated with an increase in farm size. He bases this result on the fact that the family farm is the dominating and persistent form in agriculture in the Western economies. In addition, he emphasizes the problem of decision making in cooperatives and their difficulties in avoiding 'free-riding' by weakly motivated individuals. In a newly formed cooperative, emerging through the transfer of shares to former employees, there is the additional problem of overcoming their wish to preserve the structure of the enterprise. Even if a reduction in the labour force could increase efficiency, employees, understandably, would have no interest in dismissing themselves. However, the introduction of freely tradable shares could reduce the severity of the problem.
It can be argued, strongly, that the dominance of family farming is no proof, in itself, of the comparative advantages of this organizational form. For example, Peter and Weikard (1993) argue that the structure of the sector has evolved historically and appear to side with Brandes (1995) who regards path dependence as an important explanatory approach for handling the issue of agricultural structure. Even if a change in the economic environment, or technical progress, made an alteration in farm organization desirable on efficiency grounds, adjustment could still be slowed down, or even prevented, owing to adaptation costs and delays. Hence the conclusion that the status quo in the Western industrial countries represents an optimal structure is not soundly based. Indeed, there is currently major change taking place in Western farm organization, the end of which has yet to be seen.

Analysis of efficiency in organizational form will now be done using two models. The first is a simple household model which looks at the expansion from a family-managed farm to one using hired workers. The second step is analysis of incentive structures, comparing a hierarchically and a cooperatively organized farm.

**Family farming versus labour hiring**

De Janvry and Sadoulet (1995, pp. 259–71) formulate a model of household behaviour, based on work by Eswaran and Kotwal (1986), which incorporates two universal problems: entrepreneurs are confronted by limited access to credit, while any hired workers are susceptible to moral hazard and therefore require supervision. The start is with a stochastic production function of the form:
\[ q = \mathcal{E}(L,A) \text{ with } E(\epsilon) = 1. \]

There is no definite relation between the input of labour \( L \) and the output \( q \). Consequently, there is a moral hazard problem in hiring labour \( (h) \), whereas family labour has no incentive to shirk, but needs to supervise hired labour. The time spent in supervising hired labour \( (s(h)) \) is assumed to increase more than proportionately \( (s' > 0, s'' > 0) \). The family workers have the options to work on their own farm \( (li) \), to hire labour out \( (lo) \) or to spend time supervising hired labour \( (s(h)) \). The household is equipped with a certain amount of land, \( \bar{A} \), but can rent land in and out \( (A) \) at the rental rate \( r \). Under these conditions, the household decision problem is to maximize its utility function \( u(y, le) \), which is assumed to be separable in income \( y \) and leisure \( le \), under a time and an asset constraint. This can be summarized as follows:

\[
\begin{align*}
\text{Max } & pf(L,A) + w(lo - h) - r(A - \bar{A}) - K + u(le) \\
\text{Time constraint: } & li + lo + s(h) + le = 1 \\
\text{assets constraint: } & rA + w(h - lo) + K \leq r\bar{A} + B(\bar{A}) = B' \\
\end{align*}
\]

where \( p \) is producer price, \( w \) is wage, \( K \) is fixed starting costs, other than land and labour, and \( B \) is quantity of credit proportional to land owned.

The solution of the maximization problem shows that the optimum type of farm organization depends on the initial asset endowment and the level of fixed costs. Following de Janvry and Sadoulet (1995, p. 260) it becomes:

<table>
<thead>
<tr>
<th>Initial assets position</th>
<th>Hire out</th>
<th>Own-farm work</th>
<th>Supervision</th>
<th>Farm organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>( B' ) ( \leq \bar{K} )</td>
<td>+ ( lo )</td>
<td>0</td>
<td>0</td>
<td>employed worker</td>
</tr>
<tr>
<td>( \bar{K} \leq B' \leq B'_1 )</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>worker–peasant</td>
</tr>
<tr>
<td>( B'_1 \leq B' \leq B'_2 )</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>family farmer</td>
</tr>
<tr>
<td>( B'_2 \leq B' \leq B'_3 )</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>family farmer + hired workers</td>
</tr>
<tr>
<td>( B' \geq B'_3 )</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>large-scale farmer</td>
</tr>
</tbody>
</table>

With respect to the restructuring of state farms in CEE countries, the results of this simple model imply that credit and financial institutions play a crucial role in the farmer's production decision. Improved access to credit has also been a major policy instrument to accelerate development in the rural areas of developing countries (Braverman and Guasch, 1990). In the socialist system, loans for capital formation were distributed by state banks, with the result that severe constraints were imposed on the savings and investment behaviour of individuals and enterprises. Criteria for the allocation of credit were designed...
to meet the planned production targets, even when there was frequent support of loss-making operations. Therefore the creation of financial institutions, tailored to the needs of a market economy, is essential for the development of an efficient and competitive agriculture.

**Cooperatively versus hierarchically organized farms**

As mentioned above, there exist two different patterns of privatization. In the Eastern European states, the land was often transferred to its former owners, whereas in the FSU the state farms were divided among the employees. According to the distribution of property rights, two fundamental types of farm management in large-scale farms can be distinguished: the cooperative and the hierarchical style. These carry different implications for the decision-making processes of coordination and internal control. The following model examines whether, under certain conditions, the superiority of one form can be determined. The model used was developed by Kreps (1990) and has been further elaborated by Peter and Weikard (1993). The optimal amount of labour input and the maximally attainable utility for (1) a one-person enterprise, (2) the principal and the agent in a hierarchically organized farm and (3) the partners in a cooperative, are derived and compared in three steps.

1. **The one-person enterprise** The one-person enterprise is characterised by a situation where the expected payoff $\pi$ is uncertain, here assumed as 1 in the case of success or 0 in the case of failure. The probability $p$ of success can be influenced by the amount of labour input $L$ (in the model, $L$ is expressed in units of utility loss and standardized between 0 and 1). The parameter $\alpha$ defines the relation between the input $L$ and the probability of success, $p$. It is further assumed that the entrepreneur is risk-neutral and maximizes utility.

$$
\begin{align*}
    u &= \pi - L & \text{utility function} \\
    \pi &= 1p + 0(1 - p) & \text{expected payoff} \\
    p &= L^\alpha & \text{probability of success} \\
    \text{with } L \in [0,1], \alpha \in (0,1)
\end{align*}
$$

$$
Max_L u = L^\alpha - L \quad \text{maximization problem}
$$

$$
\Rightarrow L^* = \frac{1}{\alpha^{1-\alpha}} \quad \text{and} \quad u^* = \frac{1 - \alpha}{\alpha} \frac{1}{\alpha^{1-\alpha}}
$$

In the following, economies of scale are assumed. With the switch to a two-person enterprise, a new technology can be applied so that the outcome can be 3 instead of 1 in (1) in the case of success. Consequently, an incentive for an expansion is present. In (2) a principal offers a contract to an agent. In (3) two entrepreneurs join in a cooperative.
2. The principal–agent case  The principal has to offer a contract which guarantees a level of utility for the agent which is higher than the agent could obtain alone (calculated in (1)). Under this restriction, given the knowledge that the agent works according to his own utility-maximizing function, the criterion for the wage \( w \) which the principal pays to the agent is the maximization of the principal's utility function. From the equations below it can be seen that there has to be a wage differentiation between the wage \( w_1 \) in the case of success and \( w_0 \) in the case of failure. Otherwise, if \( w_1 = w_0 = w \), the agent maximizes his utility with \( L_A = 0 \).

\[
\begin{align*}
  u_A &= pw_1 + (1-p)w_0 - L_A \quad \text{utility function, agent} \\
  u_p &= p(3-w_1) + (1-p)(0-w_0) - L_p \quad \text{utility function, principal} \\
  p &= L^\alpha = \left( \frac{L_A + L_p}{2} \right)^\alpha \quad \text{probability of success} \\
  \text{with } L_A, L_p \in [0,1], \alpha \in (0,1)
\end{align*}
\]

According to the first order condition \( \left( \frac{du_A}{dL_A} \right) \), the optimal labour input for the agent is

\[
L_A^* = 2 \left( \frac{\alpha}{2(w_1 - w_0)} \right)^{\frac{1}{1-\alpha}} - L_p.
\]

The principal maximizes his utility function \( u_p \) under the restriction:

\[
u_A = pw_1 + (1-p)w_0 - L_A \geq \frac{1-\alpha}{\alpha} \frac{1}{\alpha^{1-\alpha}} = u^* \text{ from (1)}.
\]

With the help of the Lagrange function, the following solution can be derived:

\[
\begin{align*}
  w_0^* &= 0, L_p^* = 0 \\
  w_1^* &= \begin{cases} 
    2^\alpha & \text{for } 0 \leq \alpha \leq \alpha' \\
    3\alpha & \text{for } \alpha' \leq \alpha \leq \alpha'' \\
    2^{\alpha} \alpha^{-1} & \text{for } \alpha'' \leq \alpha \leq 1
  \end{cases} \\
  L_A^* &= \begin{cases} 
    1 & \text{for } 0 \leq \alpha \leq \alpha' \\
    \frac{1}{\alpha^{1-\alpha}} & \text{for } \alpha' \leq \alpha \leq \alpha'' \\
    2 \left( \frac{3}{2\alpha^2} \right)^{\frac{1}{1-\alpha}} & \text{for } \alpha'' \leq \alpha < 1
  \end{cases}
\end{align*}
\]

with \( \alpha' = 0.458 \) and \( \alpha'' = 0.748 \).
3. The cooperative  The same preconditions as in (2) (the principal–agent case) are assumed. Because of the assumption that no-one knows the labour input of the partner, the expected outcome is shared equally between the two partners $i$ and $j$ ($=3/2$ for each in the case of success) and cannot be dependent on the individual labour input.

\[
\begin{align*}
    u_i &= \frac{3}{2}p - L_i \quad \text{utility function for partner } i \\
    u_j &= \frac{3}{2}p - L_j \quad \text{utility function for partner } j \\
    p &= L^\alpha = \left( \frac{L_i + L_j}{2} \right)^\alpha.
\end{align*}
\]

The first order condition leads to:

\[
L_u = 2 \left( \frac{3}{4} \alpha \right)^{\frac{1}{1-\alpha}} - L_j
\]

Therefore the sum of the maximal utility of $i$ and $j$ is:

\[
u_i + u_j = 3 \left( \frac{3}{4} \alpha \right)^{\frac{\alpha}{1-\alpha}} - 2 \left( \frac{3}{4} \alpha \right)^{\frac{1}{1-\alpha}}
\]

and the utility of each partner is half of the sum.

The results in (2) and (3) show that the optimal labour input and the maximum utility for each agent are both functions of $\alpha$ and hence can be compared. The utilities achieved, in the principal–agent case the sum of $u_p + u_A$, in the cooperative case the sum of $u_i + u_j$, as dependent on the parameter $\alpha$, are graphed in Figure 7, which shows that for small $\alpha$ it is the cooperative which achieves a higher utility (the point of intersection is exactly at $\alpha = 0.5$). For large $\alpha$ the model of a hierarchical organization implies a higher utility, although the division of this total between the principal and the agent is not equal. Figure 7 demonstrates that the utility of the principal is always higher than that of the agent. The higher the $\alpha$, the greater is the free-rider effect in the cooperative case. Although the model is very simple and stylized, it reveals that a definite superiority of any of the organizational forms cannot be provided. But, with increasing investments in human capital, the relation between labour input and output becomes less susceptible to interference. Thus a higher $\alpha$ is more likely, so that the principal–agent organized enterprise implies a higher gross utility.

EXPERIENCE FROM EAST GERMANY

In comparison with the conditions of transformation elsewhere, the process in the former German Democratic Republic was very special. The integration into the Federal Republic took place at high speed and was heavily supported
Agricultural Transformation Process

by financial and technical aid. Nearly 700 billion dollars have been provided to finance investments and social transfers (World Bank, 1996, p. 12). The institutional design, based on the existing institutions of West Germany, was already well defined, and there was a broad acceptance of the political, social and economic principles of the FRG (Mehl, 1997, p. 2). Although the preconditions for a successful transformation were almost ideal, many problems have occurred, the most serious being that of unemployment.

The agricultural sector in the unified Germany is a unique example of coexistence of two different types of organizational form. Family farming dominates in the former western part of Germany, where the farm family is the owner and operator of the farm. Principal and agent coincide. The average farm size was about 23 hectares in 1996 (Table 1). In the east before 1989, farming was characterized by large-scale enterprises, with an average size of 1300 hectares. During the transformation process these state-owned enterprises have been transformed into cooperatives and privately organized farms, linked with the complete reorganization of property rights. Table 1 shows the structural changes with regard to the number of farms, the average size and the number of workers.

Table 1 only contains information about average farm size, though it is important to realize that a characteristic feature in West Germany is the bimodal structure. Some 45 per cent of the 509 100 farms in West Germany are between one and ten hectares in size. A second peak can then be observed in the 50–100 ha interval (50 000 farms or 10 per cent of the total). The trend here

FIGURE 7 The levels of utility according to the organizational form

Source: Peter and Weikard (1993, pp. 320–21).
# TABLE 1  
**Key values of agricultural farm development from 1989 to 1996 in East and West Germany**

<table>
<thead>
<tr>
<th></th>
<th>1989</th>
<th>1991</th>
<th>1993</th>
<th>1995</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>West</td>
<td>East</td>
<td>West</td>
<td>East</td>
<td>West</td>
</tr>
<tr>
<td>Numbers of farms (1000s)</td>
<td>648.0</td>
<td>4.7</td>
<td>598.7</td>
<td>18.6</td>
<td>567.7</td>
</tr>
<tr>
<td>Average size (hectares)</td>
<td>18.2</td>
<td>1305.0</td>
<td>19.6</td>
<td>284.0</td>
<td>20.7</td>
</tr>
<tr>
<td>Labour units per farm</td>
<td>2.75</td>
<td>179.36</td>
<td>2.53</td>
<td>19.49</td>
<td>2.46</td>
</tr>
<tr>
<td>Labour units per hectare</td>
<td>0.16</td>
<td>0.14</td>
<td>0.13</td>
<td>0.07</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*Source:*  
Agrarbericht der Bundesregierung, different years; Statistisches Jahrbuch über Ernährung, Landwirtschaft und Forsten, different years.
is towards the 50–100 class, with declining numbers among the 1–10 ha size group. In the east, a similar dual structure has evolved; the number of small farms (1–10 ha) increased rapidly between 1989 and 1996, representing 44 per cent of 30 800 farms in 1996, along with around 26 per cent which remained large, at more than 100 ha. In the east, the decrease of the working population was particularly marked after 1989. After five years of transformation, the number of workers in agriculture declined from 850 000 to 160 000, or a reduction of more than 80 per cent. Labour force reduction was far more than predicted.

One important reason for the structural change is differing price relations. The producer prices for agricultural goods have declined dramatically, whereas factor prices, notably for labour, increased sharply after unification. In particular, the animal breeding and fattening sector was confronted by higher adjustment pressures (see Thiele, 1996). With the conversion of the currency (the DDR-Mark and the D-Mark) on a scale of 1:1, in the east the gross income per working hour increased from the fixed 39 per cent of the western level to 73 per cent in 1992. Productivity increased only from 22.7 per cent to 45 per cent of that in the west over the same period (Brücker, 1995). In effect, the factor costs for labour doubled while producer prices, on average, decreased by about 40 per cent.

Further distortions in factor prices have arisen through capital subsidies, which provided incentives to invest in grain production, and through discriminatory policies against successor enterprises of the large-scale farms of the east. The successors did not receive the same level of subsidies to labour, as well as being saddled with the burden of old debts (Thiele, 1996). A further problem is that the share of rented land is relatively high. Since owned land serves as collateral, East German farms have limited access to credit.

Workers dismissed from agriculture have great difficulty in being absorbed elsewhere. Figure 8 shows that only about 20 per cent of the 850 000 people involved found an occupation outside agriculture in 1991. By that time, of the 300 000 persons who stayed in agriculture, less than half were fully employed. Currently, in large parts of East Germany, the level of unemployment is higher than 17 per cent, or even above 20 per cent in some peripheral areas. Lack of purchasing power is obvious.

The rapid integration of East German agriculture into the European Union market has demonstrated its lack of competitiveness. It has neglected infrastructure and machines, outdated technologies, insufficient capital and underdeveloped marketing strategies. The situation is even worse in food processing and marketing (Tangermann, 1993). Moreover, the former ‘internal’ East European trade is no longer available. Consequently, the market for East German products has broken down on both the supply and the demand sides. Hence, even with financial and technical support, in addition to well-defined institutional patterns, the adjustment process is painful. It takes time to gain competitiveness and to rebuild trust into a new system. For the CEE countries, this is an even bigger problem, which will require even more Western help to overcome.
CONCLUSIONS

Modern and efficient farming is successfully integrated into upstream and downstream activities within the domestic food chain and into international agricultural and food markets. The macroeconomic, agribusiness and trade environment, therefore, plays an important role in agricultural development. Much has already been done in transition countries, including macroeconomic stabilization, trade liberalization and domestic deregulation. Nevertheless, many obstacles remain which are responsible for the sluggish improvement of the agricultural situation. These include the problem of state monopolies in the food sector having been replaced by private monopolies, as well as the trade barriers of other countries discriminating against transition countries’ exports. Limited GDP growth rates do not help.

However, the most important causes of the current transformation crisis in agriculture appear to lie in institutional, organizational and behavioural issues. Even in Western countries, despite numerous reform efforts, there is great resistance to adjustment and hence a lack of flexibility and competitiveness. Stiglitz (1993) notes the irony in Western economists’ advice to rely on the market; it is a question of the motto, ‘Do as we say, not as we do’.

Internal and external farm restructuring is slowed down or distorted owing to the following:

- the transfer of ownership to collective rather than to private owners;
• restrictions on ownership rights, which are becoming even more popular in Western countries’ environmental policies;
• malfunction of land, labour and credit markets;
• state or cartel intervention in price formation on those markets (also a phenomenon in Western countries);
• the assumption that one, and only one, organizational structure or size of a farm is optimal and should be pursued as a political objective.

The need for orientation during the transition process is acute if a costly, long-lasting, trial-and-error process is to be prevented. Transformation of a system actually provides the chance to shape basic conditions in a conscious way and to improve them. The theoretical analysis has made clear that the initial asset situation, access to credits and the managerial skills to run a farm are important in determining the optimal farm size and farm organization. Since all of these factors can differ among individuals, so farm size and structures may differ accordingly. At each point in time one therefore finds an optimal distribution of sizes and structures which moves from some bimodal form to another. Any choices of farmers in terms of exit and entry, of growing and contracting and division of labour between management and owners, as well as the contract design for workers, should be as free as possible. This guarantees a flexible and efficient response to a changing environment and is the only way to strengthen the competitiveness of agriculture.

REFERENCES

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