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Agricultural economics and transition:

What was expected, what we observed, the lessons learned

Proceedings

(Volume II)

A Joint IAAE- EAAE Seminar

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Edited by
Csaba Csáki and Csaba Forgács

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FOREWORD

Over fifteen years have elapsed since the transition from the centrally planned economic system started in the early 1990's. During this time agricultural and rural areas of Central and Eastern Europe have undergone profound structural changes with wide variations in the degree of transformation and in the rate of success in creating a competitive market and private ownership based food and agricultural system. By becoming member of the European Union the "transition" in its traditional interpretation has been concluded in ten of the Central East European countries. The transition to market based agriculture, however, is far from completion in Southern and Eastern Europe and especially in the CIS countries.

International Association of Agricultural Economists (IAAE) and European Association of Agricultural Economists (EAAE) in collaboration with the Corvinus University of Budapest and with a number of other institutions in Hungary organized an inter-conference seminar on the subject of agricultural transition in Central and Eastern Europe and Central Asia. The major objective of the seminar was to discuss and draw conclusions on the role of agricultural policy in the transition process in the light of actual progress and current situation in Central and East European countries and in former Soviet States. In addition the contribution of agricultural economics – both from the West and from the East – as a discipline and a profession to the transition process in agriculture were discussed. A specific objective was to identify priorities and means to strengthen the agricultural economics profession in the transition countries and determine research and educational priorities for the future.

The seminar was attended by 118 participants representing 26 countries from Europe, North America and Asia. The Seminar was the largest professional meeting organized by the two associations in 2007. Over 110 abstracts were submitted and evaluated by the International Program Committee. In the two days program of the meeting 8 presentations were made during the 3 plenary sessions, 66 papers were presented in the 15 contributed paper sessions in 8 subject categories. In addition there were 15 posters discussed in the poster session and the findings of a World Bank study on distortions of agricultural incentives in the region was the subject of a pre-conference workshop. Plenary speakers included Ulrich Koester, Johan Swinnen, Jerzy Wilkin, Zvi Lerman, Eugenia Serova and József Popp-Gábor Udovecz. At the end of the seminar David Colman,

President of IAAE gave a global assessment of the status of agricultural economics discipline and profession, while Csaba Csáki, former President of IAAE made summary comments on major issues discussed during the seminar. This volume includes the plenary and contributed papers presented at the seminar and submitted for publications by the authors as well as the abstracts of the poster papers discussed.

The seminar was supported and sponsored by a number of organizations and persons. All of their contributions have to be greatly acknowledged. First the two international organizations IAAE and EAAE have to be mentioned, which provided overall organizational framework and logistical support. The IAAE provided in addition a generous grant to support the participation of young agricultural economists from Central and Eastern Europe on the seminar. On the Hungarian side the Corvinus University of Budapest, the Szent István University of Gödöllő, the Research Institute for Agricultural Economics, the Hungarian Agricultural Economics Association, the Hungarian Association of Agricultural Sciences and the Hungarian Ministry of Agriculture and Rural Development were the major material and organizational supporters. The International Program committee was chaired by David Colman and Csaba Csáki and included Ulrich Koester, Joe Swinnen, Eugenia Serova and Jerzy Wilkin. The local Organizing committee was chaired by Csaba Forgács and István Szűcs and included Zoltán Lakner, András Nábrádi, József Popp, József Tóth, Gábor Udovecz, László Vajda, László Villányi, Krisztina Fodor, Attila Jámbor and Tamás Mizik. Finally IAMO, Halle facilitated the publication of this proceedings.

Budapest, May 7, 2008

Csaba Csáki
Csaba Forgács
Editors

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6 PRODUCTION AND VALUE CHAINS

FROM PUBLIC TO PRIVATE GOVERNANCE OF AGRI-FOOD SUPPLY CHAINS IN TRANSITION COUNTRIES: SOME THEORETICAL AND EMPIRICAL LESSONS

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1 INTRODUCTION¹

The objective of the seminar is to draw lessons from the experience of agricultural transition. This paper contributes to this objective by presenting lessons from the transition of the governance of the agri-food supply chains. My presentation will use both empirical evidence and theory to bring out some of the key lessons.

It is useful to start by pointing out that one of the main insights from the study of the transition process is that it may have learned the profession as much about the workings of a market economy and the governance processes in general than it did about the transition process itself. The dramatic increase in the study of the role of institutions in economic performance and development is a sign of the lessons from the past 15 years.

The governance systems of agri-food supply chains are crucial factors in the organization of trade and production, and have major impacts on economic performance and development.² The governance of food and agricultural commodity value

¹ The paper summarizes key findings from several of our studies. We refer to these studies for more detailed arguments, data and empirical evidence, and analyses (see also reference list). We would like to use this occasion to thank many colleagues with whom we have collaborated on these research issues and from whom we have learned through many discussions and exchanges, including Hamish Gow, Tom Reardon, Csaba Csaki, Azeta Cungu, Liesbeth Dries, Nivelin Noev, Chris Foster, Jan Falkowski, Domenica Milczarek, Etleva Germenji, Volker Beckman, Monika Hartmann, Miet Maertens, Siemen van Berkum, Benoit Blarel, Matthew Gorton, Marc Sadler, Bill Liefert, Kees van der Meer, Steve Jaffee, Emmanuel Hidier, and various colleagues at the OECD, EBRD and the World Bank who have been very supportive of our work.

² There is an extensive literature on the governance of economic activities in general (e.g. WILLIAMSON, 1975, 1985) and on supply chain governance in particular (e.g. GEREFFI et al., 2005). An important focus in this literature is on the non-market coordination of economic activities and transactions in commodity chains.

chains in transition countries has undergone tremendous changes in the past decades. In particular, one can identify a dramatic shift from public (or state) governance to private governance of the agri-food systems. Companies and property rights have been privatized, markets liberalized, and economies integrated into global food systems.

Important lessons from these changes were (a) that the shift to a "market system" coincided with much more disruptions than anticipated, contributing to the output and productivity fall in the 1990s, and (b) that the growth of the "market system" was only partially based on (spot) "markets" but a variety of other institutional arrangements – often "hybrid organizations" in OLIVER WILLIAMSON's (1985) framework – have emerged as the preferred governance structures in agri-food markets.

In this paper we discuss the importance of these changes in governance, their implications for efficiency and equity, and the effects in transition countries. The discussion in this paper draws on our empirical and theoretical work in this field.

2 PRIVATIZATION AND LIBERALIZATION

In the Communist world the entire agri-food system was under strict control of the state. This system of state intervention and control has undergone tremendous changes as a global process of liberalization induced dramatic changes in many of these regions. In the transition world, the liberalization of prices, trade and exchanges, the privatization of the state enterprises etc. removed much of the state control over the commodity chains as well as the vertical coordination in the chains.

These developments have been reinforced by the liberalization of trade and investment regimes in transition and developing countries – policy reforms which often accompanied the privatization and domestic price reforms. Trade liberalization caused major changes in trade of agri-food products, while the liberalization of the investment regimes induced foreign investments in agribusiness, food industry, and further down the chain, with major implications for farmers (DRIES, SWINNEN, 2004). Several food sectors in Eastern Europe, such as the sugar, dairy, and retail sector, have received massive amounts of foreign investment, which now holds dominant market shares. An example is the rapid growth of modern retail chains ("supermarkets") in transition and developing countries which was triggered by the reform process in former state-controlled economies (REARDON, SWINNEN, 2004; DRIES et al., 2004).

Associated with these changes is the spread of (private and public) food standards and an increase in the share of high-value products in agricultural production, food consumption, and trade. Consumers are increasingly demanding specific quality attributes of processed and fresh food products and are increasingly aware of food

safety issues. These food quality and safety demands are most pronounced in rich country markets (and increasingly in urban markets of low-income countries) and affect producers through domestic supply chains, trade, and foreign investment.

Interestingly, while the liberalization and privatization process has caused the growth of private "markets", the organization of these markets has been far from uniform. The simplest framework from Oliver Williamson distinguishes between "markets" (spot markets) on the one extreme and "hierarchies" (such as fully vertically integrated companies) on the other extreme, and a variety of "hybrid organizations" (including various forms of contracting between separate companies) in between those extremes. In those terms, the current agri-food markets in transition countries represent a rich mixture of all these types of organizations, going from spot markets to the (re-)emergence of huge vertically integrated agri-food companies in Russia.³ We also observe a variety of contract systems, introduced by private companies as a means to coordinate exchange in vertical commodity supply chains. In the rest of this presentation we focus on the emergence of hybrid forms of vertical coordination, on which conditions have stimulated their growth, and on their effects on efficiency and income distribution. Through this analysis of the hybrid forms we also learn about the other forms, since these will emerge in the extreme conditions.

3 FROM PUBLIC TO PRIVATE VERTICAL COORDINATION

3.1 State-controlled vertical coordination

Under the Communist regime, production and processing were centrally planned and vertically integrated. Industries were composed of large state-owned firms. The central authority provided contract enforcement and transacting parties faced a low (or zero) probability of contract breach. Vertical coordination (VC) was widespread in state-controlled food supply chains as production at various stages and the exchange of inputs and outputs along the chain was coordinated and determined by the central command system.

Most analyses pointed at the deficiencies and inefficiencies of these systems. State-controlled VC in centralized agricultural marketing systems in Communist countries was often motivated by political motives and by objectives to provide cheap food for urban markets, the maximization of foreign exchange earnings, the creation of rural employment, ascertaining the viability of certain businesses, etc. This was considered one of the primary causes of the inefficiency of the Soviet farming complex (JOHNSON, BROOKS, 1983).

³ See SEROVA (2007) for an analysis of the Russian agri-food complexes.

3.2 Liberalization, privatization, and the break-down of vertical coordination

This system of vertical coordination has undergone tremendous changes in the 1980s and the 1990s. Reforms caused several institutional changes, which lead to contract breaches, the collapse of vertical coordination and major disruptions in the food chain – as it did elsewhere in the economy (BLANCHARD, KREMER, 1997; GOW, SWINNEN, 1998; 2001). First, economic reforms split the vertically integrated chains into autonomous enterprises. Second, privatization and restructuring of the companies in the agri-food chain created many independent enterprises. Third, the previous legal system or the central planning authority was no longer able to enforce the contractual terms and a new legal enforcement mechanism was absent or ineffective. Fourth, macro-economic reforms and price and trade liberalization caused dramatic changes in both nominal and relative prices.

These dramatic and unanticipated shocks caused major disruptions and, in the absence of legal enforcement mechanisms, widespread contracting breaches resulted. The probability of contract breach was reinforced by two factors. First, the combination of macro-economic reforms, the simultaneous institutional reform of the banking system, both raising the cost of capital, and the cut in government subsidies caused severe financial distress for companies, thereby effectively reducing their capital costs of breaching the contract. Second, from a dynamic perspective, the probability of contract breach was self-reinforcing, as it undermined the reputation of the processing company, thereby reducing reputational incentives to honor future contracts.

A widespread form of transition hold-ups has been long payment delays for delivered product. Such payment delays effectively provided processors with an interest free loan from suppliers for the length of the delay, and caused a major drain on much needed cash flow for suppliers. GOW and SWINNEN (1998) documented this problem with examples from the sugar and dairy sector in Slovakia in the early 1990s. GORTON et al. (2000) find that food processing companies in 1999 considered late payments the single most important obstacle to company growth in Czech Republic and Slovenia, and number 3 out of 12 causes in Hungary.

Not only food processing companies breached contracts. Other widespread examples were when suppliers did not deliver the quality or quantity agreed upon. Quality and guaranteed supplies of raw material is crucial for processors, but processors in transition countries often have severe problems in obtaining sufficient quality supplies. Enforcing quality, and timely deliveries, is difficult in general in some sectors, e.g. such as the food industry with agricultural production affected by unobservable factors, and even more problematic in transition countries. Changes in property rights, restructuring, macro-economic reforms, etc. all affect the farms' operation, and hence the volume and quality of their output.

These exchange disruptions had major negative effects. First, they caused additional financial strain and worsened suppliers' already severe cash flow and profitability problems. A major effect of this was massive slaughtering of livestock throughout transition countries as farms could no longer finance feed at intensive livestock operations. Cattle and hog stocks fell dramatically over the 1990s in many countries.

Second, companies changed their activities and investments. In general, they cut back on relationship-specific investments. For example, a case study by GOW et al. (2000) shows that after the reforms which caused severe payment delays by a Slovakian sugar processing company, sugar beet deliveries to the processing company declined by around 30 % from 1990 to 1993, and contracted hectares fell even more. CUNGU and SWINNEN (2003) find in a representative survey of 371 Hungarian farming enterprises, of which 318 were contracting with processors, that there is a significant negative effect of the perceived likelihood of contract breaches on the farms' investments in capital assets. Other general responses were to shift exchange to spot markets, or cash transactions, to terminate activities waiting for better market conditions, or to internalize exchange transactions through vertical integration. An example of the latter is grain farms, which traditionally delivered their products directly to mills, and which started investing in on-farm storage facilities.

3.3 The emergence of private vertical coordination

However, following privatization and liberalization, new forms of VC have emerged and are growing (SWINNEN, 2007; WORLD BANK, 2005). These are no longer state-controlled but are introduced by private companies. Private traders, retailers, agribusinesses and food processing companies increasingly contract with farms and rural households to whom they provide inputs and services in return for guaranteed and quality supplies.

The emergence and spread of private VC is caused by the combination of, on the one hand, an increasing demand for products of high quality and safety standards with private sector investments and increasing consumer incomes and demands (both domestically and through trade) and, on the other hand, the problems which farms face to supply such products reliably, consistently and timely to processors and traders due to a variety of market imperfections and poor public institutions.

Farmers in transition countries face major constraints in realizing high-quality, consistent supplies. These include financial constraints as well as difficulties in input markets, lack of technical and managerial capacity etc. Specifically for high-standards products, farmers might lack the expertise and have no access to crucial inputs such as improved seeds. To guarantee consistent and quality supplies, traders and processors engage in VC to overcome farmers' constraints.

The importance of VC in transition countries is further explained by the lack of efficient institutions and infrastructure to assure consistent, reliable, quality and timely supply through spot market arrangements. VC is in fact a private institutional response to the above described market constraints. To overcome problems of enforcement and constraints on quality supplies, private VC systems are set up by processors, traders, retailers and input suppliers.

Increasing consumer demand for quality and food safety is another driving force behind private VC in transition and developing countries. Investment by modern processors and retailers (supermarket chains) reinforces the need for supplying large and consistent volumes by their use of private standards and requirements of extensive supervision and control of production processes.

There is growing evidence on the importance of these developments.⁴ Over the past years, researchers from Leuven have implemented a series of surveys in the CEE dairy sector. There we find that vertical coordination (including the provision of credit, inputs and loan guarantees) is strongly positively correlated with the progress in reforms (SWINNEN et al., 2006). Surveys by WHITE and GORTON (2004) of agri-food processors in five CIS countries found that food companies which used contracts with suppliers grew from slightly more than one-third in 1997 to almost three-quarters by 2003. There is also significant growth of supplier support measures – including credit, inputs, prompt payments, transportation, and quality control – as part of these contracts. Over 40 % of processors in the CIS sample offer credit to at least some of the farms that supply them; and 36 % offered inputs in 2003.

In more developed situations, or where farms are in a better managerial and financial situation, reducing risk is an important element in contracting. For example, at the end of the 1990s, in the Czech Republic, Slovakia and Hungary, 80 % of corporate farms sold (at least some) crops on contract, and 60-85 % sold animal products on contract (WORLD BANK, 2005). However, for most of those farms with contracts quoted security of outlets and prices as the main reasons for entering in contracts with processing companies. This contrast strongly with less developed situations, such as small cotton farms in Kazakhstan, where contracting with processors is also widespread (71 % of farms in the survey used contracts, including the provision of seeds, credit and irrigation), the most important reason for contracting is access to inputs.

⁴ A review of empirical evidence and studies in various countries and sectors is in SWINNEN (2006; 2007) and in WORLD BANK (2005). See also various other studies by Csaba Csaki and Csaba Forgacs at Comenius University in Budapest, by Jan Falkowski and Domenica Milczarek at the University of Warsaw, by Silke Boger and Volker Beckman at Humboldt University, by Liesbeth Dries (KU Leuven), by Siemen van Berkum (LEI/WUR), by Matthew Gorton (Newcastle University), and their colleagues, and by the FAO Investment Center and EBRD.

4 THE EFFICIENCY AND EQUITY EFFECTS OF VERTICAL COORDINATION WITH COSTLY ENFORCEMENT AND IMPERFECT FACTOR MARKETS

While some have emphasized that the emergence of private VC can be an engine for economic growth, rural development and poverty reduction; others have stressed a series of problems with these developments. One important issue is the enforcement of such contractual arrangements in transition countries which are often characterized by poorly functioning enforcement institutions which can add significantly to the cost of contracting and which may prevent actual contracting to take place.⁵

Another important issue is that the rapid growth of these modern supply chains in transition (and other emerging or developing) countries has stimulated a vigorous public debate in the development community on the income distributional effects of these changes. Some have argued that they are reinforcing inequality and poverty as they are excluding the weakest from participating in these vertically coordinated processes and that large and often multinational companies are extracting the entire surplus from the gains through their bargaining power within the chains (e.g. REARDON, BERDEGUÉ, 2002). Others find more positive effects on development (e.g. DRIES, SWINNEN, 2004; MAERTENS, SWINNEN, 2006).

To address these issues, we present a theoretical model and summarize some empirical evidence to evaluate the sustainability and impact of VC in transition countries. We distinguish between efficiency effects and equity effects.

5 A CONCEPTUAL MODEL

In this section, we present a conceptual model to explain the observed differences in chain governance, in particular the (lack of) emergence of VC and the distribution of the created surplus along the value chain.

Consider the situation where a household farm or a farming company – which we refer to as "the farmer" – can sell farm products to a trader or a processing or retailing company – which we refer to as "the processor". This processor sells the product (after transporting, processing, retailing, etc) to consumers – either domestically or internationally. Let θ represent the value that is created by this transaction, net of the "processing" costs. Hence, θ is the value to be distributed between the processor and the farmer, taking into account the farmers production costs.

⁵ There is an extensive literature on the role of formal and informal enforcement institutions in development, e.g. North, Platteau, Greif, Fafchamps, etc.

The production of commodities for the market requires some (specific) input use (e.g. fertilizers, credit, seeds, technology). Assume that to produce one unit of output, the farmer requires specific inputs with a value of I on top of his standard production cost for subsistence production (e.g. labour, land). We assume that these specific inputs are not available to the farmer because of factor market imperfections. This is a realistic assumption as in many developing countries local producers and households face important factor market constraints. These constraints hurt both farmers and processors: They prevent farmers from producing for the market and constrain the raw materials for the processing firm.

If the processing firm has access to the required inputs, the processor can act as an intermediary in the input market and provide (sell or lend) the inputs to the farmer. This, again, is a realistic case since the processor may have better collateral, more cash flow or face lower transport or transaction costs in accessing the inputs. If so, the processor will consider offering a contract to the farmer, which includes the provision of inputs and the conditions (time, amount and price) for purchasing the farmer's product. We assume that the processor provides the farmer with the full amount of required inputs I per unit of production, or the processor does not provide any inputs⁶.

Note that in such a contract, each agent can hold-up the other agent. On the one hand, the farmer can divert the inputs to other uses, such as selling them or applying them to other production activities; or he may apply the inputs as agreed but then sell the output to competing buyers for a higher price. On the other hand, the buyer may pay a lower price to the farmer than was originally agreed on, or simply postpone payment – a common practice in reality.

In the rest of this section we will show graphically and discuss under which conditions a contract is agreed upon and enforced (implying the creation of surplus) and the distribution of the contract surplus. The participation constraints of the farmer and the processor and their incentive compatibility constraints play a crucial role here. (See SWINNEN and VANDEPLAS (2007) for a more formal analysis, and an analysis of outside contract enforcement and two-sided hold-ups.)

5.1 Markets with perfect enforcement

To establish a baseline result, we start with assuming perfect (and costless) contract enforcement. Hence, if there exists a contract that satisfies both the farmer and the processor's participation constraints, it will be realized. The participation constraints state that the contract should yield a higher payoff for both agents than the disagreement outcome, where the farmer and the processor do not trade at all.

As enforcement is guaranteed, there is no risk of opportunistic behavior by any of the contract parties. In this case, we assume that the contract surplus is shared

⁶ Implying that the application of any amount of inputs below the optimal amount of inputs I is resulting in a lack of marketable surplus.

according to each agent's bargaining power⁷. The farmer's bargaining power is denoted as β , the processor's bargaining power is denoted as $1-\beta$. The contract surplus S is defined as the surplus created by the contract over the sum of the disagreement ("no trade") outside options of the contracting agents: It is the value θ minus the extra production cost I due to the specific inputs. Whereas ΔY denotes the share of the surplus accruing to the farmer, $\Delta \Pi$ is the processor's share. If $\beta = 1-\beta = 0.5$, the surplus of the contract is shared equally; for $\beta < 0.5$, the processor is appropriating a larger part of the surplus than the farmer. Note that an agent's total payoff is formed by adding his outside option to his share of S .

For $\theta < I$, the quality premium is insufficient to justify the specific inputs cost. Contract formation would be inefficient here. This is what we call *efficient separation*. For any value of $\theta \geq I$, contract formation is efficient, and surplus is always created. For $\beta=0.5$, $\Delta Y=\Delta \Pi=0.5 S$. Note that one of the major determinants of bargaining power is farmer versus processor concentration. If the processor has a monopsony, β can be relatively low, down to zero. On the other hand, in the case of a farmer's market⁸, the farmer's bargaining power can be substantially higher, even in the case of a monopsonistic processor.

5.2 Markets with costly enforcement

When enforcement is costly, it is no longer certain that contracts will be honored. Opportunistic behavior may emerge. Hold-ups occur if one of the agents has an attractive alternative to contract compliance. First, we discuss the case where the farmer has the opportunity to hold up the processor. In the next section, we also take into account the case where the processor has an opportunity to hold up the farmer. To understand under which conditions contracting will be sustainable and what the impacts are on the total surplus and on its distribution, we will start by considering the extreme situation where there are no external enforcement institutions – which is equivalent to assuming that external enforcement is prohibitively costly.

5.3 One-sided holdup

Assume only the farmer can potentially hold up the processor, namely by diverting the received inputs to other uses, such as selling them, or applying them to other production activities (e.g. subsistence food crops); or by applying the inputs but then selling the high-quality output to a competing processor at a higher price. Indeed, if a competing processor values the high-quality product as much as the

⁷ This bargaining power is as in PORTER's Five Force Framework (1979) determined by factors as the degree of differentiation of inputs delivered by the farmer, the presence of substitutes for these inputs, the farmer concentration to firm concentration ratio, the importance of the concerned trade volume, etc.

⁸ A farmer's market implies there is a limited supply capacity, such that the few farmers available are of increased importance to the potential buyer(s).

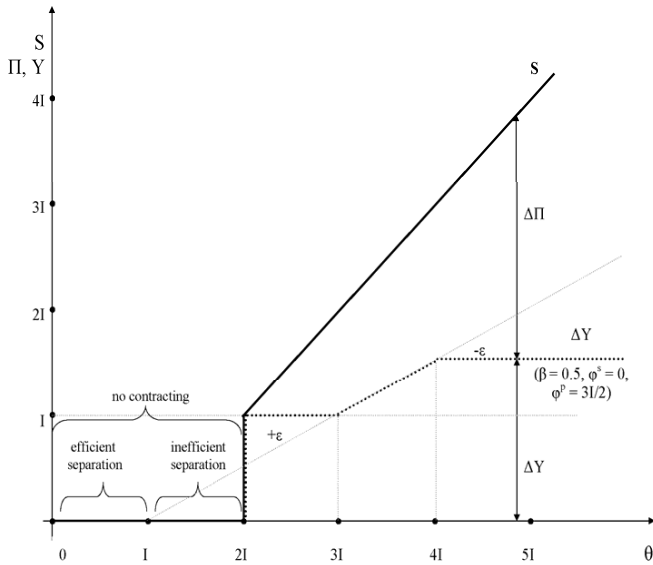
contracted processor does, the former can still earn more profits on it, as she has not paid for the specific inputs required for producing it.

The farmer's incentive compatibility constraint captures the necessary condition for the farmer to voluntarily comply with the contract. It states that the farmer's income from the contract must at least be as much as his outside option, obtained from breaching the contract and selling elsewhere. SWINNEN and VANDEPLAS (2007) show how this is equivalent to the concept of *efficiency wages* (SALOP, 1979), whereas the employer pays a higher wage to his employees to minimize their incentive to quit and seek a job elsewhere, and define the difference between the producer price under costless enforcement and under prohibitively costly enforcement as an "efficiency premium (ϵ)". The efficiency premium will need to be higher if the specific input cost is higher, implying that the supplier's payoff from diverting the inputs to other uses is higher. The required efficiency premium also increases with the price that competing buyers offer for the farmer's produce on the local market.

Figure 6.1 shows how efficient separation occurs for $\theta < I$, where the extra value created by the contract is too small to justify the specific inputs cost. However, for $I < \theta < 2I$, contracts break down although they could be profitable for both agents: *Inefficient separation* occurs. The reason is that for $I < \theta < 3I$, the farmer has an outside option that is more attractive than what he would get under an equal division of the contract surplus S . Indeed, if he would resell the received inputs (instead of using them), he can earn an amount I on top of his disagreement payoff. So this is what the processor should ultimately offer the buyer under the contract as well, by means of an efficiency premium on top of his usual surplus share. Otherwise, the farmer's ICC is not satisfied. This obviously requires that $S \geq I$, for the processor's PC to remain satisfied at the same time. If $I < \theta < 2I$, then $\theta < S < I$, and there is no division of S that allows for simultaneous satisfaction of the farmer's ICC and the processor's PC. Inefficient separation occurs. For $2I < \theta < 3I$, the processor is able to pay the farmer an efficiency premium that covers the difference between his equal division outcome and his outside option. The rest of the surplus will then accrue to the processor. Due to this efficiency premium, opportunistic behavior by the farmer is ruled out, and contracting is sustainable.

Hence, over the interval $2I < \theta < 3I$, the surplus going to the farmer is constant at $\Delta Y = I$. Notice that without efficiency premium, ΔY would range from $0.5I$ to I . The share going to the processor increases from θ to I over this interval.

Figure 6.1: Equity and efficiency of contracting with enforcement costs and two-sided hold-ups



So far, we ignored reputation costs. However, if he breaks a contract, the supplier may suffer a loss in terms of reputation, or social capital, or opportunities for future trade. This reputation loss, denoted φ^s , puts a brake on opportunistic behavior, as the outside options for contract breach are reduced by an amount φ^s . In this case, the inefficient separation interval narrows and the efficiency premium decreases. Note that farmers can benefit from weak contract enforcement institutions, through the efficiency premium, but may lose from inefficient separation.

The actual outcome depends on several factors, in general, the implications for surplus sharing are as follows: Farmers will receive a higher income when, *ceteris paribus*, (a) the value in the chain is higher, (b) their bargaining power is higher, (c) when their opportunity costs (of signing the contract as well as of honouring the contract once it has been signed) are higher and (d) when their reputation cost is lower.

6 CONCLUDING COMMENTS

The governance of agri-food supply chains in transition countries has dramatically changed. The most important change is from public (or state) governance to private governance of the agri-food systems, and from domestically oriented to globally integrated. Companies and property rights have been privatized, markets liberalized, and food supply chains integrated into the global economy. An

important aspect of these changes is that liberalization and privatization initially caused the collapse of state-controlled vertical coordination. However, more recently, privately governed vertical coordination systems have emerged and are growing rapidly. This is a response to consumer demand for food quality and safety on the one hand and the farms' production constraints caused by factor market imperfections on the other hand.

In this paper we have shown theoretically and empirically that these changes have major effects on quality, equity and efficiency of the agri-food systems and, more generally, have major implications for economic performance and development in these countries (and beyond).

There are several lessons we can draw from this process. Most importantly, it has provided insights in the working of a market economy, which is a much more complex and much less monolithic organization than often assumed (and preached). Transition has also taught us that institutional changes can be costly but still worthwhile to pursue. It has also learned that specific circumstances require specific organizational and institutional solutions (adjustments) to govern exchanges. The functioning (or not) of contract enforcement systems, both formal and informal, has major implications for efficiency and for income distributions. It is also clear that transition in this field has not yet finished and that as investment and institutional changes continue that the organization of the market – the governance of the supply chains – will continue to change and adapt. Finally, it is also clear that we do not yet sufficiently understand all the changes that are taking place and their implications and that this should be an important field for future research.

REFERENCES

- BLANCHARD, O., KREMER, M. (1997): Disorganization. *Quarterly Journal of Economics*, 112(4), pp. 1091-1126.
- CUNGU, A., SWINNEN, J. (2003): The Impact of Aid on Economic Growth in Transition Economies: An Empirical Study. LICOS Discussion Paper 128, Leuven.
- DRIES, L., SWINNEN, J. (2004): Foreign Direct Investment, Vertical Integration and Local Suppliers: Evidence from the Polish Dairy Sector. *World Development*, 32(9), pp. 1525-1544.
- DRIES, L., REARDON, T., SWINNEN, J. (2004): The Rapid Rise of Supermarkets in Central and Eastern Europe: Implications for the Agrifood Sector and Rural Development. *Development Policy Review* 22(5), pp 525-556.
- GEREFFI, G., HUMPHREY, J. and STURGEON, T. (2005): The Governance of Global Value Chains. *Review of International Political Economy*, 12(1), pp. 78-104.
- GORTON, M., BUCKWELL, A., DAVIDOVA, S. (2000): Transfers and Distortions along CEEC Food Supply Chains. In: TANGERMANN, S., BANSE, M. (eds): *Central and Eastern European Agriculture in an Expanding European Union*. CABI Publishing, Wallingford Oxon, pp. 89-112.

- GOW, H., SWINNEN, J. (1998): Agribusiness Restructuring, Foreign Direct Investment, and Hold-up problems in Agricultural Transition. *European Review of Agricultural Economics*, 25(4), pp. 331-350.
- GOW, H., STREETER, D. H., SWINNEN, J. (2000): How private contract enforcement mechanisms can succeed where public institutions fail: The case of Juhocukor a.s. *Agricultural Economics*, 23(3), pp. 253-265.
- GOW, H. R., SWINNEN, J. (2001): Private Enforcement Capital and Contract Enforcement in Transition Economies. *American Journal of Agricultural Economics*, 83(3), pp. 686-690.
- JOHNSON, D. G., BROOKS, K. M. (eds) (1983): *Prospects for Soviet Agriculture in the 1980s*. Indiana University Press, Bloomington.
- MAERTENS, M., SWINNEN, J. (2006): Trade, Standards, and Poverty: Evidence from Senegal. LICOS Discussion Paper 177, Leuven.
- PORTER, M. (1979): How Competitive Forces Shape Strategy. *Harvard Business Review*, 57, pp. 86-93.
- REARDON, T., SWINNEN, J. (2004): Agrifood Sector Liberalization and the Rise of Supermarkets in Former State-Controlled Economies: Comparison with Other Developing Countries. *Development Policy Review*, 22(4), pp. 317-334.
- REARDON, T., BERDEGUÉ, J. A. (2002): The Rapid Rise of Supermarkets in Latin America: Challenges and Opportunities for Development. *Development Policy Review*, 20(4), pp. 371-388.
- SALOP, S. C. (1979): A Model of the Natural Rate of Unemployment. *American Economy Review*, 69(1), pp. 117-125.
- SEROVA, E. (2007): Vertical Integration in Russian Agriculture. In: SWINNEN, J. F. (ed.): *Global Supply Chains, Standards, and the Poor*. CABI Publishing, Oxfordshire.
- SWINNEN, J., VANDEPLAS, A. (2007): Vertical Coordination, Rent Distribution, and Development. LICOS Discussion Paper 184, Leuven.
- SWINNEN, J. (ed.) (2007): *Global Supply Chains, Standards, and the Poor*. CABI Publishing, Oxfordshire.
- SWINNEN, J. (2006): The dynamics of vertical coordination in agro-food chains in Europe and Central Asia: Case Studies. World Bank, Washington D.C.
- SWINNEN, J., DRIES, L., NOEV, N., GERMENJI, E. (2008): Foreign Investment, Supermarkets, and the Restructuring of Supply Chains: Evidence from Eastern European Dairy Sectors. *World Development*, forthcoming.
- WHITE, J., GORTON, M. (2004): Vertical Coordination in ECA Agrifood Chains as an Engine of Private Sector Development: Implications for Policy and Bank Operations, World Bank, Washington DC.
- WILLIAMSON, O. (1975): *Markets and Hierarchies: Analysis and Antitrust Implications*. The Free Press, New York.
- WILLIAMSON, O. (1985) *The Economic Institutions of Capitalism*. The Free Press, New York.
- WORLD BANK (2005) *The Dynamics of Vertical Coordination in Agrifood Chains in Eastern Europe and Central Asia. Implications for Policy Making and World Bank Operations*, World Bank, Washington D.C.

ASSESSING MARKET FUNCTIONING: THE CASE OF THE HUNGARIAN MILK CHAIN

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1 INTRODUCTION

The main intention behind the reforms started in the early 1990s was the implementation of market coordination. Decentralized coordination was expected to provide incentive compatible decision mechanisms which in turn should allow the allocation of resource to their most beneficial uses. In addition, the improved remuneration of resources should foster economic growth and the increase of per capita income. Consequently, analyses of market functioning provides information regarding the successes made regarding the original objectives of the reforms. This in turn suggests that the analysis of market results can be used to assess the transition processes.

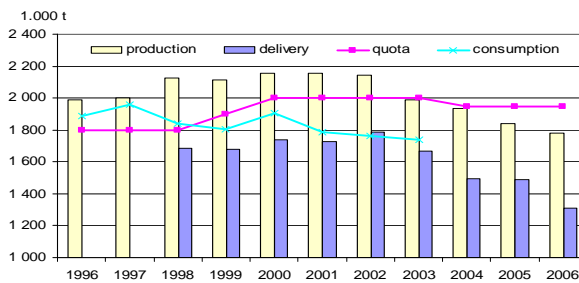
The objective of this paper is to investigate market functioning by evaluating the significance of market power directly using a structural market model. Within this framework not only price but in addition quantity data will be used to investigate resource allocation on markets. We will apply the approach to the development on the Hungarian milk market between 1998 and 2006 and discuss whether the institutional setting led to conditions that are consistent with a functioning market or whether frictions are present that allow some parties to appropriate the rents associated with milk production. We focus on the dairy chain for several reasons. First dairy production is an important source of farm income. Second, the Hungarian milk market was subject to policy shocks which induce significant adjustment in milk production and processing. Third, milk processing is relative highly concentrated and dominated by foreign capital. Forth milk prices in Hungary belong to the lowest in the new EU member states, until 2006. Especially the two latter conditions might suggest the existence of considerable market power.

2 DESCRIPTION OF THE HUNGARIAN DAIRY CHAIN

2.1 Development of milk production and consumption

Before 2004 milk production rose to about 2.1m t. Due to the abolishment of the national price support system in 2004 and the induced decline of milk prices, milk production in Hungary shrank until 2006 by about 15 % to 1.8m t. Only 79-83 % of total production was delivered to dairy companies. This shows the great importance of direct marketing and internal consumption on farms. Moreover, the share of raw milk delivered to domestic dairy companies decreased after 2004 (Figure 6.2).

Figure 6.2: Production and consumption of raw milk, Hungary, 1996/7-2005/06



Source: Tej TermékTanács, KSH – Statisztikai Évkönyv, Állatállomány.

The main reason for the reduction is the dynamic increase of raw milk export to Italy. Export quantities have increased from 43,000 t in 2004 to 108.00 t in 2005. In 2006 exports to Italy amounted to already 230,000 t. At the same time, import of raw milk has also increased, mainly from Slovakia, however to a less extend. However, imported raw milk still has a marginal share on total milk processing. The consumed volume of dairy products hasn't changed significantly in recent years. However, in the case of high value added products (especially by cheese) some increase could be observed.

2.2 Structure of milk production

Since the accession, Hungarian cow stock is decreasing continuously. Between 2003 and 2006, the number of cows has reduced by 9 %, from 359,000 to 326,000. Approximately 250,000 cows were held in enterprises with an agricultural area larger than 50 ha. The main part of the stock (223,000 animals) was held by legal entities and less than a third of the total stock (102,000 animals) were at private firms. The number of small producer with 1-9 cows is relative high yet, 90 % of the enterprises belongs to this category. Despite of this structure, milk production in Hungary is rather concentrated. Approximately 98 % of the raw milk is produced in enterprises with more than 100 cows.

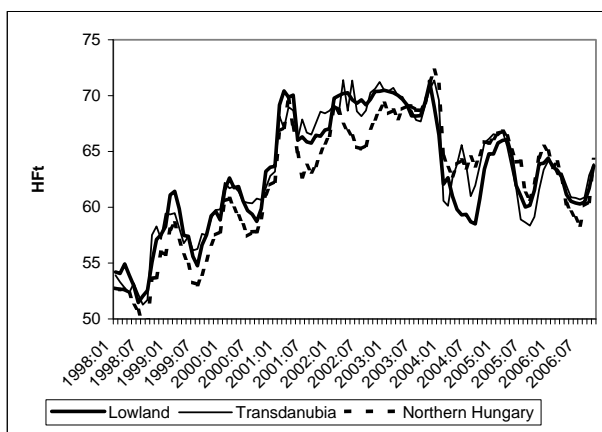
2.3 Processing industry

Between 1997 and 2004, the number of milk processors in Hungary has decreased from 104 to 93. In 2004 the ten largest enterprises bought up approximately 70 % of the raw milk. At present, the largest enterprise (Sole-Mizo) has a market share of 26 %, followed by Friesland with 24 %. While in the second half of the nineties and also at the beginning of this century the Hungarian dairy industry was dominated by foreign enterprises, this has changed slightly in recent years. The largest enterprise was bought by a Hungarian investor and also Parmalat with approximately 20 % market share was taken over in the spring of 2006 by 140-150 milk producers. The big influence of foreign companies on the Hungarian raw milk market together with the extremely high concentration suggest that farmers are in a poor bargaining position and processors might be able to exploit significant market power.

2.4 Farm gate prices

Between 1995 and 2003 the target price was adjusted annually at increasing levels. During this period, the average market price for raw milk followed the target price without significant regional differences between Lowlands, Transdanubia and Northern Hungary (06.3). Until 2004, Hungarian milk producers received a high milk price compared with other new member states such as Poland, the Czech Republic or Slovakia. Since the accession, the situation has changed in principle. Before 2004 an export subsidy system existed. Processors received export subsidies when they paid the target price for raw milk to the farmers. This system kept the milk prices artificially high. The abolishment of the national price support system in the beginning of 2004 led to decrease of the raw milk price.

Figure 6.3: Regional market prices of raw milk in Hungary, 1998-2006



Source: AKI – PÁIR.

3 MARKET POWER: A STRUCTURAL MARKET MODEL

We follow the methodology developed by BRESNAHAN (1982) and MUTH, WOHLGENANT (1999) to test for oligopsony market power of the milk processing industry. The profit of a representative processor is given by:

$$\pi_i = R(\mathbf{p}, x_i, \mathbf{z}_i) - w_x \cdot x_i - \mathbf{w}_z' \mathbf{z}_i \tag{1}$$

where \mathbf{p} is a vector of dairy product prices, $R(\mathbf{p}, x_i, \mathbf{z}_i)$ represents the revenue function depending in addition on raw milk demand (x_i) and other inputs (\mathbf{z}_i). The symbol w is used for the corresponding factor prices. The raw milk supply function is:

$$x = g(w_x, \mathbf{s}) \tag{2}$$

Here, \mathbf{s} is a vector of supply shifters and x is the total supply of raw milk. However, for analysing optimal demand of the processor it is more convenient to use the inverse supply function:

$$w_x = g^{-1}(x, \mathbf{s}) \tag{2'}$$

Given (1) and (2) the first order condition for profit maximisation is:

$$\frac{\partial R(\mathbf{p}, x_i, \mathbf{z}_i)}{\partial x_i} - w_x - \frac{\partial g^{-1}(x, \mathbf{s})}{\partial x} \frac{\partial x}{\partial x_i} x_i = 0, \tag{3}$$

where $\partial x / \partial x_i$ represents the increase of total farm supply induced by an increase of processor i 's milk demand. The first order condition can be aggregated over all n processors. After defining

$$\frac{1}{n} \sum_{i=1}^n \frac{\partial R(\mathbf{p}, x_i, \mathbf{z}_i)}{\partial x_i} = \frac{\partial R(\mathbf{p}, x, \mathbf{z})}{\partial x}$$

(3) can be written as:

$$W_x \left(1 + \frac{\Theta}{\varepsilon} \right) = p \frac{\partial R(\mathbf{p}, x, \mathbf{z})}{\partial x}, \tag{4}$$

where $\varepsilon_x = \frac{\partial x}{\partial g^{-1}(x, \mathbf{s})} \frac{g^{-1}(x, \mathbf{s})}{x} = \frac{\partial x}{\partial w_x} \frac{w_x}{x}$ denotes the price elasticity of raw milk

supply and $\Theta = \frac{1}{n} \sum_{i=1}^n \frac{\partial x}{\partial x_i} \frac{x_i}{x}$ is the average input conjectural elasticity and captures the degree of market power (BRESNAHAN, 1989). The parameter range is $0 < \Theta < 1$. $\Theta = 0$ corresponds to perfect competition, while $\Theta = 1$ characterizes a monopsonistic market. In addition we allow Θ to change over time, i.e. $\Theta = \Theta_0 + \Theta_t t$.

4 EMPIRICAL RESULTS

4.1 Empirical implementation

Raw milk supply was approximated by a translog functional specification in order to be able to identify relationships among the variables without imposing ex ante restrictions on economic relevant parameter (CHAMBERS, 1988):

$$\ln x = \alpha_0 + \alpha_x \ln w_x + \frac{1}{2} \alpha_{xx} (\ln w_x)^2 + \alpha_s \ln s + \frac{1}{2} \ln \mathbf{s}' \mathbf{A}_{ss} \ln s + \ln \mathbf{s}' \mathbf{A}_{sw} \ln w_x \quad (5)$$

where α and \mathbf{A} are parameters to be estimated. The elasticity of raw milk supply is:

$$\varepsilon = \frac{\partial \ln x}{\partial \ln w_x} = \alpha_x + \alpha_{xx} \ln w_x + \ln \mathbf{s}' \mathbf{A}_{sw} \quad (6)$$

The marginal product $\partial R(\mathbf{p}, x, \mathbf{z}) / \partial x$ in (4) was derived from a translog approximation of the processors' revenue function:

$$\begin{aligned} \ln R(\mathbf{p}, x, \mathbf{z}) = & \beta_0 + \beta_x \ln x + \frac{1}{2} b_{xx} (\ln x)^2 + \beta_z \ln \mathbf{z} + \frac{1}{2} \ln \mathbf{z}' \mathbf{B}_{zz} \ln \mathbf{z} \\ & + \ln \mathbf{z}' \mathbf{B}_{zx} \ln x + \beta_p \ln \mathbf{p} + \frac{1}{2} \ln \mathbf{p}' \mathbf{B}_{pp} \ln \mathbf{p} \\ & + \ln \mathbf{p}' \mathbf{B}_{px} \ln x + \frac{1}{2} \ln \mathbf{p}' \mathbf{B}_{pz} \ln \mathbf{z} \end{aligned} \quad (7)$$

The parameters to be estimated are β and \mathbf{B} . It follows:

$$\begin{aligned} \frac{\partial \ln R(\mathbf{p}, x, \mathbf{z})}{\partial x} &= \frac{\partial \ln R(\mathbf{p}, x, \mathbf{z})}{\partial \ln x} \frac{R(\mathbf{p}, x, \mathbf{z})}{x} \\ &= (\beta_x + b_{xx} \ln x + \ln \mathbf{z}' \mathbf{B}_{zx} + \ln \mathbf{p}' \mathbf{B}_{px}) \frac{R(\mathbf{p}, x, \mathbf{z})}{x} \end{aligned} \quad (8)$$

Substituting (7) and (8) in (5) provides:

$$W_x = \frac{(\beta_x + b_{xx} \ln x + \ln \mathbf{z}' \mathbf{B}_{zx} + \ln \mathbf{p}' \mathbf{B}_{px}) \frac{R(\mathbf{p}, x, \mathbf{z})}{x}}{1 + \frac{\Theta_0 + \Theta_t t}{\alpha_x + \alpha_{xx} \ln w_x + \ln \mathbf{s}' \mathbf{A}_{sw}}} \quad (9)$$

Equations (5), (7) and (9) constitute a simultaneous nonlinear equation model. In order to allow for cross equation co-variation of the error terms a nonlinear three stage estimation procedure (NL3SLS) is applied. Estimating a NL3SLS requires a set of instrumental variables. We used the full set of variables as instruments. In order to save on the number of parameters we imposed theoretically consistent

homogeneity restrictions on the revenue function and the supply function⁹. The individual restrictions are not presented here but are given in the annotations of corresponding tables.

4.2 Estimation results

The data set consists of 106 monthly observations (from January 1998 to October 2006). **0** provides information about the variables used in the estimation. All monetary values were deflated by the Consumer Price Index. The endogenous variables (market results) are the price of raw milk and the amount of raw milk processing.

The supply shifters (**s**) consist of the prices for feeding stuff, and labour input and the number of cows. The two latter variables were subject to several kinds of adjustments. Labour input in milk production was calculated in three steps. First, total agricultural labour input was weighted by the share of milk in total agricultural output. Second, since only about 80 % of the Hungarian raw milk production is processed by the dairy companies, the adjusted labour input was weighted a second time. In the third step the annual data were transformed into monthly time series. The number of cows was adjusted using the second and third step. In addition, a time trend was included to account for the impact of technological change on milk supply. Land was not considered in the analysis. Data on grassland were available, however since a large part of it is fallow and we have no detailed information on this, land would not be a scarce factor and thus, would not affect raw milk supply.

The shifters of the derived demand function (**z**) include a trend variable, the prices of butter and cheese, labour input in processing. Labour input has to be transformed into a monthly series, the same hold for industry revenues. A dummy variable was included in the revenue function to account for the changes in milk policy in 2004.

⁹ The revenue function is supposed to be linear homogenous of degree 1 in prices, the degree of homogeneity in prices of the supply function (CHAMBERS, 1988).

Table 6.1: Variable description

	Variable	Description	Mean	Standard deviation
Market results	price	Price of raw milk, Ft/kg, deflated by CPI, seasonally adjusted	44.92	5.64
	milk	Amount of processed raw milk, in 1000 t, seasonally adjusted	133.66	21.81
Supply function (s)	feed	Price of animal feed, Ft/kg, deflated by CPI	31.96	2.05
	labour	Labour input in milk production, 1000 persons, adjusted by the ratio of processed and produced milk and the share of milk on total production	12.23	7.18
	cows	Number of cows, in 1000 head, adjusted by the ratio of processed and produced milk	308.23	43.60
	time	Trend variable	53.50	30.60
Revenue function (p,z)	butter	Price of butter, 1000 Ft/kg, deflated by CPI	0.59	0.04
	cheese	Price of cheese, 1000 Ft/kg, deflated by CPI	0.61	0.08
	labour	Labour input in processing, in 1000 persons	9.55	1.22
	break	Dummy variable to account for the abolishment of export subsidies in 2004		
Revenue		Revenue of the dairy industry, billion Ft, deflated by CPI	11.78	1.74

Source: AKI, own estimation.

In order to ease the interpretation of the estimation results, all variables were weighted by their geometric mean. Because of this transformation, the estimates of α_x , α_s , β_x and β_z represent elasticities and value shares, respectively. $\mathbf{0}$ provides the estimation results of the system (5), (7) and (9). All parameters have the theoretically consistent sign. The value share of butter is positive, ($\beta_{butter} > 0$), and the supply elasticity is positive ($\beta_{butter * butter} + \beta_{butter} - (\beta_{butter})^2 > 0$), however, rather the reaction is rather inelastic. An increase of milk processing affects revenues positively, and, as expected, at a decreasing rate ($\beta_{milk * milk} + \beta_{milk} - (\beta_{milk})^2 < 0$), suggesting a demand for raw milk that is decreasing in prices. Technical change has a positive impact in milk processing ($\beta_{time} > 0$). The supply of raw milk increased with higher prices ($\alpha_{milk} > 0$). The result that milk supply is rather inelastic is consistent with the fact that only short run supply reactions are captured. This results from using quantities of cows and labour instead of their prices as arguments in the supply function. Furthermore, milk supply increased with the number of cows and the amount of labour input. Technical change has also a positive impact on milk supply ($\alpha_{time} > 0$).

Table 6.2: Estimation results of the full system

Revenue function		Supply function	
Coefficient	Estimate	Coefficient	Estimate
β_{break}	0.2023***		
β_{time}	0.0146***	α_{time}	0.0028**
$\beta_{\text{time*time}}$	0.0007**	$\alpha_{\text{time*time}}$	0.0002*
β_{butter}	0.1013***	α_{milk}	0.1073***
β_{labour}	3.7647***	α_{labour}	0.2546**
β_{milk}	0.9998***	α_{cows}	0.1196
$\beta_{\text{butter*time}}$	0.0004	$\alpha_{\text{milk*time}}$	-0.0221***
$\beta_{\text{labour*time}}$	0.2227**	$\alpha_{\text{labour*time}}$	-0.0070**
$\beta_{\text{milk*time}}$	-0.0705***	$\alpha_{\text{cows*time}}$	0.1173***
$\beta_{\text{butter*butter}}$	-0.0900*	$\alpha_{\text{milk*milk}}$	-4.0438***
$\beta_{\text{labour*labour}}$	48.8260**	$\alpha_{\text{labour*labour}}$	0.1949***
$\beta_{\text{milk*milk}}$	-0.1962**	$\alpha_{\text{cows*cows}}$	28.3080***
$\beta_{\text{butter*labour}}$	0.0038	$\alpha_{\text{milk*labour}}$	-0.9254***
$\beta_{\text{butter*milk}}$	0.0531**	$\alpha_{\text{milk*cows}}$	-8.2491***
$\beta_{\text{labour*milk}}$	-0.8230***	$\alpha_{\text{cows*labour}}$	0.8169
Θ_0	0.0048**		
Θ_t	0.0002		

Source: Own estimation.

Notes: (1) The homogeneity restrictions of the revenue function are $\beta_{\text{butter}} + \beta_{\text{cheese}} = 1$, $\beta_{\text{butter*time}} - \beta_{\text{cheese*time}} = 0$, $\beta_{\text{butter*butter}} - \beta_{\text{cheese*cheese}} = 0$, $\beta_{\text{butter*butter}} - \beta_{\text{butter*cheese}} = 0$, $\beta_{\text{butter*labour}} - \beta_{\text{cheese*labour}} = 0$, and $\beta_{\text{butter*milk}} - \beta_{\text{cheese*milk}} = 0$

(2) The homogeneity restrictions of the supply function are $\alpha_{\text{milk}} + \alpha_{\text{feed}} = 0$, $\alpha_{\text{milk*time}} + \alpha_{\text{feed*time}} = 0$, $\alpha_{\text{milk*milk}} = \alpha_{\text{feed*feed}}$, $\alpha_{\text{milk*milk}} - \alpha_{\text{milk*deed}} = 0$, $\alpha_{\text{milk*labour}} + \alpha_{\text{feed*labour}} = 0$, and $\alpha_{\text{milk*cows}} = \alpha_{\text{feed*cows}}$.

*, **, *** Denote significant at the 10 %, 5 %, and 1 % level, respectively

4.3 Market power and the interpretation of Θ

The estimates suggest that market power is not a severe problem in the Hungarian dairy market. This result is surprising given the high concentration of dairy processing and the relatively low milk prices in Hungary. However, even farmers are confronted by a relatively small number of processors the latter appears not to be able to benefit from their favourable industry structure. One reason is the overcapacities in the dairy industry which led to intense competition among processors on the raw milk market. The problem of overcapacities is aggravated by the fact that farmers possess different opportunities to market their produce. They can sell to Hungarian processors, export raw milk, or market their produce directly to consumers. These choices might put, on the average, Hungarian milk producers, in a relatively favourable market position which hamper the exploitation of market

power by the dairy industry. In addition, the low prices for raw milk cannot be regarded as a consequence of market power but instead of the failure of the processing industry to engage in product differentiation and to position itself successively on the market for premium goods which allow higher value added and, in turn, would increase the prices for the raw materials. Given this interpretation, the fact that the evidence for market power is relatively poor is a coherent estimation result.

We derived market power is derived in a conjectural variation approach. Correspondingly, the parameter can only be interpreted consistently within this framework. Alternatively to the conduct performance approach used in this paper, the existence of market power may be analysed in a collusion framework. Using a dynamic oligopoly model with collusion CORTS (1999) shows that within such a setting the conjectural variation approach systematically underestimates the impact of market power on market allocation when supply shocks are not permanent.

With regard to milk production this may be a relevant problem since raw milk supply shows a seasonal pattern opposite cyclical changes of raw milk price. Thus, because supply changes are temporary underestimation may be a severe problem. However, a definite answer could only be given when the likelihood and possibilities for collusive behaviour in the dairy industry would be analysed in more detail. An alternative approach would be to examine the price – cost margins in the dairy industry directly. However, because of the lack of data, these approaches could not be pursued in this paper.

5 DISCUSSION

We motivated our analysis by the questions whether the economic and institutional reforms in Hungary provided an environment in the agri-food chain in which market allocation can develop its full benefits. In order to be able to do a detailed analysis, we restricted our analysis to the milk production and processing, one of the pivotal sectors in Hungarian agriculture. We answered the question by developing a formal model that allows conclusion regarding the functioning of market by the investigation of market results, i.e. prices and quantities exchanged.

The estimation results provide that oligopsony power is significant but at a rather low level. This led us conclude, that factor allocation and income distribution on the milk market might not be biased by market power. In addition, we were able to explain the large reduction of raw milk prices after the abolishment of the price support system by the structure of demand and supply elasticities. The absence of market power on the milk market is also confirmed by the fact that farmers possess alternative choices to market their produce as there are purchases to domestic producers, export of raw milk, and direct sales of the produce. In addition, our results demonstrates that the simple look at indicators of market

structure like concentration ratios may lead to misleading results because of the lacking one-to-one relationship between these indicators and the behaviour of firms on the market.

REFERENCES

- BRESNAHAN, T. F. (1982): The oligopoly solution concept is identified. *Economics Letters*, 10, pp. 87-92.
- BRESNAHAN, T. F. (1989): Empirical Studies of Industries with Market Power. In: SCHMALENSEE, R., WILLIG, R. D. (eds): *Handbook of Industrial Economics*, 2, Amsterdam, pp. 1011-1057.
- CHAMBERS, R. G. (1988): *Applied Production Economics. A Dual Approach*. Cambridge.
- CORTS, K. S. (1999): Conduct Parameter and the Measurement of Market Power. *Journal of Econometrics*, 88, pp 227-250.
- HOCKMANN, H., VÖNEKI, É. (2004): German and Hungarian milk chains: Expectations and first experiences of accession and market reform. In: POPP, J., KAMARÁSNÉ HEGEDŰS, N. (eds): *Application of the Common Agricultural Policy in the Enlarged European Union*. Budapest, pp. 227-241.
- MUTH, M. K., WOHLGENANT, M. K. (1999): Measuring the Degree of Oligopsony Power in the Beef Packing Industry in the Absence of Marketing Input Quantity Data. *Journal of Agricultural and Resource Economics*, 24, pp 299-312.

MODELLING DAIRY FARM SIZE DISTRIBUTION IN POLAND USING AN INSTRUMENTAL VARIABLE GENERALIZED CROSS ENTROPY MARKOV APPROACH¹⁰

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1 INTRODUCTION

The aim of this paper is to analyse how dairy farm structure in Poland has changed during the post-socialist period. A relevant issue is what will happen to the subsistence and semi-subsistence farms in the restructuring process. The objectives are threefold. First the paper focuses on how farm structure has changed over time and what path it is likely to follow in the coming decade, by making several projections. Second, we investigate whether the changes in farm size can be explained by non-stationary effects. Finally, several statistical indicators are computed on farm mobility and on which farms are likely to survive.

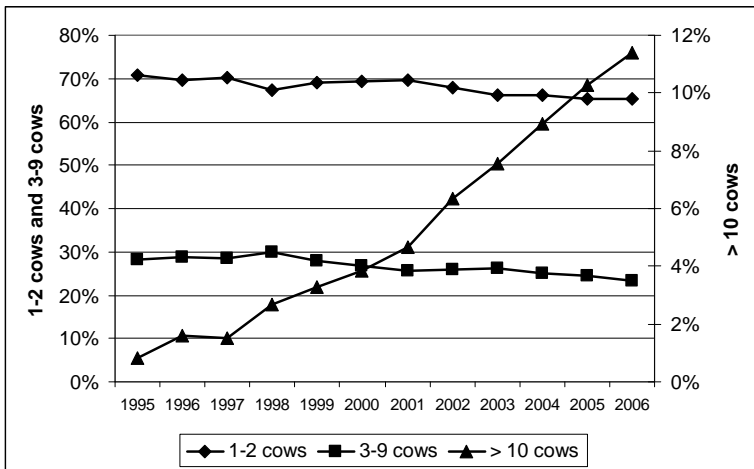
The remainder of this paper is organised as follows. Section 2 describes the farm structure of Poland, with the focus on dairy farming. Section 3 specifies the Markov chain entropy formalism. Section 4 discusses the sample data and prior information. Section 5 discusses the results, while Section 6 sets out the conclusions.

¹⁰ The views expressed in this paper are those of the authors and do not necessarily correspond to those of the European Commission.

2 FARM STRUCTURE IN POLAND, WITH THE FOCUS ON DAIRY FARMING

In Poland, dairy producers after the transition reform can be classified in three main categories: Farmers with 1-2 cows, who produce milk mostly for the farm household (i.e. subsistence dairy farms); farmers with 3-4 cows or more, who produce milk for sale in local markets and for their own needs (i.e. semi-subsistence dairy farms); and farmers with more than 10 cows, who produce almost exclusively for the dairy industry. In 1996, about one quarter of Polish milk was produced by almost 1 million individual farms holding 1 to 3 cows, while half came from farms with 3 to 9 cows (EUROPEAN COMMISSION, 1998, p. 36). This underscores the great fragmentation of Polish milk production even after transition. In 2005 there were about 700,000 dairy farms: A decline of about 51 % as compared with the number of farms in 1995. In the same year, about 65 % of farms with dairy cows belonged to subsistence farms with 1-2 cows (**Figure 6.4**) and about 53 % of the dairy cow stock was concentrated in farms with 1-9 cows. A first inspection of **Figure 6.4** suggests that the change in Polish dairy farm structure proceeded without being affected by the EU milk quota system, which was announced in 2004 and effectively introduced in 2006.

Figure 6.4: Dairy farms in Poland, 1995-2006



Source: Own calculations based on KRAWIECKA (2006).

Note: Percentages are expressed relative to the total number of active dairy farms.

In addition it appears that the size class with 3 to 9 cows constitutes the switch size class: Farms with smaller herd sizes (i.e. dairy farms with 1-2 cows) show a tendency to decline, whereas for farms with larger herds (i.e. dairy farms with more than

10 cows) the opposite holds true. This suggests that part of the dairy farms in the size class with 3 to 9 cows will go out of business, scale down or scale up to large farm size classes.

3 AN INSTRUMENTAL VARIABLE GENERALIZED CROSS ENTROPY MARKOV CHAIN

The Markov chain approach is very suitable when the only data available are count data in the form of observable proportions or aggregates rather than data at the level of micro units. In this context, the GCE algorithm developed in GOLAN et al. (1996), and MITTELHAMMER et al. (2000) is a suitable candidate for extracting the maximal signal from an initial "out-of-focus" problem.

Considering the dynamic farm growth process in a Markov problem, it is conceivable that farm growth could be explained by non-stationary effects. Several economic variables are then expected to affect the unknown transition probabilities. Applying the formulation as developed in GOLAN and VOGEL (2000) and COURCHANE et al. (2000), it is possible to assess the impact of key variables on the Markov transition probabilities, therewith potentially improving the explanatory power of the model. In formalising the problem, the non-stationary GCE Markov problem can be formulated as follows:

$$\min I(p_{lk}, q_{lk}, w_{tkh}, u_{tkh}) = \sum_l \sum_k p_{lk} \ln(p_{lk} / q_{lk}) + \sum_t \sum_k \sum_h w_{tkh} \ln(w_{tkh} / u_{tkh}) \quad (1)$$

subject to the following constraints:

$$\sum_t z_m y_{tk} = \sum_t \sum_l z_m x_{tl} p_{lk} + \sum_t z_m e_{tk}, \quad \forall n = 1, \dots, N, \text{ and } \forall k = 1, \dots, K \quad (2)$$

with

$$e_{tk} = \sum_h V_{tkh} w_{tkh} \quad (3)$$

and

$$\sum_k p_{lk} = 1 \quad (4)$$

$$\sum_h w_{tkh} = 1 \quad (5)$$

Equation (1) represents the GCE criterion which minimises the divergence between the data in the form of posterior transition probabilities p_{lk} and the transition priors q_{lk} ; p_{lk} denotes the probability of a farm in size class l at time t moving to size class k at time $t+1$. Probabilities p_{lk} are elements of a $L \times K$ squared matrix of transition probabilities where $l, k = 1, \dots, K$ and q_{lk} are the counterpart prior elements; w_{tkh} are the elements of a $TKH \times 1$ vector of error

posterior probabilities, and u_{ikh} are the counterpart prior elements. Equation (2) represents the Markov data consistency constraints, where y_{ik} are the elements of a $TK \times 1$ vector of known proportions falling in the k -th Markov states in time $(t+1)$, x_{il} are the elements of a $TL \times 1$ vector of known proportions falling in the l -th Markov states in time t . The covariates z_m , which operate like instrumental variables, form a $T \times N$ matrix, explaining the non-stationary effects. The alternative simpler Markov stationary problem can be obtained by simply withdrawing the covariates z_m from equation (2).

The error term e_{ik} , included in equation (2), is reparameterized as given by equation (3) following the classical maximum entropy formalism (GOLAN ET AL. 1996, pp. 107-110), where \mathbf{V}_{ik} is an H -dimensional vector of support points and \mathbf{w}_{ik} is an H -dimensional vector of proper probabilities with $H \geq 2$. Given that each Markov state can be characterised by a different variance as such a specific definition of support bounds for each Markov size class is desired. Equation (4) represents the set of additivity constraints for the required Markov row constraint, while equation (5) does so for the proper probabilities of the reparameterized error. All proper probabilities of signal and noise are required to be non-negative $(\mathbf{p}, \mathbf{w}) \gg 0$. The estimation procedure allowed for the possibility of non-zero covariances following the one-step GCE-SUR as described by GOLAN et al. (1996, p. 186).

The relative information content of the estimated parameters can be evaluated through the normalised entropy measure described in GOLAN et al. (1996, p. 93). Additional entropy statistics used in the paper are the so-called: Entropy-ratio and an analogous entropy Chi-square measure, both described in GOLAN and VOGEL (2000, pp. 454-455). In an instrumental variable GCE (IV GCE) Markov approach, non-stationary effects can be determined by the following elasticity that determines the cumulative effects of a unit change in each covariate z_m on y_{ik} , the vector of proportion falling in the k -th Markov state in time $t+1$, as given by KARANTININIS (2002, p. 10):

$$\eta_{kn}^y = \frac{\partial y_{kt}}{\partial z_{tn}} \frac{\bar{z}_{tn}}{\bar{y}_k} = \frac{\bar{z}_n}{\bar{y}_k} \sum_l \left[\tilde{P}_{lk} \bar{x}_l^2 \left(\tilde{\lambda}_{nk} - \sum_k \tilde{P}_{lk} \tilde{\lambda}_{nk} \right) \right] \tag{6}$$

Following the Markov formalism based on the Markov equilibrium distribution and absorbing states notions (JUDGE, SWANSON 1962, pp. 58-59), it is possible to compute several indicators such as the mean number of years it costs a farm being in a certain Markov state before absorption in a final state, as well as the probability that a non-absorbing Markov state will end up in a particular absorbing state. The projections of farm numbers were obtained in two steps. In the first step the Markov transition probability matrix was multiplied by itself n times in order to recover the transition probability matrix during n time periods. In the second

step individual elements of the transition probability matrix were multiplied by the farm number in their respective size class in the base year used for projections.

4 DATA AND PRIOR INFORMATION

Aggregate data on the size distribution of dairy farms in Poland are used. Holdings were classified according to their herd size classes. The data cover the period from 1995 to 2006 and allow the recovery of the number of dairy farms belonging to eight farm size classes: 1 cow, 2 cows, 3-9 cows, 10-29 cows, 30-49 cows, 50-99 cows, 100-199 cows, > 200 cows (KRAWIECKA, 2006). In order to capture potential non-stationary effects on the Markov transition probabilities only a trend variable z_{t1} was introduced during estimation. The prior information on Markov transition probability estimates may concern three types of information on: Persistency, entry/exit and net shifts.

Persistency: **Table 6.3** provides an overview of the estimated persistency probabilities encountered in the literature, both for dairy studies and other studies. Based on these findings in the literature, the priors on the diagonal transitional probabilities were set, moving from the top left corner to the low right corner of the transition probability matrix from 0.80 to 0.90 (i.e. $p_{lk} = 0.80 \quad l = k$ for $l, k = 2, 3, 4$ and $p_{lk} = 0.90 \quad l = k$ for $l, k = 5, \dots, 8$).

Entry/Exit: As regards exit the literature shows two basic results. Small farms are more likely to exit than large farms (see also remark made before). Moreover, the smaller a farm, the higher is the probability of exit. Combining this with the already specified priors on persistency (which was set at 0.8 for small farms) the priors on the exit probabilities p_{10} , p_{20} and p_{30} were set at 0.20, 0.15 and 0.10 respectively. Generally very little information was known about entering firms, it was then decided to specify no positive priors on any entry probabilities ($p_{0k} = 0, \forall k \neq 0$). Since by definition $\sum_k p_{0k} = 1$ these priors on entry also imply that once a farm is out of business it will stay out of business.

Table 6.3: Transition probability estimates: Literature overview

Authors	Year	Average Estimates	Smallest Class Estimates	Largest Class Estimates	Number of Classes	Transition
<i>Dairy Studies</i>						
<i>Padberg</i>	1962	0.691	0.733	0.960	4	5 years
<i>Hallberg</i>	1969	0.879	0.768	0.961	5	annual
<i>Keane</i>	1991	0.756	0.360	0.945	7	6 years
<i>Zepeda</i>	1995	0.901	0.877	0.944	3	annual
<i>Stokes</i>	2006	0.898	0.805	0.999	6	annual
<i>Other Studies</i>						
<i>Judge and Swanson</i>	1962	0.511	0.412	0.672	6	annual
<i>Krenz</i>	1964	0.862	0.804	1.000	6	5 years
<i>Lee et al.</i>	1965	0.650	0.473	0.572	4	annual
<i>Ethridge et al.</i>	1985	0.957	0.919	0.986	5	annual
<i>Edwards et al.</i>	1985	0.687	0.781	0.813	8	4 years
<i>Garcia et al.</i>	1987	0.836	0.930	0.929	11	annual
<i>Disney et al.</i>	1988	0.605	0.400	0.732	4	5 years
<i>Karantininis</i>	2002	0.531	0.386	0.768	18	annual

Source: Own calculations based on estimates from the literature.

Note: Estimates may reflect different transition period lengths as indicated by the last column.

Net Shifts: As regards the net shifts, one pattern observed from the literature is that farms show a tendency to gradually develop. A second finding is that usually there is a switch-size class, below which farms show a tendency to decline and ultimately go out of business, whereas above this size class farms expand their business. Our prior estimate of the switch size class is based on the particular sample considered and set at the size class with 3 to 9 cows (see also **Figure 6.4**). As regards the farms in this size class, our prior is that they have a fifty-fifty probability of moving up or down ($p_{32} = p_{34} = 0.05$, i.e. uninformative priors). Farms in larger size classes are assumed to move up to the adjacent size class with a probability of 0.10, whereas farms in lower size classes are assumed to move down to the next size class with the same probability.

5 ESTIMATION RESULTS AND DISCUSSION

The computed statistics suggest that the data did not push the final estimates too far away from the prior, indicating either a relatively poor data signal or data-conforming prior estimate. This finding is also likely to be related to the negative number of degrees of freedom. **Table 6.4** presents the estimated IV GCE Markov model. The final estimates were rather robust to changes in the prior magnitude.

The estimated transition probability matrix itself already provides insight into the dynamic adjustment of dairy farms. For example, during the period considered there is a strong tendency for farms to persist in the same size class from one year to the next (see transition probabilities on the diagonal containing elements p_{kk}). The off-diagonal elements of the transition matrix provide information on the extent dairy farms are going to scale up or down. For example, from one period to another about 2% of all farms with 10-29 cows will probably grow into a dairy farm with 30-49 cows. In **Table 6.4** the cumulative effects of the trend z_{t1} on the number of dairy farms y_{ik} in terms of elasticity is presented in the last row. The trend impact implies that over time there is a contraction in farms with 1-9 cows and an increase in the remaining farms. The trend also has a positive impact on the number of farms in the inactive size class. Our results suggests that the minimum efficient size of dairy farms, minimising the unit costs, or the minimum locus on the long-run average costs level for farms is at a herd size of 10 cows or more.

Table 6.4: Markov transition probabilities and non-stationary effects

Class	Exit	1	2	3-9	10-29	30-49	50-99	100-199	> 200	$S(p_i)$
Entry	1.000									1.000
1	0.118	0.882								0.727
2	0.116	0.054	0.829							0.919
3-9	0.063		0.044	0.872	0.021					0.722
10-29					0.980	0.020				0.302
30-49						0.919	0.081			0.862
50-99							0.984	0.016		0.254
100-199								0.989	0.011	0.183
> 200									1.000	1.000
z_{t1}	0.011	-0.007	-0.002	-0.007	0.011	0.047	0.003	0.132	2.524	

Source: Own estimates.

Table 6.5 reports the estimated mean number of years in each transient state for each non-absorbing state as well as the probabilities of absorption for each non-absorbing state into the two absorbing states. These estimates provide an additional indicator of the rate of change in the number of dairy farms by herd size class. Thus, for a dairy farm with 10-29 dairy cows, the mean time before absorption is about 50 years, whereas for a dairy farm with 2 cows the mean is about 6 years. This suggests a higher rate of change for small dairy farms as compared to medium and large farms. From the last two columns of **Table 6.5** it also appears that in equilibrium the majority of dairy farms with 1 and 9 cows will leave the sector, whereas farms belonging to the remaining size states will continue in dairying.

Finally, the estimated Markov transition probability matrixes were used to make several projections of the number of dairy farms in the coming decade. In terms of projections the best performance was obtained for the IV GCE-SUR model with non-uniform priors. In addition, it appears useful, judging by our results, to impose some sort of prior information on the estimated Markov transition probabilities, given the relatively low projection power of the models estimated with uniform priors.

Table 6.5: Estimated transient periods and absorption probabilities

<i>Class</i>	<i>1</i>	<i>2</i>	<i>3-9</i>	<i>10-29</i>	<i>30-49</i>	<i>50-99</i>	<i>100-199</i>	<i>Exit</i>	<i>> 200</i>
<i>1</i>	<i>8.447</i>							<i>1.000</i>	<i>0.000</i>
<i>2</i>	<i>2.689</i>	<i>5.865</i>						<i>1.000</i>	<i>0.000</i>
<i>3-9</i>	<i>0.919</i>	<i>2.005</i>	<i>7.825</i>	<i>8.182</i>	<i>2.030</i>	<i>10.164</i>	<i>15.240</i>	<i>0.836</i>	<i>0.164</i>
<i>10-29</i>				<i>49.980</i>	<i>12.402</i>	<i>62.087</i>	<i>93.091</i>	<i>0.001</i>	<i>0.999</i>
<i>30-49</i>					<i>12.403</i>	<i>62.089</i>	<i>93.094</i>	<i>0.001</i>	<i>0.999</i>
<i>50-99</i>						<i>62.089</i>	<i>93.094</i>	<i>0.001</i>	<i>0.999</i>
<i>100-199</i>							<i>93.098</i>	<i>0.001</i>	<i>0.999</i>

Source: Own estimates.

Note: The last two columns of the table report the absorption probabilities.

Table 6.6: Size distribution projected versus actual numbers for 2006

1	2	3-9	10-29	30-49	50-99	100-199	> 200	Total
IV GCE-SUR								
286,690	124,949	148,573	68,203	5,591	1,155	140	42	635,343
<i>2.47</i>	<i>-5.37</i>	<i>1.15</i>	<i>5.99</i>	<i>-6.43</i>	<i>3.34</i>	<i>-7.19</i>	<i>21.05</i>	<i>0.74</i>
IV GCE-SUR (Uniform Prior)								
183,155	111,209	120,992	37,372	4,275	1,184	253	69	458,508
<i>-34.54</i>	<i>-15.77</i>	<i>-17.63</i>	<i>-41.92</i>	<i>-28.46</i>	<i>-15.88</i>	<i>51.34</i>	<i>82.05</i>	<i>-27.30</i>
GCE-SUR								
292,110	126,837	153,170	67,985	5,564	1,146	127	41	646,979
<i>-4.40</i>	<i>-3.94</i>	<i>4.28</i>	<i>5.65</i>	<i>-6.88</i>	<i>-18.63</i>	<i>-24.15</i>	<i>8.85</i>	<i>2.59</i>
GCE-SUR (Uniform Prior)								
252,441	154,765	167,159	22,858	1,779	1,286	105	22	600,415
<i>-9.78</i>	<i>17.21</i>	<i>13.80</i>	<i>-64.48</i>	<i>-70.23</i>	<i>-8.67</i>	<i>-37.21</i>	<i>-41.48</i>	<i>-4.79</i>
Actual 2006								
279,791	132,037	146,887	64,350	5,975	1,408	167	38	630,653

Source: Own estimates.

Note: Percentage deviations are reported in italics.

The estimated IV GCE-SUR model predicts reasonably well the total aggregate number of dairy farms, although the model has a tendency to overestimate the number of farms in most of the size classes, apart from farms with 2, 30-49 and 100-199 cows, where the model underestimates the total number of farms. This is mainly attributable to the effect of net shifts from one size class to the adjacent

size class. **Table 6.7** provides the projections associated with the IV GCE-SUR model. As can be seen, it is predicted that in 2013 about 47 % of the number of dairy farms active in 2007 will leave the sector.

Table 6.7: Projected dairy farm size distribution

Year	1	2	3-9	10-29	30-49	50-99	100-199	> 200	Total
2007	253,833	115,943	128,116	66,135	6,781	1,867	188	40	572,902
2008	230,074	101,772	111,744	67,492	7,557	2,384	216	42	521,281
2009	208,359	89,303	97,464	68,480	8,298	2,955	252	44	475,155
2010	188,538	78,335	85,009	69,149	8,999	3,576	297	47	433,950
2011	170,468	68,693	74,146	69,544	9,657	4,244	351	50	397,153
2012	154,015	60,221	64,671	69,703	10,270	4,955	415	54	364,303
2013	139,049	52,779	56,406	69,662	10,837	5,703	489	58	334,982
Average Growth Rates (%)									
	-10.3	-12.3	-13.8	0.3	9.5	22.8	17.9	4.4	-9.1

Source: Own estimates.

6 CONCLUSION

The projections show that the number of dairy farms will continue to decline in the coming decade, albeit with an increase in the number of farms of medium and large size. The increase will be in farms with more than 30 cows. Therefore a consolidation process is expected, whereby small dairy farms (i.e. semi-subsistence farms) will continue to exit the sector although their relative share of the total number of dairy farms will tend to persist. The estimated mean period before the small subsistence dairy farms with 1-2 cows leave the dairy sector is approximately 7 years. In addition, only dairy farms with at least 10-29 cows and about 16 % of the dairy farms with 3-9 cows are expected to survive at the Markov equilibrium. Overall, these findings suggest that Poland will be characterised by a polarised dairy farm structure, with on the one hand a persistent fringe of subsistence and semi-subsistence self-employed small dairy farms, and on the other a growing fringe of business-oriented dairy farms.

REFERENCES

- COURCHANE, M., GOLAN, A., NICKERSON, D. (2000): Estimation and evaluation of loan discrimination: An informational approach. *Journal of Housing Research*, 11, pp. 67-90.
- DISNEY, W. T., DUFFY, P.A., HARDY J.R., W. E. (1988): A Markov chain analysis of pork farm size distributions in the South. *Southern Journal of Agricultural Economics*, 20, pp. 57-64.
- EDWARDS, C., SMITH, M. G., PETERSON, R. N. (1985): The changing distribution of farms by size: A Markov analysis. *Agricultural Economics Research*, 37, pp. 1-16.

- ETHRIDGE, D. E., ROY, S. K., MYERS, D. W. (1985): A Markov chain analysis of structural changes in the Texas high plains cotton ginning industry. *Southern Journal of Agricultural Economics*, 17, pp. 11-20.
- EUROPEAN COMMISSION (1998): *Agricultural Situation and Prospects in the Central European Countries – Poland*. Working Document, Brussels, Directorate General for Agriculture (DG VI), http://ec.europa.eu/agriculture/publi/peco/poland/pol_en.pdf/.
- GARCIA, P., OFFUTT, S. E., SONKA, S. T. (1987): Size distribution and growth in a sample of Illinois cash grain farms. *American Journal of Agricultural Economics*, 69, pp. 471-476.
- GOLAN, A., JUDGE, G., MILLER, D. (1996): *Maximum Entropy Econometrics: Robust Estimation with Limited Data*. John Wiley & Sons, Chichester [etc.].
- GOLAN, A., VOGEL, S. J. (2000): Estimation of non-stationary social accounting matrix coefficients with supply-side information. *Economic Systems Research*, 12, pp. 447-471.
- HALLBERG, M. C. (1969): Projecting the size distribution of agricultural firms – An application of a Markov process with non-stationary transition probabilities. *American Journal of Agricultural Economics*, 51, pp. 289-302.
- LEE, T. C., JUDGE, G. G., TAKAYAMA, T. (1965): On estimating the transition probabilities of a Markov process. *Journal of Farm Economics*, 47, pp. 742-762.
- MITTELHAMMER, R. C., JUDGE, G. G., DOUGLAS, J. M. (2000): *Econometric Foundations*. Cambridge University Press, Cambridge.
- JUDGE, G. G., SWANSON, E. R. (1962): Markov chains: Basic concepts and suggested uses in agricultural economics. *Australian Journal of Agricultural Economics*, 6, pp. 49-61.
- KARANTININS, K. (2002): Information-based estimators for the non-stationary transition probability matrix: An application to the Danish pork industry. *Journal of Econometrics*, 107, pp. 275-290.
- KEANE, M. (1991): Changes in the size structure of Irish dairy farms. *Irish Journal of Agricultural Economics and Rural Sociology*, 14, pp. 67-74.
- KRAWIECKA, L. (2006): *Personal Communication on Data on Private Dairy Farms in Poland*. National Statistical Office, Warsaw.
- KRENZ, R. D. (1964): Projection of farm numbers for North Dakota with Markov chains. *Agricultural Economics Research*, 16, pp. 77-83.
- PADBERG, D. I. (1962): The use of Markov processes in measuring changes in market structure. *Journal of Farm Economics*, 44, pp. 189-199.
- STOKES, J. R. (2006): Entry, exit, and structural change in Pennsylvania's dairy sector. *Agricultural and Resource Economics Review*, 35, pp. 357-373.
- ZEPEDA, L. (1995): Asymmetry and nonstationarity in the farm size distribution of Wisconsin milk producers: An aggregate analysis. *American Journal of Agricultural Economics*, 77, pp. 837-852.

SPATIAL INTEGRATION ON THE HUNGARIAN MILK MARKET

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1 INTRODUCTION

The geographical separation of markets is of a special importance in agriculture, as often, agricultural products are bulky and/or perishable, and the place of consumption may be different from that of production, implying possibly expensive transport costs (SEXTON et al., 1991). Horizontal market integration means, that it takes some time for the exogenous shocks to transform and reach the various geographically separated markets. The imperfectly integrated markets may send wrong price information signals to producers and other actors of the marketing chain, resulting incorrect production and marketing decisions. Thus it may happen for example that livestock in one region decreases, and in another one increases, regional prices diverge, because the price information flow between the markets is wrong. If this occurs, market price changes between the regions do not necessarily reflect relevant economic phenomena (GOODWIN, SCHROEDER, 1991).

The phenomena spatial price transmission has long been in the focus of empirical research. The importance of the topic is emphasised by the wide range of methods developed to study horizontal integration (see FACKLER, GOODWIN, 2001). Because price data is often non-stationary, recent papers emphasise the importance of using up-to-date econometric techniques, capable of handling non-stationary and cointegrated data. Except a few European studies (e.g. MEYER, 2004, SERRA et al., 2006), most research is concentrated on various product markets in the United States (see FACKLER, GOODWIN, 2001 for a comprehensive review). As far as we are aware, until now, there has been no published research focusing on spatial integration of agricultural prices in the Central and East European Countries. Because of the low developed market institutions and market inefficiencies, spatial price evolution in transition economies is perhaps of greater importance than in developed economies.

This paper aims to fill this gap using Hungarian data. We employ Vector Error Correction and Threshold Vector Error Correction methods to study regional market integration in the Hungarian milk sector. The paper is organised as follows. Section 2 briefly describes the theory of spatial integration. Section 3 reviews the empirical methodology, then section 4 presents the empirical analysis. The results are discussed in section 5.

2 SPATIAL INTEGRATION OF MARKETS

Research on the spatial integration of agricultural markets is often used to test the efficiency of agricultural markets. Perfectly integrated markets are usually assumed to be efficient as well. TOMÉK and ROBINSON (2003), defines the two axioms of the regional price differences theory:

- (1) The price difference in any two regions or markets involved in trade with each other equals the transfer costs.
- (2) The price difference between any two regions or markets not involved in trade with each other is smaller than the transfer costs.

Let's consider, two spatially different markets, where the price of a given good in time t is P_{1t} and P_{2t} respectively. The two markets are considered integrated, if the price on market (1) equals the price on market (2) corrected with transport costs, K_t :

$$P_{1t} = P_{2t} + K_t \quad (1)$$

Trade between the two markets occurs only if $|P_{1t} - P_{2t}| > K_t$. To put it other way, the arbitrage ensures that prices of the same good traded in spatially separate markets equalise. Early studies of horizontal integration employed correlation and regression analysis. These papers usually tested some form of the *Law of One Price, LOP*. Consider equation (2):

$$P_{1t} = \beta_0 + \beta_1 P_{2t} \quad (2)$$

According of the *strong version of LOP*, prices of a given good on the spatially separated markets are equal, and they move perfectly together in time. Using the coefficients of equation (2), the necessary conditions are $\beta_0 = 0$, and $\beta_1 = 1$. In real life however, the *strong version* occurs only very rarely, therefore the *weak version of LOP* was also defined. The *weak version* states that only the price ratio is constant, the actual price level is different due to transport and other transfer costs. Using again the notation of equation (2), the necessary restrictions are $\beta_0 \neq 0$ and $\beta_1 = 1$.

With the evolution of time series econometrics, recent papers test a more general (wider) notion of horizontal integration of spatially separated markets. In this case the long-run co-movement of prices is analysed, the *strong* and *weak versions of LOP* however, remain testable hypotheses.

3 EMPIRICAL METHODOLOGY

To avoid the danger of spurious regression with potentially non-stationary variables, cointegration needs to be tested. The Johansen cointegration procedure is based on estimating the following Vector Error Correction Model (equation 3):

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \dots + \Gamma_{k-1} \Delta Z_{t-k+1} + \Pi Z_{t-k} + u_t \quad (3)$$

where $Z_t = [P^1_t, P^2_t]'$, a (2×1) vector containing the prices in region 1 and 2, both $I(1)$, $\Gamma_1, \dots, \Gamma_{k+1}$ are (2×2) vectors of the short-run parameters, Π is (2×2) matrix of the long-run parameters, u_t is the white noise stochastic term.

$$\Pi = \alpha\beta' \quad (4)$$

where matrix α represents the speed of adjustment to disequilibrium and β is a matrix which represents up to $(n - 1)$ cointegrating relationships between the non-stationary variables. Trace and maximum Eigen-value statistics are used to test for cointegration. Once (3) is estimated we can proceed to test for weak exogeneity and then for linear restrictions on the β vector. One obvious candidate would be to test whether the elements of the vector are of the $(-1, 1)$ form, i.e. the markets are perfectly integrated. The terms of vector α (factor loading matrix) measure the speed at which the variables adjust towards the long-run equilibrium after a price shock. The α vector of the weakly exogenous variable equals zero. To find the direction of the Granger causality between the two price series, restrictions are tested on the α vectors.

A number of studies (e.g. BARRETT, 2001, FACKLER, GOODWIN, 2001, GOODWIN, PIGGOTT, 2001) have questioned the appropriateness of the linear VECM models, arguing that it ignores the transaction costs that might occur. Threshold Error Correction Models (TVECM), estimate a threshold below which the cointegration is inactive since it does not worth trading because of the low price difference. One the threshold value is exceeded, cointegration becomes active. We employ the procedure developed by HANSEN and SEO (2002) that applies a gridsearch to simultaneously estimate the elements of the β cointegrating vector, and the threshold. The threshold value is than tested for significance (the null hypothesis is linear cointegration against the threshold cointegration alternative hypothesis) using a *Supremum Lagrange Multiplier* (supLM) statistic. The distribution of the test statistic is non-standard, therefore critical values are obtained by *bootstrapping*.

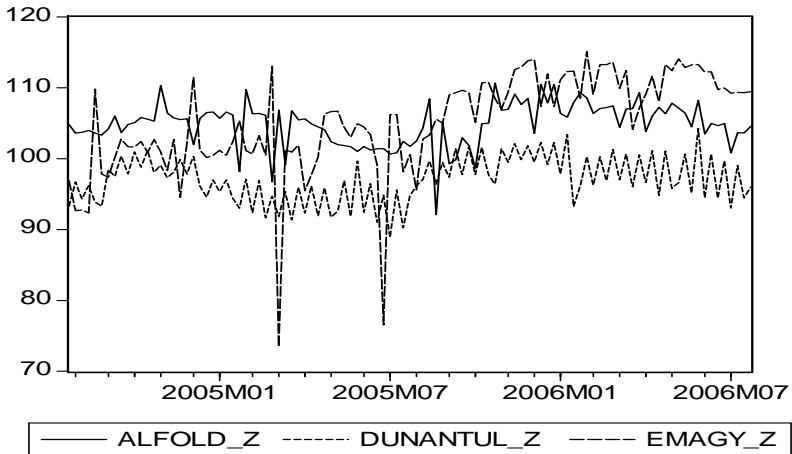
4 EMPIRICAL ANALYSIS AND RESULTS

4.1 Data

Aggregated milk price data of three Hungarian regions, *Alföld*, *Dunántúl* and *Észak-magyarország* was used for the empirical analysis. 105 weekly observations, between 26th of July 2004 and 24th of July 2006 were available. The price data is

collected by the Agricultural Economics Research Institute (AKI), and are available through the Market Information System (<https://pair.akii.hu>). The database contains plastic bagged, boxed and long-life (UHT) milk prices. The long-life milk was excluded from the analysis, because it is mostly sold through supermarket chains, quite often at discounted prices or offers as part of the given shop's marketing policy, therefore one can not expect these prices to move together in various regions. Our analysis focuses exclusively on plastic bag (noted: *_z*) and boxed milk prices (noted: *_D*) in the three regions, collected at current prices (**Figures 6.5 and 6.6**).

Figure 6.5: Plastic bagged milk prices by regions (HUF/l)

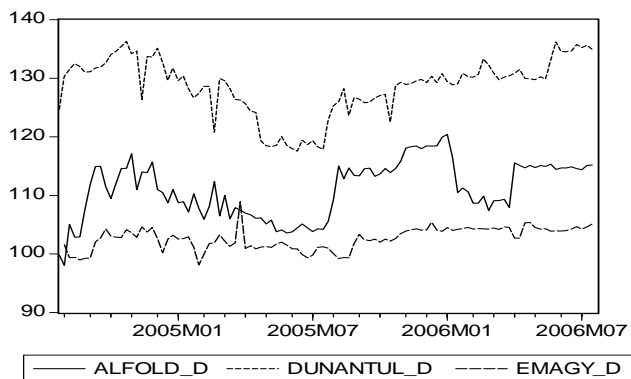


Source: AKI Market Information System.

4.2 Stationarity

ADF¹¹ unit root test (DICKEY, FULLER, 1979; 1981) results for all price series are presented in **Table 6.8**. All series proved to be $I(1)$ except *emagy_d* and *emagy_z* that seem to be trend stationary at 5%. Considering however the notoriously low power properties of the unit root tests, we carefully consider all price series as integrated of order one.

¹¹ ADF tests were run using Eviews 5.0.

Figure 6.6: Boxed milk prices by regions (HUF/l)

Source: AKI Market Information System.

Table 6.8: ADF unit root tests

Variable	Specification	Lag length	Test statistic
alfold_d	Constant	0	-2.68
	Constant and trend	0	-2.89
dunantul_d	Constant	1	-1.75
	Constant and trend	1	-1.77
emagy_d	Constant	2	-2.85
	Constant and trend	0	-4.92
alfold_z	Constant	2	-2.89
	Constant and trend	2	-2.90
dunantul_z	Constant	12	-1.70
	Constant and trend	12	-1.56
emagy_z	Constant	4	-1.81
	Constant and trend	0	-9.27

Notes: The ADF test critical values corresponding to 0.90 (0.95) confidence intervals are -2,581 (-2,889) with constant and, -3,152 (-3,453) with constant and trend. The AIC criteria was used to select the lag length.

4.3 Linear cointegration analysis

Results of the Johansen cointegration analysis¹², are presented in **Table 6.9**.

The *Pantula-principle* (HARRIS, 1995) was used to simultaneously test the deterministic form (constant, trend) of the model, and the number of cointegrating vectors. Both the trace and maximum Eigen value tests indicate that boxed milked prices in *Alföld* and *Dunántúl* are not integrated, that is, there is no long-run

¹² Eviews 5.0 was used for the Johansen cointegration analysis, VECM estimation and testing various hypotheses.

relationship between them. The rest of the boxed milk and all the milk in plastic bag price region pairs are cointegrated with one cointegration vector. The long-run relationships between cointegrated price pairs are presented in **Table 6.10**.

Table 6.9: Johansen cointegration analysis (VECM)

Model	Lag length	H_0	Trace test		λ_{\max} (max Eigen value) test	
			Test statistic	95 % critical value	Test statistic	95 % critical value
alfold_d – dunantul_d	1	$r=0$	11.72	20.26	7.92	15.89
		$r=1$	3.80	9.16	3.80	9.16
alfold_d – emagy_d	0	$r=0$	20.26	12.32	19.84	11.22
		$r=1$	0.41	4.12	0.41	4.12
dunanantul_d – emagy_d	1	$r=0$	21.37	20.26	19.59	15.89
		$r=1$	1.78	9.16	4.28	1.78
alfold_z – dunantul_z	1	$r=0$	18.06	12.32	18.05	11.22
		$r=1$	0.00	4.12	0.00	4.12
alfold_z – emagy_z	1	$r=0$	20.09	12.32	20.171	11.22
		$r=1$	0.01	4.12	0.014	4.12
dunanantul_z – emagy_z	1	$r=0$	22.10	12.320	22.10	11.22
		$r=1$	0.00	4.12	0.00	4.12

Table 6.10: The long-run cointegrating relationship

$$(P_{1t} = \beta_0 + \beta_1 P_{2t} + e)$$

Model	β_0	β_1	LR test $\beta_1 = -1$
alfold_d- emagy_d	–	- 1.085 (0.008) [‡]	$\chi^2(1)=12.21^{**}$
dunanantul_d – emagy_d	287.63 (80.69)	- 4.049 (0.786)	$\chi^2(1)=12.97^{**}$
alfold_z – dunantul_z	–	- 1.08 (0.006)	$\chi^2(1)=16.38^{**}$
alfold_z – emagy_z	–	- 0.994 (0.011)	$\chi^2(1)=0.251$
dunanantul_z – emagy_z	–	- 0.920 (0.009)	$\chi^2(1)=17.71^{**}$

Notes: [‡] Standard errors in brackets; ** significant at 1 %.

Except the *dunanantul_d – emagy_d* model, none of the other models have constant in the cointegrating relationship¹³, and the region prices are cointegrated with a coefficient close to -1. The low standard errors however suggest that the coefficients are significant, and statistically different from -1. A value of -1 suggests perfect market integration (without constant the *strong version of LOP*), whilst a coefficient different from -1 indicates imperfect integration. We employ

¹³ The constant could be interpreted as proxy for the constant part of the transport and marketing costs between the regions (DAWSON, DEY, 2002).

a Likelihood Ratio, (LR) test to formally test the $\beta_1 = -1$ null hypothesis, the results are presented in the last column of **Table 6.10**. Of all the models only the *alfold_z – emagy_z* model does not reject the null hypothesis¹⁴, these markets may be considered as perfectly integrated.

The elements of the α vector, the speed of adjustment to the long-run equilibrium (see equation 4), and their significance is presented in **Table 6.11**.

Table 6.11: The speed of adjustment vector, α

Model	Variable	α vector	t statistics
alfold_d – emagy_d	alfold_d	- 0.174	- 3.245
	emagy_d	0.107	3.197
dunantul_d – emagy_d	dunantul_d	- 0.056	- 1.622
	emagy_d	0.086	4.191
alfold_z – dunantul_z	alfold_z	- 0.345	- 3.546
	dunantul_z	0.167	2.127
alfold_z – emagy_z	alfold_z	- 0.093	- 1.938
	emagy_z	0.431	- 4.469
dunantul_z – emagy_z	dunantul_z	- 0.02	- 0.06
	emagy_z	0.576	4.876

Most t-statistics associated with the individual α values are significant, the result of the LR tests are presented in Table 6.12.

Table 6.12: Weak exogeneity (Granger causality) tests

Model	Variable	Exogeneity test	LR test statistic
alfold_d – emagy_d	alfold_d	$\alpha_{alfold_d} = 0$	$\chi^2(1) = 9.915^{**}$
	emagy_d	$\alpha_{emagy_d} = 0$	$\chi^2(1) = 9.64^{**}$
dunantul_d – emagy_d	dunantul_d	$\alpha_{dunantul_d} = 0$	$\chi^2(1) = 2.45$
	emagy_d	$\alpha_{emagy_d} = 0$	$\chi^2(1) = 15.155^{**}$
alfold_z – dunantul_z	alfold_z	$\alpha_{alfold_z} = 0$	$\chi^2(1) = 11.625^{**}$
	dunantul_z	$\alpha_{dunantul_z} = 0$	$\chi^2(1) = 4.55^*$
alfold_z – emagy_z	alfold_z	$\alpha_{alfold_z} = 0$	$\chi^2(1) = 3.786$
	emagy_z	$\alpha_{emagy_z} = 0$	$\chi^2(1) = 19.029^{**}$
dunantul_z – emagy_z	dunantul_z	$\alpha_{dunantul_z} = 0$	$\chi^2(1) = 0.003$
	emagy_z	$\alpha_{emagy_z} = 0$	$\chi^2(1) = 22.002^{**}$

Notes: * Significant at 5 %; ** Significant at 1 %.

None of the α values in the *alfold_d – emagy_d* and *alfold_z – dunantul_z* models is zero, therefore none of the milk prices in these regions is weakly exogenous related to the milk price in the other region. It follows that the price information is flowing in both directions resulting bidirectional causality, i.e. there is no dominant market amongst these pairs of regions. In the *dunantul_d – emagy_d*

¹⁴ Zero constant, and β_1 values close to -1 indicate proportional transaction costs, independent from the price. Because that would exclude some transaction cost items (e.g. commissions, risk premia, brokerage fees), the non-zero constant and coefficient different from -1 are not necessarily surprising results, and they do not suggest the lack of market integration (GOODWIN, PIGGOTT, 2001).

model, the milk price of the *Dunántúl* region is weakly exogenous, that is, the error correction mechanism does not affect short-run price setting. It results that the boxed milked price information is unidirectional, from the weakly exogenous (dominant), that is, from the *Dunántúl* region towards the *Északmagyarország* region. Similarly, in the *alfold_z – emagy_z* model, the *Alföld* region, in the *dunantul_z – emagy_z* model the *Dunántúl* region is the dominant market.

4.4 Threshold cointegration analysis

A common property of all linear (VECM) models discussed so far, is that the horizontal transmission is independent from the size of the shocks to the system. TVECM models¹⁵ however, are able to determine the relationship between the milk prices in various regions, by paying attention to the magnitude of the shocks. We employ HANSEN and SEO (2002) methods to estimate the cointegration coefficients and the threshold value¹⁶. The first column of **Table 6.13**, presents the cointegration coefficients, the second one the threshold value, the third and fourth the percentage of observations belonging to each regime. The supLM statistic testing the VECM null hypothesis against the TVECM alternative hypothesis is in the last column, together with the *bootstrapped* critical values in brackets.

Table 6.13: Threshold cointegration analysis (TVECM)

Model	Cointegration coefficient	Threshold	Regime I. %	Regime II. %	supLM test statistic
alfold_d – emagy_d	1.60	282.00	78.4	21.5	12.51 (13.62) [‡]
dunantul_d – emagy_d	0.26	69.36	70.5	29.4	12.85 (15.00)
alfold_z – dunantul_z	0.71	40.02	5.8	94.2	12.40 (15.93)
alfold_z – emagy_z	0.42	54.31	5.8	94.2	19.72 (17.56)
dunantul_z – emagy_z	0.57	30.24	5.8	94.2	20.64 (16.49)

Note: [‡] 5 % critical values computed by 1000 *Bootstrap* replications.

For *alfold_z – emagy_z* and a *dunantul_z – emagy_z* models, the supLM test rejects the linear model in favour of the threshold cointegration. From theoretical considerate, and the results obtained with linear cointegration, one would expect cointegration coefficients close to 1. Estimated coefficients however, differ from 1

¹⁵ Routines written in GAUSS programming language, available on B. Hansen's homepage (<http://www.ssc.wisc.edu/~bhansen/>) were used to test the threshold cointegration, estimate the threshold values, and cointegrating coefficients.

¹⁶ The algorithm may be adjusted to consider an *a priori* given cointegrating relationship, and only do a gridsearch for the threshold value. In this study, both theoretical considerations and the results of the linear cointegration analysis suggests a cointegrating coefficient equal to – 1 (perfect integration). The supLM test however, does not reject the linear models in the favour of the threshold cointegrating specification.

for all models, therefore because the lack of identification, the threshold values can not be interpreted. Although in the *alfold_z – emagy_z* and *dunantul_z – emagy_z* models, the threshold is significant and the test statistic rejects the linear cointegration null hypothesis, only 6 % of all observations belong to the first regime (9 observations only). To estimate a fully specified TVECM model, one would need longer time series.

5 DISCUSSION OF THE RESULTS, CONCLUSIONS

In this study, we employ econometric techniques to analyse the spatial integration on the Hungarian milk sector, using boxed and plastic bag milk price data from 3 Hungarian regions. Despite the various changes in the past one and a half decade, the spatial structure of Hungarian milk production remained fairly stable. Although the spatial concentration of the production has increased, the hierarchy in terms of production of the individual counties remained the same. Together with results obtained on previous spatial integration studies in various other countries, and the theoretical considerate, we would expect to have the three Hungarian regions highly integrated, maybe characterised by the *strong version of LOP*. Graphical inspection of boxed and plastic bagged milk price series (**Figures 6.5** and **6.6.**), show that regional prices of the products behave rather differently during the studied period. The price of the plastic bag milk changes frequently, but with small amplitude, whilst boxed milk prices are less volatile, however the magnitude of the occasional price changes is much larger. This is largely explained by the differences between the two product categories. First, plastic bag milk is usually retailed for one or two days, having frequent (daily) deliveries, thus frequent prices changes are more feasible. Boxed milk is not much different from plastic bag milk, however its shelf life is longer, and therefore changing prices is slightly more difficult. Second, 42 % of the total Hungarian retailed milk is in plastic bagged, 31 % boxed, and 27 % is long-life milk, thus the quick retailing of large quantities also increases price volatility.

Thus not surprisingly, the empirical analysis revealed linear cointegration (i.e. long-run relationship) between plastic bag milk price series in all regions. More, the constant terms proved to be zero, and the cointegration coefficients are close to 1 (in absolute value), suggesting that markets are characterised by the *strong version of the LOP*. LR tests however rejected the perfect integration null hypothesis for all plastic bagged milk price pairs except *alfold_z – emagy_z*. The analysis has revealed that there is a bidirectional causality relationship between plastic bagged milk prices in *Alföld* and *Dunántúl* regions, however each of them are dominant markets – determine prices – with respect to the *Észak-Magyarország* region. One may conclude that horizontal integration on the plastic bag milk prices is mostly according to *a priori* expectations, close to perfect integration.

For the *alfold_z - emagy_z* and *dunantul_z - emagy_z* plastic bag milk price pairs, the TVECM analysis rejected the linear cointegration null hypothesis in favour of the threshold cointegration alternative, the cointegration ycause identification problems the threshold values can not be interpreted. It is likely however, that with longer time series and less aggregated, e.g. county level data, TVECM models are more appropriate for spatial integration research than VECM models are.

The Hansen test did not reject the linear cointegration null hypothesis in favour of the TVECM for any boxed milk price pair. The *alfold_d - emagy_d* price pair is close to perfect integration, the relationship between the *dunantul_d - emagy_d* regional price pairs are not conform theory, and finally, the *alfold_d - emagy_d* price pairs are not even cointegrated, i.e. there is no long-run relationship between these regions' prices. This surprising result, might be due to the quality of the data we used.

When discussing our empirical results, we must face the problem of the data aggregation level. Econometric literature has long paid attention to the information losses, and bias introduced by aggregated data (SHUMWAY, DAVIS, 2001). Despite this, there are only a small number of studies analysing aggregation problems on real data. LYON and THOMPSON (1993) focus on temporal and spatial aggregation using alternative marketing margin models, concluding, that model selection is greatly influenced by data aggregation. VON CRAMON-TAUBADEL et al. (2006) use German shop level data to analyse the effects of aggregating cross-sectional data. The experiment shows, that aggregated data produces results, if data is used for shop level price transmission analysis. It therefore seems likely, that empirical results based on average (aggregated) data introduce some bias into the individual price behaviour analysis.

What are the implications for the present research? First, using aggregated data may lead to interpretation problems, since for example transport costs within one region may be higher than between two regions. Second, by using aggregated data on region level, we can not on draw inference about county level market integration. Finally, to model transaction costs, we would need less aggregated, (county level) data.

REFERENCES

- BARRETT, C. (2001): Measuring Integration and Efficiency in International Agricultural Markets. *Review of Agricultural Economics*, 23(1), pp. 19-32.
- CRAMON-TAUBADEL, S. VON, LOY, J. P., MEYER, J. (2006): Data aggregation and vertical price transmission: An experiment with German food prices. *Contributed Paper on the 26th Conference of IAAE, Brisbane, Australia, August 12-18.*
- DAWSON, P. J., DEY, P. K. (2002): Testing For the Law of One Price: Rice Market integration in Bangladesh. *Journal of International Development*, 14, pp. 473-484.

- DICKEY, D.A., FULLER, W. A. (1979): Distributions of the Estimators For Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association*, 75, pp. 427-431.
- DICKEY, D.A., FULLER, W. A. (1981): Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*, 49, pp. 1057-1072.
- FACKLER, P. L., GOODWIN, B. K. (2001): Spatial Market Integration. In: RAUSSER, G., GARDNER, B. (eds): *Handbook of Agricultural Economics*. Elsevier Publishing, Amsterdam.
- GOODWIN, B. K., PIGGOTT, N. E. (2001): Spatial Market Integration in the Presence of Threshold Effects. *American Journal of Agricultural Economics*, 83(2), pp. 302-317.
- GOODWIN, B. K., SCHROEDER, T. C. (1991): Cointegration Tests and Spatial Price Linkages in Regional Cattle Markets. *American Journal of Agricultural Economics*, 73(2), pp. 452-464.
- HANSEN, B. E., SEO, B. (2002): Testing for Two Regime Threshold Cointegration in Vector Error Correction Models. *Journal of Econometrics*, 110, pp. 293-318.
- HARRIS, R. I. D. (1995): *Using Cointegration Analysis in Econometric Modelling*. Prentice Hall/Harvester Wheatsheaf.
- LYON, C. C., THOMPSON, G. D. (1993): Temporal and Spatial Aggregation: Alternative Marketing Margin Models. *American Journal of Agricultural Economics*, 75(3), pp. 523-536.
- MEYER, J. (2004): Measuring market integration in the presence of transaction costs – A threshold vector error correction approach. *Agricultural Economics*, 31(3), pp. 327-334.
- SERRA, T., GIL, J. M., GOODWIN, B. K. (2006): Local polynomial fitting and spatial price relationships: price transmission in the EU markets for pigmeat. Contributed Paper on the 26th Conference of IAAE, Brisbane, Australia, August 12-18.
- SEXTON, R. J., KING, C. L., CARMAN, H. F. (1991): Market Integration, Efficiency of Arbitrage, and Imperfect Competition: Methodology and Application to U.S. Celery. *American Journal of Agricultural Economics*, 73(3), pp. 568-580.
- TOMEK, W. G., ROBINSON, K. (2003): *Agricultural Product Prices*. Cornell University Press, Ithaca and London.

SOME APPROACHES TO THE ANALYSIS OF MARKET STRUCTURE'S IMPACT IN MILK COMMODITY CHAIN¹⁷

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1 INTRODUCTION

The issue of price transmission – the proportion of an input price change that is passed on to the output prices – has always been frequently discussed in agricultural economics. It is particularly important in the analysis of welfare effects of changes in agricultural policies, like elimination of farm price support programs or introduction of alternative support mechanisms, and in the analysis of economic effects of new technologies. In many industries, it has been observed that, while increases in input prices are almost instantaneously reflected in the output prices, input price decreases are usually followed only by delayed and partial drops in the output prices (PELTZMAN, 2000).

In economic theory, this phenomenon has been explained in terms of two major influences (REVOREDO et al., 2004):¹⁸

- *Existence of market power of manufacturers (imperfect competition)*. The logic of the market power argument is simply that firms in a tacitly collusive industry earning abnormal profits tend to simultaneously increase their margins in response to a drop in the input costs thereby passing only a small fraction of the decrease on to the output prices. At the same time, collusive behaviour facilitates passing (almost) all of the input price increase to the output price. The magnitude of such transmission asymmetry depends not only on the firm behaviour but also on the economies of scale and demand and supply elasticity (MCCORRISTON et al., 2001).

¹⁷ The paper was developed within the Research plan of FBU MUAUF MSM 6215648904, thematic direction No. 4 "The development tendency of agribusiness, forming of segmented markets within commodity chains and food networks in the process of integration, globalisation and changes of agrarian policy".

¹⁸ Apart from the market power and inventory management arguments, asymmetric price transmission has also been attributed to cost adjustment rigidities, like menu costs or sticky wages.

- *Profit maximizing inventory management.* The inventory management argument is that the presence of inventories introduces additional price rigidity, which is consistent with maximizing behaviour: because of the "cushioning" effect of inventories, prices tend to move sluggishly in industries whose outputs (inputs) are storable, as price responses are substituted by quantity responses. Thus, sectors with perishable inventories are more likely to exhibit more price flexibility than those with easily storable stocks.

2 GOAL OF THE PAPER AND METHODOLOGY

Based on the results of the price transmission analysis the paper aims to assess the impact of market structure on price transmission process within commodity chain of milk in the Czech Republic, with the distinction on milk products with low (milk) or high (yoghurt, cheese) value added. The database is represented by monthly prices at individual stages of the selected commodity chain in the period of January 1998-March 2006, while at the second and the third stage of price transmission analysis the differences of monthly prices are used within selected period of time.

The analysis of price transmission within milk commodity chain is carried out in three consequential stages as suggested in LECHANOVÁ (2005):

- At the 1st stage of the analysis the process of price transmission at all market levels of the chain is assessed by means of complex and systematic approach. For enumerating of the intensity of the price transmissions, the coefficient of price transmission elasticity (EPT) is used as the basic measure.
- If we suppose two levels of the partial markets within the selected commodity chain and we denote them *i* and *j*, the coefficient of the price transmission elasticity (EPT) between these two market levels can be defined by entirely common way (MCCORRISTON, 2002):

$$EPT_{ij} = \frac{\frac{\partial p_j}{p_j}}{\frac{\partial p_i}{p_i}} = \frac{\partial p_j}{\partial p_i} \cdot \frac{p_i}{p_j}$$

- The sequence of parameters *i* and *j* is decisive for the direction of assessed process of price transmission.
- So defined EPT_{ij} coefficient expresses, by how much will change the price at *j*th market level if the price at *i*th level changes by 1 %.
- At the 2nd stage of the analysis the attention is focused on subsequent partial markets within analysed commodity chain, where the analysis of price differences is carried out in order to evaluate the difference in results in case of positive, respectively negative price differences. Price differences are enumerated from quarterly nominal prices, whereas price difference between two time periods

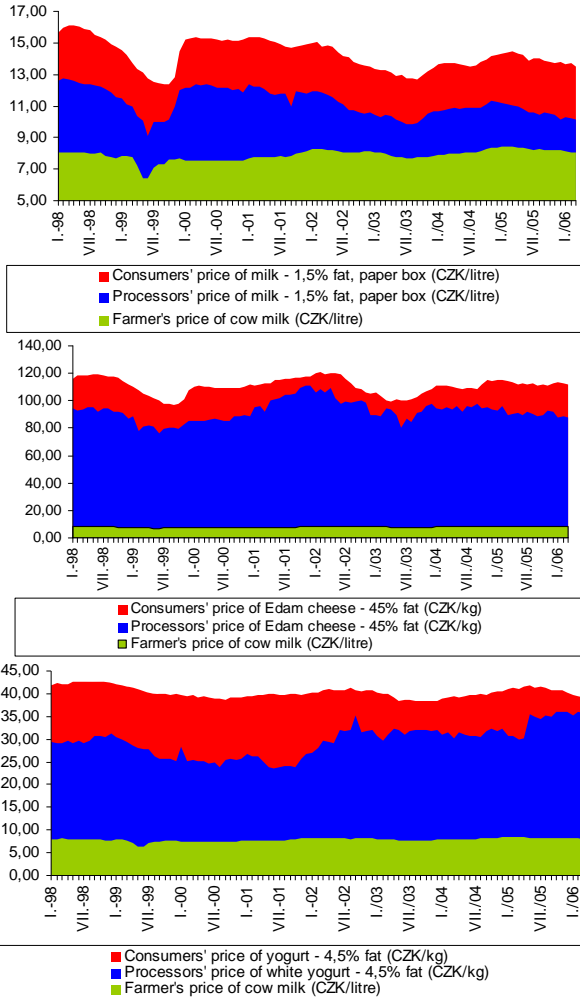
(t and $t+1$) is assigned to the following time period ($t + 1$). The asymmetry of price transmission with the distinction on positive and negative price changes was tested on the basis of regression models (simple repeated regression) according to following relationships:

- $\Delta P_{jt} = A^+ + \sum_{l=1}^k B_l^+ \cdot \Delta P_{it}^+$, resp. $\Delta P_{jt} = A^- + \sum_{l=1}^k B_l^- \cdot \Delta P_{it}^-$
- The intensity of positive or negative price differences (distinguished according to the values of independent time series) are evaluated by means of determination coefficient.
- The third stage of the analysis rests upon the analysis of the impact of time delay on the transmission of price changes between individual market levels. Monthly price differences at all market levels of analysed commodity chain are used as database for this stage of the analysis.
- The intensity of interdependence of time-delayed time series is evaluated by means of determination coefficient. Time delay of 1, 2, 3, and 4 months is tested, whereas the exact length of time delay is determined according to the time delay with highest determination coefficient. Gradually the most probable length of time delay is determined for selected branch of the milk commodity chain.

3 RESULTS AND DISCUSSION

As a starting point of the research, price development for all analysed dairy products (milk, yoghurt, edam cheese) is assessed in time period I./1998-III./2006, which is depicted on following graphs (**Figure 6.7**):

Figure 6.7: Price development (farm, producers', consumer prices) in milk commodity chain



Source: Own calculation based on data of Commodity study Milk 12/2006.

Based on visual assessment of price development in graphs on **Figure 6.7** it is clear that:

- On the 1st level of analyzed commodity chain (i.e. between the farmer and the processor) the processors' price partially copies farm price development only at the milk commodity. From the price development of other dairy products with higher value added (yogurt, cheese) it is evident that the processors' price

development is influenced besides the price of agrarian commodities (milk) also by other costs, what obviously causes fluctuating development of processors' prices.

- On the 2nd level of analyzed commodity chain (i.e. between processor and retailer) it is possible to claim that the consumer price levels of all analyzed products copy the development trend of processors' prices; in the case of consumer prices of products with higher value added (yogurt, cheese) strong fluctuations within processors' prices are absorbed in both directions; the similarity between processors' and consumer prices is at highest level in the case of milk.
- If we focus on the share of individual links of the commodity chain (farmer, processor, retailer) on the final consumer price of analyzed commodities, we can conclude, that:
- Highest share on consumer price has the farmer in case of milk; the price of agrarian commodity represents in average 58 % of consumer price. Since it is dairy product with low value added, the share of processor on final price represents in average only 20 %.
- In the case of products with higher value added (for instance yogurt or cheese) the processor's share on final price is higher than farmer's; processor's share is around 50 %, while farmer's share is only around 20 % in case of yogurt.

Table 6.14: EPT matrix (from the left: Milk, yogurt, cheese)

EPT ^m cow milk	Farmers' price of cow milk	Processors' price of milk - 1,5% fat, paper box	Consumers' price of milk - 1,5% fat, paper box	EPT ^m white yoghurt	Farmers' price of cow milk	Processors' price of white yogurt 4,5% fat	Consumers' price of white yogurt 4,5% fat	EPT ^m Edam cheese	Farmers' price of cow milk	Processors' price of Edam cheese - 45% fat	Consumers' price of Edam cheese - 45% fat
Farmers' price of cow milk	X	0,16	0,25	Farmers' price of cow milk	X	1,10	0,55	Farmers' price of cow milk	X	1,04	0,67
Processors' price of milk - 1,5% fat, paper box	0,06	X	0,84	Processors' price of white yogurt 4,5% fat	0,21	X	0,06	Processors' price of Edam cheese - 45% fat	0,31	X	0,45
Consumers' price of milk - 1,5% fat, paper box	0,11	1,08	X	Consumers' price of white yogurt 4,5% fat	0,38	0,82	X	Consumers' price of Edam cheese - 45% fat	0,47	1,03	X

Source: Own calculation based on data of Commodity study Milk 12/2006.

Results at the first stage of price transmission analysis, when the intensity of price transmission is expressed by the coefficient of price transmission elasticity (Table 6.14), approved that:¹⁹

- On the 1st level of commodity chain (producer-processor relation) we can observe inelastic transmission of farm price changes into consequential stage

¹⁹ Only price transmission of inputs into outputs and not vice versa (i.e. part of EPT ratio matrix over the diagonal) was observed due to the lower conformity. of EPT ratio values.

(i.e. into the processors' price) only for milk – product with low value added and fast production cycle. Elastic transmission of price changes was noted in case of products with higher value added (cheese and yogurt), which can be caused by certain time delay in reaction of output price into input price change as a result of important role of storage along the production of this product or higher margin of processor.

- On the 2nd level of commodity chain (producer-consumer relation) inelastic transmission of price changes was noted for all analyzed dairy products.
- At the second stage of the price transmission analysis correlation of positive, resp. negative price differences was assessed, expressed by determination coefficient (see **Table 6.15**).
- On the 1st level of commodity chain the initial presumption (positive price changes are transmitted to a greater extent than negative price changes due to the market power of individual links within the commodity chain) was confirmed for all analyzed dairy products (milk, yogurt, cheese),
- On the 2nd level of commodity chain the initial presumption was confirmed only for dairy product milk and yogurt; it was not confirmed in the case of cheese and it is most likely that the storage plays important role here again.

Table 6.15: Correlation of positive and negative price differences

		1 st level of commodity chain	2 nd level of commodity chain
Cow milk	Price increase	41%	48%
	Price decrease	26%	38%
Edam cheese 45% fat	Price increase	16%	1%
	Price decrease	9%	17%
White yogurt 4,5% fat	Price increase	6%	21%
	Price decrease	3%	7%

Source: Own calculation based on data of Commodity study Milk 12/2006.

Time delay of output prices reaction to changes in input prices was evaluated at the third stage of analysis. Due to the type of assessed dairy products the time delay was tested only for the final product Edam cheese, 45 % fat. Results of this stage of analysis (**Table 6.16**) approved that on the first as well as on the second level of this chain we can observe time delay in reaction of output prices to changes in input prices, namely in lengths of 1 or 2 months on the 1st or 2nd level of commodity chain, which proves relatively important function of storage in the cheese production process as well as in distribution process.

Table 6.16: Values of determination coefficient for several lengths of time delay

Edam cheese 45% fat	Length of time delay				
	1 month	2 months	3 months	4 months	no time delay
1 st level of commodity chain	12%	5%	1%	8%	10%
2 nd level of commodity chain	18%	33%	23%	15%	14%

Source: Own calculation based on data of Commodity study Milk 12/2006.

4 CONCLUSIONS

Results of the first and the second stage of price transmission analysis proved increasing importance of market power on partial markets within analyzed commodity chain in condition of the Czech Republic, namely:

- On the level of processor (dairy industry entities),
- On the level of trade (retail) as well.

Dairy sector in the Czech republic experienced dynamic development since 1989; purely concentrated sector in 1989 turned into fragmented in the first half of the nineties and than again into concentrated sector in 2006. Situation in the sector in 2006 is characterized with values of concentration ratios: $CR_3 = 44,6\%$, $CR_5 = 54,6\%$, and $CR_{10} = 72,9\%$. Among the largest dairy works are MADETA, OLMA, Hlinsko Dairy, Dairy Kunín and others. Nowadays the concentration rate strengthens the intensity of competition among existing companies though (see **Figure 6.8**), but the concentration process and downfall or acquisition of unsuccessful companies continues (ČERNÍKOVÁ, 2003).

Figure 6.8: Development of concentration in Czech dairy sector

1989	1994	1999	2001	2006
7 state-owned concerns	90 entities (113 dairies)	65 entities (70 dairies)	62 entities	32 entities
cca 20 new entities			22 entities	

Source: ČERNÍKOVÁ (2003), own calculations.

Since the second half of 90s strong concentration of retail sector has continued, which can be proved on revenue increase of top 10 companies on the market from 23 billions CZK (1993) to 219 billions CZK in 2005; according to Incoma Research market share of these companies was around 67 % in 2005. This process is being stabilized and slowed down in last decade.

Increasing market power of dairy enterprises as well as retail chains in the commodity chain was proved based on results of the first or second stage of price transmission analysis, where incomplete price transmission ($EPT < 1$) was approved on this level of commodity chain; in the second stage the presumption, that the

price decreases are transmitted in less extent than price increases as a result of processors' market power, was confirmed.

REFERENCES

- MC CORRISTON, S., MORGAN, C. W., RAYNER, A. J. (2001): Price transmission: The interaction between market power and returns to scale. *European Review of Agricultural Economics*, 28(2), pp. 143-159.
- MC CORRISTON, S. (2002): Why should imperfect competition matter to agricultural economists. *European Review of Agricultural Economics*, 29(3), pp. 349-371.
- ČERNÍKOVÁ, R. (2003): Structural analysis of milk industry in the Czech Republic. PhD thesis. FBE MUAUF, Brno, 148 p.
- LECHANOVÁ, I. (2005): Price formation in commodity chain of feed grains. PhD thesis. FBE MUAUF, Brno, 173 p.
- LECHANOVÁ, I., NOVÁK, P. (2006): Price transmission analysis in Czech milk commodity chain. In: *Annals of the Polish Association of Agricultural and Agribusiness Economists*. Poznan.
- NOVÁK, P. (2007): Milk Production and its concentration. In: *Firm and competitive environment*. Brno.
- NOVÁK, P. (2006): Situation in the dairy sector in the Czech Republic. In: 96th EAAE-Seminar – Causes and Impacts of Agricultural Structures. Taenikon.
- PELTZMAN, S. (2000): Prices Rise Faster than They Fall. *Journal of Political Economy*, 108(3): 466-502.
- REVOREDO, C. L., NADOLNYAK, D. A., FLETCHER, S. A. (2004): Explaining Price Transmission Asymmetry in the US Peanut Marketing Chain. Selected Papers prepared at the Annual Meetings of the AAEE, Denver, Colorado, 17 p.
- Commodity study Milk 12/2006, Prague: MAg CR, 2006. Available on <http://www.mze.cz/>.

A COMPARATIVE ANALYSIS OF THE MEAT SECTOR IN HUNGARY AND EMILIA-ROMAGNA: PERFORMANCE AND EFFICIENCY

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1 INTRODUCTION

Since the system changed, in 1989, the production structure in the Central and Eastern European Countries (CEEs) has been modified during the transition process involving the economical but also political and social aspects. Hungary has been considered, among the twelve European Union (EU) new Member States, the best performer, together with Estonia, in leading on these reforms. The inevitable backlash of market reform has been the drop in agricultural production: Output. The meat output in Hungary for the period 1997-1999 ranged the 65 % of the meat output in the period 1986-1990. In 2005, almost 80 % of food industry consisted of micro-enterprises with less than 10 employees, and that of less than 50 employees account for more than 95 % of food firms. The other inevitable consequence of market reforms was the creation of a high unemployment level. This structural changing, together with the new agricultural conditions established under the European Common Agricultural Policy, has also altered the degree of efficiency and competitiveness in the Hungarian meat sector.

In the same period, also agro-food industries in Emilia-Romagna have to face productivity and competitiveness problems. The main reasons are linked to the structure and in particular the size of the enterprises and to the difficulties in the internationalisation. In fact the numerous SMEs are often organised in *districts*, with a strong geographical agglomeration of enterprises and with a strong specialization in specific food production, often of high quality and typical products. In Emilia-Romagna the total value of the animal production is more than 1.5 billion Euro in 2006. The total value of the meat production in more than 0,6 billion Euro, mainly pork, poultry and beef.

In this paper we will evaluate and compare the growth process in the agro-food meat sector in Hungary and in the Emilia-Romagna region. In the first part of the

work we will compare the different economic performances using the most important economic and financial index. In the second part, we will analyze the technical efficiency of firms involved in the meat industry on in Hungary and in Emilia-Romagna, utilising the stochastic production function. In the third and final part, we will discuss the main role of the Industrial Districts in Emilia-Romagna and how the Hungarian entrepreneurial system differ facing the competition in the enlarged European Union and in the global market.

2 THE FEATURES OF THE AGRO-FOOD SYSTEM IN HUNGARY AND IN EMILIA-ROMAGNA

2.1 The Hungarian case

In Hungary, the agricultural and food sectors have been subjected to a great restructuring during the still on-going transition process. In 2006, FDI in Hungary showed a growth of 3.6 % with respect to 2005, while the number of firms owned by Hungarian decreased in favour to foreigners. Thanks to these investments and to the European subsidies benefiting Hungarian farmers, the agro-food system could access to better productive technologies than the ones they got in the pre-transition years.

In Hungary, till 1989, agriculture generated 13.7 % of GDP, and it employed 18 % of labour force, with more than 22 % of export income. Instead, in 2005 agriculture contributed to 3 % of GDP, it employed 5 % of active population and it determined 6 % of export, next to the levels registered in Emilia-Romagna. The number of people employed in agro-food industry was 4.1 % on the national level and more than 16 % of total workers in the manufacturing industry. Hungary is the only one, among the twelve new European Members, showing a positive trade balance in agriculture.

There are several differences between agro-food enterprises in Hungary and in Emilia-Romagna other than in the characteristics of products and in the technological equipment. In Hungary, the lower competitiveness is linked to the difficulties of producers also in presenting the demands for financial support included in the new Rural Development Plans. Today the Hungarian productive structure of agriculture is bipolar, where the number of small enterprises greatly exceeds the bigger ones.

In the last years, agriculture production prevailed over livestock in Hungary: In 2005, 75 % of farms focalized on agricultural production, while 26 % on animal production. Among individual farmers, 47 % works in agriculture while just 20 % is committed to livestock (mainly cattle and swine).

2.2 The agro-food industry in Emilia-Romagna

Emilia-Romagna is one of the most important regions in the Italian agro-food system and it's characterized by typical-well known high quality productions, as Prosciutto di Parma (meat sector) and Parmigiano-Reggiano (dairy sector). In 2005, the Region realized 21 % of the total income of the Italian agro-food industry, with a value of export reaching 17 % on the national level (FANFANI et al., 2006).

The most relevant sectors are, meat processing industry with 1,106 firms (respectively 22 % of the Emilia-Romagna regional total) and dairy with 1,537 enterprises (16.9 % of the Emilia-Romagna regional total). Emilia-Romagna is a net importer mainly of animals products and also of meat products (+13.8 % in 2005, about 31 % of agro-food regional import).

The Emilia-Romagna region is characterized by the presence of several *districts* in the agro-food sectors or local systems of production, with a mosaic-like geographical distribution on the territory. The origin, of these districts and local systems of production, is linked to the local type of development. In many cases, typical and traditions productions constituted the core for development, around which activities of processing and storage enlarge the market.

3 THE ECONOMIC AND STRUCTURAL ANALYSIS OF MEAT PROCESSING INDUSTRY ENTERPRISES

The enterprises selected from the AMADEUS data base (Bureau Van Dijk)²⁰ concern the section "Production, processing and preserving of meat and meat products", based on the 2002 ATECO classification. In order to assess the various economic and financial performances of Meat Processing Industry, we have analysed the balance sheets of about 70 enterprises over the six-year period 2000-2005. In Emilia-Romagna are located 45 of those enterprises and 25 in Hungary.

In Italy, sample of firms is mainly composed of big companies. In the period considered, the enterprises located in the Emilia-Romagna show a high and growing sales, ranging from 69.9 million Euro in 2000 to 77.5 million Euro in 2005. Even the cost of employee (6.31 million Euro) is higher respect to that of Hungarian enterprises.

In 2005, the total sales of the Hungarian enterprises considered are 29.5 million Euro with an increase, from 2000 to 2005, of 66.5 %. Also the total cost of employee grown of 70 % in the same period.

²⁰ The balance sheet data extracted from the AMADEUS data base (Bureau Van Dijk), contains financial information related to companies in Italy with over 15 million Euro sales or more than 200 employees, and enterprises in Hungary, with over 10-million-euro sales or more than 150 employees.

The analysis of the financial, structural, and income characteristics has been conducted through the calculation of balance sheet standard indexes. In order to achieve a better evaluation of the realities analysed, we have used the index medians for the two groups of enterprises (Hungarian and Emilia-Romagna) and for each year considered (2000-2005)²¹. The indexes utilised and the results obtained are briefly described.

The *current ratio*, calculated as the ratio between availability (current activities) and current liabilities, indicates the enterprises' ability to meet short-term debts with activities in the short run. Both in Emilia-Romagna and in Hungary the current ratio is over one, then the enterprises have a good solvency level. The explanatory ability of this index is supported by the comparison with the *liquidity ratio* (liquidities/current liabilities), or quick ratio, which differs from the current ratio, in so far as stocks are excluded from the numerator (liquidities). The results highlight the important role of stocks for all the companies considered. A relevant figure is given by the importance of the stocks in the enterprises located in Emilia-Romagna. Furthermore, companies located in Emilia-Romagna converge to the reference parameter (0.8), whereas for the enterprises of Hungary it is declining (**Table 6.17**).

The *shareholders liquidity ratio* (shareholders funds/medium-long term liability) expresses the enterprises' ability to meet long-term liabilities with their own capital. The enterprises in Emilia-Romagna remain essentially steady, with values slightly above the unit. Enterprises in Hungary, instead, show a high ratio, with a maximum of 7.44 in 2002. The *solvency ratio* (shareholders funds/total assets %), helps evaluate the companies' effective capitalization percentage. Enterprises in Emilia-Romagna show the lowest level of activity capitalization. In Hungary, instead, the solvency ratio is much higher but with a downward trend.

The analysis of the long-run financial balance, the *coverage rate of the fixed assets with the owner's equity* (fixed assets/shareholders funds) is greater than one, for the companies located in Emilia-Romagna, then the fixed assets are not covered by the shareholders funds. Also for the Hungarian enterprises the index is greater, but it varies considerably in the period considered. The *profit margin* (Net Income/Net Sales Revenue %) is an indicator of a company's pricing policies and its ability to control costs. In the six years considered, the enterprises' capital solidity varies considerably. The enterprises in Emilia-Romagna remain essentially steady with values slightly above the unit. Enterprises in Hungary, instead, show a positive ratio and greater ratio.

²¹ The choice of the median was determined by the necessity of referring to an indicator which would not be greatly affected by extreme values but which would provide a good synthesis.

Table 6.17: Economic and financial index

	Current Ratio					
	2000	2001	2002	2003	2004	2005
Emilia-R.	1.03	1.05	1.12	1.10	1.16	1.13
Hungary	1.00	1.13	1.04	1.05	0.84	0.91
	Liquidity Ratio					
Emilia-R.	0.71	0.73	0.75	0.73	0.72	0.74
Hungary	0.71	0.76	0.76	0.73	0.61	0.55
	Shareholders Liquidity Ratio					
Emilia-R.	1.48	1.44	1.67	1.36	0.96	1.06
Hungary	4.74	4.77	7.44	4.04	3.10	3.64
	Solvency Ratio (%)					
Emilia-R.	14.03	14.43	14.96	17.47	19.01	15.95
Hungary	38.38	42.98	41.83	38.98	30.91	33.58
	Coverage rate of fixed assets with the owner's equity					
Emilia-R.	1.70	1.81	1.60	1.31	1.32	1.38
Hungary	1.11	0.92	1.18	1.28	1.53	1.60
	Profit margin (%)					
Emilia-R.	0.98	1.11	1.14	1.00	1.23	0.99
Hungary	2.49	2.22	1.89	1.48	1.17	1.57
	Return on Shareholders Funds (%)					
Emilia-R.	11.01	11.97	10.24	9.54	8.94	7.41
Hungary	17.45	16.32	16.50	9.82	6.74	13.00
Emilia-R.	1.74	1.45	1.28	1.22	1.34	1.25
Hungary	6.55	7.11	4.10	2.26	1.88	2.95

Sources: Our processing, AMADEUS data.

The *return on shareholders funds* (Profit or loss before taxation/shareholders funds %) indicates the profitability of shareholders funds before taxation. The analysis of the results of this index confirms better situation for the Hungarian companies, respect to that of Emilia-Romagna. In both cases the index shows a considerable decline.

The overall analysis of balance sheet financial and economic indexes emphasises that the enterprises of the Hungary show a good solvency situation, a shareholders fund situation characterized by a good balance between owner's capital and external financial support, and an high level of profitability, The situation in Emilia-Romagna is characterized by poor short-term solvency, low level of activity capitalization, and consequently a high recourse to third parties' capital, accompanied with low profitability in every year analysed.

4 COMPANIES' TECHNICAL EFFICIENCY

4.1 The empirical model

The analysis of production efficiency originates from the seminal works of DEBREU (1951), KOOPMANS (1951) and FARREL (1957). Production efficiency can be measured by means of parametric or non-parametric methods. The latter methods essentially consist in linear planning techniques; they have the advantage of not requiring the imposition to the data of any functional form, as they consist of optimisation algorithms. Because no error term is present, they do not allow specifying statistic tests, and every distance from the production frontier can be always associated with efficiency and not with measurement errors. The most commonly used non-parametric methods include the Free Disposal Hull, and the Data Envelopment Analysis.

Parametric methods come from the work of AIGNER et al. (1977), as well as MEEUSEN and VAN DEN BROECK (1977), who independently proposed production stochastic frontiers. These methods imply the assumption of a functional form representing production or cost structure. The advantage of the econometric approach is the presence of an error term allowing the distinction between measure and efficiency errors, and the specification of statistic tests. The problems of parametric methods concern the necessary strong assumptions about the functional form, and the distribution of the error term.

In recent years, various models have been proposed, to analyse cross-section data, panel data, time varying models, with individual effects, etc. Here follows a general formulation of the stochastic frontier model:

$$y_{it} = f(x_{it}; \beta) \cdot \exp(v_{it} - u_{it})$$

where x_{it} is an input matrix, y_{it} is an output vector ($i=1,2,\dots$ number of firms and $t=1,2,\dots,T$), $f(\cdot)$ is the function defining the production frontier, β is the vector of the technology parameters, v_{it} is a random error, which includes the variability due to events that cannot be controlled by the firm and measurement errors, and u_{it} is a variable that is assumed to represent the enterprise technical inefficiency. Commonly, it is assumed that v_{it} is independently and identically distributed as a $N(0, \sigma_v^2)$, and that u_{it} is distributed independently of v_{it} as $|N(0, \sigma_u^2)|$. In this paper, we have chosen to use the model proposed by BATTESE and COELLI (1995), where the component u_{it} is expressed as a function of social and economic variables that affect the enterprise inefficiency.

The model analysed also helps calculate the efficiency of each enterprise by means of the following simple function:

$$EFF_i = \exp(-u_i)$$

4.2 Technical efficiency for production of meat industry

The analysis of technical efficiency of enterprises of meat industry, focuses on the variables liable to affect their efficiency of the two groups located in Emilia-Romagna and Hungary. In the analysis we utilise the stochastic frontier translog production function model, involving two inputs, capital and labour, and one explanatory variable for the inefficiency effects in the stochastic frontier (firms located in Hungary or in Emilia-Romagna).

The maximum likelihood (ML) estimates of the model were obtained using FRONTIER 4.1 (COELLI, 1996)²². The Cobb-Douglas production function is found to be adequate representation of the data, given the specifications of the translog frontier model. Hence, equation for the balanced panel data set (2000-2005) is specified by a production function in Cobb-Douglas form:

$$\ln(Y_{it}) = \beta_0 + \beta_1 t + \beta_2 \ln(K_{it}) + \beta_3 \ln(L_{it}) + v_{it} - u_{it} \quad (1)$$

Y_{it} is the sales of the i -th firm at time t (th EUR);

K_{it} the value tangible fixed assets of the i -th firm at time t (th EUR);

L_{it} the i -th firm's cost of employees at time t ;

β_k $k=0,1,2,3$ are unknown parameters for the production function;

v_{it} are random variables associated with measurement errors or the combined effects of input variables not included in the production function. These terms are assumed to be iid $N(0, \sigma^2_v)$, and independent of the u_{it} ;

u_{it} which are non-negative random variables which are assumed to account for technical inefficiency in production and are assumed to be independently distributed as truncations at zero of the $N(m_{it}, \sigma^2_u)$ distribution, where:

$$m_{it} = \delta_0 + \delta_1(\text{Hungary})$$

In the specification of the model, we have also made hypotheses related to the error term. In particular, we have assumed that it consists of two parts, a random error and a function part of firm specific variables²³. The model (1) is a

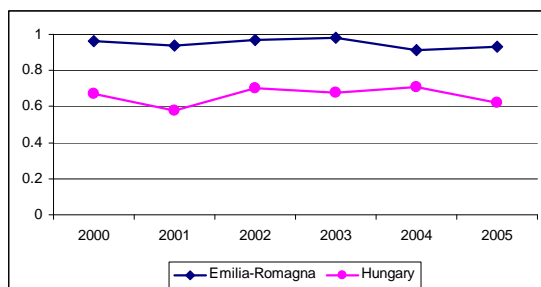
²² The program itself follows a three-step procedure. OLS are first obtained, followed a grid search that evaluates a likelihood function for values of γ between zero e one, with adjustments to OLS estimates of β_0 and σ^2 . All other values of β are restricted to be zero in this step. Finally, the a quasi-Newton iterative procedure to form ML estimates at a point where the likelihood function obtains its global maximum.

²³ To verify whether this assumption is correct, we have considered the test related to the presence of the component u_{it} . If the assumption does not bring significant information to the estimate, it can be eliminated and the model could be estimated by using OLS. The null hypothesis that technical inefficiency effects are not present in the model is expressed by $\gamma = \delta_i = 0$ $i=0 \dots 3$. The value of the LR test is 34.4, which leads to the rejection of the null hypothesis. In fact, the reference value obtained by Kodde and Palm tables is 7.05; therefore, a significant part of the variables between companies is explained by the u_{it} component. Eventually, a test has been performed to verify whether the variables entered into the error term u_{it} are explanatory of the enterprises' inefficiency. The hypothesis tested is $\delta_1 = 0$, which

good specification of the data. The results for the estimated model are reported in **Table 6.18**. The ML estimates of the coefficients of tree input variables and the explanatory variable in the inefficiency model have values which exceed their corresponding estimated standard errors except for the trend.

The analysis of the coefficients of the variables associated with the technical inefficiency is particularly interesting. The Hungarian enterprises' coefficient is positive and significantly different from zero; a lower efficiency for these enterprises is thus recorded in Hungary respect to Emilia-Romagna (**Figure 6.9**).

Figure 6.9: Mean efficiency for each group of enterprises



Sources: Our processing, AMADEUS data.

The coefficients of the input variables in the production function are elasticity parameters of mean output, with respect to the different inputs for the Cobb-Douglas model. The empirical results reported in **Table 6.18** indicate that the elasticity of frontier production respect to tangible fixed assets and cost of employees are estimated to be the positive values, 0.08 and 0.61 respectively. Thus, if the total cost of employees were to increase by 1 %, then the mean production of output is estimated to increase by 0.61 %.

Table 6.18: Stochastic frontier production function and technical efficiency – Parameters

		Coefficient	Standard-Error	T-ratio	
Beta 0	Intercept	5.03	0.51	9.89	**
Beta 1	Trend	0.01	0.02	0.69	
Beta 2	Tangible fixed assets	0.08	0.03	2.77	**
Beta 3	Cost of employees	0.61	0.03	18.59	**
Delta 0	Intercept	0.05	0.45	0.01	
Delta 1	Hungary	0.40	0.07	6.08	*
	sigma-squared	0.36	0.02	14.62	**
	gamma	0,67	0,08	8,24	**

Sources: Our processing, AMADEUS data.

Notes: *Significant for $t_{0.05}=1.645$; **Significant for $t_{0.025}=1.960$

yields a likelihood ratio test equal to 18.38, definitely higher than the χ^2_1 value (3.84); therefore, this null hypothesis is also rejected.

The returns-to-scale parameter for the Cobb-Douglas production frontier is estimate by the sum of the elasticity parameters of the two input variables to be 0.69. Hungarian's enterprises are characterized by a low level of technical efficiency, which does not seem to get better in the period considered. Enterprises in Emilia-Romagna region have high levels of efficiency, which is substantially steady throughout the period considered.

5 THE INDUSTRIAL DISTRICT AND AGRO-FOOD DISTRICTS IN EMILIA-ROMAGNA

5.1 Industrial districts and agro-food districts

The relevance of the manufacturing industry and that of food industry in Emilia-Romagna have stimulated numerous analysis on industrial and agro-food districts. These analysis has increase after the seminal works on industrial districts done by BECATTINI (1987; 1989), who revisited the Marshall's analysis of industrial districts and external economies.

In the last decades the Industrial Districts (Ids) analysis of Italian development has concentrated on manufacturing industry as a whole and on its main sectors (e.g. mechanics, textile, furniture). The food industry, although it represents the third sector of the Italian manufacturing industry. Little attention and analysis has been done, in particular, to the specialisation and concentration processes at the geographical level of the Italian food industry, over the last thirty years. These process have had different degree of intensity and they have influenced the structural changes of the main components of the Italian food industry, with different roles played by SMEs and big industrial groups. These deep sector-based structural changes and the geographical agglomeration at regional and county levels has been described as a "mosaic type of development" of the Italian food industry (FANFANI, BRASILI, 2006).

5.2 Main agro-food districts and local systems in the meat industry (15.1)

The Italian Institute of Statistics published new evidence concerning industrial districts with reference to the 2001 Census results (ISTAT, 2005). Only 7 out of the 156 industrial districts detected in 2001 belong to the food industry. Once again, as in the analysis of the 1991 Census, agro-food districts are largely "under-estimated", with respect to their real and actual importance. A recent analysis concerning the identification of these districts was published by UNIONCAMERE (2004), using a methodology similar to the one suggested by BRASILI and RICCI MACCARINI (2003).

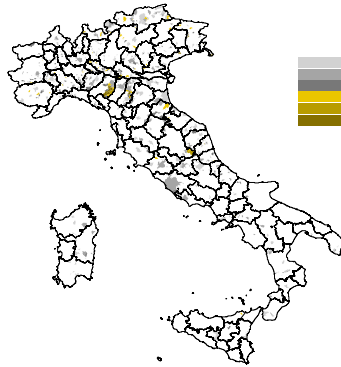
The general Census on Industry and Services 2001 data highlight the fact that in Italy the number of local units (establishments) involved in meat industry are more than 4,450. The provinces with the largest number of local units and employees are Parma, Modena and Reggio Emilia, all located in Emilia-Romagna. The province

of Parma saws a rise in the number of employees of over 13 % between 1991 and 2001, while the increase in local units was lower (3.5 %). The indices of localisation, concentration and specialisation described above were used to identify the main local systems of the meat processing industry (**Figure 6.10**).

A first evaluation for 2001 identified 10 different territorial systems of production characterized by a presence of the meat processing industry, concentrated in 65 municipalities, with over 800 local units and more than 20,700 employees.

Hence, in the meat industry there is a progressive localisation of the meat processing sub-sector, with a reduction in the number of municipalities involved, an increase in the number of local units and employees, and a simultaneous increase in specialisation.

Figure 6.10: Italian meat industry: Main districts and local systems



Source: Our processing on ISTAT – General Censuses of Industry and Service (2001).

6 CONCLUSIONS

The structural changes occurred in the Hungarian economy, together with the new agricultural support established under the European Common Agricultural Policy, has changed the efficiency and competitiveness in the Hungarian meat sector. The FDI inflows and the technological progresses introduced after the EU accession haven't been able to support the competitiveness of the Hungarian agricultural production and food industry products on the world market, also because of the EU policies provide higher protection levels on food trade and requiring high productive and qualitative standards for farms and agro-food enterprises.

The agro-food sector, and inside it the meat industry, in the Emilia-Romagna region has registered a growing relevance in the regional economy. However agro-food enterprises in Emilia-Romagna have to face productivity and competitiveness problems for different reasons, mainly linked to the structure of the industry and in particular the size of the enterprises. In fact the numerous SMEs,

representing the specific productive reality in the agro-food sector, often organised in *districts*, have serious problem in the internationalisation, in the recent years.

The main difference between agro-food enterprises in Hungary and in Emilia-Romagna consist in the organizational and dimensional structure, other than in the characteristics of products and in the technological equipment.

However the comparative analysis between the two realities gives some interesting results. In fact, the financial and economic characteristics of the production, processing and preserving of meat and meat products enterprises, in Hungary and in Emilia-Romagna region, shows very different realities and deep differences among these enterprises.

The analysis of the enterprises balance sheets, from 2000 to 2005, highlights a good economic and financial situation for the Hungarian enterprises. In fact, some crucial indexes show positive values as like current ratio and liquidity ratio. Moreover, also the return on shareholders funds shows good values, but with a great variability in the years considered. The value of Return on total assets confirms the positive pattern for enterprises located in Hungary, but even if there are decreasing value. The Emilia-Romagna enterprises show a low economic performance, with poor profitability and negative coverage ratio. Instead, the value of current ratio have a good performances in the period considered.

The analysis of the technical efficiency, done utilising the stochastic production function, shows a very different level among enterprise located in Hungary and in Emilia-Romagna. In particular, Emilia-Romagna enterprises show the highest value of technical efficiency respect to that of Hungary, in all of the six years period analysed.

The analysis performed, leads us to conclude that the meat sector in Hungary could improve in the future and it could reach better results in terms of technical efficiency. In fact, the biggest Hungarian enterprises in the meat sector, have already some good economic performances and the possibility to further developed, especially in connection with the country livestock production and the feed row materials for feeding. The further development and the relative position and efficiency of enterprises in the meat sector in Hungary, as well in Emilia-Romagna and other EU regions, will be strictly connected to the rapid structural changes in the agro-food system in the enlarged European union going on in the next few years.

REFERENCES

- BATTESE, G., COELLI, T. (1995): A model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for panel Data. *Empirical Economics*, 20, pp. 325-332.
- BECATTINI, G. (ed.) (1987): *Mercato e forze locali: Il distretto industriale*. Bologna, Il Mulino.

BRASILI, C., RICCI MACCARINI, E. (2003): Efficiency and innovation in the Italian agri-food local system. In: FANFANI, R., BRASILI, C. (eds): Perspectives of the Agri-Food System in the New Millennium, CLUEB ed, Bologna.

BRUSCO, S., (1986): Small firms and industrial districts: The experience of Italy. In: KEEBLE, D., WEVER, E. (eds): New firms and regional development in Europe. Croom Helm, London.

COELLI, T. (1996): A guide to FRONTIER Version 4.1: A Computer program for Stochastic Frontier Production and Cost Function Estimation. CEPA, Working paper 7, University of New England.

COELLI, T., PRASADA RAO, D., BATTESE, G. E. (1998): An introduction to efficiency and productivity analysis. Kluwer Academic Publishers.

FABIANI, S., PELLEGRINI, G., ROMAGNANO, E., SIGNORINI, L. F. (1998): L'efficienza delle imprese nei distretti industriali italiani. Sviluppo Locale 9, Rosenberg & Sellier, pp. 42-73.

FANFANI R., BRASILI C. (2006): A mosaic type of development: The Agri-Food Districts experience in Italy" 26th Conference of the International Association of Agricultural Economists "Contributions of Agricultural Economics to Critical Policy Issues Gold Coast", Australia, 12-18 August.

FANFANI, R., BRASILI, C. (2005): Agri-food districts: Theory and evidence. In: NIJKAMP, P., MORGAN, E., VAZ, T. (eds): The New European Rurality: Strategies for Small Firms. Ashgate.

FANFANI, R., PIERI, R. (eds): Il Sistema Agroalimentare dell'Emilia-Romagna. Rapporto. Ed. Maggioli Editore, various years.

FORGÁCS, C. (2006): Leadership may have decisive influence on successful transition of production type cooperative. Case study, Hungary, Integrated Development of Agriculture and Rural Institutions (IDARI) in Central and Eastern European Countries, Project under the 5th framework programme, Humboldt University of Berlin.

ISTAT (2005): I Distretti Industriali, Roma.

KUMBHAKA, S. C., KNOX LOVELL, C. A. (2000): Stochastic frontier analysis. Cambridge University Press.

LIEFERT, W. (2002): Changes in Agricultural Markets in Transition Economies, Market and Trade Economics Division. Economic Research Service and Johan Swinnen. Katholieke Universiteit Leuven, Agricultural Economic Report No. 806.

MEEUSEN, W., VAN DEN BROECK, J. (1977): Efficiency Estimation from Cobb-Douglas Production Function with Composed Error. International Economic Review, 18, pp. 435-444.

MINISTRY OF AGRICULTURE AND DEVELOPMENT (2007): Hungarian Agricultural Report 2006.

SIGNORINI, L. F. (1994): Una verifica quantitativa dell'effetto distretto. Sviluppo Locale, 1, pp. 31-70.

UNIONCAMERE (2004): I distretti rurali ed agroalimentari di qualità in Italia, Roma. Profili 72/Agricoltura.

BOTTLENECKS AND SUCCESS FACTORS FOR THE INTRODUCTION OF QUALITY ASSURANCE SCHEMES IN THE AGRI-FOOD SECTOR

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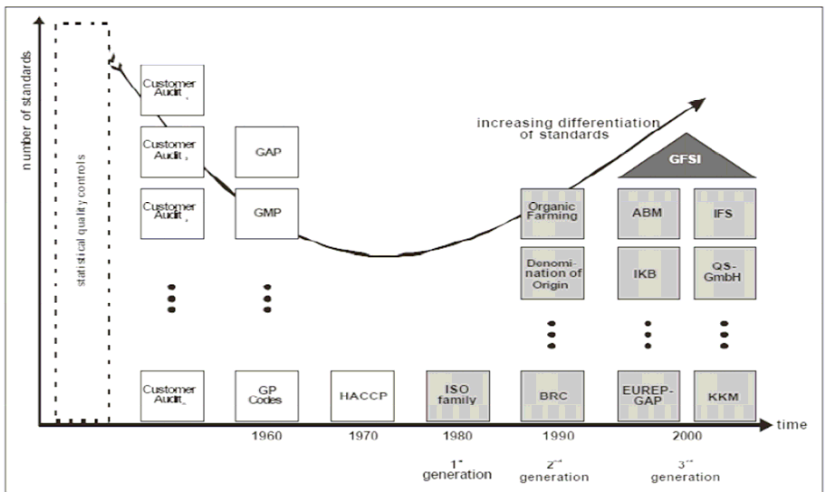
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1 INTRODUCTION

In recent years, the consumer's knowledge and concerns about food-born illnesses and food safety increased. This forced both the food industry and public authorities to develop quality and safety assurance systems (BREDAHL et al., 2001). A major challenge for the food industry is related to controlling costs associated with new food safety regulations. The increased complexity both at consumer level (risk aversion and sensitivity) and processor level (risk management and communication) requires adaptation of strategies and of institutional organization in the food supply chains. Another challenge for the food industry is the increasing globalization and the concentration process in the retail sector, which will lead to a reorganization of the food industry. Food supply chains will undergo an increasing domination, integration and globalization led by mainly supermarket retailers (WALES et al., 2006). As a reaction to the above mentioned evolutions and especially the globalization process, regions including small food firms try to differentiate by stressing the value of attributes such as tradition, origin, culture and culinary heritage. These evolutions explain the rise in the introduction of quality assurance schemes (QAS) in the EU. This paper aims to present an overview over different European QAS and about the costs and benefits involved.

2 QUALITY ASSURANCE SCHEMES – AN OVERVIEW

Quality assurance schemes (QAS) provide systems for assuring and certifying desired product attributes (BREDAHL et al., 2001). Most QAS are based on the quality management principles of ISO 9000/ISO 22000 and the HACCP-concept. In addition, some are following the Good Agricultural Practice (GAP) (ROOSEN, 2003).



Source: JAHN et al. (2004).

2.1. Worldwide QAS

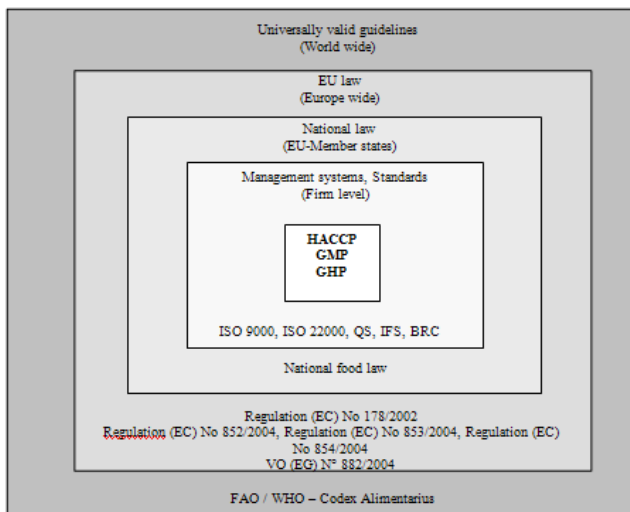
As presented in **Figure 6.12** the Codex Alimentarius (CA) is enclosing all quality systems and standards. The CA is a joint program of Food and Agricultural Organization (FAO) and World Health Organization (WHO) establishing food safety standards related to the international trade in food products. The CA-commission was founded in 1963 by FAO and WHO. The main aims of the commission are the protection of consumer's health and ensuring a fair trade in the food sector. Therefore the commission is supporting the coordination of all processes and analyses from international governmental and non-governmental institutions related to food safety standards (CA, 2007). The different nations have implemented a lot of regulations and laws to eliminate or at least minimize danger for the health of human, animals or plants from imported food products. The CA-commission aims the harmonization of all national food laws in order to reduce trade barriers and to improve the free and fair trade between all nations (FAO, WHO, 1999).

2.2 European QAS

The International Organization for Standardization (ISO) and the Codex Alimentarius Commission developed in close collaboration the ISO 22000 standard, which was implemented in September 2005. This quality management system provides a framework of internationally harmonized requirements in the food sector. ISO 22000 is an advancement of the ISO 9000 standard and furthermore, it is incorporating the ISO 9000 standard and the HACCP concept in one standard. However the main difference between ISO 22000 and ISO 9000 is the scope. The first one is aiming at food safety whereas the latter one is

aiming at food quality. The ISO 22000 standard is meant to be applied at all types of organizations within the food supply chain, independently or integrated in other management systems. On firm level, both horizontally and vertically oriented quality systems are applied. Horizontally oriented quality systems are developed through retailer initiatives such as International Food Standard (IFS), British Retail Consortium (BRC), Euro Retailer Produce working group Good Agricultural Practice (EUREPGAP) and Global Food Safety Initiative (GFSI). Vertically oriented quality systems evolved due to the rising focus on traceability. The organization of these quality systems can be divided into open (e.g. Agri-Confiance [France], Q&S [Germany]), semi-closed (e.g. Lable Rouge [France], Little Red Tractor [UK]) and closed (e.g. IKB [Netherlands]) supply chains and networks (SCHIEFER, 2003).

Figure 6.12: Overview of the different application levels of quality assurance schemes



Source: SCHMIDT (2006).

2.3 HACCP & GMP

The HACCP-concept and Good Manufacturing Practice (GMP) and Good Hygienic Practice (GHP) form the center of the quality assurance schemes (**Figure 6.12**). HACCP is applied for the food industry and aims to establish good production, sanitation and manufacturing practices to produce safe foods and to be pro-active and preventive rather than reactive. The HACCP-concept can be applied to all stages in the food system.

2.4 Traceability

The implementation of a combination of QAS can contribute to improved traceability, since an interaction between different QAS over the stages of the agri-food supply chain would raise traceability. Traceability means that companies must be able to identify the suppliers of its raw materials and the customer of its end products on a transaction basis. Though, the implementation is difficult, primarily due to the number of levels within the chain and to the numbers of producers supplying the chain (TIMON, O'REILLY, 1998).

2.5 Comparison of QAS

In **Table 6.20** different QAS are listed and compared with each other. It is presented that GMP and HACCP are included in most of the standards. The ISO 9000 standard is much less implemented in quality systems. Traceability is an issue of both B2C and B2B quality standards. Within the B2B standards contracting is preferred. The information flow can be horizontal, vertical or along the whole supply chain. B2C standards intend mainly to cover the whole supply chain. Further, only three of the mentioned QAS use an integrated chain quality control system, namely the German Q&S, the Danish QSG-standard and the Dutch Chain quality of milk (KKM) standard.

3 BENEFITS AND BARRIERS FOR QAS

The main aim of a QAS is the assurance of the quality of the food product through improved process and product quality, which lead to reduced costs because of optimizing the process organization and lesser recalls.

For the investigation of quality costs at food company level a qualitative and exploratory research was conducted (GELLYNCK et al., 2005). Based on a topic list, 17 food companies in Belgium were interviewed about their investments and costs related to food quality management. Food quality managers were asked for the reasons for realizing the investments and costs, focusing on competitive, consumer, retailer or regulatory pressures. The data related to costs and investments were collected from the internal cost price calculations. The results of this survey are presented in 0 other benefits of implementing QAS are presented, such as easier access to new markets (market entry), traceability over the whole chain, trust in the product properties (liability), easier fulfillment of EU-regulations because of intersection of these regulations with demands of quality assurance systems (cross compliance) (KRIEGER, SCHIEFER, 2005). Further, Table 6.20 also presents the degree of benefits for the different QAS mentioned in the former chapter.

Table 6.19: Comparison between technical standards, B2C- and B2B-concepts in the European Union

Quality System	GMP ¹	HACCP ¹	ISO 9000:2000 ¹	Traceability (in a SC) ¹	Logo for consumers ²	Target ²	Information flow ^{1&3}	Integrated chain quality control systems ⁴
Technical Safety Standards								
ISO 1561	+	+	+	-	-	-	-	-
ISO 22000	+	+	+	-	No	Food Comp	V	-
ISO 9000:2000	-	-	+	-	-	-	-	-
GMP	+	-	-	-	-	-	-	-
HACCP	+	+	-	-	No	Cons	-	-
B2C								
Label Rouge (France)	+	+	-	+	Yes	Cons	H, V, SC	-
Q&S (Germany)	+	+	-	+	Yes	Prod	V, SC	Yes
Danish-QSG	+	+	+	C	-	-	V, SC	Yes
IFS	-	+	-	-	-	-	H	-
B2B								
Agri confidence (France)	+	+	+	+	Yes	Prod	-	-
BRC	+	+	+	-	Yes	Ret	V, H	-
EurepGAP	+	+	-	+	No	Prod	V	-
GMP+ (Netherlands)	+	+	+	C	-	-	-	-
IKB (Belgium)	+	+	+	C	-	-	V, SC	Yes
KKM (NL)	+	+	+	C	-	-	-	-
Little Red Tractor (GB)	+	+	+	+	-	-	-	-
PVE-IKB (NL)	+	+	+	C	-	-	-	-
SQF 1000	+	+	+	-	-	-	-	-
SQF 2000	+	+	+	-	-	-	-	-

Sources: KRIEGER, SCHIEFER (2003); EC (2006); SCHMIDT (2006); WEINDLMAIER, DUSTMANN (2003).

Legend: + Characteristic feature of the quality system, - No characteristic feature or no available information. C = Commitment of contract between stages, H = Horizontal, V = Vertical, SC = Over whole supply chain.

Table 6.20: Overview of benefits of quality assurance schemes

	Market Entry	Traceability	Product Liability	Cross Compliance	Process quality	Product quality
HACCP	++	++	+	-	+	+++
ISO 9000/ ISO 22000	++	++	+	(+)	(+++)	(++)
Horizontal	++	++	++	+	+++	++
Vertical	++	+++	+++	+++	+	+++

Source: KRIEGER, SCHIEFER (2005).

Notes: - No application, + Low application, ++ Medium application, +++ High application.

The main similarity of the explored QAS is the improving of traceability of the products and through this the improvement of product and process performance. The main differences between HACCP, ISO, horizontally and vertically oriented quality systems are the scope and the focus. HACCP focus mainly on product quality and safety which is also true for most of the vertically oriented quality systems. Although, there are disadvantages and barriers for implementing even basic quality standards, such as high administrative efforts, the costs of continually obligatory external certification and no refunding of these costs through higher prices (WEINDLMAIER, DUSTMANN, 2003).

4 COSTS OF QUALITY ASSURANCE SCHEMES

QAS are implemented by the firms to manage food and process quality. Though, the implementation does not provide not in every case the expected result. Firms are required to search the best combination of quality systems for their specific situation and to compare costs and benefits in order to make the right decision.

4.1 Costs of investments in quality assurance

For the investigation of quality costs at food company level a qualitative and exploratory research was conducted (GELLYNCK et al., 2005). Based on a topic list, 17 food companies in Belgium were interviewed about their investments and costs related to food quality management. Food quality managers were asked for the reasons for realizing the investments and costs, focusing on competitive, consumer, retailer or regulatory pressures. The data related to costs and investments were collected from the internal cost price calculations. The results of this survey are presented in **Table 6.21**.

Table 6.21: Food safety investments and costs, 2002 in EUR per full time equivalent

Type		GMP/GHP	HACCP	Audit	Investments	TOTAL
Large	Min	665	240	42	334	1.555
	Max	4.694	1.980	1.109	3.100	8.755
Medium	Min	2.029	260	37	423	2.748
	Max	3.856	1.894	578	2.393	7.514
Small	Min	3.189	611	159	0	4.997
	Max	9.452	2.408	1.248	14.527	26.165
TOTAL	Min	665	240	37	0	1.555
	Max	9.452	2.408	1.248	14.527	26.165

Source: GELLYNCK et al. (2005).

The capacity of meeting new legislative requirements differs with firm size. Further results show that some companies without complying regulations to food safety (e.g. presence of HACCP plan) remain on the domestic markets. Without doing the necessary investments for food safety regulations, they can

subsequently work with other cost structures and compete on the same market. The interviewed companies claim that on the international markets trade barriers appear due to national differences of controls and penalty of food companies. The competitive position of food companies from member states where food authorities control and penalize more severely than in competing member states is weakened and not compensated by additional access to market as often claimed by advocates of rigid control.

4.2 Costs of traceability

For the measurement of traceability costs a survey, conducted in 2002 among 50 Belgian companies, observed the differences between companies in traceability operating costs and investments (DESCHOLMEESTER, LOOTENS, 2002). The main part of all interviewed companies reported investment costs above 250,000 Euro. The operating costs remain in the interval €25,000-250,000, only few companies have operating costs higher than €250,000 (Table 6.22).

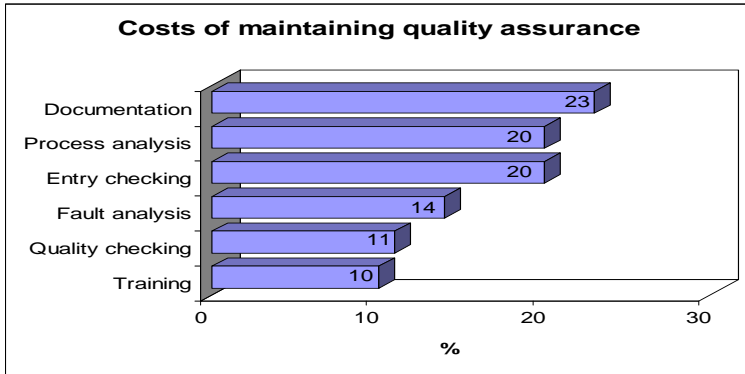
Table 6.22: Traceability investments and operating costs, in % of respondents^[PTZ3]

Type	Investments in €1.000				Operating costs in €1.000			
	None	<100	100-250	>250	None	<25	25-250	>250
Large	-	-	11	89	-	11	67	22
Medium	8	31	39	23	8	31	58	4
Small	6	31	31	32	7	47	34	13
TOTAL	6	25	31	37	6	32	52	10

Source: GELLYNCK et al. (2005).

4.3 Costs of maintaining quality assurance

In Figure 6.13 an overview of the operating costs of QAS is given, derived from a survey with food companies in Germany in 2003 (BEYER, KRIEGER, 2004). This survey investigates the costs and benefits of QAS in the food industry. More than 80 % of the responding firms followed the HACCP-standard and more than 60 % applied the ISO9000ff standards. In addition, the importance of sector-specific QAS and environmental management systems is increasing. The survey explores the costs regarding those areas important for maintaining QAS. The most cost intensive aspects of maintaining a QAS in a firm are documentation of the quality management, process analysis of quality assurance requirements and inspections of e.g. raw materials (entry checking).

Figure 6.13: Operating costs of a quality system

Source: Adapted from KRIEGER, SCHIEFER (2005).

5 DISCUSSION AND CONCLUSIONS

The main benefits of introducing QAS are the improvement of process and product quality and safety as well as a decrease in product failure and customers dissatisfaction. Moreover, product liability and cross compliance play an important role particularly for B2C approaches. Further, the improved traceability of the products is also an important benefit.

Main barriers are the high administrative costs, the costs of continually obligatory external certification and no refunding of these costs through higher prices (WEINDLMAIER, DUSTMANN, 2003). The most cost intensive aspects of maintaining a QAS in a firm are documentation of the quality management, process analysis of quality assurance requirements and inspections of e.g. raw materials (entry checking).

As a conclusion, firms are required to search the best combination of quality systems for their specific situation and to compare costs and benefits in order to make the right decision. This decision should depend on their size, on their intention to enter international markets etc.

REFERENCES

BREDAHL, M. E., NORTHEN, J. R., BOECKER, A., NORMILLE, M. A. (2001): Consumer demand sparks the growth of quality assurance schemes in the European food sector. In: REGMI, A. (Ed.): *Changing Structure of the Global Food Consumption and Trade*. Market and Trade Economics Division. Economic Research Service, US Department of Agriculture, Agriculture and Trade Report. WRS-01-1, May, pp. 90-102.

CA (2007): <http://codexalimentarius.net/>. (06.03.2007).

- DESCHOLMEESTER, D., LOOTENS, A. (2002): Vlerick Survey on Material Tracking and Tracing. Seminar on Material Tracking and Tracing: Necessary evil or business challenge. Vlerick Leuven Gent Management School.
- EC (2006): Structured inventory of existing food quality assurance schemes within the EU-25. European Commission, Directorate-General Joint Research Centre, Institute for Prospective Technological Studies, Sustainability in Agriculture, Food and Health. Seville..
- FAO, WHO (1999): Understanding the Codex Alimentarius. Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO), Rome.
- GELLYNCK, X., JANUSZEWSKA, R., VERBEKE, W., VIAENE, J. (2005): Consumer attitudes towards food traceability and costs for the food business. Conference: Au nom de la qualité: Quelle(s) qualité(s) demain, pour quelle(s) demande(s), Oct 5-6, 2005, Colloque SFER, Clermont-Ferrand, France.
- GELLYNCK, X., VERBEKE, W., VIAENE, J. (2004): Quality Management in the Food Supply chain: How does the food industry interact with consumers, retailers and public authorities? In: SCHIEFER, G., RICKERT, U. (eds): Quality Assurance, Risk Management and Environmental Control in Agriculture and Food Supply Networks. ILB Press, Bonn, pp. 443-452.
- JAHN, G., SCHRAMM, M., SPILLER, A. (2004): Differentiation of Certification Standards: The trade-off between generality and effectiveness in certification systems. 14th IFAMA – Annual World Food and Agribusiness Forum, June 12-15, 2004, Montreux.
- KRIEGER, S., SCHIEFER, G. (2005): Decision support model for the optimization of quality systems in the agri-food industry. 11th EAAE-Congress 'The Future of Rural Europe in the Global Agri-Food System', August 24-27, 2005, Copenhagen.
- ROOSEN, J. (2003): Marketing of Safe Food Through Labeling. *Journal of Food Distribution Research*, 34(3), pp. 77-82.
- SCHIEFER, G. (2003): From Enterprise Activity Quality Management to Sector Initiative Quality Assurance: Development, Situation and Perspectives. Florida, University of Florida – Institute of Food and Agricultural Sciences.
- SCHMIDT, A. (2006): Vergleichende Darstellung unterschiedlicher Qualitätsmanagementsysteme in der Fleischwirtschaft unter besonderer Berücksichtigung der Effizienz und Praktikabilität. Ludwig-Maximilians-Universität. Institut für Hygiene und Technologie der Lebensmittel tierischen Ursprungs der Tierärztlichen Fakultät. Prof. Dr. A. Stolle, München. pp. 199.
- TIMON, D., O'REILLY, S. (1998): An evaluation of traceability systems along the Irish beef chain. In: VIAU, C. (ed.): Long-term prospects for the beef industry. INRA, Ivry-sur-Seine, pp. 219-225.
- WALES, C., HARVEY, M., WARDE, A. (2006): Recuperating from BSE: The shifting UK institutional basis for trust in food. *Appetite*, 47(2), pp. 187-195.
- WEINDLMAIER, H., DUSTMANN, H. (2003): Comprehensive quality management systems as a part of an efficient supply chain management in the food sector. 82nd Seminar of EAAE – "Quality Assurance, Risk Management and Environmental Control in Agriculture and Food Supply Networks", May 14-16, 2003, Bonn.

THE IMPACT OF TRUST ON COOPERATIVE MEMBERSHIP PERFORMANCE AND SATISFACTION IN THE HUNGARIAN HORTICULTURE

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1 INTRODUCTION

There is growing literature focusing on the transformation of agricultural cooperative enterprise from socialist collective farming (GARDNER, LERMAN, 2006). Similarly, there is a wealth of literature on marketing cooperative, but research on their role in transition agriculture is scarce. Recent studies emphasise the role of trust in cooperative performance (HANSEN et al., 2002) and in producers' marketing decision (JAMES, SYKUTA, 2005) but the research on this field is still limited. Marketing cooperatives may solve many problems of vertical coordination; however the numbers of cooperatives are still low in transition countries (FERTŐ, SZABÓ, 2002). One of possible explanation for this phenomenon is the lack of trust among farmers and between farmers and their partners. Furthermore trust plays an important role for farmers to join a marketing cooperative in transition country (BAKUCS et al., 2007).

The paper tries to contribute to the literature at least two ways. First, we present a case study on a marketing cooperative in Hungary to better understand this organisation form in an uncertain environment. We analyse the "Mórákert" cooperative which is one of the most successful cooperatives in terms of increasing annual turnover and membership. Second, we focus on the role of trust in the explanation of the success of a marketing cooperative in a transition country. We can hypothesise that the importance of trust may be greater in transition countries including Hungary than in developed economies. This paper is the first to systematically investigate different types of trust amongst marketing cooperative members and between members and management in a transition country. Thus, the

aim of the paper is to empirically test the importance of trust on the economic relationships entailed by marketing coop membership in Hungarian horticulture. More specifically, this paper focuses on the impact of trust on cooperative members' performance, satisfaction and their commitment of remaining cooperative members. The structure of the paper is as follows: Section 2 provides a brief history on the "Mórákert" cooperative, section 3 presents some of the theoretical background, section 4 discusses the methodology employed, section 5 presents the dataset and the empirical analysis, and final section summarises our results and concludes.

2 THE BRIEF HISTORY OF MÓRAKERT COOPERATIVE

In this section we provide a brief description of development of the "Mórákert" Purchasing and Service Cooperative. "Mórákert" cooperative is active in the fruit and vegetable sector and it was the first officially acknowledged Producers' Organisation (PO) in Hungary certified in 2002. It works as a very successful cooperative (e.g. in terms of increasing annual turnover and membership) thus being a good example for a number of emerging producer organisations.

In 1993 the Department of Agriculture of the local authority was established in order to help small-holders submit forms for various applications. The main incentive for establishing a cooperative was very similar to the Danish tradition: Economic necessity, arising from the economic and market situation at the beginning of the 1990s. Thus an organisation was established to build up countervailing power, help the farmers with information and to strengthen their negotiation power against retailing and processing industries.

In the second step, the "Common Agricultural and Entrepreneurial Society", Móráhalom was established in January 1994 with the aim of organizing small-holders within a loose network. 35 members founded this non-profit organization. In addition of submitting joint projects, the main activity was to organise the collective purchasing activities. This type of co-ordination was successful, and in some cases savings of 18-20 % of the purchase cost were achieved.

These joint purchasing activities were extremely successful, as they could decrease transaction costs, e.g. information, negotiation and transportation costs. However, the main problem was to co-ordinate the marketing of the small-holders' produce. Therefore, in the next step the "Mórákert Purchasing and Service Cooperative", Móráhalom was established in April 1995.

In the first few years of the coop's existence, the share of retail chains was about 5-10 % of the sales. The share of products marketed through wholesale markets and retail chains changed significantly in the 1997-1999 period. According to RÁCZ (2006), now approximately 90 % of the products distributed on domestic markets are sold to retail chains (Tesco Global, Auchan Hungary, Csemege-Match, SPAR Hungary, PROFI Hungary, CORA, CBA, etc.). In order to increase the

value of the members' products, the co-operative seeks export opportunities. Thus, 80 % of the produce purchased from members is sold on the domestic market and 20 % abroad (Estonia, Latvia, Lithuania, The Czech Republic, Slovakia, Slovenia).

The cooperative pays attention to the quality and homogeneity of products, whilst trying to assure a versatile assortment in order to fulfil the requirements set by retail chains. They occasionally buy products on spot markets and sometimes from import. The products of the members however are sold first, and non-member products or import is only used if local quantities are unable to meet the demand of retail chains.

The competitiveness of the cooperative on segmented markets is improved by differentiating its products from those of other producers. The cooperative endeavours to integrate, both horizontally and vertically, the members' farming activities, and encourages activities with higher added value. The cooperative has a site with complete infrastructure. A handling, sorting and packaging line for vegetables and fruits was put into operation in September 1999. In 2002 a so-called "agri-logistics centrum" was set up by the, which covers 4,000m² including a cold storage depot accounting for 1/4 of the total area. These investments were crucial to meet the food safety, environment and hygiene requirements of the European Union. The third phase of the development was enlarging the "agri-logistics centrum" with 6,000 m² storage facility. In June 2006, the coop was using 15,000 m² and 6 hectares facilities in Mórahalom. Thus all activities such as purchasing, handling, sorting and packaging of products from members and other suppliers, as well as the storage and transportation activities may be handled at one place. A computer assisted information system helps the work in the new headquarters.

Whilst having the capacity to fulfil the basic objective, i.e. to help farmers selling their horticultural products, purchasing input materials on their behalf at the most favourable prices, and offering long term security, "Mórákert" cooperative also has a radiation effect on the surrounding region. The increase of both membership and the turnover demonstrate that is operating efficiently. The friendly approach of the local authority, the various sources of development funds, and above all, the human capital and resources within the cooperative are key elements of its success.

A crucial aspect for the future of cooperative is the loyalty of members and the leaders of the cooperative, especially considering the uncertainties dominating the Hungarian fruit and vegetable sector. Trust, interpersonal connections, the capability of the coop to solve the first hold-up problem, e.g. prevent post harvest hold-ups (HENDRIKSE, VEERMAN, 2001) are some of the most important factors explaining members' loyalty.

3 THEORETICAL BACKGROUND

3.1 Theoretical considerations

Cooperation is a process, developed by different parties to interact and form business relationships for mutual benefits. Theoretically, higher levels of cooperation are expected to improve business coordination, which in turn leads to better human and product performance (SMITH et al., 1995). Successful cooperation however, requires building higher levels of trust between those cooperating and the management. Thus, in case of a cooperative, trust is potentially able to reduce transaction costs (shorter negotiations, easier contracting, etc.). Although various definitions of trust exist, (see WILSON, 2000 for a detailed review), following HANSEN et al. (2002), one may define trust as "the extent to which one believes that others will not act to exploit one's vulnerabilities". Members of a cooperative may develop affective and cognition based trusts amongst themselves. MCALLISTER (1995), defines affective trust as consisting of the emotional bonds between members. On the other hand, cognition based trust arises from empirical evidence of trustworthiness, in the sense that members make this decision based on what they think are "good reasons" (MCALLISTER, 1995). The amount of information needed to develop cognitive trust may be somewhere between "full knowledge", in which case trust is not needed, and "total ignorance" when trust may rationally not be developed since there is no basis for it. HANSEN et al. (2002), develop slightly different definitions for cognitive and affection based trust. They emphasise the importance of the process leading to the development of the "good reasons", arguing that also both types of trust result from social interaction, the nature of cognitive trust is more objective whilst the nature of affective trust is more subjective. Members join a cooperative in order to fulfil a goal that might be of economic nature (better prices, larger marketed quantities, cheaper inputs, etc.), of security reasons (more secure/stable input – output markets), or of a social nature (interactions with other members). HANSEN et al. (2002), argue, that trustworthiness between members is more affection based in nature, whilst between members and cooperative management is more of a cognitive nature, since the fulfilment of economic goals rests mostly on the economic performance of the management, which is easier to analyse from an objective point of view. It is important to emphasise that the distinction is not so clear cut in practice. Both the inter members and members and management trust might have some cognitive and affective characteristics as well. Trust between members may lead to the development of what is called group cohesion, i.e. the bondage or commitment of members. BOLLEN and HOYLE (1990) discusses the factors and various forms of trust leading to group cohesion. They define group cohesion as "an individual's sense of belonging to a particular group and his or her feelings of morale associated with membership in the group". The sense of belonging is more composed of cognitive components (e.g. past experiences with group members, expectations from membership), whilst feelings of morale

are more based on affective components (e.g. moods, feelings, emotions). BOLLEN and HOYLE (1990) conclude, that the level of group cohesion is more likely to be due to trust amongst members than trust of members towards the management, and that this trust is more likely to be an affective one. The last issue we need to cover is the relationship between the level of trust and members' performance within the cooperative. HANSEN et al. (2002) argue, that both types of trust are likely to have a positive effect upon cooperative members' satisfactions and economic performance. More, higher levels of group cohesion have also a positive impact on perceptions of satisfaction and performance.

3.2 Hypotheses

According to the theoretical considerations, we separately test the role of trust on group cohesion and members' performance and satisfaction. We pay special attention to the distinction between cognitive and affective trust. Hypotheses 1-3 deal with the relationship between trust and group cohesion, whilst hypotheses 4-6 focus on the impact of trust on members' performance.

Hypothesis 1. Trust among members (cognitive and affective) will have a greater effect on group cohesion than trust between members and management of cooperative (cognitive and affective).

Hypothesis 2. Affective trust among members has a greater impact on group cohesion than cognitive trust among members.

Hypothesis 3. Affective trust between members and management of cooperative has a greater effect on group cohesion than cognitive trust between members and management of cooperative.

Hypothesis 4. Both types of trust (cognitive and affective) at both levels (among members and between members and management) have positive impacts on the members' performance and satisfaction from their cooperative membership.

Hypothesis 5. Affective trust (at both levels) has larger effects on the members' performance and satisfaction from their cooperative membership than cognitive trust (both levels).

Hypothesis 6. Group cohesion has a positive impact on the members' performance and satisfaction from their cooperative membership.

4 METHODOLOGY

A survey was used to collect data from "Mórakert" cooperative members needed to test the hypotheses in the previous section. The survey was designed following HANSEN et al. (2002), employing the same variables. In the first step a pilot study was run on a smaller sub-sample to test the usefulness of questions measuring various types of trust. Preliminary results highlighted that some questions should

be excluded from final questionnaire due to poor understanding and a low response rate. A total of 136 responses were returned.

4.1 Measures

The survey contained an one-item scale developed to measure cognitive trust among members and between members and management and two item scales for affective trust among members and between members and management. We collected performance and satisfaction information employing a one scale item to provide a quantitative assessment of performance (my cooperative membership has resulted in increased profits). We used a one scale item to measure for an individual perception of group cohesion. The questions in the survey are presented in **Table 6.23**.

Table 6.23: The survey

<i>Cognitive trust</i>
I used a business-like approach to determine if I could trust other cooperative members
I used a business-like approach to determine if I could trust cooperative management
<i>Affective trust</i>
I feel that other cooperative members are trustworthy
I feel that cooperative management is trustworthy
I feel that I am trustworthy for other cooperative members
I feel that I am trustworthy cooperative management
<i>Performance and satisfaction</i>
My cooperative membership has resulted in increased profits
<i>Group cohesion</i>
I feel a sense of belonging to cooperative

4.2 Control variables

The number of hectares farmed was used to control for variability caused by the size of the member's farm. The number of years they had been members of the cooperative, the age of farmers and the highest level of education of farmers were also included as controls.

5 RESULTS

Table 6.24 shows the results of hierarchical regression analyses used to test the hypotheses on group cohesion. Variables entered the hierarchical regression in the following steps: (1) three control variables, (2) cognitive trust among members, (3) affective trust among members, (4) cognitive trust between members and cooperative management, (5) affective trust between members and cooperative management. The statistics for each model iteration can be found in **Table 6.25**. In the end, 44 % of the total variance is explained by the model.

Hypothesis 1 claims that both types of trust (cognitive and affective) among members have a greater effect on group cohesion than trust (cognitive and affective) between members and cooperative management. The results indicate that trust among members explained 16.8 % of the variance in group cohesion, while trust between members and management explained 26 % of the variance in group cohesion. However, both types of trust are significant among members when they enter separately and together in the model, while trusts (cognitive and affective) are significant between members and management only when variables enter sequentially in the model. Therefore we can not reject the hypothesis unambiguously.

Hypothesis 2 states that affective trust among members has a greater effect on group cohesion than cognitive trust among members. The results suggest that affective trust among members explain 11.1 % of the variance in group cohesion, while cognitive trust among members only 7.7 % of the variance. Furthermore, the coefficient of affective trust is higher than coefficient for cognitive trust. In sum, our estimations support the Hypothesis 2.

Hypothesis 3 argues that affective trust between members and management has a greater effect on group cohesion than cognitive trust between members and management. Our findings support this hypothesis. Estimations indicate that affective trust between members and management explain 21.1 % of the variance in group cohesion, while cognitive trusts between members and management only 4.9 % of the variance. In addition, coefficient of cognitive trust is not significant in the final model.

Table 6.25 show the results of hierarchical regression analyses used to test the hypothesis concerning the impacts of trust and group cohesion on members' satisfaction and performance from their membership in cooperative. Variables were added to the model in the order indicated in the table.

Hypothesis 4 states that both types of trust (cognitive and affective) at both levels (among members and between members and management) have a positive effect on the performance. Our estimations support this hypothesis. When each type of trust is entered for each level, it has significant and positive effect on performance, except cognitive trust among members. However, in the final model including all variables, only affective trust at both levels have a positive and significant effect on performance.

Table 6.24: Results of hierarchical regression analyses, the effect of cognitive and affective trust on group cohesion

<i>Step 1</i>	Coef.	P value	F	ΔR^2	R^2	N
Land size	-0.0001	0.760	0.64	NA	0.0159	123
Members year	0.0873	0.531				
Education	-0.3105	0.236				
constant	6.4640	0.000				
<i>Step2</i>						
Land size	-0.0001	0.509	2.17	0.057	0.0726	116
Members year	0.0108	0.856				
Education	-0.0337	0.758				
Cognitive trust – member	0.2294	0.006				
constant	4.5369	0.000				
<i>Step3</i>						
Land size	-0.0001	0.334	4.62	0.111	0.1831	109
Members year	0.0016	0.977				
Education	0.0402	0.709				
Cognitive trust – member	0.1613	0.061				
Affective trust – member	0.3638	0.001				
constant	2.8049	0.000				
<i>Step4</i>						
Land size	-0.0001	0.276	5.15	0.049	0.2325	109
Members year	-0.0057	0.919				
Education	0.0520	0.620				
Cognitive trust – member	0.1114	0.193				
Affective trust – member	0.2413	0.035				
Cognitive trust – management	0.2688	0.012				
constant	2.2106	0.004				
<i>Step5</i>						
Land size	-0.0001	0.141	11.40	0.211	0.4438	108
Members year	0.0014	0.976				
Education	-0.0693	0.451				
Cognitive trust – member	0.1934	0.010				
Affective trust – member	9.19e-06	1.000				
Cognitive trust – management	-0.1077	0.323				
Affective trust – management	0.7016	0.000				
constant	1.4475	0.032				

Table 6.25: Results of hierarchical regression analyses, the effect of cognitive and affective trust on membership performance

<i>Step 1</i>	Coef.	P value	F	ΔR^2	R^2	N
Land size	-0.0002	0.034	1.62	N.A.	0.0400	121
Members year	-0.0225	0.703				
Education	0.0288	0.796				
constant	5.43203	0.000				
<i>Step 2</i>						
Land size	-0.0002	0.030	1.48	0.011	0.0509	115
Members year	-0.0386	0.533				
Education	0.0552	0.626				
Cognitive trust – member	0.0890	0.299				
constant	4.9553	0.000				
<i>Step 3</i>						
Land size	-0.0002	0.005	7.06	0.206	0.2572	108
Members year	-0.0407	0.479				
Education	0.1788	0.094				
Cognitive trust – member	-0.0015	0.985				
Affective trust – member	0.5271	0.000				
constant	2.3248	0.002				
<i>Step 4</i>						
Land size	-0.0002	0.003	7.11	0.040	0.2970	108
Members year	-0.0478	0.397				
Education	0.1897	0.070				
Cognitive trust – member	-0.0479	0.570				
Affective trust – member	0.4125	0.000				
Cognitive trust – management	0.2486	0.019				
constant	1.7829	0.020				
<i>Step 5</i>						
Land size	-0.0003	0.001	11.71	0.153	0.4504	108
Members year	-0.0405	0.419				
Education	0.0842	0.374				
Cognitive trust – member	0.0248	0.745				
Affective trust – member	0.2093	0.054				
Cognitive trust – management	-0.0813	0.468				
Affective trust – management	0.6106	0.000				
constant	1.0898	0.113				
<i>Step 6</i>						
Land size	-0.0002	0.002	11.97	0.041	0.4916	108
Members year	-0.0410	0.398				
Education	0.1037	0.259				
Cognitive trust – member	-0.0295	0.698				
Affective trust – member	0.2093	0.046				
Cognitive trust – management	-0.0510	0.639				
Affective trust – management	0.4131	0.002				
Cohesion	0.2815	0.006				
constant	0.6823	0.315				

Hypothesis 5 claims that affective trust (at both levels) has a greater impact on performance than cognitive trust (at both levels). Our results provide strong support this hypothesis. The affective trusts explain 35.9 % of the variance in group performance, while cognitive trusts only 5.1 % of the variance. Furthermore, the coefficients of affective trust are significant for all specification, but cognitive trust is significant only between members and management.

Finally, as predicted *Hypothesis 6*, the group cohesion has a significant and positive effect on member's performance. Note that group cohesion explained an additional 4.1 % of the variance in performance, for a total $R^2=49.6$ %.

6 CONCLUSIONS

The paper analyses the role of trust in a successful agricultural marketing cooperative in the Hungarian horticultural sector employing a survey approach. More specifically, we focus on the effects of trust on cooperative members' performance and satisfaction and their commitment to remaining a part of cooperative. We analyse the trust along two dimensions: Cognitive and affective. Our results suggest that trust among cooperative members and trust between cooperative and management have positive effects on group cohesions. In line with a priori hypotheses and findings by HANSEN et al. (2002) we found namely the affective trust has a greater impact on group cohesions than cognitive trust at both levels. In addition, trust among members has a greater impact on group cohesion and members' satisfaction than trust between members and management. The limitations of our research are inherent in case study approach. Our results can not be generalised across all cooperative in Hungary due to differences in geographical location and commodity handled. Thus, further research is needed to clarify the role of trust in the success of marketing cooperative.

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REFERENCES

- BAKUCS, L. Z., FERTŐ, I., SZABÓ, G. G. (2007): The Choice of Marketing Cooperative in a Transition Agriculture. Paper presented at I. Mediterranean Conference of Agro-Food Social Scientists, 103th EAAE Seminar in Barcelona, April 23-25, 2007.
- BOLLEN, K., HOYLE, R. (1990): Perceived cohesion: A conceptual and empirical examination. *Social Forces*, 69, pp. 479-504.

FERTŐ, I., SZABÓ, G.G. (2002): The Choice of the Supply Channels in Hungarian Fruit and Vegetable Sector. Paper presented at the Annual Meeting of the American Agricultural Economics Association in Long Beach, July 5-8, 2002.

HANSEN, M. H., MORROW JR. J. L. P., BATISTA, J. C. (2002): The Impact of trust on cooperative member retention, performance and satisfaction: An exploratory study. *International Food and Agribusiness Management Review*, 5, pp. 41-59.

HARVEY, J. S. JR., SYKUTA, M. E. (2005): Property Right and Organizational Characteristics of Producer-Owned Firms and Organizational Trust. *Annals of Public and Cooperative Economics*, 76(4), pp. 545-580.

HENDRIKSE, G. W. J., VEERMAN, C. P. (2001): Marketing co-operatives and financial structure: A transaction costs economic analysis. *Agricultural Economics*, 26, pp. 205-216.

MCALLISTER, D. J. (1995): Affect- and cognition-based trust as foundations for interpersonal cooperation in organisations. *Academy of Management Journal*, 38, pp. 24-59.

MÓRAKERT (2003): Mórakert Beszerző, Értékesítő és Szolgáltató Szövetkezet. [Mórakert Purchasing, Marketing and Service Co-operative]. Mórahalom, May 14, 2003. Manuscript, 1-3.

MÓRAKERT (without date): Mórakert Termelői Értékesítő Szövetkezet. Első Elismert TÉSZ [Mórakert Producer Organization]. The first acknowledgement P.O. in Hungary). Brochure.

MÓRAKERT CO-OPERATIVE (2006): Main data on the development of Mórakert Producer Organization, Mórahalom. Mórahalom, June 2006. (Manuscript, in Hungarian).

RÁCZ, J. (2007): Presentation delivered at the occasion of General Assembly of Mórakert Co-operative. 11 May 2007.

SMITH, K. G., CAROLL, S. J., ASHFORD, S. J. (1995): Intra- and inter-organisational cooperation: Toward a research agenda. *Academy of Management Journal*, 37, pp. 7-23.

WILSON, P. N. (2000): Social capital, trust, and the agribusiness of economics. *Journal of Agricultural and Resource Economics*, 25(1), pp. 1-13.

INTEGRATION OF SMALL AND MEDIUM SIZE FARMERS BY CO-OPERATIVES IN THE HUNGARIAN FRUIT AND VEGETABLE SECTOR – A CASE STUDY

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1 INTRODUCTION

1.1 Background and motivation

Agricultural economy in transition economics can be described by considerable uncertainties, especially in the fragmented sector like fruit and vegetable. Within Hungarian agriculture, the above sector plays an important role. The main co-ordinators/channels used in Hungarian fruit and vegetable supply chain are the following: Local market, wholesale markets, production co-operatives, marketing co-operatives, producers' organisation, processing industry, wholesalers and retailers. However, it should be noted that spot markets and different types of contracts (including in some cases contract production) are the most common forms of co-ordination.

Different retail chains gain a progressively larger share of the fresh fruit and vegetable market. It is very important, therefore, that the farmers have to use marketing channels which could give them the strengths (countervailing power) of more concentrated organisations. It is indispensable for them to know the possibilities of the different forms of vertical co-ordination and integration in their sector. Marketing co-operatives and producers' organisations (PO) can solve the marketing problems of the fruit and vegetable producers also. In May 2006 there were 7 officially acknowledged POs and 62 provisionally acknowledged POs in Hungary. The number of POs is around 55 in 2007, which means fluctuation in the actual numbers of POs.

1.2 Main aim of the case study and methods employed

In this case study, we examine the integration role of Mórakert Purchasing and Service Co-operative, in Mórahalom in county Csongrád which can be found in the southern east part of Hungary. The Mórakert co-operative active in the fruit

and vegetable sector and it was the first officially acknowledged Producers' Organisation (PO) in Hungary. It works as a very successful co-operative (e.g. in terms of increasing annual turnover and membership) thus being a good example for a number of emerging producer organisations.

During the case study research we focus on the development and innovation of the Mórakert Co-operative employing a variety of methods. First, literature searches and review of the most important studies on the topic, especially regarding any printed or multimedia materials available about the activity of the Mórakert Co-operative have been used. Second, interviews of major players, e.g. with President of the Board, Managing Director etc. have been conducted.

2 THE DEVELOPMENT OF MÓRAKERT CO-OPERATIVE

Mórahalom is a small town between Szeged and Baja in the south-eastern part of Hungary. This city is the centre of the Homokhát Region. This area is a typical agricultural area, which means that more or less the only way for its inhabitants to earn their living is by agricultural production. Mórahalom is the most important production centre of the South-Danubian Region. Climate and soil conditions are in favour for producing vegetables and fruits assuring the flavour and taste of the various products. The most important plants are vegetables: Tomato, green pepper, delicate and hot paprika, various types of cabbage, onion and potato. Plastic tunnels and greenhouses now cover significant proportion of the cultivated land.

There was a situation in the micro region of Mórahalom in which about 1500-1800 private (small-holder) economic units attempted to do business at their own risk since their co-operative became defunct without a legal successor. The average area cultivated by the small-holders varied between 3 and 5 hectares. The producers faced oligopolistic and monopolistic players on the market, had not enough information about the market and they had very limited negotiation power. It was a real and huge need to build up countervailing power for the small-holder economic units.

The Common Agricultural and Entrepreneurial Society was established by the local authority of Mórahalom in January 1994 with the aim of organizing small-holders within a loose network. It was a non-profit organization. The number of founding members of the Society was 35. The main activity, in addition to organizing joint projects, was the organizing of collective purchasing activities. This type of co-ordination was successful, and in some cases savings of 18 or 20 % of the purchase cost were achieved.

These joint purchasing activities were extremely successful, as they could decrease transaction costs, e.g. information, negotiation and transportation costs. However, the main problem was rather to co-ordinate the marketing of the small-holders' produce. Therefore, the next step was to set up the Mórakert Purchasing

and Service Co-operative, Mórahalom in April 1995. The help of the local authority and mayor Zoltán NÓGRÁDI, who had taken the idea of setting up a new type of (marketing) co-operative from his study tour in Denmark, was invaluable in creating a new organisation of agricultural producers.

Activity of Mórakert co-operative based mainly on agriculture, its share in total revenue was close to 100 %, but last two years this ratio started to decrease. All measures of co-operative concerning years 1995-2007 show a very attractive growth with more than 750 members and with a turnover of HUF 8 billion in 2007.

3 THE ROLE OF MÓRAKERT CO-OPERATIVE IN THE FRUIT AND VEGETABLE SUPPLY CHAIN

3.1 Main channels used by Mórakert co-operative

The Mórakert co-operative is a strong marketing implement for its members and also has a radiation effect on the regions it works. The Mórakert PO helps their members and non-member producers to be able to sell their fruit and vegetable produce at the best possible price. After collecting product from members and non-members the co-op carries out activities which can increase the value added, such as selecting-sorting, packaging, storing.

It is worth to point out that the diversification of assortment is rather big, since the main products sold by the Mórakert co-operative are ranking from different vegetables like tomato, delicate and hot paprika, lettuce, various types of cabbage, carrot, parsley, green pepper etc. till a growing number of fruits like apple, water-melon, nectarines etc.

Potato is sold trough a co-operative ("Homoki Rózsa Burgonya Termelői Értékesítő Szövetkezet"), which is an other producer-owned organisation in Mórahalom, in order to be able to avoid problems of getting support as a PO. Since the potato does not count as a vegetable (e.g. it is not a PO plant), its share lowering the necessary share of the vegetables has to be sold by the co-op to be able to be acknowledged as a PO.

About 90 % of the products distributed on domestic markets by the case study co-operative are sold to retail chains (Tesco Global, Auchan Hungary, Csemege-Match, SPAR Hungary, PROFI Hungary, CORA, CBA etc.). In the first few years of the co-op existence the share of the retail chains was about 5-10 % in the total sale, while the proportion of wholesale markets and chains has been changing gradually and significantly in the period of 1997-1999 up to 90 % which is still the share (RÁCZ, 2006b). They have also opened two shops, one in MÓRAHALOM (2006) and an other one in the centre of Szeged (2007).

To be able to increase the value of the members' products, the co-operative seeks opportunity for export. 80 % of the produce purchased from members is sold

on the domestic market and 20 % abroad (Estonia, Latvia, Lithuania, The Czech Republic, Slovakia, Slovenia).

3.2 Contract requirements of retail chains regarding logistics

As mentioned above, retail chains have significant shares in the Mórakert co-operative trade. Some products are sold on a contractual basis according to weekly prices. The co-operative is more or less satisfied with the contracts and connections already established, but it should be noted that it is extremely difficult to fulfil the exacting requirements with respect to quality, quantity and range and the other terms of trade and payment stipulated by the retail chains. However, these do provide a secure market and a degree of stability for the farming activity of the members. The question of monitoring is becoming crucial in the context above.

Requirements regarding logistics are gaining more and more place in the contracts with the retail chains. Appendices of the contract contain the general trading criteria (rebates, benefits, discounts, bonuses etc.) as well as requirements concerning logistics (methods, deadlines, confirmation of placing orders etc.). The contract contains information regarding the product (quality, period of keeping the same quality, traceability etc.), transport (frequency, refrigeration etc.), methods and units of packaging and the form of communication (fax, e-mail, EDI etc.) The chains continuously measure the activity of the supplier by the help a complex indicator which fact underlines the significance of logistics processes taking place among the companies not just in the individual enterprise (HUSZTA, 2005).

It is also a general requirement that a whole assortment has to be delivered into each of the chains; as well the continuity of each product has to be secured. For example, in certain period of the year Mórakert Co-op has to import Spanish paprika, which type of product – after packaging – will supplement its own assortment.

3.3 The significance of contracts between members and the co-operative

The co-operative is willing, in the interest of its members, to display and market their produce. To achieve competitiveness, in certain cases the co-operative works on the basis of so-termed production type of contracts, which involve the co-operative detailing the requirements for the producer to ensure that the necessary quantity is produced. Main elements of the contracts are differ in case of different products, but generally contains the name and code (which is alternate regarding members and non-members) of the producers, the quantity and value of input supplied by the co-op, the species produced, the pacing of harvesting and the quantity. Quality requirements are also very important parts of the contracts. Members, who supplied between 90 % and 110 % of the contracted quantity in the contracting period, get a bonus of 2 %. There are also penalties regarding to potential opportunistic activity of members. Members can alter from the contracting quantity to both directions by 10 % without any consequences.

This information on one hand help the farmer in his discipline of providing data and helping them in adjusting to the requirements of EU, on the other hand provide useful information for an integrated controlling system. These contracts are the bases for the managing director in the yearly negotiation processes with the retail chain.

Efforts are always made to purchase input materials of the same type, to enable members to accomplish excellent, balanced quality in their production. The co-operative also deals with produce derived from non-members through an Ltd. called Mórakert TЭСZ Kft., in the interest of achieving better exploitation of its capacity. Very important advantage of being a member to get a contract, since non-members only called in case if the members can not supply the quantity and variety of products needed.

3.4 Branding and quality assurance programmes

The co-operative pays emphasis on the quality and homogeneity of their products, however they try to assure a versatile assortment in order to fulfill the requirement of the retail chains. They occasionally buy products on spot markets and sometimes from import; however, first they sell the products of the members, than if needed they call for the produce of non-member suppliers.

One of the main steps to improve the competitiveness on segmented markets is for the co-operative to differentiate its products from those of other producers. The co-operative sells potato, onion, tomato etc. in different packaging bearing its name, which makes it easier for the consumer to remember and recognize its produce. The co-operative marks the onion, potato and pepper it sells with its own label, and is now attempting to increase the range of products sold in packaging showing its name.

Bar codes are also used, and a registration system developed to enable the co-operative to control its selling parameters on computer. The system allows those operating it to distinguish which member's vegetables are being sold to a specific market, and therefore the farmer can be tracked down if problems arise. The traceability gains more and more importance registering EU number, product codes etc. Regarding business practice and according to legal regulations as well, it is natural in case of every product which is sold by Mórakert Co-op that traceability has to be provided according to each producer (RÁCZ, 2006b). The co-op distinguishes its member and non-member suppliers with the code SE and SE on the contract and also when purchasing the products.

Generally speaking in case of quality assurance there are national and EU legal regulation and standards. The co-op employs HACCP quality assurance system through its HACCP team and 192 producers belonged to the EUREPGAP system as well in 2006 (RÁCZ, 2007, HALÁPI, 2007). HACCP is legal obligation; EUREPGAP is mainly used because of market pressure since in a number of

cases it is part of the requirements of delivery set up by the chains. As mentioned above, prices are very similar, however if some organization can not meet the conditions e.g. quality assurance the others will gain some more market share.

3.5 New marketing strategies: Increase of export and further integration

The co-operative endeavours to integrate, not only horizontally but also vertically, the members' farming activities, and also to develop activities with higher added value. The co-operative has a site equipped with a full infrastructure. In June 2006 the co-op use 15,000 m² and 6 hectares in Mórahalom, which is a significant increase from the start. Facilities are fitted with modern sorting and packaging line, qualifying 20 % of the co-op' products for export. Everything can be handled in one place, such as purchasing, handling, sorting and packaging of products coming from members and other suppliers, as well as the storage and transportation activities. A computer supported information system helps the work in the new headquarters.

Increasing consumer demand concentration in retail chains has to be answer from the supplier side as well. There are two stages of the trendy process, namely fewer supplier delivers more products as well as the notion of networking. These processes attempt to restrict the severity of the competition and also to get into and stay in the stable supplier circle of the chains. It is necessary to state that – with the co-operation of POs – strategic alliances appear in which they work together in the field of purchasing, marketing and logistics. Above the decreasing transaction e.g. transportation costs these types of concentration helps to establish and secure trust among partners which can lead to set up of subsector networking and clusters (HUSZTA, 2005).

The co-operative tries to involve more segments of the chain and also extending its membership (750 owner – members in 2007) and circle of suppliers. The non-member trade is a question of importance in the case a PO since majority of the trade has to be done with members. In order to be able to fulfil the requirements of Pos in EU the co-op currently develops a new organizational model resulting in a kind of holding form. The members and other suppliers still sell their products to the co-operative which is the owner of an Ltd called Mórakert TЭСZ Kft. The Ltd (through the managing director) is the one who is in contact with consumers. The business partners (consumers) are the same, the administration is almost the same of the Mórakert Co-op, since they use an integrated resource planning system. The owner of the Ltd is the Mórakert co-op (92 %) and the authority of Mórahalom (8 %), so this is still a producer-owned organization. This system ensures that the co-op can get support from the budget of European Union, since fulfil all the criteria regarding Pos in the fruit and vegetable sector.

To be able to strengthen intrafirm collaboration and networking, they established a secondary level organization as a founding member of a joint stock company named DATЭСZ Dél-Alföld Rt. The company is a good means to increase the

competitiveness of the collaborating firms which are themselves leading enterprises of the South-Danubian region. They have also set up a joint venture called DALZA Hungária Kft. with another big Hungarian PO in order to facilitate joint export activities.

The PO is a founding member of a national association called HANGYA Cooperation of Hungarian Acquisition, Merchandise and Service Associations/Co-operatives. The ambitious plan is to establish a so called secondary or regional type co-operative which can be a good institution to secure markets for the members, to increase product's prices and in the meantime to reduce transaction costs. The co-op is a founding member of the South-Great Plain Co-operative Foundation which is a professional representative body aiming to help the work of the co-operatives in the region.

4 SERVICES AND INTEGRATION OF SMALL AND MEDIUM SIZED FARMS

4.1 Capital requirements for members and supports for the co-op

Regarding to the specific forms in which the small-scale holders included in the restructured market, suppliers of Mórakert co-op are organized small-scale farmers of primary products and at the same time the members of the organisation are owners of a segment of supply chain. The by-law of the co-operative which is in accordance with laws and other legal regulations concerning POs and co-operatives in the EU and Hungary contains the rules, rights and obligations of the members. Therefore, the by-law regulates the product, capital and management/control line of the co-operative member connections.

To fulfil the above mentioned aims and to be able to reduce transaction costs, the co-operative members and the co-operative had to invest significantly in order to increase of the value added of the products sold. Some of the investments, made by the members and the co-operative as well, are really specific, thus strengthening closer co-ordination. The value of the so-termed co-operative share, which represents the ownership and there is an obligation to purchase in the by-laws of the co-operative, increased from HUF 25,000 (1995) to HUF 180,000 (2006). The above mentioned contribution is only partly enough for providing financial support needed for the development described above. The members have to pay an additional amount of HUF 330,000 as a single payment contribution for investment carried out on behalf of the co-operative for the interest of the members. The above requirements are detailed in the by-law. There is also an amount of 4.1 % of the turnover which has to be paid or is hold back as a contribution to the operating costs of the PO.

Apart from the financial contribution from the members, the co-operative organization itself has got some non-financial support from the local authority and

significantly has some state and European Union supports according to its successful tenders. Noteworthy is that the co-op was excluded to pay local tax between 1996-2002, thus local authorities of Mórahalom supported the co-op in its initial phase of development. Nowadays the co-op pays significant amount of local tax, helping the development of the town into a beautiful middle town with full infrastructure which change can be noticed by any visitor.

The co-op can get support of HUF 150 million from the budget of European Union, since it meets the requirement regarding Pos in the fruit and vegetable sector. They use also bank credits and loans, including revolving charge account causing the fall in share of own equity of the co-op to 42 % in 2005. However, the main important point is that the co-op reinvests the significant part of the surplus made in the co-operative annually.

4.2 Services and integration: Decreasing transaction costs

There are numbers of ways, which the Mórakert co-operative can decrease transaction costs. In line with purchasing input materials and to selling vegetable and fruit products produced by the members the co-operative is still endeavoring to establish secure markets for the long term. It is extremely important since, producers have got a high degree of market and technological uncertainty. The co-op organizes the buying of input materials and the functioning of selling outlets in a more coordinated way, therefore promoting farming for the small-holders through better market prices.

Providing information is also very important with respect to the success of the co-operation between the co-operative enterprise and its members. Members can obtain information from a published circular, which provides practical details such as when and how input materials ordered can be delivered.

The co-operative has already bought transport vehicles as well, but members have to transport their own produce and/or input materials from and to the sites of the co-operative. However, this is cheaper and easier than to transport produce to the wholesale market, thus lowering the transaction costs for the individual members.

The co-op carries out other services for the members, like providing consultation (advice) within various fields, such as plant cultivation, the filling in of application forms for subsidies, storage etc. Storage and especially cold storage is very useful since it can decrease of the seasonal effects of fruit and vegetable production. Similar to the practice of using contracts in the case of purchasing products from members, the co-op has got a type of contract used in case of storing of the products of the members. Connected to the importance of quality assurance (HACCP, EUREPGAP) mentioned above, in case of storing, members have to use consultation/advisement in order to ensure the best quality.

Inclusion in marketing and promotion materials of the products of the co-operative hence of members is also a service of great importance and significance.

5 CONCLUSIONS

The Mórakert co-operative is a strong marketing implement for its members and also has a radiation effect on the regions it works. It has the capacity to fulfil the basic objective: Help farmers to sell their horticultural products, purchase input materials on their behalf at the most favourable prices, and offer long term security. The increase of both membership and the turnover of the co-operative demonstrate that it is operating efficiently. This is due to the friendly approach of the local authority, the various sources of capital derived from funds for development, and above all, the human capital and resources within the co-operative.

The crucial issue for the future of co-operative is the loyalty of farmers to their co-op and the leaders of the co-operative, especially under uncertainties dominating in the Hungarian fruit and vegetable sector. We have to emphasize the roles the Chairman of Board of Directors and the Managing Director (positions filled by the same persons from the beginning), have in ensuring stability and trustworthiness for members. Probably, because of the organized trust and the excellent human factors in the Mórakert co-operative the agency problem is not really significant at this level of development.

To be able to establish such countervailing power and to reduce the co-operative's transaction costs, the co-operative is more and more dependent on non-members trade, which practice could arise free-rider problems, however their products are only bought up when members' fruit and vegetables have already been intaken, they won't get any reimbursements or price supplements and they have no voting rights; therefore the free rider problem is not a hot issue so far in Mórakert co-op. Despite the co-operative can solve some of the horizon problems, if the co-operative is going to grow, it may face with the common property and horizon problems. To be able to solve potential horizon problems, the co-op uses a newsletter for disseminating information, they organize "professional evenings" for members, are currently developing a text message system providing short information for members, and currently they are also developing a website.

The main important weapons in the hands of the co-operative manager and president are secure markets and relatively high prices for good quality products coming from members and non-members alike.

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REFERENCES

- BAKUCS, L. Z., FERTŐ, I., SZABÓ, G. G. (2006): MÓRAKERT COOP: A successful case of linking small farmers to markets of horticultural products in Hungary, 2006. *Regoverning Markets, Phase 2*, pp. 1-51.
- HUSZTA, R. (2005): A magyar zöldség-gyümölcs ágazat logisztikai problémái. *Logisztikai évkönyv 2005* (in Hungarian).
- HUSZTA, R. (2006): *Agrárlogisztika. Hogyan – Es hogyan ne! Tranzit, 2006 január-február* (in Hungarian).
- MÓRAKERT (without date): Mórakert Termelői Értékesítő Szövetkezet. *Első Elismert TЭСZ [Mórakert Producer Organization, The first acknowledged P.O. in Hungary]. Brochure.*
- MÓRAKERT CO-OPERATIVE (2006): *Main data on the development of Mórakert Producer Organization, Mórahalom. Mórahalom, June 2006. (Manuscript, in Hungarian.)*
- RÁCZ, J. (2007): *Presentation delivered at the occasion of General Assembly of Mórakert Co-operative. 11 May 2007. (Power Point presentation in Hungarian.)*

INTERVIEWS

- HALÁPI, B. (Quality assurance manager) (2007): Interview, July 2007.
- HÓDI, P. (President of Board of Directors) (2006): Interview, May 2006.
- HÓDI, P. (President of Board of Directors) (2007): Interview, July 2007.
- HUSZTA, R. (Developing manager) (2007): Interview, July 2007.
- PÓNYAI, R. (Marketing manager) (2007): Interview. August 2007.
- PÖRNEKI, J. (Logistics manager) (2007): Interview, July 2007.
- RÁCZ, J. (Managing director) (2006a): Interview. May 2006.
- RÁCZ, J. (Managing director) (2006b): Interview. August 2006.
- RÁCZ, J. (Managing director) (2006c): Interview, July 2007.

LESSONS ON VERTICAL COLLABORATION IN UKRAINE

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1 INTRODUCTION

The increased requirements towards food products have led to the demand of a transparent production chain. This has caused a high demand for availability of information making information a competitive must. Nevertheless, in order to get a competitive advantage, this information has to be transformed into knowledge creating an inimitable and non-substitutable asset. In favour of these aspects, the food chain is in the progress to be re-designed into vertically coordinated organisations. These organisations that contain various firms and that are sequentially connected can be called supply chain networks.

The questions of how such chain networks have to be designed and which governance structure fits best have been addressed in several well known articles (e.g. GULATI et al., 2000; LAZZARINI et al., 2001). However, questions dealing with chain strategy and management are not discussed satisfyingly. Therefore, the aim of this paper is not to improve the discussion of the government of chain networks. Instead, we want to enhance the discussion on coordination of vertical network, i.e. chain management. A comprehension of these aspects can have crucial implications for the agribusiness of transition countries. One of the reasons for this is that efforts on vertical coordination have often failed in the agri-food sector of Central and East-European Countries (GORTON et al., 2003; SWINNEN, 2005).

In this context, we first outline the Ukrainian agri-food business in transition. Thereafter, we introduce the concepts of networks and supply chain networks. Adjacent, we elaborate on the issues of chain management. Finally, some conclusions are drawn.

2 THE UKRAINIAN AGRI-FOOD BUSINESS

Nowadays the Ukrainian agri-food business includes more than 60,000 food retailers, about 22,000 food processing companies, and more than 85,000 agricultural producers (STATE STATISTICS COMMITTEE OF UKRAINE, DERZHKOMSTAT, 2006). Modern forms of retailing (supermarkets, hypermarkets and cash & carry) account for 45 % in total retail turnover. Of these, 49.4 % belongs to top five retailers (ZMP, 2006). Food processing is currently represented by numerous small- and medium-sized enterprises (SME). However, there are also several distinguished actors. Market shares of ten biggest players in the meat processing, milk processing, flour-milling and sunflower-seed processing industries are 40 %, 40 %, 50 % and 70 %, respectively (DRAGON CAPITAL, 2006). These sectors also exhibit some backward vertical integration and consolidation in agriculture. At the same time, a specific feature of the Ukrainian agriculture is that over 60 % of gross agricultural output is produced by households (DERZHKOMSTAT, 2006). Another tendency is that the agri-food sector is internationalised at a growing rate. In the structure of total FDI, the retail sector, processing industry and agriculture account for 18.7 %, 13.5 % and 2.7 %, respectively (DERZHKOMSTAT, 2004). The retail sector and the processing industry are the most attractive sectors of the national economy for FDI. In most cases, foreign entrants employ their own business concepts as a means of competitive advantage. In order to successfully compete with them, local companies often imitate their strategies but also use their own knowledge of local situation.

A particular aspect of multinationals' strategies is an increasing orientation on improvement of vertical relationships between agri-food chain actors. This process can be regarded as the verticalisation of the agri-food business. However, in this process agri-food companies can face a number of challenges inherited in the transition economies. In general, these challenges include the problems of infrastructure, marketing, quality, trustful relationships, transaction costs, and financial aspects. Infrastructural issues that hinder the integration efforts in the food supply chain include the scale inefficiencies of agri-food enterprises, worsened roads and transportation facilities, a seldom use of modern IT, etc. As one more infrastructural issue, the managerial unpreparedness of most enterprises to working in market conditions can be recognised. Such circumstances can substantially impede procurement relationships in the sector. Indeed, many agri-food enterprises experience problems with marketing. One more reason is that they are poorly informed about quality and quantity requirements of the customers (IFC, 2004). To deal with marketing issues in agriculture, efforts on horizontal cooperation between farmers were made in the transition period. They resulted in creation of cooperatives to which farmers supplied their production. However, lack of liquidity in most cooperatives caused farmers' supplies outside. As a result, trustful relationships between cooperative members failed. In this situation, the

absence of a price premium or even prompt cash payments was the factor of cooperation failure.

Today, a great deal of transactions is still coordinated via the price mechanism in the Ukrainian agribusiness. One reason for this is that contracts can not be realised due to poor contract enforcement. GORTON et al. (2003) report that medium-sized processing enterprises suffered most of all, facing about 12 % of existing contracts not realised by suppliers in 2003. At the same time, small enterprises do not use any contracts at all. There are two reasons for contract breaching in transition countries (SWINNEN, 2005). First, producers mistrust their buyers and are afraid of not being paid for production. Second, they may not be able to fulfil a contract because they cannot access basic production factors. Again, the shortage of quality supplies has occurred due to the lack of necessary inputs, expertise and know-how resulting from financial constraints. Initial vertical ties did not aim to resolve the quality issue. If contracts between processors and farmers included loan support to farmers, they aimed just to utilise the production capacities of processors.

However, the question of quality is increasingly addressed today due to growing consumer demands. To a great extent, the improvement of consumers' requirements can be explained by the increase in incomes and the development of retail sector. Dealing with an ongoing competition in the sector, retail companies provide their customers with a range of offers concerning the style of items, store location and quality. In order to continuously maintain such activities, retailers arrange their networks of suppliers that would be most able to meet the requirements. For the retail sector, it is obviously more beneficial to work with large scale suppliers (SWINNEN, 2005). In Ukraine, however, most enterprises are SME at the processing and farm levels. Therefore, the arrangement of well-functioning vertically cooperating organisation is a challenging task and has to consider a number of specific aspects.

3 THE CONCEPTUALISATION OF SUPPLY CHAIN NETWORKS

Network is a term, widely spread in sociology and management sciences. This term covers all arrangements defining recurrent contractual ties among autonomous entities (MENARD, 2002). Generally, networks can be defined as "specific properties of the transaction relationships, typified by relational relationships in which formal and informal sharing and trust building mechanisms are crucial" (ZYLBERSZTAJN, FARINA, 2003). Networks do not solely address vertically organised ties. They rather more generally cover all questions on inter-organisational relationships of more than two firms (LAZZARINI et al., 2001).

In network science, the collaboration is determined by different forces e.g. complementary abilities of the involved firms and risk reduction (MENARD, 2002). While traditionally the resource-based view of the firm focused on the intra-firm

creation of core competencies as a competitive advantage (BARNEY, 1991), GULATI et al. (2000) amplified it in such a way that inter-firm networks can be seen as an origin of inimitable resources creating inimitable and non-substitutable value. Especially, the transfer and creation of explicit and implicit knowledge within the network by cooperation permits the network to be more competitive. Mainly organisational knowledge gains in importance as it has the ability to serve as a source of sustainable differentiation and is inherently difficult to imitate. By formal and informal knowledge (e.g. routines), contractual rules can be substituted lowering transaction costs and information asymmetries. Within networks, firms are embedded in upstream and downstream flows of resources, information, and knowledge. Hence, networks can influence the nature of competition and the profitability beyond traditional measures of industry competition (GULATI et al., 2000).

Besides financial incentives, also non-pecuniary ones, i.e. knowledge generation, power, and trust are key concepts in the network theory that motivate economic actors to work together (UZZI, 1997). On the other hand, there are also some constraints in networks: Divergent aims of the actors, information asymmetries, partitioning of gains and losses, opportunistic behaviour, etc. (ARBEITSKREIS, 1995).

A more differentiated approach to networks is taken by BURR (1999) who classifies four network typologies. They include the spontaneous network, self-organising network, project-orientated network, and strategic network. This typology is derived from the intensity of relations, the coordination mechanism, and the existence of a broker. In the subsequent thoughts, we focus on strategic networks or supply chain networks in agribusiness.

Under a supply chain network we understand the joint and cooperative behaviour and actions of companies that are related by vertical product and information flows in the supply chain in order to provide a product or service to the end consumer. The objective of most of the supply chain networks is to produce higher quality and/or higher efficiency by cooperation rather than by full integration of the supply chain or by market transactions (LAZZARINI et al., 2001; ZYLBERSZTAJN, FARINA, 2003). In such pyramidal-hierarchical networks (JARILLO, 1988), a strategy-leading focal company is the core element of the network being either manufacturer or retailer. The focal firm is expected to manage the system in order to realise the strategic objectives. Furthermore, the focal company is liable with its reputation for each product being produced by its supply chain network (SCN). Since the focal firm is liable without limitation for the correctness of the production i.e. for all credence characteristics, it must avoid any type of defect within the entire network.

Hence, the focal company has to set incentives to create a situation, in which every actor has self-interest to secure the sustainable stability of the whole network

(PICOT et al., 2001). On one hand, these incentives must be of monetary nature to create a short-term win-win situation (i.e. higher profits). On the other hand, the incentives have to be of non-pecuniary nature to create a long-lasting "unique relationship proposition", which cannot be imitated easily by competitors. Exclusive benefits can include higher profits or joint growth in the future. Nevertheless, for some participants of the network this might be just to stay in business. The cooperation in SCN relies on confidence and understanding. These characteristics have to grow over a long time and create the space to achieve a superior joint solution of a problem (HANF, KÜHL, 2003).

Especially in the food business, where numerous SME are active, cooperative networks give those enterprises the chance to concentrate on their core competencies. By cooperating, SME can better exploit their core competencies and reduce at the same time the inherent risk by focussing on single activities. Because of this structure, the focal company has to consider that such companies do not dispose of a sophisticated IT-infrastructure and high manpower. Additionally, single SME do not dispose of a sufficient quantity of commodities in order to supply the whole demand of the network. Particularly for agricultural goods, the total amount of necessary supply has to be delivered by various farmers. For this reason, horizontal cooperation has to be installed being managed by the focal company itself or by a system supplier.

4 STRATEGIC CHAIN MANAGEMENT

Food supply chains consist of a number of consecutive stages and at each stage of one or more independent firms so that the material and information flows have to be coordinated as to timing, quantity, quality and other aspects. On account of this, vertical cooperation between firms requires a great deal of coordination among them. Though in the organisational theory cooperation and coordination are both attributed to integration, GULATI et al. (2005) stress that there are distinct differences between them. We explain subsequently these differences and their implications in detail.

In the context of SCN, cooperation refers to the alignment of interests. Thus, problems of cooperation accrue from conflicts of interests (GULATI et al., 2005). These conflicts arise because self-interested individuals optimise their own private benefits before they strive for collectively beneficial outcomes. GULATI et al. (2005) conclude that the problem of cooperation can be regarded as a problem of motivation. To overcome this problem, formal and informal mechanisms can be used. Formal mechanisms include: Contracting, common ownership of assets, monitoring and sanctions, and prospect of future interactions. Informal mechanisms are identification and embeddedness (GULATI, 1995).

Coordination can be understood as the alignment of actions. Coordination problems arise if actors are not aware that their actions are interdependent. In general, interdependence is created when decisions and actions by one partner influence the decisions and actions of partnering firms (THEUVSEN, 2004). There are three types of interdependencies: i) horizontal or pooled interdependences between firms competing in the same market, ii) vertical interdependences between firms operating in different markets but linked by sequential work flows where the output of one is the input of the other, and iii) symbiotic or reciprocal interdependences between firms that complement each other or have reciprocal product and/or information flows (LAZZARINI et al., 2001). Another reason for coordination problems is the uncertainty about others' rationality so that one does not know how the others will act. Thus, problems of coordination are results of the lack of shared and accurate knowledge about the decision rules that others are likely to use and how one's own actions are interdependent with those of the others (GULATI et al., 2005). Again, there are formal and informal mechanisms to overcome coordination problems. Formal mechanisms can be derived from the literature on intra-organizational coordination (MARCH, SIMON, 1958; THOMPSON, 1967). They include programming, hierarchy, and feedback. In order to enhance the predictability of the others' actions, schedules and standards are installed. Such *ex ante* agreements can be regarded as programming. A stronger way to enhance predictability is to introduce hierarchal elements, such as single sources of authority and centralised decision making. Integrating feedback processes helps to enable mutual adjustment on an ongoing basis (THOMPSON, 1967). Informal mechanisms to overcome the constraints of coordination are leadership, norms, culture, shared values and experience, trustworthiness, and a shared strategy (HANF, KÜHL, 2005).

GULATI et al. (2005) deduce that even though cooperation may be achieved, i.e. the interests of the individual actors are aligned, the coordination problems may persist. Thus, both, the alignment of interests as well as the alignment of actions have to be simultaneously achieved in order to create a successful partnership. For this, collective strategies must be implemented by chain actors. Collective strategies can be regarded as instruments dealing with the variation in the inter-organisational environment (ASTLEY, FOMBRUN, 1983). So they aim to stabilise and dominate the interdependent task environment (BRESSER, HARL, 1986).

Another reason to implement collective strategies is to overcome coordination difficulties arising from interdependences among the firms. In order to use collective strategies to overcome coordination problems, the focal company has to consider three different types of interdependences. LAZZARINI et al. (2001) provide the advice to exert managerial discretion for sequential (vertical) interdependences; to achieve process standardisation – for pooled interdependences; and to maintain coordination through mutual adjustments – for reciprocal interdependences.

The cooperation problem of aligning of the interests of individual partners in supply chain networks is addressed by partnering strategies. Partnering is a term

that addresses issues which are associated with the design of relationships within a supply chain. Partnerships exhibit a certain degree of continuity and the focus of the relationships goes beyond price (MENTZER et al., 2000). Considering supply chain networks and the heterogeneity of their member firms, it can be expected that an optimal mode of partnerships widely varies along the whole chain. Thus, the focal company has to work out how the partnerships should be designed. In our paper, we use the typology of MENTZER et al. (2000) dividing partnering into strategic and operational. Specifically, they define strategic partnering as an "on-going, long-term, inter-firm relationship for achieving strategic goals, which deliver value to customers and profitability to partners" (MENTZER et al., 2000). The aim of strategic partnering is to improve or dramatically alter a company's competitive position through the development of new products, technologies and markets (WEBSTER, 1992). Additionally, strategic partnering should also include exclusivity and non-imitability (MENTZER et al., 2000). Operational partnering is defined as a "needed, short-term relationship for obtaining parity with competitors" (MENTZER et al., 2000). Thus, an operational partnering strategy seeks to improve operational efficiency and effectiveness. Such strategic orientation involves shorter time spans and less organisational resources. Therefore, operational partnership is much easier to implement and also to reverse than strategic partnership (MENTZER et al., 2000).

As shown by GULATI et al. (2005), cooperation and coordination are two sides of the same coin. Based on this, we believe that both aspects have to be integrated in chain management concepts. Additionally, DUYSTERS et al. (2004) have shown that collaborations have to be analysed on three different levels in the context of chain management: Firm, dyadic, and network levels. Analyses at the firm level reveal that successful cooperation intensively employs managerial constructs known from single firms, e.g. alliance databases, joint business planning, and alliance managers. At the dyadic level, the design of governance structure has a significant impact on performance. Further on, at this level, trust and commitment play a particular role for the success of coordination. Studies at the network level emphasise the role of social capital to enhance information exchange resulting in information advantages (UZZI, GILLESPIE, 2002). Furthermore, network performance is related to current ties and ties with potential partners.

6 CONCLUSIONS

Based on our arguments, it is evident that chain management in agri-food business is a tremendous task. There is also evidence that chain management is being firstly introduced in the Ukrainian agribusiness. Because the corresponding structures are just evolving – better to say, they are just being built up – strategies and their impacts can be studied and the resulting consequences can be observed. Focus on the agri-food business of Ukraine reveals a number of infrastructural challenges

and barriers chain management faces in transition economies. Even so, we argue that the general mechanisms of chain management are effective alike. For example, quality standardisation is being rolled-out in Ukraine nowadays. Furthermore, the issue of trustful relationships with local partners has to be addressed to minimise risks and provide feedback to newly installed business models. Another important point is the need for strong focal actors that have sufficient power to promote trust among other actors and make them work together. The role of focal actors in the Ukrainian agribusiness can be played by rapidly developing retailers and big processors. Except for inter-firm coordination, even higher attention has to be paid to cooperation issues. Obviously, the arrangement of formal incentives for cooperation must go along with the installation of informal ones and vice versa. On account of this, informal incentives may play even greater role in transition countries. One can consider the reputation effect of big multinational brands on local partners. Small- and medium-sized suppliers strive to cooperate with foreign retail groups or processing companies due to the confidence that those would not renegotiate a contract. Furthermore, the prompt cash payments are perceived as a benefit obtained from such relationships. Thus, the reputation of being engaged is highly important and perceived as an advantage.

One could argue that thoughts addressing supply chain networks and their management are interesting solely for developed countries. However, we suppose that it is of high interest for transition economies too. Nonetheless, on the operative level big differences can be identified. The latter could be one possible direction for future research on the effects supply chain networks exert on agribusiness in transition countries. Another question is how to successfully implement chain management practices in agribusiness. For this, the understanding of goals of chain management must be achieved. Furthermore, the development of a clear collective strategy addressing the achievement of goals at different network levels is of importance. Additionally, the cooperation and coordination sides have to be addressed simultaneously in chain management. If these tasks are accomplished, the preconditions for successful vertical collaboration will be provided.

REFERENCES

- ARBEITSKREIS (1995): Das Unternehmen im Markt: Vertikale Geschäftsbeziehungen zwischen Industrie und Handel. Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung, Sonderheft 35, pp.179-204.
- ASTLEY, W. G., FOMBRUN, C. J. (1983): Collective Strategy: Social Ecology of Organizational Environments. *Academy of Management Review*, 8, pp. 576-587.
- BARNEY, J. (1991): Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), pp. 99-120.
- BURR, B. (1999): Koordination durch Regeln in selbstorganisierenden Unternehmensnetzwerken. *Zeitschrift für Betriebswirtschaft*, 69(10), pp. 1159-1179.

BRESSER, R. K. F., HARL, J. E. (1986): Collective Strategy: Vice or Virtue? *Academy of Management Review*, 11, pp. 408-427.

DRAGON CAPITAL (2006): <http://www.dragon-capital.com/>.

DUYSTERS, G., HEIMERIKS, K. H., JURRIENS, J.A. (2004): An integrated perspective on alliance management. *Journal on Chain and Network Science*, 4, pp. 83-94.

GORTON, M., WHITE, J., CHERNYSHOVA, S., SKRIPNIK, A., VINICHENKO, T., DUMITRASCO, M., SOLTAN, G. (2003): The Reconfiguration of Post-Soviet Food Industries: Evidence from Ukraine and Moldova. *Agribusiness*, 19(4): 409-423.

GULATI, R., LAWRENCE, P. R., PURANAM, P. (2005): Adaptation in vertical relationships: Beyond incentive conflicts. *Strategic Management Journal*, 206, pp. 415-440.

GULATI, R., NOHRIA, N., ZAHEER, A. (2000): Strategic Networks. *Strategic Management Journal*, 21(3), pp. 203-216.

HANF, J., DAUTZENBERG, K. (2006): A theoretical framework of chain management. *Journal on Chain and Network Science*, 6, pp. 79-94.

HANF, J., KÜHL, R. (2005): Branding and its Consequences for the German Agribusiness. *Agribusiness: An International Journal*, 21, pp.177-189.

HANF, J. H., KÜHL, R. (2003): Marketing Orientation and its Consequence for the Food Chain. In: BAOURAKIS, E.G. (ed.): *Marketing Trends for Organic Food in the Advent of the 21st Century*. World Scientific Publishing, London, pp. 116-135.

INTERNATIONAL FINANCE CORPORATION (2004): *Agricultural Production and Agribusiness in Ukraine*. Analytical Research Report on Project of Agribusiness Development in Ukraine: 2001-2003, Kyiv, IFC (in Ukrainian).

JARILLO, J. C. (1988): On strategic networks. *Strategic Management Journal*, 9(1), pp. 31-41.

LAZZARINI, S., CHADDAD, F., COOK, M. (2001): Integrating Supply Chain and Network Analysis: The Study of Netchains. *Journal on Chain and Network Science*, 1(1), pp. 7-22.

MARCH, J. G., SIMON, H. A. (1958): *Organizations*. Wiley, New York.

MENARD, C. (2002): *The Economics of Hybrids Organisations*. Presidential Address, ISNIE, MIT, 29th Sept. 2002, Boston.

MENTZER, J. T., MIN, S., ZACHARIA, Z.G. (2000): The Nature of Interfirm Partnering in Supply Chain Management. *Journal of Retailing*, 76, pp. 549-568.

PICOT, A., REICHWALD, R., WIGAND, R. T. (2001): *Die grenzenlose Unternehmung*. 4. Aufl., Wiesbaden, Gabler Verlag.

STATE STATISTICS COMMITTEE OF UKRAINE (2004): *Agriculture of Ukraine: Statistical Yearbook*, Kyiv, IPC of Derzhkomstat.

STATE STATISTICS COMMITTEE OF UKRAINE (2006): <http://www.ukrstat.gov.ua/>.

SWINNEN, J. (2005): *When the Market Comes to You. – Or Not. The Dynamics of Vertical Coordination in Agri-Food Chains in Transition*. Final report on "Dynamics of Vertical Coordination in ECA Agri-Food Chains: Implications for Policy and Bank Operations". The World Bank.

THEUVSEN, L. (2004): Transparency in netchains as an organizational phenomenon: exploring the role of interdependencies. *Journal on Chain and Network Science*, 4, pp. 125-138.

THOMPSON, J. D. (1967): *Organizations in Action*. New York, McGraw-Hill.

UZZI, B., GILLESPIE, J. J. (2002): Knowledge spillover in corporate financing networks: Embeddedness and the firm's debt performance. *Strategic Management Journal*, 23, pp. 595-618.

UZZI, B. (1997): Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly*, 42(1), pp. 35-67.

WEBSTER, F. E. JR. (1992): The Changing Role of Marketing in the Corporation. *Journal of Marketing*, 56, pp. 1-17.

ZMP (2006): *Ukraine: Lebensmittelhandel und Exportchancen*. Bonn, ZMP Zentrale Markt- und Preisberichtsstelle für Erzeugnisse der Land-, Forst- und Ernährungswirtschaft GmbH.

ZYLBERSZTAJN, D., FARINA, E. M. M. Q. (2003): Dynamics of Network Governance: A Contribution to the Study of Complex Forms. Paper presented at the IV International Conference on Agri-Food Chain/Networks Economics and Management held in Ribeirao Preto, Brasil, October 2003.

7 INSTITUTIONS

**PROMOTING SUSTAINABLE MARKET INSTITUTIONS
IN THE TRANSITION ECONOMIES:
THE ROLE OF INTERNATIONAL ASSISTANCE**

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1 INTRODUCTION

Sixteen years after the beginning of the transition, a consensus has emerged that while price and trade liberalization may be necessary for successful agrarian reform, they aren't sufficient. Nearly all the countries of Eastern Europe and the Former Soviet Union liberalized trade and eliminated price controls, and many have made significant progress in land and enterprise privatization. But not all can be considered successful reformers. The more successful countries not only liberalized prices and trade, but also built the institutions critical to productivity growth – land markets, rural credit, market infrastructure, agricultural extension, and regulations governing food safety, plant and animal health standards. Institutional reform outside agriculture is also critical – reform of the judiciary to ensure contract enforcement, banking reform, and growth of non-agricultural employment.

In recognition of this need, international donors have implemented some wide-ranging technical assistance programs aimed at addressing these institutional needs. The primary players in the agricultural sector were USAID, USDA, the European Union (EU), the World Bank, the United Nations Food and Agricultural Organization (FAO), and a number of bilateral. Many projects addressed the issue of rural credit; others were aimed at agricultural extension, market information systems, development of grades and standards, construction of wholesale markets, assistance to plant health and veterinary services, and the capacity to carry out agricultural policy analysis.

¹ The author is an economist with the U.S. Department of Agriculture. The discussion in this paper is mainly drawn from the author's experiences implementing technical assistance programs in Eastern Europe. Any opinions, findings, or recommendations expressed in this paper are those of the author and do not reflect the view of the U.S. Department of Agriculture.

But success has been mixed, and many of the transition countries still have weak and underdeveloped market institutions. The strongest institutions can be found in the eight countries that joined the European Union (EU) in 2004. But the New Member States (NMS) were strongly influenced by the accession process – the EU required them to develop the administrative capacity to implement the *acqui* and provided considerable technical and financial assistance to that end. Outside the NMS, success stories are harder to find. There have been many successful grass roots efforts to help producers invest in modern technology, organize producers associations, or provide financing to small processing plants. But efforts to build the institutions to support those new entrepreneurs often meet with less success. The landscape is littered with failed projects-market information systems that withered away, seriously underfunded extension systems, livestock auction houses that stand empty. Would-be exporters in many countries are still thwarted by the lack of a nationally recognized system of grades and standards and lack of credible veterinary or food safety inspections.

This paper will present examples of successful and unsuccessful attempts to build market institutions in the transition economies and attempt to draw out some lessons from those examples. Much of the discussion will focus on technical assistance aimed at building market information systems (MIS – the collection, analysis, and dissemination of agricultural prices and other relevant information.) These projects were successful in some countries – most of the NMS, as well as Serbia and Montenegro – but less successful in others, such as Armenia, Russia, Ukraine, and an early project in Romania. To a large extent the lessons that we can learn from these projects can be applied to other types of institution building projects. Keys to success include collaborative design of projects-giving the counterpart institution a sense of ownership – insistence on cost sharing, careful attention to the government’s capacity to absorb the assistance, and a great deal of patience. Institutions take time to evolve, setbacks are inevitable, and donors need to be realistic in their expectations.

2 THE PROBLEM: SMALL PRODUCERS ISOLATED FROM THE MARKET

At the beginning of the transition, many countries saw the sudden emergence of a large number of small private farmers who had never previously been in business for themselves. In the former Soviet Union many of the new farmers were former state and collective farm workers. They had typically been very specialized – they were tractor drivers, veterinarians, etc. They were unprepared to manage an entire farm business. Others had never engaged in farming but lost their jobs in industry, acquired a piece of land, and began subsistence farming. Private farmers in Poland and the former Yugoslavia had longer experience managing their own farms, but they had grown accustomed to guaranteed prices and guaranteed sales. They were

unprepared to deal with the risks of volatile market prices or take responsibility for their own production and marketing decisions

What resulted was a large subsistence agriculture sector. Very little domestic production reached the markets, and urban markets tended to be flooded with imported food. Even though farmers were receiving prices well below world market levels, they could not compete with imports. A number of critical market institutions that would enable farmers to sell more of their production were missing. Farmers were hampered by a lack of credit, poorly functioning land markets, poor market infrastructure, lack of market information and poor contract enforcement.

3 TECHNICAL ASSISTANCE AIMS TO ADDRESS INSTITUTIONAL SHORTCOMINGS

Technical assistance from Western institutions aimed to address all these institutional needs. The primary players in the agricultural sector were USAID, USDA, the European Union (EU), the World Bank, the United Nations Food and Agricultural Organization (FAO), and a number of bilateral programs sponsored by individual EU countries, as well as Japan.

In general assistance falls into two categories: What could be called grass roots efforts aimed at individual farmers, entrepreneurs or associations, and institution building projects aimed at helping national governments build the institutions critical to a functioning market economy. Grass roots projects are focused at the community or province level; they aim to help individual farmers or groups of farmers raise their productivity and improve the marketability of their products. Their goal is generally not to influence policy making at the national level. These projects might help finance the start-up costs of a small processing firm or the purchase of a cooling tank for a dairy farmer, facilitate the organization of a producers association or cooperative, provide training to farmers and other agribusiness entrepreneurs, or provide seed funds for local credit clubs. Typical institution building projects aim at reforming the banking system, creating a land cadastre, strengthening agencies regulating food safety and animal or plant health, organizing agricultural extension and market information systems.

3.1. Grass roots projects are often successful..

The grass roots projects have achieved some notable successes throughout the transition economies. The LAMP (Linking Agriculture to Markets) project in Bosnia and Hercegovina (funded by USAID), for example, provided a grant to a mushroom producer, allowing the owners to expand their premises, install drying

equipment, and ultimately increase their sales by over 50 %.² LAMP has also provided training to dairy farmers in technologies to improve the safety and quality of their milk and more cost effective techniques for cutting and baling hay. Similarly, USDA programs in Armenia have helped Armenian farmers organize producer associations and cooperatives, helped equip small dairy plants with modern cooling equipment, provided seed capital to organize credit clubs in local communities, provided workshops in product quality, packaging and branding, and organized export promotion campaigns for Armenian products (COCKS et al., 2003; AINES, GOSSER, 2004).

There have been many similar projects in the other transition economies, funded by EU projects as well as U.S. Many of these endeavors have shown positive results in that a significant number of farmers and agribusiness entrepreneurs have established successful enterprises, which have managed to thrive and grow even after the termination of foreign assistance.

3.2 ...but institution building is more problematic

But the enterprises benefiting from such grass roots assistance often find themselves stymied by the lack of fundamental institutions essential to support a functioning market economy. In many of the countries land markets are still not fully functioning – even though the land is nearly 100 % privately owned, land sales are hampered by lack of credit, lack of papers proving ownership, and restriction on sales that, for example, give neighbors first right of refusal. Market information is lacking or inadequate, so producers seeking to enter the market find it difficult to find out what the market is demanding. A lack of nationally recognized grades and standards thwart many would-be exporters and even hinder domestic sales – supermarkets entering the countries will often import the goods they sell because that is the lowest cost way to ensure consistent quality. Agricultural extension, or advisory services are absent in many countries, and where they exist, they tend to be underfunded and overly focused on technology to boost output rather than marketing advice.

Enforcement of contracts is inadequate in most countries. Without third-party contract enforcement, business relationships are generally restricted to a closed group of acquaintances – often family and long time personal friends – with whom they expect repeat business in the future. In these cases, even without a developed court system, the threat of losing future business is enough to ensure a contract will be carried out. Non-acquaintances have no such threat, and appealing to the court system can be a long and costly process. This can lead to allocative inefficiencies. There could be lower cost suppliers or buyers offering better prices, but their trustworthiness is unknown, and farmers and processors prefer to deal with people they know.

² See http://www.usaid.gov/locations/europe_eurasia/countries/ba/index.html for more detailed description of LAMP projects.

International donor organizations are fully aware of such shortcomings, and many projects have been implemented to address these. But success has been uneven. Success stories include a wide range of institution building projects implemented in Poland, Hungary Czech Republic, and Slovakia during the 1990s. There were a number of successes in Bulgaria – market information, economic analysis, agricultural statistics, warehouse receipts to name a few. There were also a number of failures – market information systems created during the 1990s in Romania and Russia, which subsequently disappeared, and policy analysis units attached to ministries, which withered away with the end of donor support.

More common, perhaps, are the indeterminate outcomes – extension systems in Romania and Bulgaria, which proved to be sustainable, but not very effective, or market information systems in Albania, Macedonia, and Armenia, which, while sustainable, suffer from a lack of quality control, inadequate dissemination, and methodological problems. These services to varying extents are public goods, and some level of involvement and financing by the transition governments is critical to the sustainability of these assistance projects. But many transition governments have been reluctant to put their own resources into projects to strengthen these institutions. National budgets are tight, and there are many competing demands on those limited resources. Many transition governments do not see the value of market information or agricultural extension – some have very close ties with large agribusiness and are unsympathetic to the needs of small farmers. Government salaries tend to be very low, and experts trained under foreign assistance programs often depart for private sector jobs.

4 THE URGE TO PRIVATIZE – THE CASE OF MARKET INFORMATION

As a result, some international donors decide to avoid working with the Government and work instead with private sector organizations. This sentiment has led some donors to focus their efforts on grass roots projects. Other donors have chosen to set up a private firm or NGO to deliver services such as market information, agricultural extension, or policy analysis. These entities may be very successful at delivering the services, but the question is how they can be sustained once donor support ends.

A decade of attempts to build market information systems illustrates the pitfalls of this approach. The goal of a market information system (MIS) is the collection, compilation, and dissemination of agricultural prices from different markets around the country. If the information is accurate, timely, and broadly disseminated, it can be an important tool for farmers as they make their production and marketing decisions. But it is also expensive to collect such information – it is necessary to collect a large volume of data through surveys of producers, from spot transactions, and from commodity exchanges, in order to ensure that a

market information system contains truly representative prices from all participants in the market.

4.1 Many governments are reluctant to make the necessary investment...

The result has often been an under-funded system that does not meet the needs of its users. A case in point is Armenia. Armenia's MIS is the responsibility of a network Agricultural Support Centers (ASC). These were founded by the Ministry of Agriculture, with substantial support from USDA, and their basic mission is farmer training and technology transfer. They have now been converted into independent, joint stock companies. There are 10 district, or *marz*, support centers and a Republic Agricultural Support Center in Yerevan. However, the *marz* centers are not subordinated to the Republic center. The Ministry of Agriculture supervises the activities of all 11 centers and provides a small amount of funding. The World Bank also provides some support.

But the centers are underfunded, there is little quality control over the information that is collected, and dissemination is weak. The only outlet for the information is a newspaper with a circulation of 4,500 copies. Both the Ministry of Agriculture and the Republic ASC have websites, but the price information is not available on either site. And there are a number of methodological issues – wholesale prices, for example are not reported. The result is that the system, while it has been sustainable, does not serve the needs of the farmers. The Ministry of Agriculture has so far been unwilling to devote even small amounts of funding to improving the system.

4.2 ...spurring efforts to privatize

Because many transition Governments are reluctant to devote the necessary resources to MIS, donors in other countries decided to privatize the effort: Either engaging an existing commercial firm to do the work or creating a new entity from scratch. In either case, the donor institution would pay the expenses for a fixed amount of time (perhaps the first year); after that start-up period, the agency set up to collect the market information was expected to cover its own costs through government financing, subscription fees, or a combination.

There are some successful examples of partially privatized systems. One is the Bulgarian MIS (known as SAPI in Bulgarian). It has been collecting and disseminating market information for over ten years with no foreign support. But it continues because the Bulgarian Government provides about 40 % of its funding – it earns the rest through specialized marketing studies and consulting services.

SAPI has succeeded because it remains partially funded by the Government. Efforts to create a fully privatized market information system have not been successful. In 1996, the EU PHARE Program initiated a MIS project in Romania, designed as a public-private partnership between the Ministry of Agriculture

and a commercial company. The program continued for a year and a half after that but then stopped, principally because of the cost. The Ministry declined to allocate any funds to the program. For a time the company attempted to operate the system without Ministry support by charging subscription fees. But the target audience was not interested in paying for the information, and the whole project eventually folded. The company still exists, but it offers various IT services rather than collect market information.

A more indeterminate outcome was CAMIB (Central Agricultural Market Information Bureau) in Moldova, established in 1996 by an EU TACIS project. It was converted to an NGO in 1999 as part of a sustainability plan – it was to cover its own costs through sales of products and services. Its mission was three-fold: Market research and information, business promotion, and consulting. CAMIB still collects market information—for now the information can be found at no charge on the website of a Dutch project, known as Alliance for Support to Agricultural Markets, but information on the CAMIB website is available only to subscribers. In the meantime, CAMIB is taking on new foreign projects which stray farther and farther afield from its original MIS mission – the latest is a USAID food safety project. For now, market information system in Moldova continues to function because the CAMIB is still receiving large amounts of foreign assistance. But prospects for the sustainability of a 100 % privately financed MIS are not good.

4.3 Technical assistance succeeds in Serbia and Montenegro

In contrast USDA efforts to build market information systems in Serbia and Montenegro have been largely successful. After three years of work in Serbia and just two in Montenegro, weekly reports of fruit, vegetable, and live animal prices can now be found on the Ministry of Agriculture websites of both Serbia (www.stips.minpolj.sr.gov.yu) and Montenegro (www.amis.cg). Serbia also reports prices of grains and oilseeds. These reports list prices from multiple markets in the respective countries both wholesale and retail. They report prices from the neighboring countries, where available, as well as the EU, and they present a brief commentary describing the supply and demand factors that are affecting prices. In both countries, these projects have proved sustainable, in that the Serbian and Montenegrin Ministries are fully financing the systems. Media coverage is slowly expanding, and farmers are becoming more aware of the program. There is already evidence that some farmers are changing their behavior in response to improved access to information.

5. WHAT EXPLAINS THE DIFFERENCE?

Serbia and Montenegro are also fairly poor countries, also with many competing demands on the State budgets. But officials in both countries recognized the value

to the program and were willing to commit their own funds and staff to the project. These two governments are also seriously committed to strengthening their extension systems and overhauling their regulatory systems for food safety and plant and animal health. Their experience shows that a small national budget need not be a barrier to serious institutional reform.

5.1 The lure of the EU

Both Serbia and Montenegro aspire to eventual EU membership; neither has official candidate status, but both are making concrete progress towards that goal. As EU members, the countries will be required to implement stringent food safety and animal health regulations, and they will also have to report comprehensive market information to Brussels. The accession process has also been an important factor behind the relatively advanced state of reforms in the 10 East European countries that have already joined the EU. Armenia and most of the rest of the Former Soviet Republics are unlikely to become serious candidates for EU accession.

But there are other lessons to be learned. The USDA experience in Serbia and Montenegro has reinforced the validity of the lessons learned during our work in Bulgaria and Poland during the 1990s, described in some detail in COCHRANE, OSBORNE (2004) and summarized below.

5.2 Flexibility and collaborative design of projects

The process of technical assistance needs to be flexible enough to allow programs to evolve to fit the conditions in each country. While many of the basic methodological tools being transferred are standard, countries develop their own mix of commodities, style of reporting, methods of dissemination and use of information. Counterparts will develop their own ways of working together, based on the structure of their institutions and their cultural traditions. Governments will be more likely to buy into the projects if they have a role in designing the programs. If the program truly meets the needs of the recipient country, local institutions will be more willing to devote their own resources to it. This means listening to counterparts and understanding their priorities.

5.3 Flexibility also means patience

Many international assistance projects are designed to last just one or two years. USDA's experience has demonstrated that it often takes much longer to leave a sustainable program in place. Successful USDA programs in Poland and Bulgaria during the 1990s took five to seven years to establish. USDA has been working in Serbia since 2002, and it took nearly two years of discussions with Serbian officials before actual training could get started. But those extended discussions allowed time for Serbian officials to decide exactly what they wanted, and in the end, they were ready to take ownership.

5.4 Start small

MIS programs in Serbia and Montenegro began with only a small number of commodities – fruit and vegetables – expanding only gradually to cover live animals, slaughterhouses, and finally grains and oilseeds. The list of commodities expanded only as the counterparts developed the capacity to absorb the additional work. Even now, they are still reporting only weekly prices, while the ultimate goal is daily price reports for certain commodities. The frequency of reporting will likewise increase as counterparts are able to devote the required resources to it.

5.5 Leadership matters

The success of USDA programs depended critically on finding a small group of strong, committed counterparts emerged that could mobilize their colleagues to work on the projects without any immediate or guaranteed reward for it. Initial efforts to establish a market information system in Serbia floundered because the Government in power had no interest in the project. But the new Government that took power in 2004 understood the value of the project and committed its own funds to pay 18 extension stations to collect the information. The project owes its success largely to the determination of a handful of officials at the Ministry of Agriculture. In Montenegro, Ministry officials saw the success in Serbia and requested similar assistance. The Montenegrin officials also demonstrated strong leadership, and they too have committed their own resources to the project.

6 REMAINING CHALLENGES

The situations in Serbia and Montenegro are not perfect. The future of the MIS programs is clouded by shortages of funds and political instability. The Extension Service in Serbia, which is responsible for price collection, has other duties and is short of funds. The Ministry, which oversees the system, is also understaffed and unable to exercise the quality control that would be optimal.

One of the biggest challenges is reaching the very smallest farmers. There is an obvious role for extension services in disseminating information and helping farmers make use of it. But of all the transition economies, only Poland and the former Yugoslav republics have well-developed extension systems, and these countries had an extension system during the Communist period. Efforts to create extension systems from scratch in the other transition economies have faltered. It is extremely expensive to organize and maintain an extension system, and local governments have found it difficult to provide enough funds to sustain the system after the end of western assistance. Even in Poland, where the extension centers continue to play a pivotal role in disseminating information to farmers, the number and staffing levels of these centers have declined since the end of USDA assistance. The Serbian extension system is uneven in quality – some

stations are excellent, and others barely function – and under increasing pressure to privatize.

There are broader issues to address as well. Capacity building projects such as MIS, agricultural extension, or policy analysis can be challenging in an environment of tight budgets and political instability. But reforming the judiciary and ensuring prompt enforcement of contracts and property rights are even bigger challenges that cannot be addressed by agricultural experts alone, and these problems must be solved if institutions like MIS or extension are to have their optimal impact on markets. The New Member States of the EU have made substantial progress in overcoming these deficiencies, but only under strong pressure from the EU and the promise of eventual membership. It is an open question how long it will take to achieve progress in transition economies not in line to join the EU. In those countries, such as many in the Former Soviet Union, where Governments have proved unwilling to provide basic public goods and rule of law is still weak, building the institutions critical to successful market reform will remain a challenge. In such a political environment, efforts to privatize these services will likely continue – such projects may demonstrate short term success, but long term sustainability is in some doubt.

REFERENCES

- AINES, L., GOSSER, T. (2004): Development of Armenian Agribusiness through Transfers of Skills and Technology. Working Paper 04/09, Armenian International Policy Research Group, <http://www.aiprg.net/en/content/42/>.
- COCKS, J., GOW, H., DUNN, D. (2003): Meeting Private Grades and Standards in Transition Agriculture: Experiences from the Armenian Dairy Industry. *International Food and Agribusiness Management Review*, 6(1).
- COCHRANE, N., OSBORNE, S. (2004): Success in Building Market Information Systems: Poland versus Russia. In: MACEY, D. A. J., PYLE, W., WEGREN, S. K. (eds): *Building Market Institutions in Post-Communist Agriculture. Land Credit and Assistance*, Landham, MD, Lexington Books.
- WORLD BANK (2005): Armenia's Rural Economy: From Transition to Development, <http://www.worldbank.org.am/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/ARMENIAE/XTN/0,,contentMDK:21115374~pagePK:141137~piPK:141127~theSitePK:301579,00.html>.

ROLE OF RESEARCH AND RESEARCHERS DURING TRANSITION: CASE STUDY OF LITHUANIA

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1 INTRODUCTION

The transformations that have taken place across the Central and East European region are truly remarkable. While early visions by "Washington Consensus" proponents of the unbounded promise of unleashing market forces across the region were naïve and unrealistic, the combination of wise policy decisions and good luck, sometimes tempered by poor policy decisions and bad luck, has resulted in some real success stories. We believe that Lithuania was one of these success stories and have an interest in tracking those factors that may have enhanced or impeded the transition process.

Every country that has progressed along the path from plan to market started from different initial conditions, confronted different constraints, and progressed at different rates. The Lithuanian case can be viewed as an informative one on the productive interplay of research and practice, though a very similar story doubtless evolved in other CEECs. Since there was little prior experience in the international economics profession that could serve as a true scientific base for assessing the magnitude and nature of the challenges and pitfalls that economic, social and political transition would bring, we argue that basic economic analysis had to be combined with a clear understanding of the initial conditions, social and cultural heritage, and practical constraints that can only be fully comprehended from within the transition countries themselves.

Many economic studies have been conducted during Lithuania's transition from central planning to market economy and continuing in the early years after EU accession. A review of more than 100 publications and papers by Lithuanian and external experts published from 1990 to 2006 in academic journals, books and monographs, proceedings and reports by the World Bank, EU, FAO, research

institutes, universities and other institutions is the basis for this assessment of the role agricultural economics research has played in the policy evolution from 1990 to present. Perhaps more importantly, there are also many ways in which the experiences of policy makers have informed the agricultural economics profession and improved our knowledge and understanding of the complexities of reform and transition. That is, the transition experience was in many ways a two-way and interactive learning process between researchers and policy makers and between east and west. For example, a study could focus on some ideal way forward, while policy makers had to frame this in the context of what was possible within the political, financial, social and institutional constraints.

We discuss the role of collaboration, the role of research, and the contribution of research to policy making. A few of the many different types of reviewed publications are used as examples as these themes are discussed.

2 KEY ROLE OF INTERNATIONAL COLLABORATION

From the early days of transition, the role of networks and collaboration has been invaluable. It is from these joint efforts that most studies and documentations of developments in the Lithuanian agricultural transformation have been conducted and disseminated. The collaboration of the authors of this paper, in fact, began in 1989 with an agreement between the Center for Agricultural and Rural Development (CARD) at Iowa State University and the Lithuanian Agrarian Economics Institute (LAEI). About the same time, agreements were launched between the Finnish Agrifood Research Institute (MTTL) and agrarian economics research institutes in Lithuania, Latvia, and Estonia, which included the Finnish-Baltic Seminar series that continued for several years and built lasting and productive collaboration. The CARD collaboration formed the basis for our participation in World Bank missions starting in 1992 and in the OECD expert meetings starting in 1993.

About the same time, the European, American and International agricultural economics associations were inviting and supporting participation of agricultural economists from this region, who presented papers and joined discussions to improve understanding and communication (KAZLAUSKIENE, 1992; KAZLAUSKIENE, MEYERS, 1999). By the mid 1990s, the DG-Agri of the European Commission was using experts and networks of experts to obtain independent assessments of developments in agricultural markets and policies. Later, through EU research framework programs, networks of experts that spanned all candidate countries were formed to collect data, assess various aspects of food, agricultural, and rural policy and prepare reports for DG-Agri. We highlight the studies of the Network of Independent Agricultural Experts in the CEE Candidate Countries, which *inter alia* produced a major document on rural areas for the EU Salzburg Conference of 2004 and to support the rural policy restructuring for 2007-2013, and the

AGMEMOD partnership, which builds and maintains commodity models to analyze market and policy scenarios across the EU-27.

One can see from a survey of publications and papers that most of the studies have been a consequence of one or more of these joint efforts. We can conclude that the research and the building and strengthening of analytical networks were joint products of these collaborations. There was a sense of urgency about understanding the situation and analyzing the consequences of certain actions or inaction, because reform and transformation in Lithuania and other CEECs was taking place rapidly and there was little use for purely academic or highly theoretical research.

One very important aspect of the collaborations was the international interactions that took place. Examples of such productive interactions were the Finnish-Baltic and CARD-Baltic collaborations and the much larger OECD Ad hoc Group of Experts on East-West Economic Relations in Agriculture that met twice a year during 1993-1997 and its successor, the Expert Group on Agricultural Policies in Non-Member Countries 1997-2002. The EU Network of Independent Agricultural Experts in the CEE Candidate Countries was in some ways a continuation of the important international interaction after OECD ceased this activity, and the AGMEMOD Partnership has a similar origin, though its mission is targeted differently. It is remarkable and very significant that many of the same analysts and experts that built close ties and good communication during the OECD expert group meetings have also participated in the EU network of experts and AGMEMOD Partnership. However, it is also important that new colleagues are joining in AGMEMOD, so capacity building is continuing.

Another important aspect of the international collaboration was the interaction among analysts, practitioners and policy makers. A USAID funded Dairy Policy project combined analysis, a workshop, and training visit to Iowa that involved researcher, industry and government participants. The successful Rural Loan Guarantee Fund scheme in Lithuania was developed under a World Bank technical assistance project. An unsuccessful World Bank project was the Private Agricultural Development Project (PADP), which was not sufficiently tailored to local conditions, focused too much on very small farms and was never disbursed. The first market regulation agency and interventions purchase scheme in Lithuania was developed in consultation with Agriculture and Agri-Food Canada and the Canadian Grain Board. It was common for the World Bank and OECD and occasionally FAO to organize workshops or seminars where results of studies were presented and discussed with policy makers and other stakeholders (MEYERS et al., 1999; OECD, 2003; 1999). Most of these included participants from other Baltic countries and sometimes other countries, which broadened the scope of interaction. Even after World Bank borrowing ended in Lithuania, there have been several small studies and related workshops funded under technical assistance activities (MEYERS et al., 2004).

Perhaps conditionalities associated with international agencies and EU accession should not be considered collaboration, but in many ways these were the most official collaboration. World Bank conditionalities in the structural adjustment loans gave strong emphasis to positive policy directions like bank privatization and liberalization of price and support policies, and gradually had effect. The persistent World Bank emphasis on permitting legal entities to have ownership of agricultural land was finally realized with the added support of the EU *acquis*. The *acquis* also included foreign ownership, which is being realized over a transition period. Other positive aspects of the *acquis* were improvements in competitiveness (quality and safety), advisory services, training and capacity building, while there may be negative impacts through CAP measures that tend to freeze the still inefficient farm structure and slow the farm restructuring that was taking place.

3 ROLE OF RESEARCH

The reviewed studies include a broad range of subjects, such as land privatization and farm restructuring (MEYERS, KAZLAUSKIENE, 1998; MEYERS, 1999), macroeconomic reforms (KAZLAUSKIENE, MEYERS, 1994), markets and policies (KAZLAUSKIENE, 1997a), trade policies and agreements (KAZLAUSKIENE, MEYERS, 2004; 2001; KAZLAUSKIENE, 1998), credit and financial policies (MEYERS et al., 2004), commodity market modelling and projections (KRISCIUKAITIENE et al., 2004), environmental policies (KAZLAUSKIENE et al., 1995; MEYERS, KAZLAUSKIENE, 1994), rural development policies (MEYERS, 2006), and developments preparing for EU accession (KAZLAUSKIENE 1997b; KAZLAUSKIENE, MEYERS, 1997; EUROPEAN UNION 2002b). Although academic knowledge was surely advanced through these studies, the principal purpose of all the studies we have reviewed was documentation of the reform process and the improvement of policy and economic performance for Lithuania. An important consequence and sometimes a stated objective was building and strengthening of the research capacity in Lithuania. There were basically three types of studies:

- (1) ex-post analyses, which were documentation of developments and applying economic principles to interpret or explain past tendencies,
- (2) ex-ante analyses, which were projections and prognoses on possible consequences of proposed or suggested policy changes or external market shocks,
- (3) policy advice or recommendations, which were mostly from World Bank studies.

World Bank teams produced a number of specific as well as comprehensive studies, such as the first assessment of the economy (WORLD BANK, 1993), an analysis of agricultural reforms (CSAKI et al., 1998) and a policy note covering

agriculture as well as other key sectors of the economy (WORLD BANK, 1998). World Bank and FAO combined for an EU accession workshop (WORLD BANK, 1999). OECD produced the Agricultural Policy Review for Lithuania (OECD, 1996b) and held a review session with government representatives. OECD also published proceedings of two Baltic workshops on agricultural policy (OECD, 1999; 2003), as well as annual policy reviews of all transition countries from 1993 to 2002 that were based on the information from expert meetings hosted by OECD all those years (OECD, 1993; 1994; 1995; 1996a; 1997; 1998; 1999; 2000; 2001; 2002). The World Bank also initiated a review of situations and policies in transition countries, including Lithuania, in 1998 (CSAKI, NASH, 1998) that continued annually until 2004 (CSAKI et al., 1999; 2000; 2001; 2002; 2003; 2004). These also included a somewhat subjective ranking of countries relative to their reform progress, but they did not have the benefit of as much vetting by country analysts as did the OECD's work.

The European Commission produced three pre-accession country studies of Lithuanian agriculture (in 1994, 1999 and 2003 – EUROPEAN UNION, 2002a), as well as funding the reports made by the Network of Independent Agricultural Experts in the CEE Candidate Countries (EUROPEAN UNION, 2003a; 2003b; 2004a; 2004b) and the AGMEMOD partnership (ERJEVEC et al., 2005; MEYERS et al., 2007). All of these were done through collaboration with country experts. The Commission and FAO also commissioned studies to be done by Lithuanian experts that became part of multi-country reports.

Another type of publication is the individual research paper or collection of papers in proceedings of seminars and meetings. Agrifood Research Finland, Economic Research (MTTL) published six volumes of papers prepared and presented by participants in the Finnish-Baltic seminars from 1990 to 1996. CARD initiated a Baltic Report series that issued 25 papers from 1991 to 1997, most of which were on Lithuania. Numerous other papers of Lithuanian authors or joint with Lithuanian authors were presented at professional conferences and appeared in journals and conference proceedings, primarily in Europe and North America. Some of the analytical papers also appeared in the Lithuanian language in journals, LAEI publications, government documents or agricultural magazines in Lithuania. These mediums have the effect of spreading the knowledge to a broader group of stakeholders. A few of the World Bank publications were also produced in Lithuanian for the same reason.

A key element in many of these collaborative studies is the development of tools and strengthening of analytical capacity. In the Lithuanian case, tools included policy modeling starting at CARD and LAEI (KAZLAUSKIENE et al., 1991) and continuing to AGMEMOD today (KRISCIUKAITIENE et al., 2004), PSEs (OECD, 1993-2003; MEYERS, 1996), case studies (JANSIK, 2001), and comparative statistics (VALDES, KRAY, 1999) among others.

We have counted more than 100 such publications from 1990 to 2006, and that only includes those that involved one of collaborations mentioned here. It does not include other collaborations that have multiplied in recent years or, for example, reports of the LAEI that appear regularly on various topics related to agricultural and rural development conditions and policies.

4 CONTRIBUTION OF RESEARCH TO POLICY MAKING

Aside from interactions and networking systems already mentioned, an important linkage between collaboration, studies and policy making is the fact that the same individual may be involved in all of these. In Lithuania, as in many other CEECs, researchers from institutes or universities were brought into policy making positions of the government and/or as advisors to policy makers. The knowledge and skills they developed as well as the networks they were involved in were a scarce human capital resource and became a valuable asset for the Government, not only for domestic policy but for negotiations on international agreements. Negotiations on EU accession, WTO accession, multilateral and bilateral trade agreements were often conducted by such experienced experts. The senior author of this paper is one such example. She also was at one point participating as a local expert on a World Bank Structural Adjustment mission, and the next mission was on the other side of the table as Deputy Minister of Agriculture. This "inside-outside" process brings the analytical skills and comprehension of research implications into the policy making arena and also brings the understanding of the policy maker to the analytical process. In both cases, it enhances the research-policy making interface.

So the question of how research and analysis impacts policy making and policies is rather complex. In Lithuania, and possibly in most other CEECs, it is not a simple matter of whether this or that study was used by a government official in making a decision. It is more likely that the combination of networking, conducting analysis, discussing results in workshops and meetings, and exchanging ideas and experience among analysts and policy makers in other countries broadens the scope for decision making and has a greater effect on policy outcomes. This cumulative effect is the result of the entire process not only of a particular research effort. Add to this, the shifting positions of some individuals from research to policy making or advising, and the impact tends to grow. It is also the case that the Ministry of Agriculture in Lithuania has often asked the LAEI to design a program or recommend a funding allocation or mechanism, so the impact is extended to the policy implementation and program design as well.

5 CONCLUSIONS

We argue that research and researchers played a key role in the transformation progress and that the documentation and studies they produced served as catalysts rather than prime movers in this process. Economic and social analyses, documentation of lessons learned by other countries, and especially interactions and collaboration among analysts and policy makers in different countries with differing views and experiences were all important. There were a variety of forms of international interaction, which combined to provide a productive interplay of analysis, policy decision and policy implementation.

The key lessons for the numerous countries still in earlier stages of transition are that there is no universal formula for success that can be easily applied from one country to another. However, the lessons learned and processes of collaboration and consultation that were so valuable in Lithuania, and probably also across the countries that have made notable progress in the past fifteen years, will be invaluable in providing these countries with increased opportunity for success in the future.

REFERENCES

- CSAKI, C., FOCK, A. (1999): *The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States: Situation and Perspectives, 1998*. The World Bank Working Paper No. 13, ECA/ECSSD, The World Bank.
- CSAKI, C., FOCK, A. (2000): *The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States: Situation and Perspectives, 1999*. The World Bank Working Paper No. 24, ECA/ECSSD, The World Bank.
- CSAKI, C., KRAY, H. (2001): *The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2000*. The World Bank Working Paper No. 32, ECA/ECSSD, The World Bank.
- CSAKI, C., MEYERS, W. H., KAZLAUSKIENE, N. (1998): *Status of Agricultural Reforms in Lithuania: 1995-1997*. Europe and Central Asia Rural Development and Environment Sector Series, The World Bank, Washington, D.C.
- CSAKI, C., NASH, J. (1998): *The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States: Situation and Perspectives, 1997*. World Bank Discussion Paper No. 387, ECA/ECSSD, The World Bank.
- CSAKI, C., NUCIFORA, A. (2002): *The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2001*. The World Bank Working Paper No. 36, ECA/ECSSD, The World Bank.
- CSAKI, C., ZUSCHLAG, A. (2003): *The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2002*. The World Bank Working Paper No. 37, ECA/ECSSD, The World Bank.

CSAKI, C., ZUSCHLAG, A. (2004): The Agrarian Economies of Central-Eastern Europe and the Commonwealth of Independent States: An Update on Status and Progress in 2003. The World Bank Working Paper No. 38, ECA/ECSSD, The World Bank.

ERJAVEC, E., DONNELLAN, T., KAVCIC, S. (2005): Outlook for CEEC agricultural markets after EU Accession. *Eastern European Economy*, in press. [supported by AGMEMOD Partnership Fifth Framework research project (QLK5-2000-00473)].

EUROPEAN COMMISSION (2004a): Network of Independent Agricultural Experts in the CEE Candidate Countries: The future of rural areas in the CEE new Member States. February, Directorate General for Agriculture.

http://europa.eu.int/comm/agriculture/publi/reports/ccrurdev/index_en.htm/.

EUROPEAN COMMISSION (2004b): Network of Independent Agricultural Experts in the CEE Candidate Countries: Consumption trends for dairy and livestock products, and the use of feeds in production, in the CEE accession and candidate countries. January, Directorate General for Agriculture.

http://europa.eu.int/comm/agriculture/publi/reports/ccconsumption/index_en.htm/

EUROPEAN COMMISSION (2003a): Network of Independent Agricultural Experts in the CEE Candidate Countries: Key Developments in the Agri-Food Chain and on Restructuring and Privatisation in the CEE Candidate Countries. February, Directorate General for Agriculture.

http://europa.eu.int/comm/agriculture/publi/reports/agrifoodchain/index_en.htm/.

EUROPEAN COMMISSION (2003b): Network of Independent Agricultural Experts in the CEE Candidate Countries: Social security systems and demographic developments in agriculture in the CEE candidate countries. July, Directorate General for Agriculture.

http://europa.eu.int/comm/agriculture/publi/reports/ccsocialsec/fullrep_en.pdf/.

EUROPEAN COMMISSION (2002a): Network of Independent Agricultural Experts in the CEE Candidate Countries. Agricultural Situation in the Candidate Countries: Country Report on Lithuania. July, Directorate General for Agriculture

<http://ec.europa.eu/agriculture/external/enlarge/publi/countryrep/lithuania.pdf/>.

EUROPEAN COMMISSION (2002b): Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs. March, Directorate General for Agriculture.

http://ec.europa.eu/agriculture/publi/reports/ceecimpact/fullrep_en.pdf/.

JANSIK, C. (2001): Foreign Direct Investment in the Food Processing of the Baltic Countries. Agrifood Research Finland, Economic Research (MTTL) Research Reports 250.

KAZLAUSKIENE, N. (1992): Transition of Agriculture in the Baltics: Discussion. *American Journal of Agricultural Economics*, 74(5), pp. 1174-1175.

KAZLAUSKIENE, N. (1997a): Annex 3: Study on Lithuania. In: *The CAP and Enlargement; Agrifood Price Developments in Five Associated Countries*. *European Economy*, no. 2. European Commission, Directorate-General for Economic and Financial Affairs, Brussels, pp 171-199.

KAZLAUSKIENE, N. (1997b): Integration of Lithuanian Agriculture into the EU Market. In: MANIOKAS, K. VITKUS, G. (eds): *Lithuania's Integration into the European Union*. European Integration Studies Centre, Vilnius.

KAZLAUSKIENE, N. (1998): BFTA: Agricultural and Trade Policies in the Baltics. In: Regional Trade Arrangements and Agricultural Policy in Central and Eastern Europe. Wye College Press, pp. 103-130.

KAZLAUSKIENE, N., BUDVYTIENE, V., AND BUDVYTIS, S. (1995): Environmental Policy: Institution and Legal Framework of Environmental Protection in Agriculture – The Lithuanian Case. In: The Institutional and Legal Framework for Environmental Policy in the Agriculture Sector Estonia, Latvia and Lithuania, Socio-Economic Environmental Research (SEER), No. CIPDCT930030, Report 1. South Jutland University Centre, Esbjerg, Denmark.

KAZLAUSKIENE, N., DEVADOSS, S., MEYERS, W. H. (1991): An Adaptive Policy Simulation Model to Analyze Price Reforms for Lithuanian Food and Agricultural Products. Technical Report 91-TR20, Center for Agricultural and Rural Development, Iowa State University, Ames.

KAZLAUSKIENE, N., MEYERS, W. H. (1994): Macroeconomic Adjustment and the Economic Transition in Agriculture: The Case of Lithuania. Baltic Report 94-BR 18, Center for Agricultural and Rural Development, Iowa State University, Ames.

KAZLAUSKIENE, N., MEYERS, W. H. (2001): CEEC Interests and Options in the WTO 2000 Negotiations. In: INGCO, M., WINTERS, L. A. (eds): Agricultural Trade Liberalization in a New Trade Round: Perspectives of Developing Countries and Transition Economies. World Bank Discussion Paper No. 418. Washington, D.C. The World Bank, Chapter 6.

KAZLAUSKIENE, N., MEYERS, W. H. (1997): Preparing for Accession to the EU: Transition Policies for Transition Economies. In: Options for National Agricultural Policies of the EU Associated Countries: Transfer of the EU Members Experience to the Baltic Countries, Sixth Finnish-Baltic Seminar of Agricultural Economists, Riga-Jurmala, Latvia, 1996. Working paper, Agricultural Economics Research Institute, Finland, pp. 28-34.

KAZLAUSKIENE, N., MEYERS, W. H. (1999): The Baltic Free Trade Agreement for Agriculture: Early Results of the Experiment. MOCT-MOST, Economic Policy in Transitional Economies, 9(3), pp. 98-108.

KAZLAUSKIENE, N., MEYERS, W. H. (2004): Implications of EU Accession for Trade Regimes and Trade Flows of CEECs. Agricultural Sciences, Lithuanian Academy of Sciences. Nr. 4 pp. 11-19.

KRISCIUKAITIENE, I., ANDRIKIENE, S., KAZLAUSKIENE, N., MEYERS, W. H. (2004): The accession of Lithuania to European Union – Scenario analysis for key agricultural markets with the AG-MEMOD modelling approach. End of Project Report, AGMEMOD Partnership Fifth Framework research project (QLK5-2000-00473).

MEYERS, W. H. (1996): Use of the Producer Subsidy Equivalent Measure in Transition Economies: Discussion. American Journal of Agricultural Economics, 78, pp. 243-250.

MEYERS, W. H. (1999): Emerging Structures in the Agro-Food Chain: Policy Challenges in Farm and Agribusiness Privatization and Restructuring. In: Baltic Agro-Food Policies: Proceedings of the OECD Meeting at the Ministerial Level. Seminar organized by the OECD/CCET Paris: OECD, pp. 91-98.

MEYERS, W. H., KAZLAUSKIENE, N. (1994): Agricultural Policy and Structural Reforms in the Baltic States: Prospects for Environmental Benefits. In: NAPIER, T. L., CAMBONI, S. M., EL-SWAIFY, S. A. (eds): Adopting Conservation on the Farm; An International Perspective on the Socioeconomics of Soil and Water Conservation. Soil and Water Conservation Society, Ankeny, IA, pp. 289-301.

MEYERS, W. H., KAZLAUSKIENE, N. (1998): Land Reform in Estonia, Latvia, and Lithuania: A Comparative Analysis. In: WEGREN, S. K. (ed.): *Comparative Land Reform in the Former Soviet Union and Eastern Europe*. Routledge Press, London-New York.

MEYERS, W. H., KAZLAUSKIENE, N., GIUGALE, M. (eds) (1999): *Lithuania's Accession to the European Union: Successes and Challenges for a Rural Economy in Transition*. ISU Press, Ames, IA.

MEYERS, W. H., KAZLAUSKIENE, N., KRISCIUKAITIENE, I. (2004): *Lithuania's Progress and Prospects in the Global and EU Markets*. Agricultural Sciences, Lithuanian Academy of Sciences. Nr. 4, pp. 1-10.

MEYERS, W. H., KAZLAUSKIENE, N., NAUJOKIENE, R., KRISCIUKAITIENE, I. (2006): *Lessons Learned and Challenges in Rural Development Programmes of Lithuania*. Agricultural Sciences, Lithuanian Academy of Sciences, Nr. 1, pp. 1-8.

MEYERS, W. H., KAZLAUSKIENE, N., NAUJOKIENE, R., KRISCIUKAITIENE, I. (2004): *Rural Financial Constraints in the Framework of EU Accession of Lithuania*. World Bank. Vilnius.

MEYERS, W. H., KRISCIUKAITIENE, I., GALNAITYTE, A., JEDIK, A. (2007): *Impacts of CAP Reform and Exchange Rate on Lithuanian Agricultural and Food Markets*. Agricultural Sciences, Lithuanian Academy of Sciences, Nr. T-14, pp. 136-144. [Supported by AGMEMOD Partnership Sixth Framework research project (SSPE-CT-2005-021543).]

OECD (2003): *Agricultural and Rural Development Policies in the Baltic Countries*. Centre for Co-operation with Non-Members and Directorate for Food, Agriculture and Fisheries. Paris.

OECD (2002; 2001; 2000; 1999; 1998): *Agricultural Policies in Emerging and Transition Economies*. Directorate for Food, Agriculture and Fisheries and Centre for Co-operation with Non-Members.

OECD (1999): *Baltic Agro-Food Policies: Proceedings of the OECD Meeting at the Ministerial Level*. Seminar organized by the OECD/CCET. OECD, Paris.

OECD (1997; 1996a): *Agricultural Policies in Transition Economies* Centre for Co-operation with the Economies in Transition. Paris.

OECD (1996b): *Review of Agricultural Policies: Lithuania: Monitoring and Evaluation*. Centre for Co-operation with the Economies in Transition. Paris.

OECD (1995; 1994): *Agricultural Policies, Markets and Trade in the Central and Eastern European Countries, Selected New Independent States, Mongolia and China: Monitoring and Outlook*. Centre for Co-operation with the Economies in Transition. Paris.

OECD (1993): *Agricultural Policies, Markets and Trade in the Central and Eastern European Countries, Selected New Independent States, Mongolia and China: Monitoring and Outlook*. Centre for Co-operation with the Economies in Transition. Paris.

VALDES, A., KRAY, H. A. (1999): *Strategy for the pre-EU accession period adjustments of Lithuanian agricultural and trade policies to the CAP*. World Bank.

WORLD BANK (1999): *Regional and International Trade Policy: Lessons for the EU Accession in the Rural Sector*. Proceedings of the World Bank/FAO Workshop, June 20-23, 1998. Budapest, Hungary. ECA/ECSSD.

WORLD BANK (1998): *Lithuania: An Opportunity for Economic Success*. A World Bank Country Study. Washington, D.C.

WORLD BANK (1993): *Lithuania: The Transition to a Market Economy*. A World Bank Country Study. Washington.

ROLE OF STATE ADMINISTRATION IN UPDATING LAND-ESTATE AND FARM-SIZE CONDITIONS

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1 INTRODUCTION

In the society the land has different function which can be divided into three main groups as economic, social and cultural ones. The structure of land estates and farm-sizes are the basis of a competitive and sustainable agricultural production, hence these questions belong to the evergreen themes both of theory and practice also on international level. However, while the development of family farms in the United States and in Western-Europe has been resting on unbroken, calculable and safe basis, the development of land estate and farm conditions in the Central and Eastern European countries has survived unexpected and incalculable breaks after the World War II (SZUCS et al., 2003).

The land reform after the war distributed large share of the estate lands to small holders in these countries. The agrarian transformation brought about fundamental changes in the ownership system parallel with social class relations. They were motivated by political and social goals with less economic consideration.

In Hungary the land distribution was a vital and burning issue even before World War II. The land reform started in 1945 transformed the characteristically large and medium sized estate centred Hungarian agricultural structure to characteristically small scale farming system. Prior to land distribution land's ownerships larger than 200 cadastral yokes, which was made up of third of all estate ceased to exist. In Hungary as a result of the land reform the agrarian structure became characterised by a dual structure with many small-scale farms (SZAKACS, 1998).

Agricultural policy in CEECs was largely dominated by the centrally planned economy and the socialist political model with a strong emphasis on production increase from the beginning of 1950s. This was based on the principle of common use of land (regardless of its ownership) and industrialization can be mentioned as the overriding priority of agricultural policy. Collectivization of farming took place over very large areas. Only Poland is unique in the region. Polish collectivization failed completely, and as a consequence of it the agricultural sector became a margin and it was kept from development. Despite of common used the private ownership of land was never abolished in these countries and continued to coexist with state ownership uniquely also cooperative ownership (LERMAN et al., 2004).

Radical political and economical changes which occurred in the Central and Eastern European Countries at the beginning of the 90s led to a sharp economic decline and originated the formation of new agricultural policy and a new agricultural structure built on private ownership. The process of land reform can be better understood by the theoretical framework of institutional change by applying the approach of new institutional economics.

2 THEORETICAL BACKGROUND OF TRANSITION AND INSTITUTIONAL CHANGES

Property rights specify relations concerning the use of things among those who have various rights and those who have duties to honour the rights (ZAWOJSKA, 2004).

According to Weimer (WEIMER, 1997), three categories of property right theories of institutional change can offer important conceptual foundation for studying the transformation of property rights: Neoclassical or efficiency theories, public choice and distributional theories. Neoclassical institutional economists focus their attention on economically efficient resource allocation. Efficiency theories generally ignore the role of politics and policies in the process of institutional change.

According to public choice theory of institutional change, political actors motivated by self-interest (to win elections, become leader of an association, etc.) to offer institutional changes to clientele groups. The political influence of rural electorate on politics is especially substantial (SWINNEN, 1997). The political conflict over land reform was obvious in CEE countries and as governments were changed the land estate policies were changed as well, however with different rate by time and countries.

According to the so called property right school a clear assignment of property right is a precondition economically efficient resource allocation and eventually, environmental sustainability. Two characteristic of land features set apart the land

from other goods. Those are immobility and a virtual indestructibility which makes it ideal collateral in financial market transaction. To realise this potential it is necessary that land be endowed with secure, clearly defined and easily transferable property rights (HO, SPOOR, 2006).

The main benefit from well defined and secure individual property rights related to (1) greater incentives for long term resources conservation and the associated increased demand for investment; (2) improving transferability of land to those who have resources to make better use of it an issues that depend on the presence of economics of scale and the disincentives to rental; and (3) ability to use land as collateral in formal credit markets (DEININGER, FEDER, 2001). The ability to exchange land rights affects the efficiency of the land market. These advantages need to be measured against following disadvantages: A highly unequal distribution of land, risk of losing of land serves as a social safety net in the region with limited alternative income possibilities, possibilities of negative effects on landscape and biodiversity and social ownership of water and other scarce resources.

The collectivity has always been vindicating more right of land estates being in private property than of movable properties. The state, as safeguarding body of public interests has to maintain the possibility to warrant for the advantages of land possession or at least of land tenure to those people, to them it is most of all due, out of public interest (IHRIG, 1968). Interrelated social, institutional and political factors involved in land make it an asset different from other.

The land-estate policy can serve the protection or modification of existing structure of land-estates. A land-estate policy has to be valid for long term, land issues and conflicts are deeply embedded in social, economic and political history of country therefore it requires a nation-wide understanding. The land estate policy reform must based on a clear analyses of the problems to be dealt with, and shared agreement amongst the principal stakeholders on aims and objectives and good knowledge of field situation (EU LAND POLICY GUIDELINES, 2004).

A review of literatures indicates that power and distortion in agricultural land relations have implications for the potential success on land reform and the emergence of functioning land market (BISWANGER et al., 1993).

A broad range of literatures has discussed the existence of various forms of farmer enterprises according to their size and legal status. The research studies of farm performance at the beginning of transition focused on the issue of whether individual (family) farms are superior to corporate structures (CSAKI, LEMAN, 1996; DAVIDOVA et. al., 2001). Based on more than 15 years experiment can not be sad that any farm organizations are superior to others.

According to CHRISTIAENSEN and SWINNEN (1994) it need to be kept in our mind that historically the process of the development of family farms in the EU was not the one of self-organisation only, but it was strongly shaped by politics and policy. The farm performance much depend on other factors, as management

skills, access to factor markets, actual policy, land quality and farm size than on their legal status (MATVEEV, 2005).

The theory of agricultural contracting tries to explain the different contract choices between agent (owner and user of land) and principals of use. ANDERSON, 1995 examined the economic implication of vast differences in bargaining power between landlord and the land user. This especially the case when land can be transferred though transaction in land market and both agents are assumed be risk averse and face both price and production risk. Furthermore, asset price risk i.e. recognizing the fact that the price of land at a future point of time is uncertain, has not been considered in previous analyses of power and distortions of land relations (ANDERSSON, 1995).

In the examined countries group these issues are of relevance both in the context of privatization process and in the EU accession process and even nowadays when the improvement the low or its application on land consolidation and land exchange work have been on the table yet.

3 ROLE OF AGRICULTURE IN THE CENTRAL AND EASTERN EUROPE

Agriculture is a special type of activity in the sense that it guarantees qualitative and quantitative food security and being multifunctional in nature, occupying a large area, and having importance in employment especially in Central and Eastern European Countries (CEECs), it contributes to economic, social and ecological equilibrium (FEKETE-FARKAS et al., 2005). Farming is not isolated from the external economic and social environment. According to their historical background production potential and level of development of *CEECs was much lower compare to member countries of EU-15. Additionally due to the transformation crises the whole economy went down in beginning of 1990s. Despite of decreasing in the GDP during the transition the Central and Eastern European Countries faced to other two problems: As high inflation and unemployment rate.* CEECs have about 25 to 70 % of EU average GDP per capita. As a consequence, labour costs vary significantly as well. CEECs are characterised by large areas, which are threatened to a relatively small extent by urbanisation and transport. It increases the demand of land for purpose other than agricultural. The living standard in the rural area depends much on the land use policy. The proportion of rural people is about 20 % of the total in the countries of EU-15. As poverty is characteristic for some rural and especially agriculture-dominated areas, it is very important to work out efficient rural developing programs, including land consolidation programs and creation employment and alternative work possibilities (FEKETE-FARKAS et al., 2003). During the transition period the share of agriculture decreased rapidly, however its role in the economy remained much more important comparing it with the EU-15.

4 AIMS AND CONSEQUENCES OF CHANGE IN LAND PROPERTY RIGHTS

In CEECs land reform has a mixture of purposes: The need to move to a market economy; to give priority of individual farm; increase economic efficiency and to raise revenue from private property; the restitution of rights to former owners that were expropriated by the state; and social justice for farm workers.

Agricultural land reform in former socialist countries revealed numerous contradictions. The restitution program, which was based on the outcomes of the land reform implemented after World War II was common used in CEECs. The choice of restitution over the distribution for farm was probably a strictly political decision driven by the memory of private landownership and by the desire to make clean break with the socialist past (LERMAN et al., 2004). In the CEECs countries the physical distribution of land parcel was more common. Consequently, this process has contributed to the current situation of fragmentation of land ownership. In Bulgaria the reform created over 2 million landlords with many plots, where each owning on average 3,8 plots with size of 0,53 hectares (DIRIMANOVA, 2005). In Hungary land privatisation impacting on more than 50 % of the total area of the country, creating approximately 2,5 million new properties and through a process involving compensation and land privatisation affecting some 20 % of the population with 2.2 ha in average. Only a small number of the new owners were actually able and willing to rely on agriculture as their main occupation (SZUCS et al., 2003a). Poland entered the transition era with 76 % of its agricultural land cultivated by family units, so the issues of privatization and restitution of land played much less role than in other countries, but it face the high fragmentation problem as well especially in central and eastern regions of the country.

The land fragmentation is an effect of breaking the collective structures into private farms or new type of cooperatives (DUJK, 2002). In Hungary a great part of cooperatives and state farms – similarly with other countries – was transformed into joint stocks, liability companies or new type of cooperatives at the beginning of 1990s. These enterprises rely mostly on lands leased from small holdings or from their members; this fact decreases their competitiveness or viability. A typical corporate farm is much smaller on average than the traditional cooperatives or state farms.

The liberal Inheritance Law, which applied in CEECs and provide equal share rights to heirs – is one of the main driving forces behind current process of land fragmentation in term of ownership and this is what may worsening the situation in the future.

According to several authors (SWIMMEN, 2000; LERMAN et al, 2004; MOLNAR, 2000; SZUCS et al., 2003a), land fragmentation is a common phenomenon in CEECs. However the optimal farm size is a debated issue both in the scientific

economic literature and political practice. It has to be addressing to production structure and preferences of whole society as well (SZUCS et al., 2003b).

By the liberal point of view on a well functioning market the free flow of production factors can allocate them efficiently. The structural change is ideally guided by market signal which convey information about the social preferences and production possibilities. However, due to economic and political situation in the transition countries market forces is not functioning as a primary engine for land consolidation. Most of CEECs introduced some restriction according to land ownership. As an example Hungarian land law of 1994 makes the land ownership possible only for state and individuals up to 300 ha, and not allows to have own land and for foreigners and the legal entities.

We can mention as common feature that land market does not function properly. The reasons of this – beside of official restriction – can be find both on demand and supply side of the market. The unclear property rights, the low price of farmland, high unemployment rate and lack of alternative income possibilities, in the uncertain and low income, landlords' sentimental value to their family land, expectation of increasing *subsidy and price of land after the EU accession, the low productivity in the agriculture, uncertainties in the agricultural policy can be mentioned as the main constraint for well functioning land market* (TOTH et al., 2004).

Land fragmentation is a barrier of sustainable development for sustainable development of agriculture, farm efficiency and resource allocation and also land transaction can be more complicated and more expensive (SZUCS et al., 2003b).

For the reason of required policy formulation the land fragmentation has to be measured more detailed. The number of user is the second widely used indicator of land fragmentation (DIJK, 2002; SZUCS et al., 2003a). The actual use of agricultural land can be more consolidated through land lease. Especially in the Czech Republic, Slovakia and to a lesser extent Hungary, the land use structure is much better than the ownership statistics suggest. Enterprises have succeeded in acquiring tenancy on large amounts of leased land, typically hundreds of hectares. At the moment in Hungary about 60 % of cultivation area is rented by other farmers or corporate organization, but in Slovakia or Czech Republic even more. The Polish farms rely almost entirely on their own resources. Third indicator of the number of parcels used one owner or one person. According statistical census and experts' estimation one person may use may use 2-15 plots or more, and some of them can be quite far from others. Land fragmentation i.e. non contiguous landholdings can cause significant level of production loss due to high supervision cost and increased time requirement. In many countries especially in Poland and Romania the subsistence farms service as a social net, providing supports for unemployed families. Large number of absentee-owner and their future expectation also has large effect on land market. If the parcel is too small

to sell they may abandon that. Land abandonment is the other serious issues connected with situation described above.

The owners of small parcels of land have been living the business by land leasing or offering their land for sale on the market or directly to state, in Hungary to National Land Fund. The main aim of creating the National Land Fund, which was established in 2001, is to create the economically cultivable land size and to keep back the land speculation, the illegal land purchase and land use. Similar land institutions operate in other CEECs. The land fragmentation with the demographic issue and lack of capital can be mentioned as the main reason of productivity gap between CEECs and old countries of EU (**Table 7.1**).

Table 7.1: Partial CEECs/EU comparison of factor endowment and productivity in agriculture

1998	Employ Million AWU	UAA Million ha	Employ./100 ha		GVA/AWU		GVA/UAA	
			AWU	EU %	ECU	EU %	ECU	EU %
CEEC-10	9,478	59.9	15.8	316	1,784	8.5	282	27
EU-15	6,891	136.4	5.0	100	20,968	100	1,059	100

Source: BAKER (2002).

However the average size is much larger in old members of EU than new members but the new members often have dualistic farm structure. Data of **Table 7.2** provide more information about the farm structure in CEECs. When we try to evaluate the level and impacts of fragmentation of land use we need to consider the crop structure as well. The higher share of arable and especially cereal production makes the fragmentation problem more serious.

Table 7.2: Dualistic Farm structure in CEE countries

Country	Year	Share of UAA used by family farms/household plots (%)	Average size of family farms (ha)	Average size of private and state- owned holdings (ha)
Slovenia	2001	94	6	290
Poland	1996	82	7	426
Romania	1997	67	3	2,491
Hungary	2000	55	9	312
Czech Rep.	2001	27	28	1,035
Bulgaria	1999	26	1	519
Slovakia	2000	23	4	1,399

Source: EAA (2004).

Due to the accession process the increasing convergence with EU policy also took place during this period. According to the main goals of CAP reforms and the multifunctional services of agricultural of takes on over increasing importance of policy regulation. The free movement of capital within the European Union was

fully achieved in 1992. The new members-according to the very low land price compeering with EU-15 average – granted a transition period of 7 or more years concerning the property acquisition by foreigners. Maybe it is not so known, that most of EU member states allow the land purchase of foreigner only with the same conditions as for the natives. According to this the permanent settlement, the personal cultivation of land, and the agricultural qualification are necessary. In every developed country – included Western Europe – the land is much more protected than for example in Hungary, but it is different that it works through regulations or through self governmental actions.

The prices of agricultural land are significantly lower than those in the old members of EU. It was expected that after a number of years of EU membership these huge difference of price level will diminish, but this process not accepted to be quick. Price of land on the well functioning land market created by both of demand and supply side but land market should to be active. In order to make the land market more active some of current restriction has to be abolished, crucial change could be for example the increasing of security of land use rights and giving tenants more rights and allowing enterprises to own land.

The main question is: What is the role of state in solving the problem. A significant part of the policy makers and scientist is against of total liberalization of land market according to the risk of re-concentration, monopolistic position, the access of land for more vulnerable groups, buy out of land by foreigners. These risks are increasing due to low land price, low land market activity, information asymmetry and imperfection in other markets as labor capital and other inputs. By the protectionist views, the government has to restrict the property and tenor rights by the low and regulation, if it is common interest of society. But also there is no consensus between the parties and other participants of farmer society is the common interest.

5 CONCLUSION

Land market much more heterogeneous and complex set of institution than generally assumed. It can be established that with our EU-accession, a well-considered and consequent land tenure policy constitutes an immediate precondition to the development and modernization of agriculture in all CEECs. To solve above problems clear concept land policy and comprehensive land consolidation procedure is needed, which requires definite political wish, legal and institutional framework, sufficient financial sources and consensus with stakeholders. The development of land tenure relationship has to be closely connected to the objectives of rural development and to the protection of environment. CEECs are not homogeneous; each country will have to find solution that addresses its economic, social, cultural, geographical and political environment. But increased political consensus on key issues is essential.

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REFERENCES

- ANDERSSON, H. (1995): Landlords and farmers: Implication of disparities in bargaining power for tenancy in agriculture. *Agricultural economics*, 12, pp 151-162.
- BAKER, D. (2002): Agriculture in the EU's Eastern enlargement-current status for CEECs. *Fødevareøkonomisk Institut, Report nr. 144, København*.
- CHRISTIAENSEN, L., SWINNEN, J. (1994): Economic, Institutional and Political determinants of Agricultural production Structures in Western European Countries. Department of Economics, Catholic University of Leuven, Working paper 1994/1.
- CSAKI, C., LERMAN, Z. (1996): Agricultural Transformation in Central and Eastern Europe and Former USSR: Issues of Land reform and Farm Restructuring. Paper presented in the VIIIth Congress of the European Association of Agricultural Economics, Edinburgh.
- EU LAND POLICY GUIDELINES (2004): EU land policy guidelines to support land policy design and reform process in developing countries. Brussels, 25 October.
- DAVIDOVA, S., GORTON, M. RATINGER, T., ZAVALINSKA K., IRAIZOZ, B., KOVACS, B. MIZO, T. (2002): An analysis of competitiveness at farm level in CEECs. Research Section of Agricultural Economics and Business Management, University of London.
- DEININGER, K., FEDER, G. (2001): Land institution and land market In: GARDNER, B. L., RAUSSER, G. C. (eds): *Handbook of agricultural economics*, Volume 1A. Elsevier, pp. 287-324.
- DERIMANOVA, V. (2005): Land market with fragmented Landownership Rights in Bulgaria: An institutional approach. Paper prepared for presentation at 94th EAAE seminar, Ashford.
- DIJK, T. v. (2002): Scenarios of Central European land fragmentation. *Land use policy*, 20, pp. 149-158.
- FEKETE-FARKAS, M., KAMPHORST, E., ROUNSEVELL, M., AUDSLEY, E. (2003): The role of policy in scenarios concerning European agricultural land use change in the coming century. Paper prepared for presentation at 80th EAAE Seminar, Ghent.
- HO, P., SPOOR, M. (2006): Whose land? The political economy of land titling in transitional economies. *Land use policy*, 23, pp. 580-587.
- IHRIG, K. (1968): Rent and value of agricultural land in the market economies (in Hungarian). MTA Közgazdasági Intézet, Budapest.
- LERMAN, Z., CSAKI, C., FEDER, G. (2003): Agriculture in transition. Land policy and evolving farm structure in Post Soviet Countries, Lexington Books.
- MATVEEV, E. (2005): Evaluation of the Efficiency of agricultural holdings in view of structural change in Estonia. Paper prepared for presentation at 94th EAAE seminar, Ashford.
- SZAKACS, S. (1998): From land reform to collectivization (1945-1956). In: GUNST (eds): *Hungarian Agrarian society from the Emancipation of Serfs (1848) to the Re-privatization of land (1998)*, Columbia University Press, pp. 257-297.
- SZUCS, I. (ed.) (2003a): Land estates and economics of scale. *Agroinform*.

SZUCS, I., FEKETE-FARKAS, M., MOLNAR, J. (2003b): Predictable trend of changes in land property and farm structure. *Gazdálkodás*, 47(5), pp. 26-31.

SWINNEN, J. F. (1997): Political economy of agrarian reform in Central and Eastern Europe. Aldershot, Ashgate.

SWINNEN, J. F., VRANKEN, L. (2003): Land Rental Markets and Household farms in Transition: Theory and Evidence from Hungary. LICOS discussion papers 12903, LICOS-Centre for institutions and economic performance, Katholieke Universitet, Leuven.

TOTH, ZS., FEKETE-FARKAS, M., SZUCS, I. (2004): Land market, prices and rent in the agriculture of CEECs. *ANNALS of The Polish Association of Agricultural and Agribusiness Economists*, 6, pp. 79-83.

ZAWOJSKA, A. (2004): Process of land reform in Poland. *Electronic Journal of Polish Agricultural Universities*, <http://www.ejpau.media.pl./volume7/issue1/economics/art-01.html/>.

WEIMER, D. L. (1997): The political economy of property rights. Cambridge University Press.

THE ROLE OF PROFESSIONAL AGRICULTURAL ECONOMICS ASSOCIATIONS IN SHAPING NATIONAL AGRICULTURAL POLICY: THE CASE OF SERIA

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1 INTRODUCTION

The collapse of the centrally-planned economic and socio-political system and the adoption of the free market as the resource allocation mechanism created demand for economic analysis at macro- and micro-economic level based on capitalist economic theory. In Poland, the demand for market and marketing studies (including consumer studies) developed rapidly following the privatization of the wholesale and retail trade, the sector where privatization of assets occurred at a faster pace than in manufacturing. After the initial transition period, the so-called shock therapy implemented in Poland, and the emergence of the private food production and distribution system, the next step was the development of professional economic organizations needed to support the system's requests for advice, expertise, and qualified employees. In response to the emerging demand signaled by the private sector, the existing institutions and individual university faculty, especially at agricultural universities and universities of economics, responded by adjusting the curricula of undergraduate and graduate studies, creating consulting firms, and establishing private university-level schools. Major changes were undertaken in reforming the extension system in Poland. Demand was also great in the public sector, other than the extension system (e.g., by the Ministry of Food and Agriculture), for studies in the area of policy impact, feasibility, trade policy, rural development, and public agricultural secondary schools.

2 OBJECTIVE

The purpose of this paper is to present a summary of the emergence of the Polish Association of Agricultural Economics and Agribusiness (known by its Polish acronym SERiA, Stowarzyszenie Ekonomistów Rolnictwa i Agrobiznesu),

its activities and its role in research, teaching, advising and consulting. In particular, I describe the initial role of contacts with professional associations outside Poland in stimulating the development of a modern domestic organization, the growth of the organization and the variety of activities, and the need for improvement including the possible role of other national organizations and international associations in advancing the quality and quantity of professional activities of Polish agricultural economists. The discussion refers to the role of social capital and various forms in which it demonstrates itself as the causes of the establishment of SERiA and its continued existence.

3 THE EMERGENCE OF SERiA

Developments in the agricultural economics profession in Poland are a vivid illustration of the institutional adjustments in a transition economy. The creation of the professional association outside the institutional framework inherited from a centrally planned economy demonstrates the ability of human capital improvement outside the government owned system and a necessary development strengthening the transformation to a market economy emphasizing individualism. Moreover, the professional association represents social capital necessary for the efficient functioning of modern economies (FUKUYAMA, 1999). In the case of SERiA, it enhances the education system and applied research, and encourages the participatory democracy required for sustained economic growth and societal well-being. In the broader sense, a new professional association, horizontal in nature, increases the institutional density associated with long-term growth and development (KNACK, KEEFER, 1997).

Prior to the establishment of SERiA, agricultural economists were organized as a section of the Polish Economics Society (Polskie Towarzystwo Ekonomiczne, PTE). The section functioned well in Warsaw, where it served as a focal point for those working at universities or government agencies. Given the central nature of the decision-making process and limits on public activism, such an approach was consistent with the previous system. The profession outside the capital seldom participated in the meetings of the agricultural economics section and did not benefit from the exchange of ideas, access to information and knowledge, or opportunities for advancement. SERiA emphasized at the onset of its existence that the goals of the organization were not competing with the functioning of the agricultural economics section within the PTE. Indeed, SERiA offered an opportunity for the profession located outside the capital access to information and a chance to communicate results of research, teaching, and outreach.

SERiA emerged as the economy and the food and fiber sector suffered consequences of the collapse of the central budget supporting consumption, processing and distribution of food, cuts in teaching and research budgets, fundamental changes in the political system, and the reassessment of basic values. Agriculture,

which in "socialist" Poland was important for political reasons, lost its relative importance after food imports were liberalized, price controls removed, and direct foreign investment was permitted and encouraged. Agriculture and agribusiness and their surrounding institutions including agricultural research, education, and outreach have become "unpopular." Agricultural economists faced difficulties in coordinating their professional activities as the competition for funding intensified. Agricultural education focused on producing managers for the state and cooperative farms had difficulties in finding new students and jobs for the graduates. The profession became fragmented and polarized with individual schools and faculty pursuing their own teaching, research, outreach, and consulting projects. For a while, relationships built on the commonality of fairly equal inability to pursue opportunities under the previous system were being replaced by the rush to exploit the emerging conditions for an individual gain. The establishment of SERiA offered a platform for the exchange of socio-emotional goods including mutual validation and self-regard (ROBINSON, FLORA, 2003). These are basic human needs superseding physiological needs (ROGERS, 1961). Within this professional organization, members are being treated with distinction and validated through active participation, for example, presentation of papers.

In November of 1993, a group of agricultural economists organized the funding congress and collected 73 signatures, enough to begin the court-supervised registration process of a new organization, SERiA. Since the 1st Congress of SERiA held in Poznan in December 1994, about 250 agricultural economists meet at annual conferences presenting a wide array of papers from the fields of agricultural economics, consumer studies, agribusiness and policy.

3.1 Professional solidarity

The historic transformation in Central and Eastern Europe caught the attention of people around the world, but also individual professional groups. Many, including agricultural economists, chose to reach out to colleagues in the CEE in an attempt to assist in the transition by sharing knowledge and experience.

The presence of social capital as defined by FUKUYAMA (1999) led to the initiative within the American Agricultural Economics Association (AAEA) to create a committee focused on cooperation with professionals from Central and Eastern Europe. The first chair of this committee, Joseph Havlicek, guided activities of the committee, which included, among others, the participation of invited agricultural economists from the CEE in the AAEA annual meetings. The first group of participants joined the AAEA meeting in Manhattan, Kansas, in 1991, and included participants from Czechoslovakia, Poland, and Hungary.

The participation in the AAEA meetings included presentations at Organized Symposia. Discussions, which were an inherent part of each Symposium focused on restructuring agriculture, trade, and policy, but also offered an unobstructed view of how a professional organization provided a platform for public debate.

Invited colleagues from the CEE also attended other sessions, from the Presidential address to the Business Meeting, gaining insights about the whole array of activities and the organization of the meeting's program.

The participation in the AAEA annual meetings and other interaction with agricultural economists abroad facilitated the establishment of SERiA. Foremost, it created an understanding of benefits stemming from a professional organization and suggested forms of activities that could be undertaken within it.

3.2 SERiA goals

The purpose of establishing a professional organization of agricultural economists was to create a framework for the exchange of information and ideas. Because the membership is open to anybody who pays the dues (and the dues have not changed since the inception), the barrier to entry is virtually non-existent. Therefore, the organization offered a previously non-existent platform for the exchange of ideas, information, and knowledge on an unprecedented scale. It made the accumulated social capital work with increased efficiency, meeting the demand for new or updated knowledge in the area of agricultural economics, agribusiness, and outreach.

3.3 Forms of activities

The annual congress is the primary activity of SERiA. From time to time, additional conferences are held between congresses. The analysis of the number and subject matter of papers selected for presentation at the congresses illustrates the scope and achievements of the profession. Participation in the meetings includes paper presentations and the interaction of all generations of agricultural economists and is a recognized annual event. Publication of papers in the SERiA Journal is valued in the process of professional advancement and promotion in Poland.

Every year, since its inception, among congress participants are agricultural economists from other countries. Their participation expands the variety of topics and perspectives presented at the meetings. In recent years, one section of the selected papers includes only presentations in English by authors from Poland and other countries. In the first SERiA congress, two presentations were made by the President of the AAEA and the President of GEWISOLA. At the second congress in Krakow, the AAEA President participated. The visitors shared their experience in the organizing and functioning of their professional organizations.

The annual congress of SERiA involves a study tour. Participants visit a variety of farms and agribusinesses, and infrequently, national parks or historic sites. On several occasions, congress participants visited professional colleagues and agribusinesses in neighboring countries. The first visit was to Kaliningrad, Russia, during the meeting in Olsztyn in 1996, but later tours included Sweden and Denmark, the Agricultural University in Prague, the Czech Republic, a tour of

agribusinesses in Slovakia, a session at the Dublany Agricultural University in Ukraine, and a trip to Bornholm, Denmark. In years when a foreign tour is not feasible, participants tour domestic farms, agribusinesses, and institutions.

The tours update the knowledge of issues in farm economics and agribusiness, and strengthen relationships among members. They also build trust and cooperation with expectations of contributing to higher quality research and teaching.

Table 7.3 shows the total number of papers presented at selected SERiA meetings and the number of papers presented by authors from institutions outside Poland. First, there has been a significant increase in the number of the total papers presented, while the number of papers from other institutions fluctuates, but shows a growing tendency. The number of papers gauges participation intensity and is an indirect measure of expanding social capital as more professionals become involved in SERiA activities. Civic involvement in general leads to improvements in the education system (KNACK, KEEFER, 1997). The number of papers at the Congress in Poznan in 2006 was similar to the number of papers at the Warsaw meeting, while the number of papers accepted for the 2007 meeting in Krakow exceeded 300.

The breadth of paper topics led to the creation of sections grouping papers with similar subjects. The subjects included agricultural policy and trade, marketing and consumer studies, agribusiness and farm management, and a separate section where papers were presented in English by Polish and international authors. The growth in the number of accepted papers is expected to change the program in order to accommodate all authors.

SERiA as a professional association represents a form of institutional arrangement creating access to and use of the diversity of knowledge in the area of agriculture and rural development. In a narrow sense, the association acts as a firm interpreted as a social community capable of generating information (SPORLEDER, MOSS, 2002).

The association provides opportunity to improve one's competitive position and the position of one's school. Access to knowledge stimulates innovation in the search for solutions of issues undertaken by SERiA members, whether presented at the annual meeting or elsewhere.

Table 7.3: The list of SERiA congresses, the total number of papers selected for publication;^a and the number of papers authored or co-authored by economists from foreign institutions

Congress venue and year	Total number of papers	Number of papers from foreign institutions
Szczecin 1997	84	1
Wroclaw 1998	133	24
Rzeszow 1999	109	5
Zamość 2000	242	15
Białystok 2001	195	5
Bydgoszcz 2002	247	11
Koszalin 2003	259	12
Puławy 2004	259	12
Warszawa 2005	276	20

Source: Author's calculations based on SERiA proceedings for years 1997 and 1998, and "Zeszyty Naukowe SERiA" from 1999 to 2005.

Note: ^a SERiA started the publication of proceedings at the IIIrd Congress in Olsztyn, in 1996 and the publication of the journal, "Zeszyty Naukowe SERiA" in 1999 at the VIth Congress in Rzeszow.

4 CAUSES OF SERiA SUCCESS

Voluntary cooperation was a pre-requisite for SERiA establishment. The desire to voluntarily cooperate after years of pseudo-cooperation under socialist policies, reflected positive emotions. Such emotions are consistent with the observation that human relations are not emotionally neutral (BOULDING, 1973). Members must engage in an activity perceived as one of mutual gain and benefit. Such voluntary cooperation is easier in a community or society which "inherited a substantial stock of social capital in the form of norms of reciprocity" (PUTNAM et al., 1993). Despite years of functioning in the system where the trust, cooperation, and reciprocity were systematically undermined by authorities who viewed them as a potential threat to their control over "state-owned" resources, the volume of social capital was sufficient to permit the establishment and functioning of the professional organization. Societies that experience difficulties in institution building including professional organizations (like one serving the agricultural economics profession), are characterized by continuing deep divisions and distrust consistent with the expected outcomes from game theory. Economic growth in those societies may be slower than under conditions of increased voluntary cooperation associated with trust and reciprocity.

Members of SERiA enjoy the same status without restrictions while running for officer positions, expressing their views at the business meetings, submitting papers for presentation, or voting. By reducing the asymmetry of hierarchy within

a professional organization, the cost of information exchange and access to knowledge is also reduced. Moreover, there are spillover effects since the benefits of cooperation extend to activities and relations outside SERiA. Through contacts established at the SERiA meetings, members have opportunities to engage in common research projects or teaching exchanges. These opportunities could materialize without the existence of SERiA but, likely, at a higher cost to society.

Moreover, the basic rules of SERiA (defined in the court-approved statute) and its activities limit opportunistic behavior. The likelihood of discovering of opportunistic behavior is high because the primary activity is the annual congress, while the term served by officers lasts two years. The review process and the subsequent public presentation of papers and their publication assure that each member can make personal evaluation of others' conduct. OSTROM (1992) noted that well-crafted institutions reduce opportunism. If some SERiA members engage in opportunistic behavior, they create short-term costs for others and some worthwhile activities may be forgone. Consequently, in the long run, the professional organization may be weakened and, under extreme conditions, cease to function. It is, therefore, imperative to assure that the exchange of socio-emotional goods and services offered by SERiA's annual meetings be sustained. Moreover, such an exchange must be inclusive in nature because of the threat of stagnation due to exclusion of topics or groups.

5 CONCLUDING REMARKS

This paper offers a brief description of the emergence of the professional organization of agricultural economists, SERiA, in Poland. The organization was established in the early 1990s, a period of unprecedented proliferation of civic, commercial, and industrial associations. A rise in the number of organizations is necessary "to make democracy work" (TOCQUEVILLE as cited by PUTNAM, 1995)

The sustained functioning of SERiA (and other similar professional organizations) implies that the utility function of each member is modified. Individuals maximize their utility, which includes a measure of self and others (COLLARD, 1975). The utility function also accounts for the benefits derived from the participation in SERiA outside the organization's activities. For example, presentations at SERiA's congresses and the subsequent publication of referred papers are viewed positively in the process of periodic evaluations and consideration for promotion. These tangible long-term benefits strengthen the link to the organization and add to other non-tangible gains such as the provision of socio-emotional goods.

The threat to the existence of organizations like SERiA is the occurrence of inequality. Such an inequality may result from a shift of power, but the shift of power is, to some extent, controlled by each member having one vote, terms of

holding office, and the periodic business meetings approving the performance of the board. It has been noted that the demise of a community results from prolonged stagnation brought about by the protection of interests of a small group within it (RAINEY et al., 2003).

To repeat SERiA's success in different environments, it is necessary to gauge the available social capital and the desire to engage in an exchange of socio-emotional goods. Otherwise, individual efforts are isolated and lost because the "market is too thin", and the critical mass of those willing to engage in exchange is too small.

It is possible that some perceive the emergence of a new professional organization as an invalidation of their existing relationships. To overcome this resistance, it is worthwhile to consider what form the new organization represents the continuity of past activities and goals. However, if the emerging organization had no predecessors, this issue is of lesser importance.

REFERENCES

- BOULDING, K. (1973): *The Economy of Love and Fear*. Wadsworth, Belfont.
- COLLARD, D. (1975): Edgeworth's Propositions on Altruism. *Economic Journal*, 85, pp. 355-360.
- FUKUYAMA, F. (1999): *Social Capital and Civil Society*. Paper presented at the IMF Conference on Second Generation Reforms, November 8-9. Available online at www.imf.org/external/pubs/ft/seminar/1999/reforms/fukuyama.htm. Accessed: July 17, 2001.
- KNACK, S., KEEFER, P. (1997): Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *Quarterly Journal of Economics*, 112(4), pp. 1251-1288.
- OSTROM, E. (1992): Institutions as Rules-in-Use. In: *Crafting Institutions for Self-Governing Irrigation Systems*. ICS Press, San Francisco, CA, Chapter Two, pp. 19-39.
- PUTMAN, R. D., LEONARDI, R., NANETTI, R. Y. (1993): Social Capital and Institutional Success. In: *Making Democracy Work: Civic traditions in Modern Italy*. Princeton University Press, Princeton, NJ, Chapter 6, pp.165-185.
- PUTNAM, R. D. (1995): Bowling Alone: America's Declining Social Capital. *Journal of Democracy*, 6(1), pp. 65-78.
- RAINEY, D. V., ROBINSON, K. L., ALLEN, I., CHRISTY, R. D. (2003): Essential Forms of Capital for Sustainable Community Development. *American Journal of Agricultural Economics*, 85(3), pp. 708-715.
- ROBINSON, L. J., FLORA, J. L. (2003): The Social Capital Paradigm: Bridging Across Disciplines. *American Journal of Agricultural Economics*, 85(5), pp.1187-1193.
- ROGERS, C. R. (1961): *On Becoming A Person*. Boston: Houghton-Mifflin Co.
- SPORLEDER, T. L., MOSS, L. A. (2002): Knowledge Management in the Global Food System: Network Embeddedness and Social Capital. *American Journal of Agricultural Economics*, 84(5), pp. 1345-1352.

SOME CONCEPTIONAL THOUGHTS ON THE IMPACT OF SOCIAL NETWORKS ON NON-FARM RURAL EMPLOYMENT

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1 INTRODUCTION

Imagine you live in a rural region in Eastern Europe. You have spent there all your life. You have worked in the local plant, producing a mass-product – let it be components for electric machines. Your children are in the 3rd and 4th grade and your wife is a nurse in the local hospital. And one day, your world changes dramatically. The plant you have been working for so many years is stopping production. You are laid off. Your wife still has her job, but the money is not enough to provide a decent livelihood for the whole family. What do you do? Look for a job in the village? Of course, you try this way, but there are lots of people like you looking for employment. It does not look good – no jobs, no contracts, and no social benefits. Imagine also you have some arable land and see most of your co-villagers starting to do farming, some other try to find a job in the big city or in the small town nearby. And very few try to start their own business. Which option will you favour?

This is a typical story. Millions of people have faced and are still facing this problem and have to find a way to deal with it. Their livelihood decisions have a huge impact on rural landscapes and on the wellbeing of the people living there. This paper attempts to reflect on insights from different disciplines and provides a theoretical base that helps explaining what drives people to start non-farm businesses. Our interest goes specifically to *self-employment* in rural areas for two reasons: First, small non-farm businesses are often a last resort if no wage jobs are available. Second, successful start-ups offer the potential of creating comparably higher family incomes and additional jobs for family or non-family members. Regular wage employment is often the first choice of rural job seekers. However, evidence suggests that often the capacity of the local labour market is limited, with the public sector dominating it (TRAIKOVA, 2005).

After 1990, "distress-push"-forces drove many rural residents into small-scale farming (BUCHENRIEDER, MÖLLERS, 2006). It was assumed that this will be a

temporary solution until other employment opportunities would develop and "pull-out" the workforce from the farming sector. In the context of this paper, the emergence of rural non-farm self-employment cannot be understood without considering also the situation in the farm sector. Often farm and non-farm businesses are undertaken in the same household. Personal relations here are supposed to be especially important.

The idea on which this paper is based is that the opening up of non-farm income sources in transition economies is closely connected to the social networks, in which rural decision-makers are embedded. Networks can do both, lock people in, but also pull them out of a difficult situation. In the following the issue of social networks is addressed in the context of rural non-farm employment by introducing some key theories and combining them with insights from behavioural theory.

2 THE NOTION OF SOCIAL CAPITAL AND NETWORKS

The term "social capital" is widely discussed. It is out of the scope of this paper to provide a comprehensive overview on the large body of publications on the topic, but for a good literature review see for instance DUFHUES et al. (2006), MIHAYLOVA (2004) and PRODUCTIVITY COMMISSION (2003). This paper concentrates rather on relevant issues of the concept that might explain the decision making process, when it comes to diversifying into non-farm employment, especially with regard to rural self-employment.

Individuals live rarely alone; they are usually embedded in networks of people with whom they interact in the one or the other way. Interaction can be formal or informal, regular or not, but because of the social nature of people, it has its own rules that make its outcomes more predictable. These rules or social norms influence the behaviour of people to a different degree, but usually in the same direction. COLEMAN (1988) states that norms arise as attempts to limit negative external effects or encourage positive ones.

The scholarly literature struggles to overcome the deficiencies of the myriad of definitions of social capital that sometimes contradict with each other. But there are some aspects on which there seems to be an agreement:

- Social capital is about ties between people. It does not refer to persons, but to the relationships among them (BOURDIEU, 1985).
- Social capital is conceived as networks plus resources, (e.g. credit, information) (DUFHUES et al., 2006).
- Social capital is a context dependent phenomenon; it depends on the history and local circumstances (PRODUCTIVITY COMMISSION, 2003).

MIHAYLOVA (2004) categorises three groups of definitions of social capital laying a focus either on *networks*, *trust*, or *civic participation*. In some aspects, all of them can be relevant for the choice of non-farm employment. WOOLCOCK and NARAYAN (2000, p. 1) define social capital as referring to "the norms and networks that enable people to act collectively".

While the decision to diversify is an individual one, the definition discussed above aims at the community level. Despite this the network approach seems useful because individual choices rest upon beliefs about the societal institutions and organisations and the networks behind them. This point will be discussed again in the next section.

In the context of searching for employment, GRANOVERTER (1983; 1974) found that job seekers are most likely to have heard about the jobs they eventually secured through contacts or people they did not know well, thus suggesting what he called "the strength of *weak ties*" (GRANOVERTER, 1983, p. 201). These were people looking for wage jobs. But how about starting an own business? What kind of ties does one need for that?

In order to work with different types of ties between individuals, a useful classification has been introduced by GITTEL and VIDAL (1998): Bonding and bridging. *Bonding* describes ties between similar people. The key characteristic here is the similarity of individuals on certain criteria. In this paper bonding is defined as close family members and close friends. Bridging is characterised by cross-cutting ties. Bridging ties refer to individuals that differ from one another. Other than with bonding, here heterogeneity is crucial. Bridges are horizontal links. An example for a bridge is an ex-colleague, who currently lives in another city and holds a different job. *Linking* is a special case of bridging, connecting non-similar individuals vertically, that is with different power positions. In that case the ex-colleague can be a decision-maker in the local authority, while one is e.g. a small farmer.

Rural people use their networks in different ways. They *cope* (SIK, 1994) with problems that seem too difficult to be handled without help from others. For instance, a sudden loss of income can be softened by resources provided by friends and relatives. But people can also mobilize their networks if they see a good opportunity that promises benefits to them and their friends. This is the so called *grab* behaviour (SIK, 1994). A vivid example this can be found in the privatisation process in post-communist countries, where public property has been sold to people close to the decision-makers on prices, far below the market price. This practice can be seen as a redistribution of resources that would not have been possible without network cooperation; for those outside the network, negative consequences resulted from this.

BURT (1992) explains how imperfect access to information makes such developments in the privatization process possible. He states that opportunities arise

everywhere. The structure of the network defines *who*, and *when* learns about them and *who* gets the chance to utilize them. According to BURT's (1992) Theory of Structural Holes, players with a network optimally structured to provide these benefits enjoy a higher success rate. This can explain how the above mentioned redistribution could reach a few, well connected beneficiaries. They must have had a key person (BURT calls it a structural hole) who knew more and earlier than the others about the procedure of privatisation. With regard to the diversification into non-farm employment, it is to expect that those who have their own non-farm business are among others also better informed about market opportunities. To better understand the influence of networks it is necessary to gain particularly more knowledge about the channels of information they use – whether they rely more on formal or informal communication over their network for their business.

3 THE THEORY OF REASONED ACTION

Why are some rural people more open for non-farm employment than others? Why are there not more start-ups? When trying to answer such questions one needs among others also to explain the reasoning behind human behaviour. The current analysis will rely on the fundamentals of economic theory, namely rationality and utility maximisation, but also will use explaining variables offered by the Theory of Reasoned Action by AJZEN and FISHBEIN (2005). Their main assumption is that people's behaviour follows reasonably from their attitudes, norms and control beliefs, and their respective intentions. These determinants of behaviour have been discussed in the context of rural non-farm employment by MÖLLERS and BUCHENRIEDER (2005). The theory argues that specific attitudes towards specifically defined behaviour have a significant predictive power (MASTEAD et al., 1983).

Strong attitudes involve issues of personal relevance and are held with great conviction and certainty (PETTY, KROSINICK, 1985). They are also more likely to be resistant to change. People hold fairly strong attitudes towards their jobs (AJZEN, FISHBEIN, 2005). However, not all rural people might be explicitly interested or involved in self-employment.

Sometimes even if the attitude towards self-employment is positive, external obstacles hinder individuals to start the business. For example someone may want to start up a new shop, but does not have the money needed for the initial investment. This implies that it is important to consider also the degree of control which an individual has over certain behaviour.

Considering all this, AJZEN and FISHBEIN setup their Theory of Reasoned Action (**Figure 7.1**). They identify three major kinds of considerations that influence the decision to perform an action:

- The outweighing of expected positive and negative consequences of behaviour (attitudes),
- The approval or disapproval of the behaviour by respected individuals or groups (norms), and
- The factors that may impede or support the desired behaviour (actual and perceived control).

The term *behavioural belief* stands for the likely consequences of behaviour. For example, one may think that if a person starts new non-farm business this will result in better income situation for the family. In general it is assumed that these beliefs produce an overall positive or negative *attitude* towards the particular behaviour. In the given example the result will be a positive attitude towards starting a family business.

Normative beliefs are about perceived social pressure. That is if a person is to leave agriculture, what will the family, friends, colleagues, boss and so on say about this decision. Here social networks play an important role as opinion-forming factor.

A *subjective norm* is the social pressure resulting from normative beliefs, corrected by the degree of willingness to follow it. The potential entrepreneur may know that everyone in the village will say that he is crazy to take an expensive credit for investing in the new non-farm idea, but he might also do not care about that and choose not to conform. So a subjective norm is what an individual believes to be right.

Control beliefs concern the presence or absence of factors that make the performance of behaviour easier or more difficult. *Actual behavioural control* – the objective possibility one has to exercise control over the situation. *Perceived behavioural control* is the degree to which a person thinks he is able to control the situation. It is in the head of the individual. For example a potential entrepreneur may know about a program supporting start-ups, but decides not to apply because he may have heard that the applying procedure is quite complicated. It could be that in the reality the procedure is far less difficult than perceived (that is the actual control), but because of the subjective biased perception (perceived control) the resulting action is also biased – the idea to take credit is given up.

Subjective norms and perceived behavioural control (shaded in the figure) are those aspects of intentions formation, where networks are supposed to have most importance.

Rural villages do not have the anonymity of big cities and it seems there to exist a higher degree of closure. People see each other daily, have expectations towards each other and develop norms about each other's behaviour (COLEMAN, 1988). Closure creates trustworthiness in a social structure, because it eases also sanctions. Thus it is to expect that normative beliefs have more pressure in rural

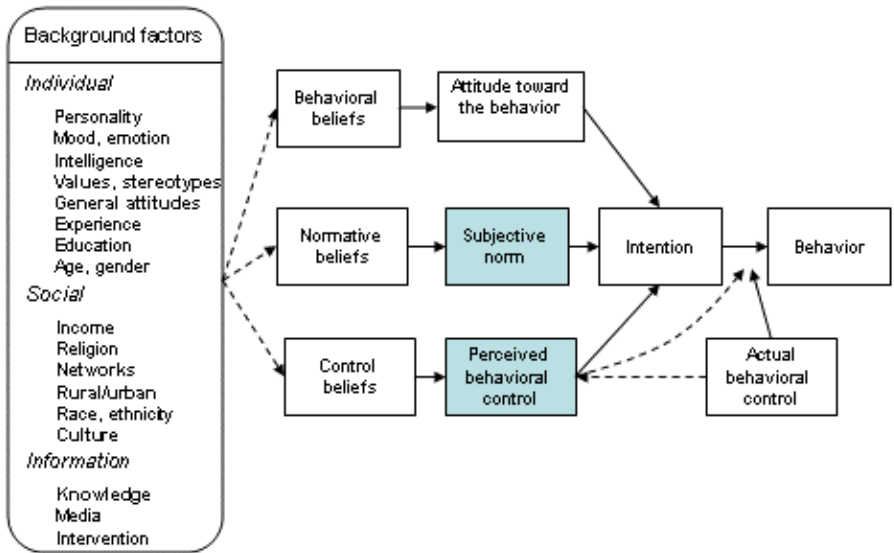
than in the urban regions and consequently these norms deserve more attention if it is to try to explain participation in rural non-farm activities.

Perceived control is much dependent on the whole context of the background factors listed on the left side of **Figure 7.1**, and networks is one of them. Here is to be highlighted that networks could support the perception for higher degree of control, for example when a diversifier has to decide whether to adopt an innovation or not. And this support can have all the dimensions discussed in the social capital literature – trust, resources that could be mobilised over the network, the capability of collective action due to cohesion in the village, the belief that by voting one could change the rules of the political game.

Similarly, a lack of connections (especially in a society where the state is not performing well) may be a reason for an individual to think he is incapable to handle the task of starting a new business and cope with complicated registration procedures or required bribes. In such a case one may see lack of entrepreneurial initiatives despite good endowment with human capital, modern infrastructure, easy access to credit and available market opportunities. The weaker the state and the looser the formal rules, the more these perceptions are supposed to gain on importance. This is particularly the case in the post-communist economies, where a giant shift of the formal rules took place, triggering a major change in the power structures.

It is important to note that all three types of beliefs described by this theory (behavioural, normative and control) are influenced by a wide variety of cultural, personal and situational factors. So it can be expected to find differences in the beliefs of men and women, young and old, educated and uneducated, rich and poor, and, last but not least, rural and urban people (AJZEN, FISHBEIN, 2005). This complements the uniqueness of social networks as a context-specific phenomenon.

Despite all the complexity, it is reasonable to assume that there must be some kind of pattern in the social networks and the norms of those who do farming as opposed to those who started own off-farm business. In search of it, this paper tries to give an overview of features that come up in the process of starting a non-farm business and then make a first attempt to propose an analytical framework.

Figure 7.1: The theory of reasoned action

Source: Adapted from AJZEN, FISHBEIN (2005, p. 194).

4 THE WAY TO START UP A NON-FARM BUSINESS

For starting an own business some crucial preconditions should be fulfilled. The first of which is the existence of a *business idea*. How to generate such an idea? It is likely that this will happen if more people with different background get together and exchange ideas. This will probably depend also on the educational level and other personal characteristics. For example, if one really enjoys farming and the rural lifestyle it is less likely that one will think a lot about non-farm opportunities. But in general it is to suggest that if many different people pool together their knowledge, skills, interests and perspectives, it is much more likely that a good idea will spark in the head of some of them. Thus it is to expect a positive influence will arise from the presence of more bridging ties. In this sense going out (not only in the village) and keeping in touch are quite important.

Then, if the idea becomes an intention, the *need of market information* arises. Is it possible to sell the service or the product? Who is the target group? Will there be enough purchasing power? Rural people are rarely educated economists, but

intuitively they look for a way to sell what they have to offer. Again, social networks might be crucial in opening up channels that they will use to collect this information. It is to expect that informal sources as well as impressions about the business stories of co-villagers will be also used as a reference and will have impact on the personal decision.

If there is a demand, a way to provide the product or service in question has to be developed. Here the next element needed in order to start a non-farm activity is represented by the *skills and know-how* required for that. Beside individual knowledge and previous experience, networks could facilitate the start of the business. A couple of questions will be asked: Who could be useful to facilitate the start-up? If a partner is needed, will know-how be the only criteria for the choice? Maybe there are specialists in the village, but they are considered to be hostile, or just disliked? Is it good to work with friends? No clear-cut answer here. It will be interesting to check in real survey what networks are mobilized to solve that.

Assuming there are sufficient know-how and skills, the next issue is about *initial investment*. Is there enough equity capital or an affordable access to credit? If not, who could help? Are helpers bonds or bridges? Does one have the courage to ask for that? Can the business pay back the debts?

Furthermore, are there *competing interests* in the village? Who are the strong of the day? Is this favourable or not for the future business? How is the potential diversifier embedded in the local power structure? Here networks are especially important. The flow of information can decide about life or death of the future business. Linking could be of a great help. The scope of ones network will probably influence the self-confidence.

Regulations determine the formal rules of the game. The future entrepreneur should assess whether it will be possible to comply with them or not. Is the state seen as something suppressing private initiative? Will it be costly to get permission? Are laws enforceable? Do you need friends to cope with that? There is evidence that significant share of the economies in transition countries is informal (ANDERSON, GRAY, 2006). This should apply also to rural regions.

Probably these are not all the relevant considerations, but should suffice to gain the impression that networks and perceptions can eventually help to a certain extent to explain the variance in self-employment participation.

As an attempt to make these considerations work for an empirical testing, the paper proposes to use the following explanatory variables for a model that has participation in off-farm self-employment as the dependent variable. A short description of the proposed variables will follow.

Variables related to networks:

- *General stock of overall trust in the particular village* – It is to expect that rural businesses have rural partners and clients. Trust is known to decrease

transaction costs for business operation and thus it is reasonable to assume that this would have a positive impact on the probability to start an own non-farm business.

- *Prevailing level and structure of bonding versus bridging ties* – As explained above, the probability to get a good business idea is assumed to positively correlate with the frequency of bridging contacts.
- *Perceived access to credit* – If no or little problems are to be expected, the probability for credit application should increase, thus solving the issue of the initial investment. In this case a positive impact is expected.
- *Perception for corruption scope in public authorities* – Depending on the chosen behaviour (grab or cope) this can have positive or negative impact for the probability to start new business. Grabbing individuals will find it easier to pay a bribe and just start operation, while coping persons (not willing or not able to pay) will struggle in attempts to get all the things in the legal way and experience stress and dissatisfaction by knowing that other people will use corruption as a "feature" of the system. The direction of the effect is not clear.
- *Perceived probability to secure a wage job off-farm* – In the context of the distress-push theory one can assume that, if the chances are low to find a wage job through the own network as well as the formal way, then people turn to the option to create employment themselves. A negative effect is expected.
- *Reliance on informal sources for market related information* – If potential diversifiers rely more on informal than formal sources, this could give them an advantage, especially if the information comes from structural holes. On the other side, depending on the scope of the utilised network, the information received may be not so trustworthy or not in time as compared to the formal sources. It is not clear what effect this will have on the probability to start own off-farm business.
- *Number of persons to ask for money when in need* – If the person is well embedded in a network, where more people could offer help in times of hardship, this would probably decrease the risk aversion and respectively have a positive impact on the willingness to start own business.

Additionally to the network aspect, it is known that there are also diverse other factors, that have impact on the participation in non-farm self-employment. Some of them will be listed below accompanied with short explanation for their reasoning:

- *Urban closeness* – A study on Bulgaria (TRAIKOVA, 2005) found out that in peri-urban regions it is thirteen times more likely to find non-farm self-employment than in rural areas. Integration with the urban economy, lower transport costs and easier commuting are the reason to expect positive impact here.

- *Endowment with human capital* – The more educated a person is, the greater is the expected chance for the respective person to be able to run an own business and to deal with complex regulations. Also active age (between 16 and 64 years) and good health should influence positively the probability to start self-employment.
- *Previous off-farm experience* – Has to do with know-how and skills. They should increase the self-confidence and be supportive for potential entrepreneurs.
- *Average income level in village* – Determines the purchasing power in the target market. The higher it is, the greater the potential money to be earned for start-ups. A positive impact is expected.
- *Population size in village* – Relates to the size of the potential target market. The bigger the expected demand, the better for the success of a new business.
- *Infrastructure* – It is assumed as necessity for the operation of non-farm firms. A positive effect is expected.
- *Perceived attractiveness of agricultural opportunities in village* – If farmers in the village make good money and agriculture is perceived as something positive, this should decrease the pressure to leave the farm sector.
- *Desire to be independent or to be own boss* – Some people are "marked" by the bad experience of being laid-off or being suppressed by "less capable" seniors. They have the impulse to take the responsibility in their own hands and probably to run a successful firm. Considered as supportive for participation in non-farm self-employment.
- *Dependency ratio* – The number of elderly and children related to all members of the family. If high, it is expected to increase the pressure to provide for the family, and thus increase the probability to find one in self-employment.
- *Perceived wellbeing* – If someone is happy as a farmer or at lower income level, no pressure to diversify will be present and thus no incentives for big changes. That is why negative effect is expected.

Of course, each study should consider the specific conditions in the examined sample. In order to better understand the historical, political, economic and other unique determinants of the participation in self-employment in a particular village, it is good to combine the quantitative data defined by the variables discussed above, with qualitative inputs. This will allow interpreting the results in the light of the local context.

5 CONCLUSIONS

To sum up, networks can have a significant impact on the decision to participate or not in non-farm self employment. They can lock individuals into an unfavourable

low-income situation, or pull them out of it. Networks have a crucial role when it comes to information exposure and recognizing possible opportunities. Another aspect is that power structures represent vertical networks. They are present in every human society. The position which a potential employment diversifier holds within such a structure may influence the perception or capability to deal with issues, relevant for self-employment. Such issues are for example getting permission, or believing that the new start-up will be backed up by the group in order to hold the competition. Networks facilitate the access to resources thus depriving or promoting fragile new-born start-ups. And last but not least, the norms that are lived in the network, where rural people are embedded, play a role in the opinion-forming process, which determines their future intentions and plans. Considering all this, it is reasonable to include the network aspect in the analysis of the participation in self-employment outside agriculture.

REFERENCES

- AJZEN, I., FISHBEIN, M. (2005): The Influence of Attitudes on Behavior. In: ALBARRACÍN, D., JOHNSON, B. T., ZANNA, M. P. (eds): *The Handbook on Attitudes* Mahwah, NJ, Erlbaum, pp. 173-221.
- ANDERSON, J. H., GRAY, C. W. (2006): *Anticorruption in Transition 3. Who Is Succeeding . . . And Why?:* World Bank, Washington D.C.
- BOURDIEU, P. (1985): The Formas of Capital. In: *Handbook of theory and research for the sociology of education*, pp. 241-258.
- BUCHENRIEDER, G., MÖLLERS, J. (2006): A Synthesis of Theoretical Concepts for Analysing Non-Farm Rural Employment. 26th Conference of the International Association of Agricultural Economists (IAAE), Brisbane.
- BURT, R. (1992): *Structural Holes, the Social Structure of Competition:* Harvard University Press, Cambridge, USA.
- COLEMAN, J. S. (1988): Social Capital in the Creation of Human Capital. *American Journal of Sociology*, 94, pp. 95-120.
- DUFHUES, T., BUCHENRIEDER, G., FISCHER, I. (2006): *Social Capital and Rural Development: Literature Review and Current State of the Art.* IAMO, Halle (Saale).
- GITTEL, R., VIDAL, A. (1998): *Community Organizing: Building Social Capital as a Development Strategy.* Russel Sage, Newsbry Park, USA.
- GRANOVETTER, M. (1983): The Strength of Weak Ties: A Network Theory Revisited. *Sociological Theory*, 1, pp. 201-233.
- GRANOVETTER, M. S. (1974): *Getting a Job: A Study of Contacts and Careers.* Harvard University Press.
- MASTEAD, A. S. R., PROFFITT, C., SMART, J. (1983): Predicting and Understanding Mother's Infant Feeding Intentions and Behavior: Testing the Theory of Reasoned Action. *Journal of peroslanlity and social psychology*, 44, pp. 657-671.

MIHAYLOVA, D. (2004): Social Capital in Central and Eastern Europe. A Critical Assessment and Literature Review. Cps Policy Studies Series, Central European University.

PETTY, R., KROSINICK, J. A. (1985): Attitude Strength: Antecedents and Consequences. Lawrence Erlbaum Associates, Mahwah, NJ.

PRODUCTIVITY COMMISSION, (2003): Social Capital: Reviewing the Concept and Its Policy Implications. Commission Research. AusInfo, Canberra.

ROSE, R. (1999): Getting Things Done in an Antimodern Society: Social Capital Networks in Russia: Glasgow. Centre for the Study of Public Policy, University of Strathclyde.

SIK, E. (1994): Network Capital in Capitalist, Communist and Post-Communist Societies, *International Contributions to Labor Studies*, 4, pp. 73-93.

TRAIKOVA, D. (2005): Gender Differences in Non-Farm Rural Employment – The Case of Bulgaria: University of Hohenheim, Stuttgart-Hohenheim.

WOOLCOCK, M., NARAYAN, D. (2000): Social Capital: Implications for Development Theory, Research and Policy. *The World Bank Research Observer*, 15, pp. 225-249.

REPAYMENT PERFORMANCE UNDER JOINT LIABILITY BORROWING. DOES SOCIAL CAPITAL MATTER? – EVIDENCE FROM ARMENIA

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1 INTRODUCTION

Following theoretical models, joint liability lending schisms have positive impact on the repayment performance of borrowers. The expected success is basically attributed to the non-traditional characteristics of the collateral, specifically social collateral used. In the sense that social collateral of borrowers takes the place of traditionally accepted forms of physical collateral, joint liability lending relies upon social capital³ of the group (BESLEY, COATES, 1995). Under such lending conditions, the group takes the liability for the individual loans of members and by that overcomes the problem of lack of traditional forms of collateral. By delegating the function of screening, monitoring, and enforcement of loans to the group members, banks in their turn overcome the problem of asymmetric information and accordingly the problem of prohibitively high

³ The World Bank defined social capital as "the norms and social relations embedded in the social structures of societies that enable people to coordinate action to achieve desired goals" (WORLD BANK 2000, p. 1). In respect to its forms, social capital is divided into structural and cognitive. Structural social capital consists "information sharing, collective action and decision making through established roles and social networks, rules and precedents" (UPHOFF 1999, p. 218). Structural social capital is easily observable in that it can be easily measured, for example, by the number of associations and their members. Compared to structural social capital, cognitive social capital is more difficult to observe. It consists of "shared norms, values, trust, attitudes and beliefs" (*ibid.*).

transaction costs⁴ (GHATAK, GUINANE, 1998). Pointing on the main hypothesis of such programs, that is the comparative advantages of collective actions in screening, monitoring and in enforcement activities, STIGLIZ (1990) argues that group members have better access to information on reputation, creditworthiness and an intended purpose of peer borrowers. Moreover, people connected with social ties have better possibility to enforce repayment by implementing social sanctions against defaulters (BESLEY, COATE, 1995). Consequently, the horizontal social relations among actors are critical as the base for the knowledge on the reputation, credibility and enforcement. GHATAK (1999) suggests that by implementing group lending practices, banks get a chance to distinguish good borrowers from the risky ones. Under group lending schemes the good borrowers will select higher joint liability and lower interest rate contracts. Risky borrowers, on the other hand, will select lower joint liability and higher interest rate contracts. The concept of joint liability can thus be understood as a forced risk sharing arrangement technique which in theory can lead to higher repayment rates (BESLEY, 1995). By the end of 1980s increasing number of microfinance institutions already adopted joint liability techniques to reach the poor and disadvantaged groups of communities⁵.

Despite the existing theoretical literature there is little empirical evidence to prove the basic assumptions of screening, monitoring, enforcement and the efficiency of such models. Especially the connection between social capital indicators – i.e. trust, associational life, collective action and the repayment rates of such groups is not well documented. This article aims to contribute to the existing empirical literature by analysing the impact of different aspects of social capital on the repayment performance of individual members of joint liability lending projects in Armenia.

The article is organised as follows: Section 1 draws on empirical studies concerning the determinants of repayment rates in group lending. Section 2 presents the data and the methodology used in the analysis. The results of the regression model are presented in section 3 and Section 4 concludes the paper.

2 REVIEW OF EMPIRICAL STUDIES

The findings of empirical studies concerning the determinants of repayment rates in group lending in respect to social capital indicators are controversial. WYDICK (1999) in his study in Guatemala recorded that social cohesion and the strong social ties have rather negative than positive impact on repayment rates. In the case of Bangladesh, SHARMA and ZELLER (1997) found a negative relationship

⁴ "Transaction costs are costs resulting from information search, market entry and exit costs for borrowers, savers, and financial intermediaries" (HEIDHUES, SCHRIEDER, 1999, p. 13).

⁵ The best known example is the Grameen Bank's lending program in Bangladesh.

between the presence of relatives in the group and the repayment rates. They also stated that the groups which followed the self-selection criterion perform better. Similarly, VAN BASTELAER and LEATHERS (2006) identified a negative relationship between the participation in the same church and the repayment rates of joint liability seed groups in Zambia. WENNER (1995) on the other hand in his study in Costa Rica pointed out that the written internal rules about ones expected behavior in the group facilitate credit repayment. The results were supported by ZELLER's (1998) findings in Madagascar where the groups with stronger social ties and with internal rules performed better.

3 DATA AND METHODOLOGY

This contribution is based on field research conducted in 2006 in Ararat, Armavir and Vayotz Dzor provinces of Armenia. By the use of direct observations and semi structured questionnaire the members of six randomly selected joint liability groups⁶, which include 86 individual group members, were interviewed. The information on different social as well as the economic indicators of respondents was obtained.

During interviews it became obvious that the enforcement assumption of peer pressure by the use of social sanctions does not work efficiently in the case of Armenia. It was recorded that though the members have sufficient information to predict who will and who will not default and are aware of each others life situation and the ability or the willingness to repay, they are reluctant to sanction those who default. The cultural factors to keep good and long lasting relationship with the neighbors and relatives (possibly as social safety nets) seem to be more important than the short time benefits accruing from borrowing. This makes it difficult to impose social sanctions, as no case of a social sanction was recorded we hypothesis that other specific types of social capital facilitate repayment. By and large following VAN BASTELAER and LEATHERS (2006), we classify the social capital indicators as those affecting collective action, the proxies of structural social capital and the proxies of cognitive social capital.

In order to examine the relative significance of the different aspects of social capital that are believed to influence the repayment behavior of individual credit group members, an empirical logit model was estimated. SPSS 14 was used for the analysis.

⁶ The name of the project and the groups are known to the authors. The aim of the paper is, however, not to evaluate the very project but to understand how joint liability groups are formed and function in Armenia. For this reason the project and the groups have asked to stay anonym.

4 EMPIRICAL MODEL AND RESULTS

The logit model tests the hypothesis that the presence of social capital within a group facilitates loan repayment behaviour of its members. The model is as follows:

$$\text{repayment_behaviour} = f(c_a, s_sc, c_sc, sev)$$

where repayment behaviour of joint liability group members is measured as a binary variable (yes = credits are repaid on time, no = credits are not repaid on time). The parameter c_a stands for the factors affecting collective action in the group; s_sc stands for structural social capital proxied by the associations to which the actors belong. Cognitive social capital, c_sc identified by the level of trust towards each other in the group (most members can be trusted, you can't be too careful) and sev stands for selected economic variables, i.e., total value of household items. The definitions of the variables involved in the model are presented in **Table 7.4**.

Table 7.4: Definition of variables involved in the model

Variables	Definitions
<i>Factors affecting collective action:</i> INCOMEH	Members' perception of group's homogeneity in respect to income (1 = mostly same income level) and (2 = mixed rich/poor)
FAMREL	Family relations (1 = yes, else = 0)
<i>Proxies for structural social capital:</i> MPRODC MPOLP	Member of production cooperative (1=yes, else = 0) Member of political party (1=yes, else = 0)
<i>Proxies for cognitive social capital:</i> TRUST	Trust in group members (1 = most members in the group can be trusted, else = 0)
<i>Selected economic variables:</i> OFFFEMP FARMP TVHHI	Off-farm employment (1 = yes, else = 0) Farm productivity (US\$) divided by 1000 Total value of household assets (US\$) divided by 1000

By applying this model, the following hypotheses are tested:

1. *Factors affecting collective action in groups, i.e. group homogeneity:* A positive relationship exists between the perception of group homogeneity and the repayment behavior, as it allows better efficiency of group dynamics (group homogeneity in terms of risks). Furthermore, family relations facilitate collective action and credit repayment since the information flow among relatives is higher.

2. *Proxies of structural social capital*: A higher level of involvement in associational activities facilitates one's adherence to norms and accordingly to better credit repayment.

3. *Proxies of cognitive social capital*: The repayment behavior of individual members depends on the existing trust in the group in the way that the higher the trust is the better is the repayment behavior.

4. *Selected economic variables*: Total value of household items as an indicator of wealth status of the borrowers, off-farm employment as an indicator of increased family budget and risk diversification and higher farm productivity enhance the capacity of an individual to repay the loans on time and will therefore have a positive effect on repayment behavior. Involvement in non-farm activities will imply income diversification. That means, if for some reason farm income is zero, families still have a source of income and are more probable to repay the loan.

The results of the regression analysis are presented in **Table 7.5**. The significance level of variables shows, members' perception of group homogeneity in respect to income (with the negative sign), trust towards other group members, membership in production cooperative, farm productivity are significant determinants for individual members credit repayment.

Table 7.5: Results of regression analysis for the repayment model estimated by logit estimation

	Coefficient	S.E.	Wald	Significance
INCOMEH	- 1.915	1.115	2.949	.086*
FAMREL	.523	.907	.907	.565
MPROD	3.650	1.104	10.922	.001***
MPOLP	.017	1.733	.000	.992
TRUST	4.335	1.134	14.608	.000***
OFFFEMP	.428	.858	.248	.618
FARMP	1.696	.764	4.923	.027**
TVHHI	.137	.328	.174	.676
Constant	- 4.844	1.620	8.937	.003***

Source: Own calculation.

Notes: Nagelkerke $R^2 = 0.736$, * Significance at the 10 % level, ** Significance at the 5 % level, *** Significance at the 1 % level.

The significance of the perception of the income homogeneity variable (INCOMEH) shows that the perception of individual members about the same social status, economic power and credit risk of other borrowers have rather negative than positive effect on repayment behavior. This indicates that under specific situation group members may use the benefit of collective action rather to avoid than to enforce repayment. The family relations (FAMREL) variable seems not to be a significant determinant of good performance. Though family relations may facilitate collective action in a group there is no guarantee that the

action is positive. The cognitive social capital, proxied here by (TRUST) between group members, is significant on 1 % level and is positive. This may indicate that the repayment of individual members depends on their subjective belief that other members in the group will repay their loans too. This is important as the repayment of others may determine if the loan will be available in the next round or not. As BASLEY and COATE (1995) noticed, if the same good individuals observe others defaulting, they may default too, since they will not receive a new loan even if they repay and they do not need to repay the loans of others. The significance of one of the proxies of structural social capital, that is the membership in the local production cooperative (MPRODC), indicates that the membership in associations indeed facilitates one's adherence to norms and better credit repayment. However, it may merely be done to secure good social reputation to ensure future economic benefits. As the variable 'membership in the political party' (MPOLP) is not significant we may conclude that at present economic associations play more important role in relation to rural financial markets in Armenia. The significance of "farm productivity" (FARMP) shows the importance of economic factors on ones decision and the ability for payback of a loan. It seems that the individuals with good harvest performed better, which indicates that higher farm productivity enhances the capacity and the willingness of an individual to repay the loans on time. The total value of household items (TVHHI) as the indicator of wealth status of the borrowers and off-farm employment (OFFFEMP) as the indicator of increased family budget and risk diversification failed to explain repayment behavior of members

5 CONCLUSIONS

The theoretical models of joint liability lending argue that through the use of social capital of borrowers, the repayment performance of groups is improved. This is because the peers are better able to screen, monitor and enforce loan repayment of each other. The empirical studies to test the hypothesis of such models are not many and the findings are diverse. This paper shortly reviewed both, theoretical and empirical literature. By estimating a logit model, the significance of different social capital indicators on the loan repayment performance of individual credit group members on the basis of their social capital structure was studied. The econometric results showed that the members with a higher level of structural and cognitive social capital as well as of higher farm productivity performed better. This clearly points to the importance of both, social as well as the economic factors on credit repayment. However, the impact of social factors such as trust and reputation seems to overwhelm the impact of economic indicators. The significance of both cognitive and structural social capital proxies supports the notion that different aspects of social capital are important in such an analysis.

Consideration of only one type to the exclusion of the others may produce misleading results and biased estimations.

REFERENCES

- BESLEY, T. (1995): Nonmarket institutions for credit and risk sharing in low-income countries. *Journal of Economic Perspectives*, 9(3), pp. 115-127.
- BESLEY, T., COATE, S. (1995): Group lending, repayment incentives and social collateral. *Journal of Development Economics*, 46, pp. 1-18.
- GHATAK, M. (1999): Group lending, local information and peer selection. *Journal of Development Economics*, 60, pp. 27-50.
- GHATAK, M., GUINNANE, T. W. (1998): The economics of lending with joint liability: A review of theory and practice. Department of Economics, Mimeographed.
- GHATAK, M. (2000): Screening by the company you keep: Joint liability lending and the peer selection effect. *The Economic Journal*, 110, pp. 601-631.
- HEIDHUES, F., SCHRIEDER, G. (1999): Rural financial market development. Discussion paper No. 01/99, University Hohenheim. Available at <http://www.uni-hohenheim.de/i490a/> (accessed 01.04.07).
- MORDUCH, J. (1998): Does microfinance really help the poor? New evidence from flagship programs in Bangladesh. Mimeo. Department of Economics, Harvard University.
- SHARMA, M., ZELLER, M. (1997): Repayment performance in group-based credit programs in Bangladesh: An empirical analysis. *World Development*, 25(10): pp. 1731-1742.
- STIGLITZ, J. E. (1990): Peer monitoring and credit markets. *The World Bank Economic Review*, 4(3): pp. 351-366.
- VAN BASTELAER, T., LEATHERS, H. (2006): Trust in lending: Social capital and joint liability seed loans in southern Zambia. *World Development*, 34(10), pp. 1788-1807.
- WENNER, M. (1995): Group credit: A means to improve information transfer and loan repayment performance. *Journal of Development Studies*, 32(2), pp. 263-281.
- WYDICK, B. (1999): Can social cohesion be harnessed to repair market failure? Evidence from Group Lending in Guatemala. *Economic Journal*, 109, pp. 463-475.
- WORLD BANK (2000): Social capital for development. World Bank, Washington D.C. Available at www.worldbank.org/poverty/scapital/ (accessed 16.02.07).
- ZELLER, M. (1998): Determinant of repayment performance in credit groups: The role of program design, intragroup risk pooling, and social cohesion. *Economic Development and Cultural Change*, 46(3), pp. 599-621.

8 IMPACT OF EU ENLARGEMENT

AGRICULTURE IN NEW MEMBER STATES – EXPECTATIONS AND LESSONS LEARNED

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1 INTRODUCTION

Eight post-socialist countries, which joined EU in 2004, form heterogeneous group, especially when agriculture is considered. Present structure of agriculture in new member states is mainly a result of communist legacy, strategy of post-communist transformation and adjustment to the EU conditions. May 1st 2004 could be treated as a symbolic date of the end of post-communist transformation in eight above mentioned countries¹. By joining EU it was formally confirmed that these countries have built political and economic system which is generally compatible with system existing in the EU-15. Minor transformations and adjustments to the EU conditions will continue for many years, of course. From previous enlargements we may learn that full institutional adjustment to mechanisms and structures of the European Community, which allows for taking full benefits from integration, takes 10-15 years. New member states are in the first stage of this process.

In this paper I present and discuss main results of accession for agriculture mostly on the example of three new members: Poland, Czech Republic and Hungary.

The effects of integration with the EU in relation to agriculture may be presented in breakdown into three spheres:

- *Real sphere*: Changes in production, profitability, incomes, exports, imports, etc.
- *Regulatory sphere*: New instruments of agricultural policy, liberalization of trade within the Union, support system for agriculture and rural areas, legal standards, etc.,

¹ Post-communist countries which joined the EU on May 1st, 2004 are: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

- *Spheres of perception and evaluation* of what is going on in these countries in respect of European integration: Hopes and fears in connection with integration, range of support for accession to the EU, evaluation of benefits and concerns resulting from Community policy instruments, etc.

Agricultural situation in transforming economies has been difficult in most of the period between 1990 and 2004. It was due to necessary profound changes in structures and institutions both in agriculture and in its economic environment.

Main developments in agriculture in countries discussed here were as follows:

- decline or stagnation of agricultural production;
- unfavorable price relations;
- low rate of investments;
- continuous changes in property rights structure;
- growing pressure of foreign competition;
- unstable and inconsistent agricultural policy.

Benefits from economic development which are a result of successful post-communist transformation are unevenly distributed among rural and urban areas. Disparities of incomes have been growing quickly during that time. Among three discussed here NMS biggest disparities are observed in Czech Republic and in Hungary, and lowest in Poland.

Table 8.1: GDP per capita in three types of regions in 2001 on NUTS 3 level (EU-25 = 100.0)

	PR	IR	PU	PU/PR ratio	MS value
Czech Republic	52.5	55.9	147.2	280.4	66.2
Hungary	40.6	48.0	116.1	286.0	56.2
Poland	36.4	38.8	73.9	203.0	45.9

Source: RURAL DEVELOPMENT (2006), p. 48.

Notes: Classification of regions: PR – Predominantly Rural, IR – Intermediate Regions, PU – Predominantly Urban

Attitude of farmers in CECs towards European integration before accession was dominated by fears rather than by hopes and optimistic views. This attitude had its roots in farmers experience with post-communist transformation and market reforms. For large groups of farmers it was almost traumatic experience.

2 THE ROLE OF SAPARD

In the beginning of year 2000, 10 candidate countries in Central and Eastern Europe got access to pre-accession funds, including SAPARD, special program

aimed at supporting agriculture and rural development. SAPARD had two major goals: First, to contribute to building institutions which were necessary for successful integration with EU and second, to accelerate modernization of agriculture, food industry and rural areas. Pre-accession programs based on the rules and mechanisms used by the EU for governing structural funds. In this situation success in absorbing efficiently pre-accession funds depended on building institutions, including legal framework, similar to those existing in EU. SAPARD played important role in adjustment to the EU conditions and in mobilization of governments, farmers, agricultural and rural organizations for modernization of agriculture, food sector and rural areas. Efficient implementation of SAPARD has been important factor for later successful adaptation to the CAP framework. It was clearly visible especially in the case of Poland. SAPARD was an important learning process for central and local governments, farmers and their organizations, agricultural advisors, food industry managers and others. This program finally contributed also positively to the attitudes of farmers towards European integration, although beginning of the program implementation was difficult and often discouraging.

According to the SAPARD financial plan, resources allocated to the candidate countries were available since the year 2000. Practically, expenditures within SAPARD programme started much later. In Bulgaria, Estonia, Latvia, Lithuania and Slovenia it was in 2001; in Hungary, Poland, Romania and Slovakia in 2002, but in Czech Republic not until 2004. In Hungary and in Romania after starting the programme in 2002, there was break in SAPARD expenditure in the year 2003. Bulgaria, which begun the programme in the earliest group of countries had difficulties in implementation of particular measures and by 2005 utilized only 36 % of allocated money. The story of SAPARD implementation illustrates how important and difficult was to build institutional capacity for efficient absorption of the EU support.

Table 8.2: SAPARD Expenditure by country, programming period 2000-2006 (1000 EUR)

Member State	2000	2001	2002	2003	2004	2005	2000-2005	Payment/Financial Plan
Czech R.	0	0	0	0	78,816	9,333	88,148	95 %
Estonia	0	3,046	6,554	17,056	19,865	1,969	48,491	95 %
Latvia	0	5,444	2,798	21,048	38,112	19,563	86,965	95 %
Lithuania	0	7,433	3,200	24,922	52,155	31,466	119,176	95 %
Hungary	0	0	9,483	0	26,119	108,585	144,257	90 %
Poland	0	0	42,035	99,712	193,116	339,077	673,939	95 %
Slovenia	0	1,579	94	5,549	11,738	6,358	25,318	95 %
Slovakia	0	0	4 557	4,819	22,525	41,169	73,070	95 %
NMS – 8	0	17,503	68,721	173,105	442,000	557,519	1,259,364	94 %

Source: RURAL DEVELOPMENT (2006).

As early as by mid-2002 Polish farmers and local self-governments could seek Community support under the pre-accession SAPARD program. The number of applications submitted for this program grew at a very high rate and the funds allocated to Poland were distributed completely by 2004. In all, the funds allocated to four measures under SAPARD amounted to EUR 1,084 million, in that about EUR 720 million from the EU. Finally, 24,396 applications (from over 27 thousand registered) have been accepted for an amount of 4,805 PLN million, which made 100.7 % of the program limit.

There were 15 measures available in the SAPARD program. Each candidate country selected some of them according to its priorities in the field of agriculture, food processing and rural development. Most of eight NMS have chosen measures supporting competitiveness of agriculture and food processing. Final allocation of SAPARD money has been as follows:

- processing and marketing – 33 %
- rural infrastructure – 29 %
- investments in agriculture – 23 %
- diversification of agriculture – 9 %
- other measures – 6 %

In Poland priority was given to rural infrastructure, in Hungary it was investments in agriculture, but in Czech Republic, except processing and investments in agriculture, relatively high priority was given to measures: Land improvement/repalcelling and renovation of villages.

Selection of priorities for public support (both domestic and EU) and the process of building institutional framework for efficient absorption of this support are a domain of politics and public choice. In some countries, instability of governments and agricultural policies, high political impact on the operation of agencies and other institutions implementing agricultural and rural development programs had negative effects on efficiency of SAPARD and similar programs. The same situation we may observe after accession. Although agricultural policy has become common (goals, principles, instruments, budgeting and so on) but implementation of CAP plus setting up and operating rural policy still is an area of national policies.

3 MAIN EFFECTS OF ACCESSION FOR AGRICULTURE AND RURAL AREAS IN NEW MEMBER STATES

Common Agricultural Policy is the most developed and comprehensive institutional system of European Community operation. CAP is regarded special "glue" strengthening integrity of the EU. This is also the most expensive part of the EU policy. Attractiveness of CAP has been an important part of general

attractiveness of EU for candidate countries. Analyses and simulations prepared before accession revealed significant benefits for agriculture in NMS coming from entering CAP². In these circumstances how to explain fears and negative attitudes of farmers towards accession in candidate countries before 2004? In my opinion, these attitudes were determined mainly by three factors:

- painful experience with market reforms and restructuring of agriculture during post-communist transformation;
- asymmetrical trade liberalization between EU and CEECs in the 1990s;
- complicated, bureaucratic, and not transparent nature of CAP.

In the 1990s almost all CEECs, except Hungary and Bulgaria, became net importers of agri-food products. Central and East European markets were flood by subsidized agri-food products from EU. Competitiveness of agriculture in CEECs was generally low in the 90s due to underinvestment, low profitability and unfinished institutional reforms. Majority of farmers in the candidate countries were afraid that they could not face up to competition from EU-15 farmers after accession.

Scope and conditions for agricultural support in NMS were not clear until the end of negotiations about membership, which were finished in December 2002. Direct payment issue, reference quantities, milk and sugar quotas, co-financing of agricultural and rural measures, and level of financial resources devoted to NMS were among most controversial topics during negotiations. Even in 2002, one year before referendum on membership in EU, farmers in accession countries were afraid that they will be treated as "second class" participants of the CAP. Reluctance to extend direct payments in agriculture to new members, presented by EU-15 during first phase of negotiations played important role in building negative attitude among CEECs farmers towards European integration. Another important aspect in this matter relates to high transaction costs of entering CAP. These costs could be regarded *ex ante* transaction costs which must be paid before entering CAP and starting to benefit from this policy. Fortunately, part of this cost could be covered by EU from pre-accession funds –PHARE and SAPARD.

² One of the studies on competitiveness of CEECs agriculture and on the impact of integration on agriculture and rural areas in accession countries is IDARA project, summarized in *Integrated Development of Agriculture and Rural Areas in Central European Countries*, 2006 (Eds: DAVIDOVA, S., BAUER, K., CUDDY, M., Lexington Books).

Table 8.3: Position of new member states in agricultural structures and general economy of the EU-25 (2005)

	Agricultural land (1000 ha)	Number of agricultural holdings (1000 units)	Number of employed in agriculture (1000 persons)	Share of agriculture in total employment	Value of agricultural production (Mio EUR)	Share of agricultural products in imports (%)	Share of agricultural products in exports (%)	Balans of agricultural trade (Mio EUR)
EU-25	163,706	9,900	9,541	4.9	311,569	6.0	6.1	-2,453
Czech Rep.	3,603	42	195	4.1	3,419	4.3	3.9	-182
Estonia	834	28	35	5.8	526	5.1	4.4	-48
Hungary	5,863	715	187	4.8	6,129	2.5	10.7	574
Latvia	1,734	129	130	12.6	752	6.5	9.5	-22
Lithuania	2,837	253	218	14.8	1,611	4.1	9.2	-77
Poland	15,906	2,477	2,386	17.1	15,057	6.3	11.8	358
Slovakia	1,941	69	108	4.9	1,693	2.8	2.9	-49
Slovenia	509	77	83	8.9	1,073	7.6	5.8	-54
EU-15	130,331		6,180		280,562	6.1	6.0	3,126

Source: EUROPEAN COMMISSION (data from Eurostat, FAO and UNSO).

8 New Member States contributed in 10 % in the total agricultural production of the EU-25 (2005). It is much below of the production potential level in these countries. Contribution of 8 NMS to some branches of the EU agriculture is significantly higher than is shown by average index. In 2005 they amounted to (Changes 2007):

- 29 % in the production of cereals;
- 17 % in the production of beet;
- 19 % in the production of vegetables;
- 13 % in the production of fruit;
- 16.5 % in the production of meat, including:
 - 17.3 % of pork;
 - 21 % of poultry
- 19.5 of the output of milk.

One of the main effects of accession was significant increase in the support for agriculture from public finances (national and EU). In Czech Republic support for agricultural policy increased from average 18 008 CZK billion in 1998-2003 to average 30 129 CZK billion in 2004-2005 (DOUCHA, JELINEK, 2007). Direct area payments have become main element of agricultural support.

Table 8.4: Area payments in Czech Republic, Hungary, Poland and EU-15 (in EUR/ha)

Country	2004	2005	2006
Czech Republic	145.7	159.0	172.2
Hungary	149.5	161.0	174.3
Poland	104.0	113.4	122.9
EU-15	300.5	300.5	300.5

Source: POPP 2007. Payments for Czech R., Hungary and Poland include also contribution from national budget.

In Poland, support for agriculture and rural development increased from PLN 5,080 million in 2003 to PLN 18,515 million in 2006, i.e. almost four times.

Table 8.5: Support for agriculture and rural development in Poland, 2003-2006, in PLN million³

	2003	2004	2005	2006
Expenditures from the state budget	4,378	5,641	6,905	8,714
Expenditures from EU funds	702	5,352	8,808	9,801
Total expenditures	5,080	10,993	15,713	18,515

Source: ANALIZA (2007), and Ministry of Agriculture and Rural Development.

Launching direct payments for farmers, based on a simplified scheme of implementation of this Community support, was extremely important for improvement of the financial condition of Polish agriculture. In virtue of considerable mobilization of institutions which process Community programs in Poland, particularly ARMA (Agency for Modernization and Restructuring of Agriculture), and solutions adopted at the 2002 Copenhagen Summit, advantageous for Poland, 1.4 million of Polish farmers, operating on 90 % of cropland in the country, could benefit from direct payments already in the first year of membership; these payments amounted to PLN 6,388 million. In 2005 PLN 6.8 billion were allocated to direct payments, granted to 1.5 million farmers. Among the new Community members, Poland was the country in which during the first year of membership direct payments were disbursed the earliest and probably most efficiently. Adoption of a simplified scheme for these payments and allowing almost all farmers to benefit from them, was and still is controversial among economists and some politicians. It is emphasized that such form of Community support does not foster improvement

³ Amounts presented in the **Table 8.5** do not include expenditures from the Polish state budget aimed at support of social security system for farmers. This support amounted to 14 969 PLN million in 2006. This was much more than total transfer from EU to Polish agriculture. It is paradoxical that after accession expenditure from the state budget for agriculture has increased despite including Poland in the Common Agricultural Policy system. This is due to national complementary direct payments (top-up) and co-financing of other rural and agricultural programs.

of the agrarian structure in Poland, does not prefer the most efficient and competitive holdings and may create a situation in which a large part of funds intended for modernization of agriculture may be finally used for increased consumption in peasant households. There are some arguments in defense of the solution adopted in Poland:

- Payments were launched quickly and efficiently, which had a very positive impact on the farmers' attitude towards the EU. Farmers were the first beneficiaries of the Community funds after Poland obtained membership in the Community.
- Payment distribution was featured by general and easy access, but was far from the principle of equality; those farmers who manage vast areas of land received large funds and small farmers received relatively little.

In this situation owners of huge, commercial holdings received large amounts which allow increasing capital expenditures and enhancement of competitiveness. These funds shall also be accessible to them in the coming years on a growing basis (*phasing-in* principle).

In Hungary, direct payments for farmers were delayed due to some problems with administration of agricultural transfers. It coincided with record harvests in 2004 and 2005 which caused difficulties in managing and storage of big amounts of grain. Dissatisfaction with implementation of CAP in Hungary took form of massive demonstrations of farmers on the streets of Budapest. In 2005 around 210 thousand farms received direct payments in Hungary (New 2007). It is relatively small share of all farms operating in this country. The number of farms reached 660 thousand in 2005. There is strong polarization of farm structure in Hungary. The average area size of all farms in Hungary is 8.6 ha, but 70 % of all individual farms are below 1 ha, and 93.4 % below 10 ha. The position of large farms is still dominant in land use and production. Farms operating at least 100 ha constitute 1 % of all farms but they use 72.2 % of agricultural area in Hungary (NEW, 2007).

The first three years of Poland's membership in the EU were – on the whole – advantageous to Polish agriculture. However, this period is too short to become a turning-point in its modernisation and to reduce the distance to west European agriculture. European integration, i.e. free access by Polish agricultural and food producers to the huge market for 450 million consumers and the opportunity to benefit from the extensive aid for agriculture and rural areas, funded from Community sources, provided a new, great opportunity for remarkable improvement of the condition of Polish agriculture and food economy as a whole, never encountered earlier. What use shall the Polish farmers make of it? The beginnings were promising: Relatively good adjustment to Community standards by Polish producers, general absorption of funds allocated to direct payments, extraordinary dynamics of exports to Community markets, growth of investments in agriculture and food economy and suchlike phenomena. Despite the fears expressed earlier,

Poland's accession to the EU did not prove traumatic to Polish farmers; small holdings were not eliminated, the Polish market was not flooded with foodstuffs from other EU MS, foreigners do not purchase agricultural land en masse and the Polish farmer had no grounds for feeling alien in the "European family". These positive developments influenced also attitude of farmers towards European integration.

Table 8.6: Share of farmers supporting Poland's accession to the EU

Year	1999	2002	2003	2005
Supporters (%)	23	38	66	72

Source: For 1999 and 2002 research of the Institute of Public Affairs; for 2003 support for EU accession recorded during the referendum; for 2005 (February) CBOS data

One of the most positive outcomes of Poland's integration with the EU is acceleration of agri-food trade.

Table 8.7: Agri-food trade in Poland

Specification	2003	2004	2005	2006	2004	2005	2006
	EUR million				2003 = 100.0		
Exports of agri-food products, – of which to EU	4,010 2,617	5,242 3,782	7,028 5,191	8,291 6,314	130.7 143.5	175.2 198.4	206.7 241.3
Imports of agri-food products, – of which to EU	3,557 2,176	4,406 2,764	5,373 3,338	6,174 3,796	123.9 125.1	151.1 155.7	173.6 174.5
Balance of trade in agri-food products, – of which to EU	453 441	836 1,018	1,654 1,802	2,117 2,518	184.3 234.3	364.8 409.0	466.8 571.2

Source: SZCZEPANIAK (2007).

Poland and Hungary were biggest agri-food trade net exporters among 10 NMS, but tendencies in both countries are different. In the beginning of transformation, agricultural and food products contributed in 24.9 % of total exports in Hungary. In 2006 it was only 7.2 %, and balance of agri-food trade has fallen from EUR 1,573 million to EUR 993 million in 2006. This tendency is clearly shown in fruit trade in Hungary, where positive trade balance of EUR 62 million in 2000 turned to minus EUR 42 million in 2006. Hungary became also net importers of dairy products and pig meat.

In Czech Republic, agri-food trade balance has declined during transformation period. This tendency has not been reversed after accession. Quite contrary: Negative trade balance in agri-food products significantly increased in 2004-2006, especially in trade within EU-25 (DOUCHA, 2007).

Inclusion of Polish farmers into the CAP forces revolutionary changes in relations between farmers and the financial and advisory institutions. In late nineties only less than 20 % of farmers had bank accounts and used bank services. In 2004 almost 90 % of farmers had to have a bank account to be able to receive direct payments and other forms of Community support. The necessity to contract bridge and supplementing loans, required to absorb agriculture-oriented measures, was an additional impulse for popularisation of the use of banks among farmers. The use of EU aid programmes requires considerable knowledge: Technical, production, economic, legal, ecological and other. Therefore, demand for guidance in this respect also grew. Business plans, "cash flow", animal welfare, code of good agricultural practices or 12 ecological standards for investments and production became prerequisite component's of farmer's knowledge if he wants to benefit from the Community support system for agriculture. European integration forced our farmers to learn how to use modern financial and advisory institutions and to harmonise the complex production and economic processes with requirements in respect of the use of the natural environment, in which agricultural activities are set.

Accession has big impact on land market in new Member countries. In all these countries, except Czech Republic, prices of agricultural land increased significantly.

Table 8.8: Change in real land sales prices

	2003-2005 2003 = 100
Czech Republic	74
Estonia	150
Hungary	117*
Latvia	243
Lithuania	131
Poland	135
Slovak Republic	121

Source: SWINNEN, VRANKEN (2007), FEHER, BIRO (2007).

Note: * Nominal prices.

Land transactions in Czech Republic are difficult due to complicated property structures and limited accessibility of plots. Former state and cooperative large farms have been divided between many owners who often do not work personally in agriculture. Part of the land does not have identified owner. In Czech Republic 86 % of total agricultural land is rented. In Poland only 22 % of agricultural land is under rental contracts. Attractiveness of agricultural land property in new Member States has increased significantly after extension of area direct payment scheme to these countries. There are also other payments available for operators of land (LFA, forestation etc.) New Member States established some transitional restrictions for acquisition of agricultural land by foreigners. These restrictions are in force during 12 years after accession in Poland and 7 years in Czech R., Estonia, Hungary, Latvia, Lithuania, and Slovak R.

4 CONCLUSIONS AND LESSONS LEARNED

Accession of eight former communist countries to the EU in 2004 was a historical turning point for these countries. Three years after we may say that accession played important and highly positive role in acceleration of economic development and modernization in new Member States. Agriculture was among first and biggest beneficiaries of this process. Not all outcomes of European integration are positive for farmers in NMS but positive ones prevail. It is not possible to prepare comprehensive evaluation of results of eastward enlargement of the EU after 2-3 years of this event. The most important effects of enlargement will come later. In this paper I presented only selected aspects of processes initiated few years ago. Some conclusions drawn from this analysis are as follows:

- The attitude of farmers in post-communist countries towards accession was a mixture of fears and hopes, with fears prevailing in the beginning.
- Majority of farmers looked at European integration through the lens of their experience with post-communist market reforms which brought to them many painful results.
- Market reforms and opening-up the CEE economies in the 1990s have revealed low competitiveness of agriculture and food economy in these countries. Most of them became net importers of agri-food products, including Poland, biggest country in this region. Growing import of agri-food products came mainly from EU countries. This experience contributed to the fears related to expected full liberalization of trade with EU after accession.
- Institutional system in agriculture and in cooperating branches was a big concern in CEECs before accession. Some important institutional reforms were not finished before integration with EU, including land reforms, cooperation structures between farmers, organizational system for promotion of progress in agriculture (research and advisory services) and marketing structures for agricultural products.
- Adaptation of legal framework and building other institutions necessary for entering CAP system was a big challenge for all candidate countries. This was also linked with high transaction costs related to accession.
- What farmers in CEECs expected from the accession?
 - Substantial increase of the support for agriculture and rural development;
 - Higher prices of agricultural products and better incomes from farming;
 - Easier access to the EU markets and equal treatment of producers from old and new Member Countries;
 - Stabilization of agricultural policy and relatively clear vision of policy framework for coming years.

- Most of expectations have come true but some disappointments remain. Efficient and quick absorption of EU support need adequate institutional capacity. Institution building necessary for comprehensive implementation of CAP has been delayed in some cases. For example, in Hungary farmers received direct payments later than it was expected by them due to institutional problems. Higher agricultural incomes and growing demand have induced increase in agricultural inputs prices. Unfavorable terms of trade in agriculture, has not been changed after accession. There was much faster increase in agricultural input prices than in agricultural outputs prices: In Czech R. agricultural price index in 2006 reached 40 % of 1990 level (DOUCHA, 2007), in Poland it was 69 % of 1995 level (ANALIZA, 2007) Significant part of agricultural support has been transferred to other branches of the economy. CAP payments play important role in stimulation of agribusiness and consumption spending in rural areas.
- Agricultural policy in the EU is common but institutional framework for implementation of CAP measures in particular member country is a subject of national political game. This factor strongly determines of CAP effects in each member state. Unfortunately, political situation in some new Member States is unstable and this has negative impact on efficient implementation of CAP and other EU programs⁴. Governance structures for implementation of EU support have become an area of intensive politicking. This phenomenon contributes to lowering efficiency of EU support.
- Eastward enlargement of EU has made additional pressure for reforming CAP. Even before enlargement it was clear that CAP for EU-15 does not fit to EU-27. Some steps toward reforming of CAP has been made since adoption of Agenda 2000 but fundamental and comprehensive reform of CAP is still ahead.
- Growing significance of rural development measures in the framework of CAP inclines to better coordination of this policy with other EU-sponsored policies and programs.
- New Member States do not participate sufficiently in European dialogue about CAP reforms in connection with reforming other important elements of EU. Real impact of these countries on the institutional reforms taking place in the EU does not reflect needs and potential of New Member States.

⁴ Chairman of Restructuring and Modernization of Agriculture Agency (ARiMR), the biggest public institution responsible for distributing direct payments and other agricultural support has been changed seven times during past two years (2004–2006), due to political shifts in Poland.

REFERENCES

- Analiza produkcyjno-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w roku 2006 [Analysis of production and economic situation of agriculture and food economy in 2006] (2007): Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej, Warszawa.
- Changes in the Food Sector after the Enlargement of the EU (2007): Institute of Agricultural and Food Economics. National Research Institute, Warsaw.
- DOUCHA, T. (2007): Czech Agriculture after EU Accession. Paper presented at international seminar: "A future vision for European agriculture. The New Member States perspective". 19-20 February 2007, Warsaw.
- DOUCHA, T., JELINEK, L. (2007): Land Market in the Czech Republic after 1989. Unpublished paper.
- FEHER, I., BIRO, S. (2007): Review of the transitional restrictions maintained by new Member States with regard to the acquisition of agricultural real estate in Hungary. Unpublished paper.
- Mieszkańcy wsi o integracji europejskiej: Opinie, wiedza, poinformowanie [Rural inhabitants about European integration: Opinions, knowledge, awareness] (2002): KOLARSKA-BOBINSKA, L. (ed.), Institute of Public Affairs, Warsaw.
- New Hungary Rural Development Programme 2007-2013 (2007): Ministry of Agriculture and Rural Development, Budapest.
- Polish rural areas upon accession to the European Union (2004): Foundation for the Development of Polish Agriculture, Warsaw.
- Polskie rolnictwo – dwa lata po akcesji do UE [Polish agriculture – Two years after accession to the EU] (2006): Sekcja Analiz Ekonomicznych Polityki Rolnej FAPA, Warszawa.
- POPP, J. (2007): The Common Agricultural Policy beyond 2013 – Should its objectives be modified? Paper presented at international seminar: "A future vision for European agriculture. The New Member States perspective". 19-20 February 2007, Warsaw.
- Rural Development in the European Union. Statistical and Economic Information (2006): European Commission, Directorate for Agriculture and Rural Development.
- SWINNEN, J., VRANKEN, L. (2007): Review of the Transitional Restrictions Maintained by New Member States with Regard to the Acquisition of Agricultural Real Estate. LICOS and CEPS, Unpublished paper.
- SZCZEPANIAK, I. (2007): Competitiveness of the Polish Food Sector after Accession to the European Union. In: Changes in the Food Sector after the Enlargement of the EU. Institute of Agricultural and Food Economics. National Research Institute, Warsaw.

HUNGARIAN AGRICULTURE AND EU ACCESSION

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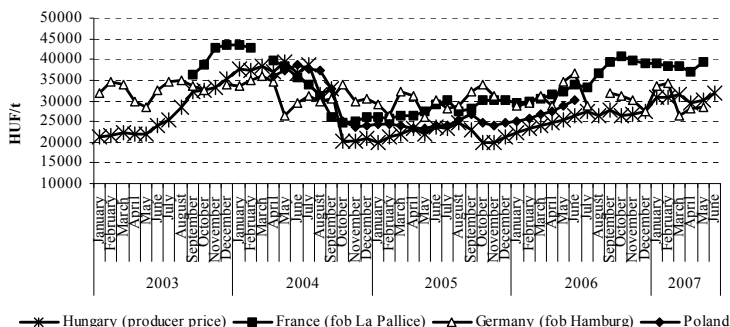
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1 INTRODUCTION

Because of the excellent natural conditions stakeholders of the Hungarian agri-food sector supported Hungary's accession to the EU. They were expecting a single market without trade distortion and a rational division of labour, with the assumption that all stakeholders would prepare for a successful EU accession. The positive expectations were based on relatively high yields and low producer prices. Model results for some sectors reflected that in particular crop producers (cereal, oilseed and protein) would be the winners of the enlargement (MÉSZÁROS et al., 1999; 2000a; 2000b; UDOVE CZ, 2000; MÉSZÁROS, SPITÁLSZKY, 2002). The low feed costs have masked the competitive challenges of the poultry and pork production. Prior to accession the market price for feed grain in Hungary was on average way below the intervention price in the EU (**Figure 8.1**).

Figure 8.1: Producer prices of maize in Hungary, Poland, France and Germany (2003-2007)



Source: RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

The projections of market developments, however, were not positive: They highlighted the existing inefficiencies, the lack of cooperation between farmers and the burdens of adjustments.

The share of agriculture in the GDP and employment has not changed considerably after enlargement. In 2005, agriculture in Hungary contributed 4.3 and 5 % respectively of GDP and employment. No major change can be observed either in the development of the share of agricultural and food products in total exports and household income spent on food. The contribution of agriculture and the food industry to total exports was 7.2 % in 2005, down 0.8 % from 2000. The share of food products in the average household budget remained relatively high over the past years and stood at about 25 % in 2005 (**Table 8.9**).

Table 8.9: Agriculture's place in the Hungarian economy (1990-2005)

	2000	2004	2005
Share of agriculture in GDP (%)	5.4	4.8	4.3
Share of agriculture in employment (%)	6.6	5.3	5.0
Share of agriculture in total investments (%)	5.0	*3.9	*4.4
Household income spent on food (%)	29.2	26.7	25.0
Share of agricultural and food products in total exports (%)	8.0	7.1	7.2

Source: HUNGARIAN CENTRAL STATISTICAL OFFICE (CSO).

Notes: * Includes agricultural investments of households.

2 AGRICULTURAL POLICY PRIOR TO ENLARGEMENT

Before enlargement, border measures, administered prices, input subsidies, area and headage payments, export subsidies were the main policy instruments used to support agriculture. Among payments based on the use of inputs, the most important were subsidized credits and capital grants, and fuel-tax subsidies. Budgetary support, based on capital, was provided mainly in the form of subsidized interest rates for farm credit and capital grants (for investments, working capital, land improvement and irrigation, for purchases of breeding animals etc.).

Institutional prices introduced before accession were well below the EU intervention price level especially for bread wheat and maize. A system of guaranteed prices combined with minimum and maximum intervention prices existed for milling wheat and feed maize, and buy-up quantities were strictly limited. Prices for milk, pig meat and beef were supported by a system of guaranteed, intervention and guidance prices. For these livestock products, output-based payments were used to cover the gap between market prices and guidance prices. In addition, price premiums for high-quality production were provided mainly for beef, milk, pig meat, poultry and game meat, although some vegetable products were also eligible. Support was also granted for the distillation and storage of high quality wines as

well as for the storage of apples. Agri-environmental and rural development measures were increasing in importance. Per hectare subsidies to limit soil erosion and to promote organic farming were the two main environmental policy measures.

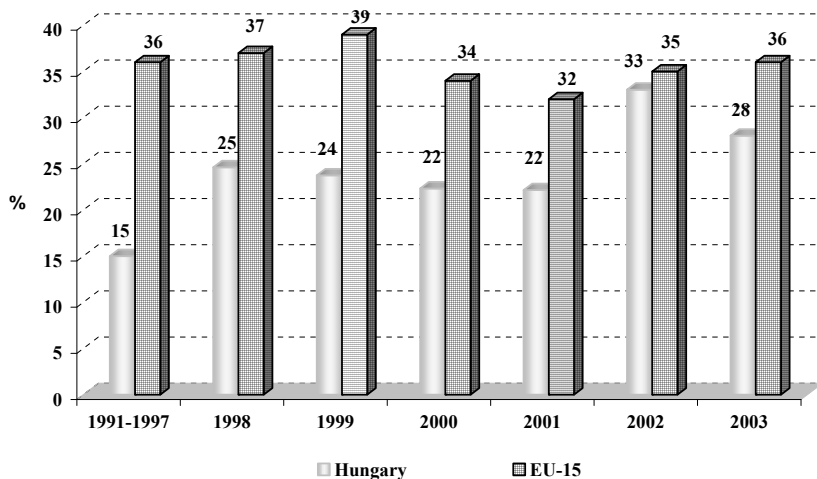
An area based payment scheme was established in 1999 and remained one of the main programs providing direct payments to farmers. Farms with less than 300 hectares of agricultural land were granted area payments to with payments inversely related to the farm size (this discriminative feature was later discontinued). Headage payments were provided for the purchase and breeding of animals. For milk, an output quota was introduced. None of these policy measures did fully comply with the CAP (POPP, POTORI, 2006).

An agricultural trade agreement between Hungary and the EU entered in force on 1 July 2000. This agreement liberalized agri-food trade according to the so-called "double-zero" principle under which the two parties agreed not to use export refunds or import duties for a range of products. For some more sensitive products, where this principle was not applied preferential quotas were extended. In 2002, the agreement was replaced by a new trade liberalization agreement. As a result, 97 % of Hungarian agri-food exports to the EU and 84 % of EU exports to Hungary became free of import duties before accession.

The producer support estimate (PSE) – support to producer measured as a percentage of farm receipts – remained relatively high between 1991 and 2003 in the EU-15 fluctuating between 32-39 %.

During the period 1991-2003, the PSE in Hungary almost doubled from a 15 % average of 1991-1997 to 33 and 28 %, respectively, in 2002 and 2003 (**Figure 8.2**). The upward and downward trend of the PSE between 1991 and 2003 conceals considerable increase in budgetary payments and market price support (MPS). Nevertheless, other candidate countries (Poland, Baltic states, Slovakia etc.) provided less support to producers prior to enlargement than Hungary.

With a view to EU membership, budgetary resources were allocated to support farm extension services, to improve the farm data collection and management system (Farm Accountancy Data Network) and to build the institutional framework required for the EU Special Accession Program for Agriculture and Rural Development (SAPARD). Investment aids were also granted to the food industry in order to ensure compliance with EU quality and food safety regulations.

Figure 8.2: % PSE of Hungary and the EU-15 (1991-2003)

Source: Research Institute for Agricultural Economics, OECD.

Prior to accession, SAPARD provided funds for four groups of measures: Investments in agricultural holdings; improvement of the processing and marketing of agricultural and fishery products; development and improvement of rural infrastructure; and diversification of activity in rural areas. Due to the late approval of the Hungarian SAPARD by the European Commission (EC), payments to agriculture within SAPARD accounted for only 25 % of the total SAPARD funds in 2004. In 2005, 50 % of the total SAPARD funds were paid out, and the rest was made available in 2006.

3 EU ENLARGEMENTS

3.1 Direct payments

Hungary has opted for the Single Area Payment Scheme (SAPS). The Act of Accession provides for a transitional period for the progressive introduction of the CAP direct payments in the new member states. New member states received in 2004 25 % of the full EU-15 payment rate from EU budget, rising gradually to 100 % by 2013. Direct payments are divided equally over all eligible hectares. During the phase-in period the new member states may complement (top up) EU funds for direct payments by national contribution (Complementary National Direct Payment: CNDP) up to 30 % above the applicable phasing-in level for direct payments for the relevant year.

CNDP may be granted for the production of products covered by the CAP support schemes. Bovine animals (beef production) and ewes can be supported exclusively by CNDP. Most support will continue to benefit larger and often richer farms. The level of area payments is based on reference yield. Due to low reference yields, area payments granted for the new member states (EU-10) will reach by 2013 on average 83 % of the level of the EU-15 (**Table 8.10**).

Table 8.10: Area payments granted for the EU-10 [SAPS+CNDP*]/ha (in EUR/ha)

Country	Reference ha	2004	2005	2006	2007	2008	2009	2010	2011-2013
Czech Republic	4.20	145.7	159.0	172.2	185.5	212.0	238.5	265	265
Hungary	4.73	149.5	161.0	174.3	208.6	238.4	268.2	298	298
Poland	3.00	104.0	113.4	122.9	132.3	151.2	170.1	189	189
Slovakia	4.06	140.8	153.6	166.4	179.2	204.8	230.4	256	256
EU-10	**4.00	138.6	151.2	163.8	176.4	201.6	226.8	252	252
EU-15	4.77	300.5	300.5	300.5	300.5	300.5	300.5	300.5	300.5
EU-10/ EU-15,%	83.8	46.1	50.3	54.5	58.7	67.1	75.5	83.8	83.8

Source: DG AGRI, Country Reports.

Notes: * CNDP: From the national budget; **Author's estimate.

3.2 Rural development

SAPARD was replaced by the Hungarian Agriculture and Rural Development Operational Programme (ARDOP) and the National Rural Development Plan (NRDP) for the EAGGF Guarantee Section Measures both covering the years 2004-2006. However, due to the late approval of these programs by the European Commission, there were no payments in 2004. Payments within these programmes started only at the end of 2005, and will be finished by 2008.

The NRDP planned expenditure is € 754 million for the period 2004-2006, of which 20 % or € 152 million has to be financed by the national budget (**Table 8.11**). The NRDP has been financed by the EAGGF Guarantee Fund on rural development priorities, i.e. different agro-environmental schemes as well as to help less-favoured areas (LFA) or to finance early retirement, etc. In 2006, HUF 61 billion (€ 244 million) has been paid from the NRDP budget. A total of € 423 million was made available through ARDOP over the period 2004-2006 with 25 % financed

by the national budget (**Table 8.12**). During 2004-2006, the Agriculture and Rural Development Agency (ARDA) received over 11 thousand applications for ARDOP support of which almost 40 % were accommodated. Over 60 % of the accommodated applications were submitted for investment aids. Until March 2007, about HUF 77 billion (€ 308 million) has been paid from the ARDOP budget (POTORI, NYÁRS, 2007).

Table 8.11: EAGGF Guarantee expenditures in Hungary: NRDP (2004-2006)

Measures	Total budget € 602 mln (EU) + € 152 mln (national)	
	HUF billion	%
1. Agri-environment	78	40.8
2. LFA and areas with environmental restrictions	21	10.8
3. Meeting standards/animal welfare	43	22.5
4. Afforestation of agricultural land	20	10.6
5. Early retirement	5	2.6
6. Semi-subsistence farming support	6	3.2
7. Setting up producer groups	9	4.5
(8. Technical assistance)	10	5.0
Total	192	100.0

Source: RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

Table 8.12: EAGGF Guidance expenditures in Hungary: ARDOP (2004-2006)

Measures	Total budget € 317 mln (EU) + € 106 mln (national)	
	HUF billion	%
1. Assistance to investments in agriculture	55	52.1
2. Setting up of young farmers	3	2.9
3. Assistance to vocational training and retraining	2	1.5
4. Structural assistance in the fisheries sector (FIFG)	1	1.4
5. Improvement of processing/marketing of agricultural products	15	14.2
6. Expansion of rural income earning opportunities	6	6.1
7. Development and improvement of infrastructure connected with agriculture	12	11.3
8. Renovation and development of villages	4	3.5
(9. LEADER+)	5	4.6
(10. Technical assistance)	3	2.5
Total	106	100.0

Source: RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

3.3 National support

Apart from top up payments, several national support programs have been provided following EU accession as a continuation of pre-accession policy measures. These include support for on-farm afforestation, subsidized veterinary costs, intra-EU marketing of agri-food products, water management, training, education and research, credit subsidies, producer organizations and social insurance fees. In February 2004, an agricultural loan program worth € 397 million to help farm businesses, and small- and medium-sized food processing plants prepare for EU accession was approved. The program provided, *inter alia*, for medium-term loans with a favourable interest rate and debt rescheduling. Some resources were also allocated to new temporary national support schemes maintained until 30 April 2004 such as support for fruit and wine plantations, export subsidies, etc.

4 EXPECTATIONS AND EXPERIENCES OF HUNGARY

The situation in Hungarian agriculture 3 years after enlargement appears relatively mixed. The market impact of enlargement seems to be both positive and negative. High expectations have been fulfilled only partly: The single market has not proved to be transparent due to different direct payment schemes in place in the member states leading to trade distortion. The delayed preparation for EU membership and the late implementation of the CAP can not be considered a success story either. Agricultural producers and the food industry have underestimated the burdens of adjustment and the pressure to improve efficiency after enlargement.

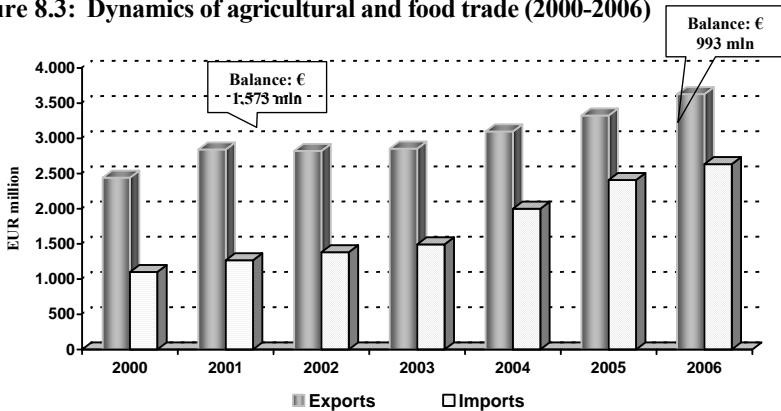
Hungary has not realized in time that the huge fluctuation of purchasing power and consumption patterns of consumers in the member states would have an impact on the development of consumer food prices: A food product in one member state considered as a cheap "by-product" has become highly demanded in another, thereby destroying producer prices. More efforts are needed to improve the vertical coordination and strategic cooperation between the up- and downstream sectors.

The first experiences of enlargement have been rather negative than positive for Hungary leading to cash-flow problems faced by the Hungarian farmers after enlargement, to rapid increase of agricultural imports and to demonstrations. The relative "peace" in agriculture can be attributed to the record harvest in the past three years and to the implementation of the single area payment scheme (SAPS) together with CNDP. In addition, the income of farmers has increased every year since enlargement. An effective integration into the single market depends on the development of production and marketing infrastructure and on the compliance of production with EU standards in a cost efficient manner (MÉSZÁROS et al., 1999).

5 DEVELOPMENTS IN AGRICULTURAL TRADE

As regards agricultural and food trade, Hungary has maintained its position as a net exporter after accession. During 2004-2006, exports and imports both increased, from € 3.1 to € 3.6 and from € 2 to 2.6 billion respectively. The agricultural and food trade balance has fallen from almost € 1.6 billion in 2001 below 1 billion in 2006 (**Figure 8.3**). Although imports are projected to increase further, the agricultural and food trade balance of Hungary is likely to remain positive; however, if improvements in the commercial infrastructure fail to take place, the trade surplus may slowly erode (it is worth noting that the sale of the intervention stock may temporarily increase trade surplus in 2007).

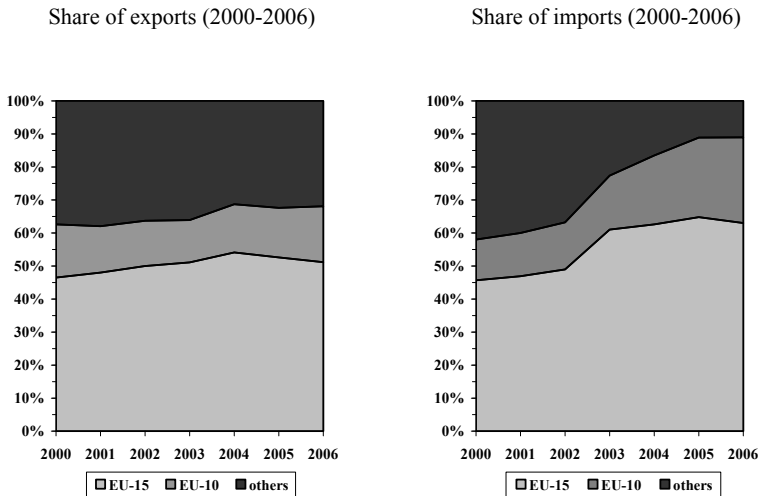
Figure 8.3: Dynamics of agricultural and food trade (2000-2006)



Source: CENTRAL STATISTICAL OFFICE AND RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

A high level of integration of markets of the EU-25 was achieved prior to enlargement. The impacts on intra-EU-25 trade are driven by changes in production and consumption, rather than by the lowering of intra-EU-25 protection, which was already low before accession. Nevertheless, trade creation effects have been observed since accession in a number of areas where prior to enlargement barriers to trade existed, in particular between old and new member states but also between old and new member states. Membership had positive effects as far as trade integration between Hungary and the new member states is concerned. The integration of agricultural and food trade between Hungary and the EU is more advanced on the import side: The share of exports to the EU-25 increased from 64 to 69 % while the share of imports from the EU-25 rose from 67 to 80 % in 2004. While the share of exports to the EU-25 remained stable the share of imports from the EU-25 rose to 89 % in 2006 with only imports from the new member states showing an increase (**Figure 8.4**).

Figure 8.4: Integration of agricultural trade between Hungary and the EU (2000-2006)

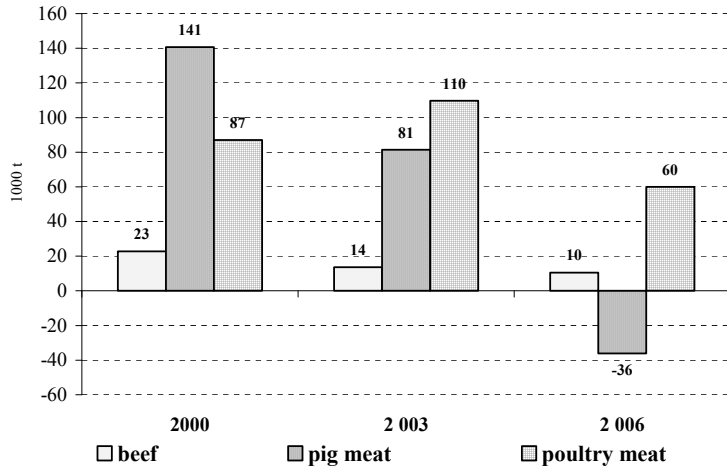


Source: CENTRAL STATISTICAL OFFICE.

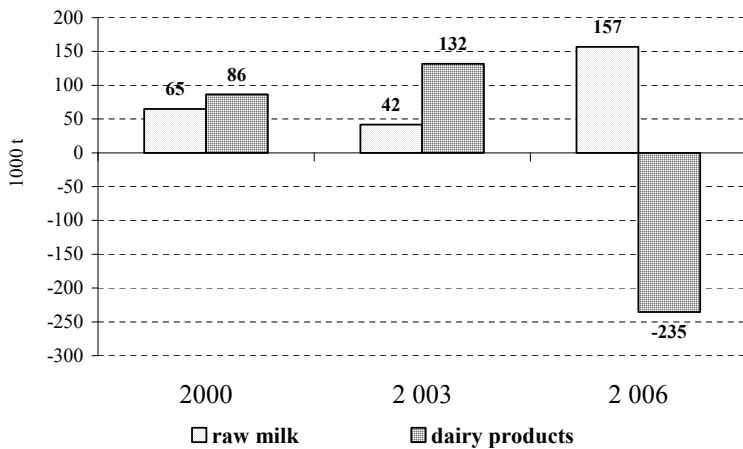
6 AGRICULTURAL MARKET DEVELOPMENTS

Although livestock producers in Hungary enjoyed a system of guaranteed, intervention and guidance prices, and some direct subsidies, they had almost no access to investment and capital aids in the pre-accession years, which was partially the reason for a drop-back in production, even with headage payments being continued after accession to help pig and poultry producers meet EU environmental, animal-health and welfare requirements. Late approval of the Hungarian SAPARD, the ARDOP and the NRDP by the European Commission and thus the delay of payments have also contributed to the decline of the livestock sectors (MÉSZÁROS, SPITÁLSZKY, 2002).

In Hungary, the livestock sectors are the largest consumers of cereals. Production of pig meat and poultry will remain the dominant factor in the development of total demand for feed grains. The Hungarian domestic market of cereals is characterised by the decreasing use of cereals for feed and food. The cereal-fed livestock production could not benefit from favourable regional feed cereal prices as well as from opportunities to expand markets share of poultry meat and pork meat on the EU markets (MÉSZÁROS et al., 2000a). In the past two years, Hungarian pig meat production has decreased at a faster pace than poultry meat production (Figure 8.5). The lack of competitiveness has led to production constraints in the dairy markets as well (Figure 8.6).

Figure 8.5: Trade of meat products in Hungary

Source: RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

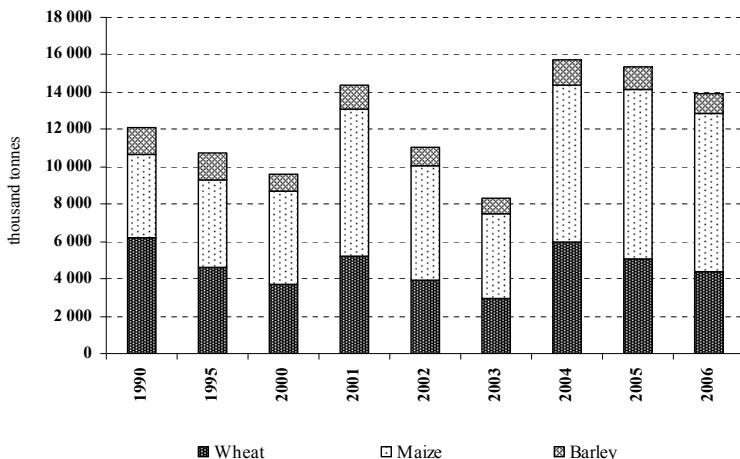
Figure 8.6: Trade of dairy products in Hungary

Source: RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

6.1 Cereals production

As a result of the extraordinarily favourable weather conditions, cereals production in Hungary doubled in 2004, compared to 2003, to a record of 16.8 million tons, and 2005 output was only slightly down. In 2006 production was still well over 14 million tons (**Figure 8.7**).

Figure 8.7: Production of the major cereals in Hungary (1990-2006)



Source: HUNGARIAN CENTRAL STATISTICAL OFFICE and RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

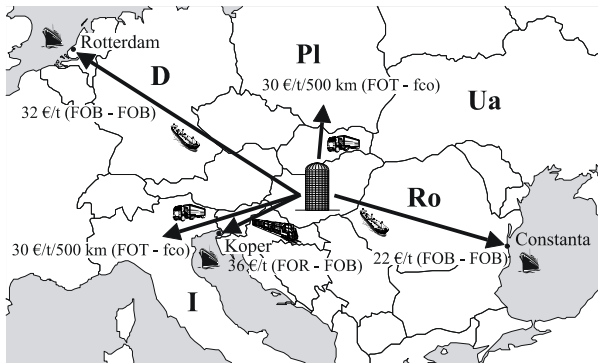
Market participants with insufficient storage capacity began to invest in the building of new stores in order to bridge the gap between harvest time and the beginning of the intervention season, and thereby fully benefit from the CAP. To speed up this process, rural development funds were made available. By the end of 2006, a total of 4.1 million tons of new storage capacity became available for the storing of intervention grains. Unfortunately, these investments were not fitted into an overall infrastructure development strategy, and therefore the whole program might prove economically unsuccessful in the longer term.

In 2004/05, expectations of market participants regarding the guarantees provided by the EU cereal intervention regime on the one side, combined with the lack of adequate storage capacity for intervention grains and the high cost of transport, on the other, led to serious disruption in the Hungarian cereals market. As the taking of cereals into intervention as well as the area payment (both SAPS and the national top-up payment for arable crops) was delayed considerably, farmers faced increasing liquidity problems, and began to sell out their wheat; maize and barley stocks mostly to well capitalized trading firms at the lowest prices in the EU-25.

In the 2004/05 and 2005/06 intervention season, 8.1 million tons of cereals were taken into intervention. Intervention opening stocks at the beginning of the 2006/07 crop year totalled to 7 million tons. In the 2006/07 intervention season, only 1.5 thousand tons of cereals were taken into intervention. The disappearance of intervention stocks became a rapid process. If this continued at the pace observed in the last months of 2006 and in the first months of 2007, intervention stocks could decline below 1 million tons until the beginning of the 2007/08 intervention period.

For Hungary, as for a few other new member states, being landlocked is a permanent disadvantage not considered in the Common Market Organisation for cereals. The transport cost of cereals is high due to the scarcity of shipping capacities and the inefficiency of infrastructure. Hungarian cereals are competitive only within a limit of certain distances of transportation, primarily by shipping cereals on the Danube River (**Figure 8.8**). The cost up to the sea amount to € 20-30 per ton at least. Grain transport on rails has been too expensive in the last few years, and this it is hardly surprising that the share of railways in Hungarian grain exports has decreased recently.

Figure 8.8: Cost of shipping cereals by different transport modes from Hungary to EU destinations/exits (April, 2007)



Source: Research Institute for Agricultural Economics.

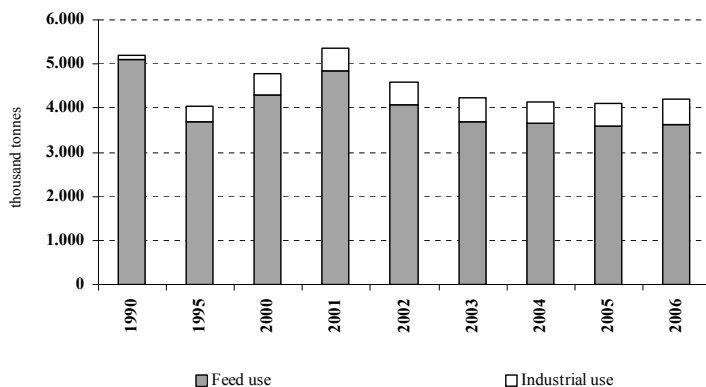
Notes: 36 €/t (FOR – FOB) to Koper means the cost of transporting 1 tonne of grain to Koper already loaded on wagon at the geographical centre of Hungary is €36 including

Undoubtedly, Hungary will remain a major potential exporter of wheat in the new member states: Production of wheat is expected to stabilize between 4.5 and 5 million tons while domestic consumption is unlikely to exceed 2.5-3 million tons. Demand from the milling industry will stay at around 1.3-1.5 million tons of high quality wheat, while the expansion of feed wheat use may be constrained to a large extent by the excess quantities of by-products from the emerging bioethanol industry.

Demand for feed maize is expected to remain well below 4 million tons in the next few years. Bioethanol production is likely to increase domestic maize consumption and reduce excess stocks significantly in the mid-term. Besides the two existing processing plants (Szabadegyhaza and Győr) with a total capacity of about 500 thousand tons of maize (for bioethanol and glucose production), various investor groups have announced the building of bioethanol plants at more than 20 sites in the country. Assuming that the demand for raw material of the domestic bioethanol industry increases to 3 million tons in 2010/11, and world market prices of cereals remain at a high level (which is very likely *inter alia* because of mandatory blending of bio-fuels in the US and the EU), the eventual accumulation of maize stocks will become a marginal issue (**Figure 8.9**).

To comply with the 5.75 % replacement rate set by the EU Biofuels Directive for renewable energy resources in 2010, Hungary would need about 120 thousand tons of bioethanol, which can be produced from 50-60 thousand hectares of maize. However, in the mid-term, large quantities of bioethanol could be exported to the EU-15 (e.g. Sweden, Denmark and Germany).

Figure 8.9: Domestic feed and industrial use of maize in Hungary (1990-2006)



Source: HUNGARIAN CENTRAL STATISTICAL OFFICE and RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

The production of biofuels from energy crops will provide for many Hungarian farmers with a significant new market for their crops. Farmers will have potential for long-term contracts; price certainty through fixed contracts, with prices being set higher than the cost of production, allowing cash-flow forecasts and thus providing an opportunity to invest in the infrastructure and thus they will face less risk. The high-protein by-product of the industry supports the livestock sector reducing the need for production of some cereals being grown for animal feeds topped up by EU imports.

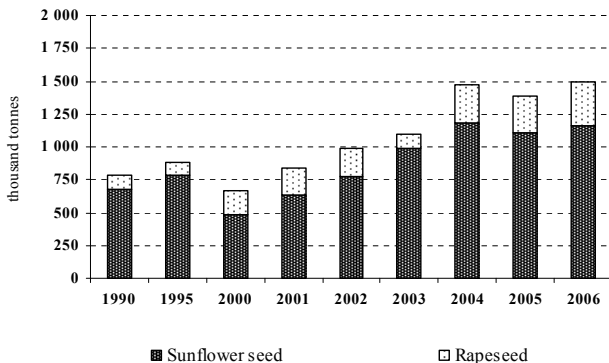
6.2 Oilseeds production

With a production volume over 1 million tons a year, sunflower is by far the most important oil crop in the country. Oilseed rape is second to sunflower in Hungary with an average output of 300 thousand tons (2004-2006).

Due to the growing demand for edible sunflower seed oil and biodiesel produced from oilseed rape, as well as the phasing in of EU direct support, oilseeds production is expected to be profitable in the short- and mid-term. The eventual accumulation of oilseeds stocks is improbable: Sunflower and rapeseed produced in Hungary will be processed domestically or exported. Due to the expansion of domestic crushing capacities, exports are expected to decrease further (**Figure 8.10**).

To comply with the 5.75 % replacement rate set by the EU Biofuels Directive for renewable energy resources in 2010, the country would need 130 thousand tons of biodiesel for domestic use which would require the processing of more rapeseed than the total output of the last years or the imports of biodiesel.

Figure 8.10: Production of the major oilseeds in Hungary (1990-2006)

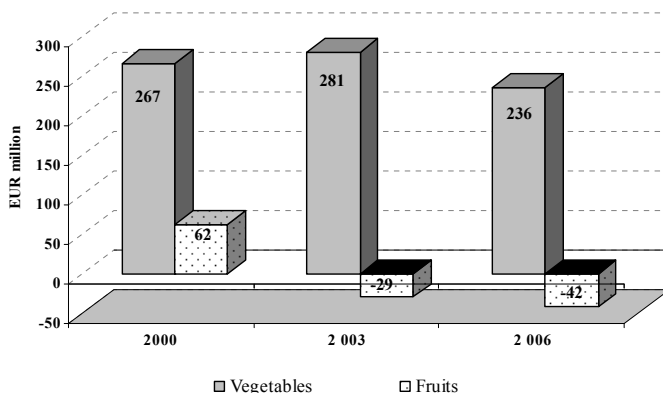


Source: HUNGARIAN CENTRAL STATISTICAL OFFICE and RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS

6.3 Fruit and vegetable production

Fruit and vegetable production represent 10-12 % of total agricultural production in Hungary. In the fruit sector, the impacts of accession have been more adverse than expected. The foreign trade of fruits has been characterized by the decline of exports and the steady increase of imports during the past few years. Import growth was particularly strong in the case of banana and exotic fruits (substitutes for traditional fruits), as well as of melons and table grapes. However, processed fruits still exhibited a positive balance thus the total net trade of the fruit sector amounted to minus € 42 million in 2006 (**Figure 8.11**).

Figure 8.11: Foreign trade position of the Hungarian fruit and vegetable sector (2000-2006)

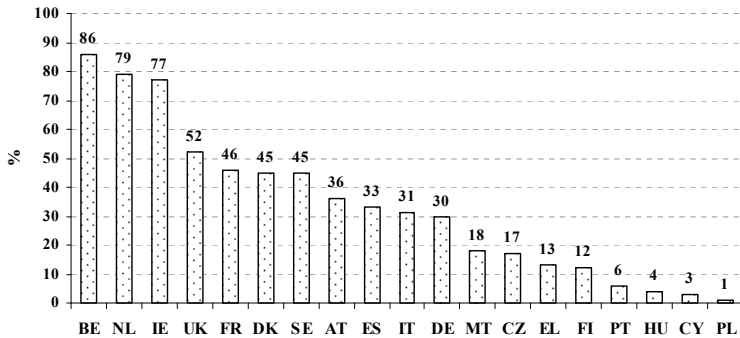


Source: RESEARCH INSTITUTE FOR AGRICULTURAL ECONOMICS.

Vegetable production is of significant importance in Hungarian horticulture. In the Central and Eastern European region, natural conditions, geographical location (proximity of major markets) and traditions are all favourable for vegetable production. As a result of adverse market trends total vegetable production decreased from 2 million tons in 2004 to 1.5 million tons in 2006. The foreign trade of fresh and processed vegetables has been characterized by the steady increase of both exports and imports during the past few years; however the growth of imports were more dynamic thus the trade balance declined by 16 % during 2003-2006 (Figure 8.10).

In the pre-accession years, cooperation between farmers and emerging Producer Organizations (POs) started too late and too slowly, and the lack of readiness has spawned further weakening in producer bargaining positions causing an unfavourable effect on sales and incomes (Figure 8.12). Currently there are 52 provisionally recognized and 8 recognized POs integrating some 21 thousand producers, and having an estimated 15-18 % share of total fruit and vegetable sales which signals a considerable growth compared to 2004.

Figure 8.12: Share of PO sales in the fruit and vegetable sector of the EU-25 in 2004



Source: EUROPEAN COMMISSION.

6.4 Pig meat production

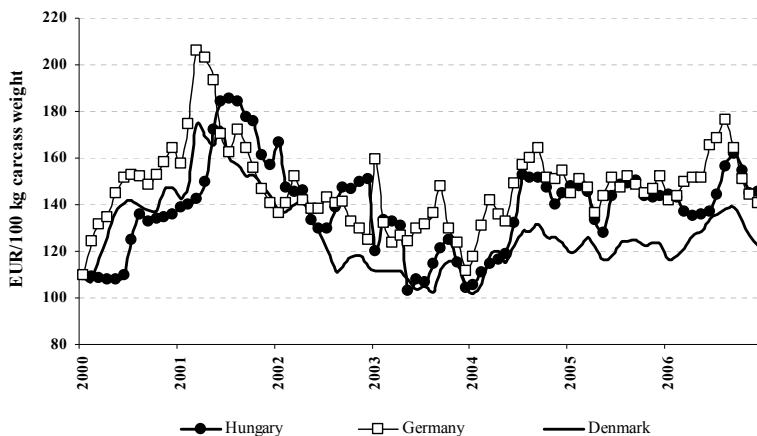
During 2000-2006, producer prices of pigs in Hungary closely followed price movements in Germany and Denmark with a few months lag. Since enlargement, Hungarian prices have been fluctuating around €130 per 100 kgs carcass weight, still above the Danish but below the German average (**Figure 8.13**).

Prior to accession, imports were insignificant in the sector but after enlargement the number of imported live pigs and the volume of imported pork have increased dramatically. In 2005 Hungary became a net importer of pig meat (**Figure 8.10**). Most of the imported live pigs came from Holland; however, in 2006, Poland became the major supplier.

As far as direct support is concerned, the partial or full decoupling of top-up payments will have no perceptible impact on the development of the Hungarian pig sector: In the coming few years, the number of pigs is expected to change very little, not exceeding 4-5 million at the end of the decade. The possession or use of arable land which helps the sector to receive support indirectly is undoubtedly an essential condition for growth. Flattening of the pig-cycle is expected in the coming years. This is primarily due to the substantial decrease in the number of small-scale family farms engaged in pig breeding and fattening which results in a more balanced supply and a more stable domestic market.⁵

⁵ Already in the year of accession, over 200 thousand family farms abandoned pig breeding and fattening because of the changes in agricultural policy and markets.

Figure 8.13: Producer prices of pigs* in Hungary, Germany and Denmark (2000-2006)



Source: EUROSTAT, AKI.

Note: * 'E' quality class.

The lack of capital, the urgent need for modernisation, compliance with EU environmental, animal-health and welfare requirements are all deterring production; moreover, foreign investors are discouraged *inter alia* by the existing land law. Also because of the pressure on the Hungarian pig meat market caused by Polish exports, a number of producers including big farms decided to give up production in the first months of 2007.

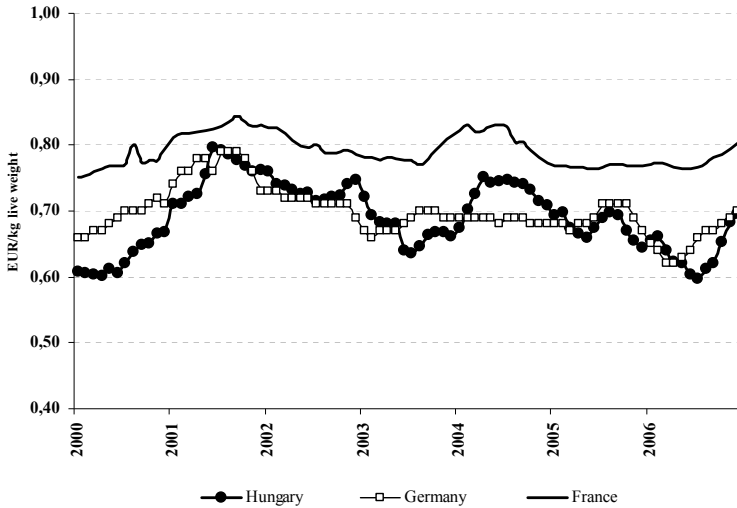
6.5 Broiler production

During 2000-2006, producer prices of chicken varied between € 60 and 75 per 100 kgs live weight in Hungary. Due to strengthening of the national currency in the second half of 2001, prices reached the German level, and since then, producer prices in Hungary and Germany have been moving more or less closely but remained well below the French level (**Figure 8.14**).

After enlargement, due to the continuous decline of producer prices production dropped back slightly. In 2006, due to the increase of production costs, low purchase prices and outbreaks of Avian Influenza, the broiler industry faced losses and production continued its downward trend. However, in the next few years, broiler meat production is expected to stabilise.

Sales to the EU-15 are expected to decrease further in the next few years; in fact, there is a threat that exports will completely erode by the end of the decade. The position of Hungarian broiler meat production will be seriously challenged, since Hungarian broiler meat exports essentially consist of oven-ready products. In terms of prices, Hungarian exporters are unable to compete with Brazilian suppliers.

Figure 8.14: Producer prices of chicken in Hungary, Germany and France (2000-2006)



Source: ZMP, Agreste, CSO.

6.6 Dairy and beef production

During 2000-2006, producer prices of milk in Hungary showed more seasonal fluctuations than prices in the old member states. Due to the strengthening of the national currency in the second half of 2001, prices in Hungary reached the German level, and since then, they have exhibited a seasonal peak very close to the actual price level in Germany every year (**Figure 8.15**).

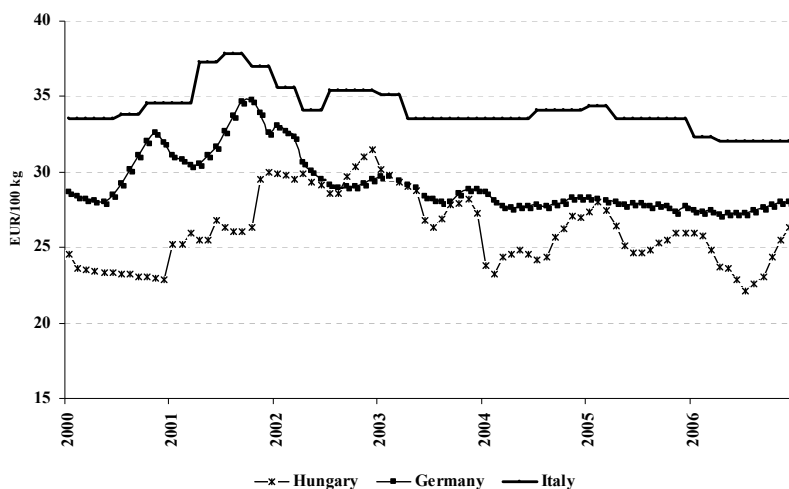
After EU accession, imports of liquid milk and low-priced dairy products from the NMS increased at a fast rate, and the volume of high added-value dairy products from the EU-15 has grown as well. On the other hand, raw milk exports to Italy increased continuously thanks to high prices in the Italian market. In 2005 Hungary has become a net importer of milk and dairy products (**Figure 8.11**). Imports of dairy products such as cheese and curd doubled while total exports decreased by 34 % during 2004-2006. While the volume of raw milk imports is unlikely to change, imports of processed dairy products is forecasted to expand further.

The number of dairy cows is likely to decrease slightly in the years ahead. Nevertheless, the total number of cattle in Hungary is expected to remain at the same level in the next few years, which can be regarded as a positive change after experiencing a continuous decline during the period between the start of economic transition and EU enlargement. This is primarily due to the EU and national direct subsidies which are considerably higher compared to direct payments granted

before accession, and as far as beef cattle are considered, to the push-up effect of the EU institutional price on domestic producer prices. However, partial and full decoupling of direct aids may have a negative effect on beef production.

The low profitability of milk production warns that the sector may not be able to generate the financial resources needed for an urgent modernization, *inter alia*, to meet EU environmental requirements. An anticipated slight increase of producer prices in the coming years may contribute to the improvement in net incomes of dairy farms still in production.

Figure 8.15: Producer prices of milk in Hungary, Germany and Italy (2000-2006)



Source: AKI, ZMP, CLAL.

Direct aids coupled to production, guarantees provided by the beef intervention system and the growing demand for fattened bulls had a positive effect on beef production in 2004 and 2005. Producer prices continued their upward trend and exceeded the 2004 level by nearly 30 % in 2005 and increased by a further 3 % in 2006, although they were still below the EU-25 average. Imports of live cattle are expected to decrease steadily as the complementary national direct payment for fattened bulls has become decoupled from production in 2007. Imports of beef are projected to grow only slightly. Exports of live cattle and beef are foreseen to decrease by 10 % until the end of the decade.

7 CONCLUSIONS

The impact of enlargement on certain markets has not been unambiguously positive in Hungary. Problems caused by delays in establishing the required infrastructure and institutions have been amplified by record harvests in the first two years of EU membership. Both the value of agricultural exports and imports has increased in Hungary after accession. In 2004 and 2005, the rate of increase of imports exceeded that of exports. However, the agricultural trade balance will still remain positive with a decreasing trend partly due to the increasing feedstock consumption by the biofuel industry.

Competitiveness of cereal and oilseeds production in Hungary is out of question; however, the use of cereals for food and feed is decreasing while bioethanol production is likely to increase domestic maize consumption. The production of biofuels will provide for many Hungarian farmers with a significant new market for their crops. The trade balance of the fruit and vegetable sector has declined after enlargement.

In the pre-accession years livestock producers in Hungary enjoyed some direct subsidies but they had almost no access to investment and capital aids. This and the late approval of rural development programmes contributed largely to the decline in production. Outlook for livestock production, especially for the pig meat, poultry meat, and milk production is rather depressing.

The proposed "health-check" of the CAP in 2008 provides an opportunity for both review and simplification. We hope that the "health-check will lead to more transparent single market, to the decrease of trade distortions between member states and to less support schemes based on past production. The health check may also provide an opportunity for further reform driven by the pressures from the 2008/2009 EU budget review. The budget review provides an opportunity for the EU to undertake a full and wide-ranging review on all aspects of EU spending, including the CAP. The mechanisms of the CAP will need to be reformed in order to ensure simplification and reflect the demands and expectations of society if public money is to be spent on public goods.

Agriculture remains a strategic asset; this is likely to increase in the coming years given the contribution it can make to reducing climate change. Agricultural production is likely to increase in the longer term due to the growing global demand for food and non-food crops, including energy crops. Looking to the future there is a clear need for a longer term policy outlook in the EU, to prepare for and respond to growing external (globalisation) and internal (societal, financial, enlargement) pressures, and at the same time to give farmers the certainty they need to run their businesses competitively.

REFERENCES

- KOVACS, G., UDOVECZ, G. (2005). "Hungarian agriculture's first year in the European Union", *Studies in Agricultural Economics*, no. 103, pp. 5-16. Budapest: Research Institute for Agricultural Economics (AKI).
- MÉSZÁROS, S., SPITÁLSZKY, M., UDOVECZ, G. (1999): Az EU-csatlakozás várható agrárgazdasági hatásai – Modellszámítások I. Budapest: Agrárgazdasági Kutató és Informatikai Intézet.
- MÉSZÁROS, S., SPITÁLSZKY, M., UDOVECZ, G. (2000a): Az EU-csatlakozás várható agrárgazdasági hatásai – Modellszámítások II. Budapest: Agrárgazdasági Kutató és Informatikai Intézet.
- MÉSZÁROS, S., SPITÁLSZKY, M., UDOVECZ, G. (2000b): A termelői és a fogyasztói árak változása, az agrárgazdasági termelés és az export-import alakulása, költségvetési hatások (a MEH Európai Integrációs Főosztály részére készült tanulmány). Budapest: Agrárgazdasági Kutató és Informatikai Intézet.
- MÉSZÁROS, S., SPITÁLSZKY, M.(2002): A magyar élelmiszergazdaság versenyképességének alakulása az EU közvetlen jövedelemtámogatási mértékétől függően (kézirat). Budapest: Agrárgazdasági Kutató és Informatikai Intézet.
- POPP, J., POTORI, N. (2006): Excerpts from the EU-integration Story of Hungarian Agriculture: Heading Where?, *EuroChoices*, 5(2), pp. 30-39.
- POPP, J., POTORI, N. (2006): Agrarian policy of the countries of Central and Eastern Europe on the way to Eurointegration and its first consequences. In: BORODINA (ed.) et al.: *Ukrainian agrarian sector on the way to Eurointegration*. Institute of Economics and Forecasting of NAS of the Ukraine, Kiev, pp. 130-158.
- POTORI, N., NYÁRS, L. (2007): EU integration experiences of the agri-food sectors in Hungary. In: *Changes in the food sector after enlargement of the EU*. Institute of Agricultural and Food Economics – National Research Institute, Warsaw, pp. 94-121.
- POTORI, N., UDOVECZ, G. (2005): An assessment of the short-term impacts of EU integration on Hungarian agriculture. *Studies in Agricultural Economics*, No. 102, pp. 5-14. Research Institute for Agricultural Economics (AKI), Budapest.
- UDOVECZ, G. (2000): A Magyar Agrárgazdaság felkészültsége és versenyképessége az Európai Unióban (MTA doktori értekezés).

IMPLICATIONS OF EU ENLARGEMENT FOR AGRICULTURAL MARKETS IN THE NEW MEMBER STATES

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1 INTRODUCTION

The Central and Eastern European countries which joined the EU in the 2004 enlargement formed a diverse group as regards their agriculture and food processing industries. During their transition to a market-oriented economy, the restructuring of agriculture and food industries in most of these countries went successfully. Nevertheless, the competitiveness of their agriculture before EU accession was generally much lower – particularly in the livestock sector – than the average level in the "old" EU Member States.

The implications of the 2004 EU enlargement for the agricultural markets and their projections have been analysed in several studies, using approaches based on partial or general equilibrium modelling (e.g. EUROPEAN COMMISSION, 2002; 2006; FABIOSA et al., 2005; TOKOZ, 2004; BROCKMEIER et al., 2003; BINFIELD et al., 2005). This paper focuses on the projections for agricultural markets of the new Member States at national and aggregated level using AGMEMOD modelling approach (ERJAVEC, DONNELLAN, 2005; EUROPEAN COMMISSION, 2007).

The aim of the paper is to present the results of a study financed by the European Commission (EUROPEAN COMMISSION, 2007), emphasizing: (1) market projections for the aggregate EU-8 of the main agricultural commodity markets in the eight new Member States (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia) based on the latest developments in agricultural and trade policy and (2) assessment of the impact of further CAP reform (introduction of decoupling and new direct payment schemes) on the main EU-8 agricultural commodity markets.

2 THE MODELLING APPROACH

AGMEMOD – a partial, multi-market equilibrium modelling system – was applied to supply, demand, trade and price projections at national and at aggregated level in this study.

AGMEMOD takes a bottom-up approach based on national models, which considers specific national situations (CHANTREUIL et al., 2005; ERJAVEC, DONNELLAN, 2005). The AGMEMOD approach, developed in projects under the EU Framework Programme (FP), can provide details at agricultural sector level for each EU Member State, on the aggregates of the selected countries and on the EU-25 market⁶ as a whole. This paper analyses the projected aggregates for the eight new Member States (2004 enlargement).

Individual models cover a detailed set of agricultural policy instruments in each country, thus allowing projections and simulations of different national policy scenarios to be generated. Key EU prices and other variables relating to other countries are determined exogenously in individual stand-alone models. Stand-alone national models for the new Member States provide 10-year projections up to 2015 for the main agricultural commodity markets:

- soft wheat, durum wheat, barley, maize, rye and other grains;
- rapeseed, sunflower seed, soybeans, vegetable oils and meal;
- milk, butter, skimmed milk powder, cheese and whole milk powder;
- beef and veal, pork, poultry, sheep and goats.

The models were calibrated and validated by country experts and have been further developed and improved as part of the ongoing EU FP project.

The major differences between national NMS AGMEMOD models are the macroeconomic assumptions, the components of policies under the Single Area Payment Scheme (SAPS) and the distribution of direct payments among agricultural activities. Apart from Slovenia, all the new Member States in our study adopted the CAP in the form of the simplified SAPS involving direct payments. Slovenia applied the standard CAP schemes. The SAPS have been mostly decoupled and are based on farm area and flat-rate payment of aid at national level. The national models also reflect different assumptions about the impact of direct payments on agricultural production (degree of decoupling).

The macroeconomic assumptions are based on the macroeconomic projections of population, inflation, per capita economic growth and national currency exchange rates obtained from national statistical services. The assumptions about the US dollar/euro exchange rate and projections of world market prices for

⁶ Cyprus and Malta are not included.

commodities were taken from the FAPRI 2006 U.S. and World Agricultural Outlook.

The links between world, national, and other Member States' agricultural commodity markets are covered by equations which reflect the influence of those markets on prices. For each commodity, the EU key market is identified and the EU key price is set as the price observed in the most important national market for that commodity. Agricultural income is calculated at sector level.

The projections for the NMS aggregates were obtained using the individual stand-alone models for the new Member States, with exogenous key prices delivered by the AGMEMOD EU-15 combined model.

Two scenarios were simulated. The first scenario – or "Baseline" scenario – assumes the implementation of the SAPS in the new Member States until 2008, which is followed by the introduction of the Single Farm Payment Scheme (SFP) from 2009 onwards. Complementary national direct payments (CNDP) remain in force in the NMS until 2013. In the case of the old Member States and Slovenia, it assumes additional milk quotas, a cut in intervention prices and the national implementation of the Single Farm Payment Scheme introduced under the Luxembourg Agreement.

The second scenario, known as the "Further CAP reform" (FCR) scenario, assumes the full decoupling of direct payments from 2007 and a doubling of the modulation rate from 2007 onwards in the old Member States and Slovenia and from 2013 onwards in the other NMS.

Decoupled payments under the SFP, SAPS and CNDP schemes are modelled in a similar manner. SFP, SAPS and CNDP payments (if decoupled) are also assumed to have some supply-inducing impact on agricultural production, although less than the impact of coupled payments or prices. The supply-inducing impact of different types of payment is reflected by deriving synthetic premiums in the country models. Producers' supply decisions are therefore a function of market prices and synthetic premiums based on the SFP or SAPS and CNDP payments. Countries use different multipliers to allow for possible differences in the supply-inducing impact of SFP, SAPS and CNDP payments.

3 RESULTS

The NMS projections represent an aggregation of eight new Member State (EU-8) which were involved in the 2004 enlargement. Although the agricultural markets of the individual countries have differing levels of development and the country models are being further developed, the projections presented in this paper provide insights into the general trends of the agricultural commodity markets of the new Member States after their accession to the EU.

Although results differ from country to country, the baseline scenario projections suggest that – compared to the production level in the year 2000 – the introduction of direct payments is likely to expand the aggregate EU-8 production mainly of oilseeds, grains, sheepmeat and cheese, and that beef and veal production would also increase. The domestic use of oilseeds is projected to expand; consumption of more expensive beef and veal meat would be substituted by poultry and pigmeat.

The baseline projections suggest a rise in cereal production in the EU-8 (especially Hungary, Slovakia, Poland, Slovenia). Production in Hungary and Poland, in particular, will grow due to rising yields. EU-8's share of EU-25 production and consumption is likely to increase. The domestic use of maize will increase despite the rise in price, while the consumption patterns for soft wheat will change only marginally over the period 2005-2015 compared to the baseline (**Figure 8.16**).

In the Further CAP reform scenario, the introduction of the SFP from 2008 – and thus the full decoupling of direct payments – will reduce production and consumption of soft wheat compared to the baseline. The increase in the maize price will affect the domestic use of maize, while its production is assumed to increase (**Figure 8.17**).

Under the baseline scenario, both oilseed production and domestic use in EU-8 are projected to expand by around 11 % over the period 2005-20015 mainly because of rising output levels in Latvia, Lithuania, Estonia and Slovakia. The EU-8 remains a net exporter of oilseeds and the EU-8 share of the EU-25 oilseed production is projected to increase. The production and domestic use of rapeseed is showing the largest growth (**Figure 8.18**). Domestic EU-8 use of oilseeds will grow despite the price increase because of the expectation of growing demand for oil for bioenergy. The FCR scenario will lead to lower production of oilseeds, mainly sunflower (**Figure 8.19**).

NMS have freedom as regards the extent to which their CNDP – topping up of direct payments, are decoupled from production. CNDPs in the EU-8 are linked to livestock, but are mostly coupled to production.

Baseline EU-8 beef production and prices are projected to increase, with a slight decline in production after 2012 (**Figure 8.20**). The increase in the EU-8 share in the EU-25 beef and veal production following accession was mainly due to higher slaughter weights (technical progress of better beef breeds). In response to higher prices, pigmeat production will increase (Hungary is looking to explore a significant growth in the production of both meat types) as well as the EU-8 share of the EU-25 pork production. With higher beef prices and a change in consumer preferences, domestic beef consumption will be substituted by poultry (**Figure 8.22**). The traditionally high pigmeat consumption will remain more or less unchanged over the 2005-2015 period (**Figure 8.21**).

Figure 8.16: EU-8 Projections for soft wheat under the baseline and FCR scenarios

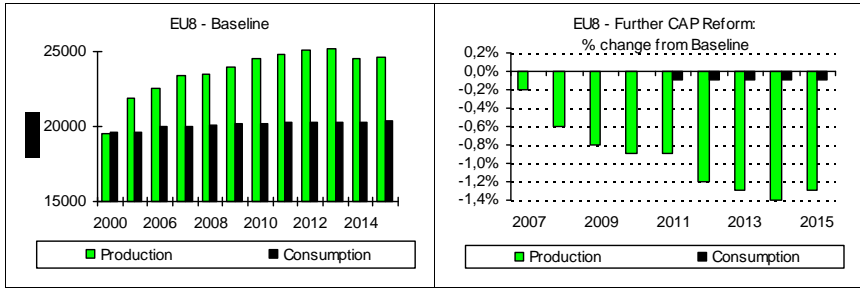


Figure 8.17: EU-8 Projections for maize under baseline and FCR scenarios

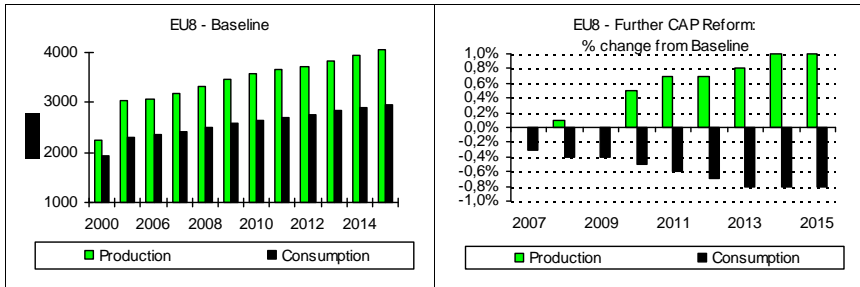


Figure 8.18: EU-8 Rapeseed projections under baseline and FCR scenarios

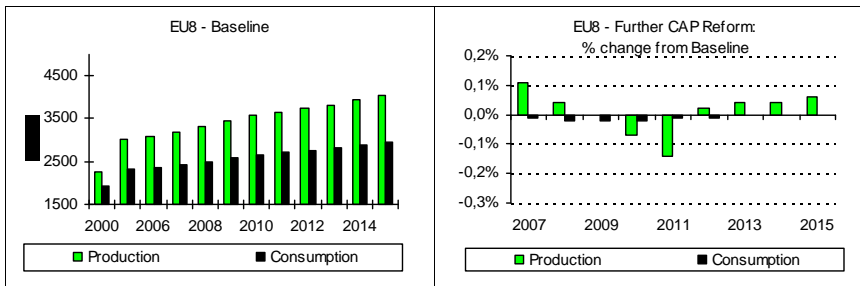
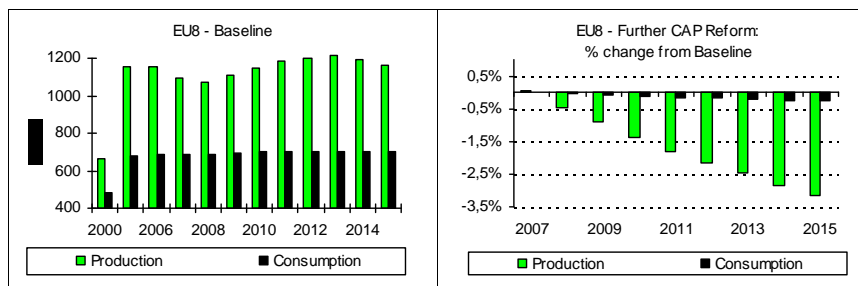


Figure 8.19: EU-8 Sunflower projections under baseline and FCR scenarios

Beef production is projected to decline relative to the baseline from 2007 onwards under the FCR scenario, which assumes full decoupling. Regardless of any policy changes in the pig and poultry sector, pork production will continue to increase. Changes in poultry production will be negligible over the reference period compared to the baseline (**Figure 8.21**).

Milk prices in the EU-8 were below EU price level before their accession. However, the trend in milk production is determined by milk quota, irrespective of price convergence. After accession there was a rise in milk yields in the EU-8, which was accompanied by reductions in dairy cow numbers. Unlike the old Member States, where the reduction in the intervention price for butter will mean that milk is allocated to butter rather than cheese production, in the EU-8 the production of intervention commodities – butter, SMP and WMP – will grow at a higher rate than cheese production (**Figures 8.23-8.25**). Cheese consumption will increase in the baseline scenario and will decline in relative terms in the FCR scenario as a result of the cheese prices increase.

In the FCR scenario, further adjustments in price, production and consumption are likely in the absence of specific reform of the market organisations for dairy commodities. The agricultural output value, subsidies and agricultural incomes were projected taking into account only the commodities analysed in the study. From 2004 to 2015 the baseline agricultural output value in the EU-8 is expected to increase (**Figure 8.26**). Phasing in agricultural support in the EU-8 will increase the value of support granted between 2004 and 2013. In the FCR scenario, on the other hand, support is expected to decline from 2013 onwards.

The scenario of further CAP reform is not expected to have a significant impact on EU-8 agricultural output value and subsidies compared to the baseline; agricultural income, on the other hand, is expected to rise from 2013 onwards compared to the baseline.

Figure 8.20: EU-8 Beef and veal projections under baseline and FCR scenarios

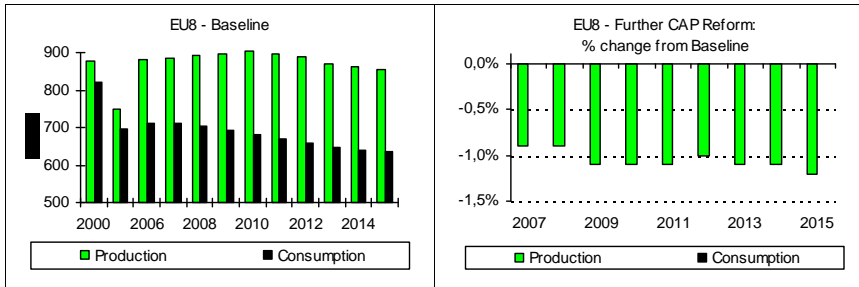


Figure 8.21: EU-8 Pigmeat projections under baseline and FCR scenarios

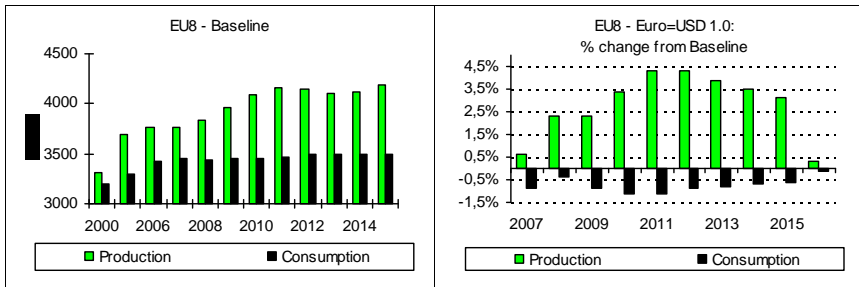


Figure 8.22: EU-8 Poultry meat projections under baseline and FCR scenarios

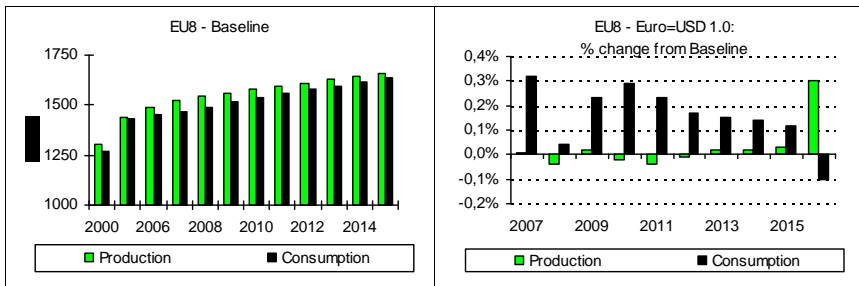


Figure 8.23: EU-8 Butter projections under baseline and FCR scenarios

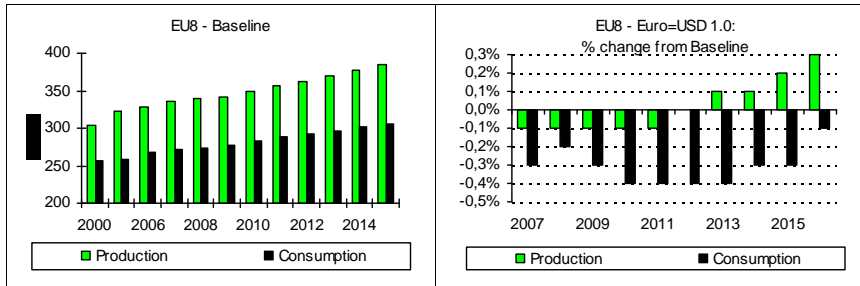


Figure 8.24: EU-8 Skimmed milk powder projections under baseline and FCR scenarios

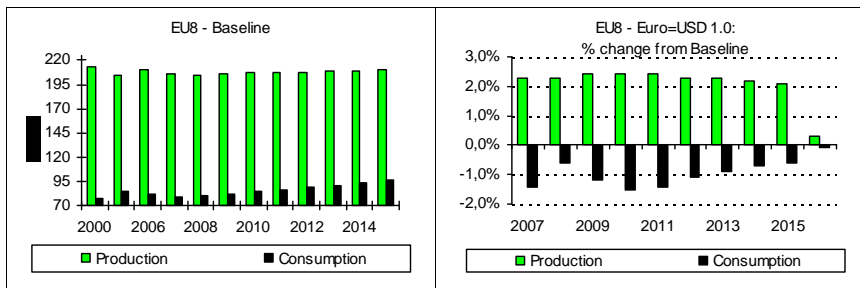


Figure 8.25: EU-8 Cheese projections under baseline and FCR scenarios

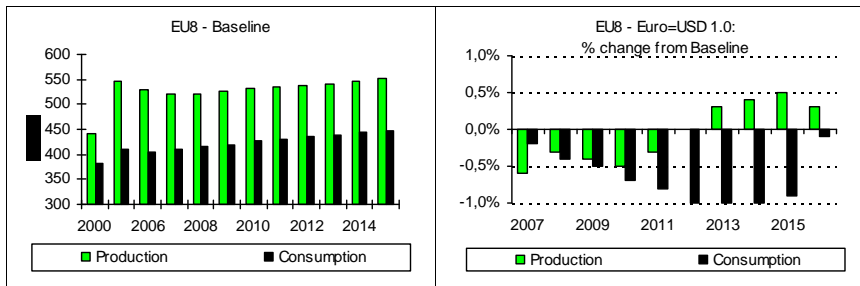
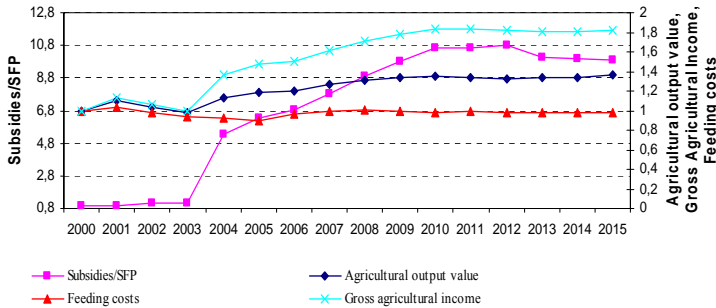


Figure 8.26: EU-8 Agricultural output value, subsidies, feed costs and gross income in the baseline (2000 = 1)



Source: EUROPEAN COMMISSION, AGMEMOD (2007).

4 DISCUSSION AND CONCLUSIONS

The EU-8 results are driven primarily by changes in prices and technology. The majority of EU-8 agricultural prices were below EU price levels before accession, except for pigmeat and poultry. In the national models, domestic prices are assumed to converge with EU key prices. The negative effect of commodity price increases will be partially offset by an expected rise in per capita income in the EU-8.

Although results differ across countries, the aggregated baseline results indicate that EU-8 production will grow in several sectors from 2005 to 2015. In the cereals sector the introduction of decoupling will lead to an increase in maize production, while wheat production and overall consumption of cereals will decline. In the oilseed sector, the aggregate market projections point to rising prices and baseline production levels.

The "Baseline" scenario predicts a decline in beef and veal production. The Further CAP reform will prompt a further decline. However, the negative impact of decoupling will be mitigated by price increases. Domestic beef consumption will be substituted by poultry. Pigmeat consumption will be unaffected over the 2005-2015 period. Pig and poultry production are both projected to expand in the EU-8; milk prices were below the EU price level before EU accession. In the dairy sector, production of intervention commodities – butter, SMP and WMP – in the EU-8 will rise faster than cheese production.

In general, the outcomes of the "Further CAP reform" scenario match the a priori expectations. The policy measures under this scenario will have a limited impact, since EU-8 direct payments before accession and under the SAPS were mostly decoupled.

However, as the method of implementing decoupled payments in the AGMEMOD country models may not have fully reflected the impact of decoupling on the agricultural production of individual EU-8, this method will therefore need to be further developed.

The projections for new EU Member States presented in this paper were generated by aggregating the results of the national AGMEMOD models. Although the modelling approach and national models are still being developed, the results obtained in this study provide useful information about general trends on the main agricultural markets of the new Member States.

REFERENCES

- BINFIELD, J., MEYERS, W., WESTHOFF, P. (2005): Challenges of Incorporation EU enlargement and CAP Reform in the GOLD Model Framework. Proceedings of the 89th EAAE Seminar, Parma, Italy, 3-5 February 2005.
- BROCKMEIER, M., HEROK, C. A., LEDEBUR O. V., SALAMON, P. (2003): EU Enlargement – A New Dimension Paper prepared for presentation at the 25th International Conference of Agricultural Economists, August 16-22, 2003, Durban, South Africa.
- CHANTREUIL, F., LEVERT, F., HANRAHAN, K. (2005): The Luxembourg Agreement Reform of the CAP: An Analysis using the AGMEMOD Composite Model. Proceedings of the 89th EAAE Seminar, Parma, Italy, 3-5 February 2005.
- EUROPEAN COMMISSION (2002): Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs. Directorate-General for Agriculture, Brussels.
- EUROPEAN COMMISSION (2006): Prospects for agricultural markets and income 2006-2013. Directorate-General for Agriculture, Brussels.
- EUROPEAN COMMISSION (2007): Impact analysis of the CAP reform on main agricultural commodities. Final report, ITPS, Unpublished, 80 pp.
- ERJAVEC, E., DONNELLAN, T. (2005): Development of the AGMEMOD Country-Level Agricultural Policy Analysis Tool in the New Member States of the EU. Proceedings of the 89th EAAE Seminar, Parma, Italy, 3-5 February 2005.
- FABIOSA, J. F., BEGHIN, J. C., DONG, F., OBEID, A., FULLER, F. H., MATTHEY, H., TOKGOZ, S., WAILES, E. (2005): The Impact of the European Enlargement and CAP Reforms on Agricultural Markets. Much Ado about Nothing? Working Paper 05-WP 382, CARD Iowa State University.
- TOKGOZ, S. (2004): Can EU Enlargement lead to "Immiserizing Growth"? An Empirical Investigation Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Denver, Colorado, August 1-4, 2004, 22 pp.

STRUCTURAL CHANGE AND DISTRIBUTION OF SUPPORT IN HUNGARIAN AGRICULTURE FOLLOWING EU ACCESSION: A PRELIMINARY FADN ANALYSIS

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1 INTRODUCTION

This paper offers a preliminary descriptive analysis of some of the structural and distributional changes that have occurred in Hungarian agriculture following accession to the European Union (EU). Hungary is one of the ten countries that joined the EU in May 2004 and has achieved considerable economic and social progress since transition to a market economy. Economic indicators of performance show that agriculture's contribution to the Hungarian economy has decreased considerably since 1989, with the sector experiencing significant transformations. For example, the restitution of land to private ownership and the creation of a land market have had a radical effect on Hungary's farm structure.

The analysis is based on FADN (Farm Accountancy Data Network) survey results for 15 farm types and focuses on changes in gross margin (i.e., gross value of production minus variable costs) and farm income, as measures of economic performance, and on changes in the distribution of agricultural subsidies. The two years of analysis are 2002, two years prior to accession, and 2005, one year after accession.⁷ Although this is a relatively short time period for a robust analysis, results show that there have been some significant structural and distributional changes in Hungarian agriculture.

Hungary has a dichotomous farm structure comprising private farms and economic organisations. The latter includes a number of different legal business forms, namely limited liability companies, co-operatives, deposit companies and joint stock companies. Private farms include a very large number of small units, many of which can be classified as uncommercial. Under each of the two major

⁷ 2002 is the first year for which numbers of farms in the various type and size categories are available for use as raising factors in weighting the sample results.

groupings, the FADN survey records economic and financial information for eight farm types, equating to small arable, medium arable, large arable, cattle and sheep, pigs and poultry, permanent crops, mixed, and horticulture.⁸ For 2002, sample data for the horticulture farms of the economic organisations are not publicly available because of too few observations, and thus the number of farm types for the analysis is reduced to 15.

As a measure of the economic performance of farms, the analysis focuses on gross margin and farm income. The former circumvents the problem of evaluation of the labour input on Hungarian private family farms. AKI (2006, p. 27) notes that "incomes of private farms and economic organisations cannot be directly compared" and, consequently, employs a "correction" for labour costs on Hungarian private farms based on the labour costs recorded by economic organisations. The same correction is employed in this paper when reporting farm income. The analysis also focuses on farmers' receipts of agricultural subsidies, as recorded in the FADN survey. These have changed significantly over the three year period under study, as Hungary's former system of agricultural support has been replaced by the EU's Single Area Payment Scheme (SAPS), with "top-ups" under Complementary National Direct Payments (CNDP).

2 THE FADN SURVEY

The FADN consists of an annual survey carried out by all EU member states, which collects physical and financial data from farms for evaluating incomes and business analysis of agricultural holdings. The survey aims to provide representative data on region, economic size and type of farming. It covers approximately 90 % of the total EU Utilised Agricultural Area (UAA) and more than 90 % of total agricultural production. However, the survey covers only those holdings which owing to their size can be considered market-oriented.

The basic FADN information for Hungary is shown in **Table 8.13**. The total sample in 2005 comprised 1,940 farms drawn from a population of almost 87,000 farms.⁹ The average size of farm in 2005 was 51 hectares, but with a wide discrepancy between the private farms and economic organisations. Most of the sample (1,546) relates to the private farms, which are far more numerous. However, the much larger average size of farms (395 hectares in 2005) under the economic organisations means that each grouping accounts for approximately half of the total agricultural land area in Hungary. Between 2002 and 2005 the number of private farms fell, with an increase in the average size of farm, whilst the number of farms under the economic organisations grouping *increased* by 30 %, causing a

⁸ Dairying is represented mainly in the 'cattle and sheep' and 'mixed' farms.

⁹ This is the number of farms above the FADN minimum threshold of 2 ESU (Economic Size Unit). The total number of farms in Hungary in 2005 was 715,000, down from almost 1,000,000 in 2002.

correspondingly large fall in the average size of this category of farm. In the analysis, national level results are derived by use of raising factors based on the number of farms recorded in the population, i.e. N/n (**Table 8.13**).

Table 8.13: Hungarian FADN records – Basic data, 2005 and 2002

	2005	2002	% change
<i>All farms</i>			
Number of farms in sample (n)	1,940	1,893	
Number of farms in population (N)	86,773	91,128	-4.8
Average farm size (ha)	51.0	48.3	5.6
<i>Private farms</i>			
Number of farms in sample (n)	1,546	1,401	
Number of farms in population (N)	81,033	86,717	-6.6
Average farm size (ha)	26.7	23.6	13.1
<i>Economic Organisations</i>			
Number of farms in sample (n)	394	492	
Number of farms in population (N)	5,740	4,411	30.1
Average farm size (ha)	394.8	526.8	-25.1

Source: AKI.

3 THE NATIONAL FARM

The gross value of production of the Hungarian "national farm" in 2005 was 1,496 billion HUF, slightly more than in 2002.¹⁰ Over this period, variable costs decreased slightly and thus the total national gross margin rose to 876 billion HUF (top half of **Table 8.14**). Total farm income, after adjustment for the cost of labour on private farms, increased by almost five-fold, as a result of direct agricultural subsidies increasing from 121 billion HUF to 227 billion HUF. In both years, total subsidies far outweighed total farm income; the contribution of subsidies to the gross margin of the national farm rose from 15 % in 2002 to 26 % in 2005.

¹⁰ All values and prices in the paper are reported in nominal terms; deflators have not been used.

Table 8.14: Economic performance of farms, 2005 and 2002

	2005	2002	% change
<i>All farms</i>			
Gross Production Value (m HUF)	1,495,930	1,445,960	3.5
Variable Costs (m HUF)	620,401	638,428	-2.8
Gross Margin (m HUF)	875,529	807,532	8.4
Farm income* (m HUF)	59,000	12,173	385.0
Agricultural Subsidies:			
– m HUF	226,912	120,524	88.3
– as % of Gross Margin	25.9	14.9	–
			% point change
<i>Private farms' share (%)</i>			
Gross Margin	36.0	33.5	2.5
Agricultural Subsidies	41.0	30.7	10.3
<i>Economic Organisations' share (%)</i>			
Gross Margin	64.2	66.5	-2.3
Agricultural Subsidies	59.3	69.3	-10.0

Source: FADN and authors' calculations.

Note: * Adjusted for labour cost on private farms.

Private farms contribute approximately one-third to the total gross margin of the Hungarian national farm (lower half of **Table 8.14**).¹¹ The dominance of the economic organisations was reduced slightly between 2002 and 2005, but their share of agricultural subsidies decreased by 10 percentage points. Conversely, in 2005, private farms' share of agricultural subsidies had risen to above their corresponding share of the national gross margin. To obtain a clearer picture of the changes that underlie these broad aggregates, the paper next examines what has occurred at the level of main farm types within the private farm and economic organisation groupings.

4 FARM TYPES

A breakdown of the total national gross margin by the 15 farm types for the two years is given in **Table 8.15**, in which the farm types are ordered by the percentage point change in shares. It is clear that there was a marked shift from animal and mixed farms to large arable farms, which affected both private farms and economic organisations. Large arable farms increased their share of the national gross margin by 9 percentage points between 2002 and 2005 (**Table 8.15**). The shares of pigs and poultry and mixed farms each fell by over 5 percentage points.

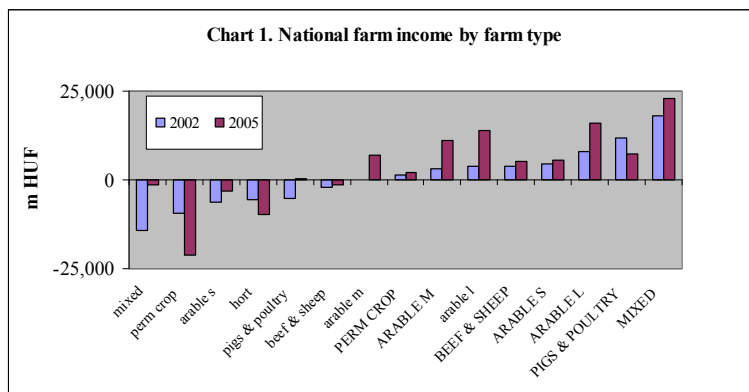
¹¹ The division of farm income between private farms and economic organisations was, respectively, -15,000 m HUF and 74,000 m HUF in 2005; and -39,000 m HUF and 51,000 m HUF in 2002.

Table 8.15: Share of national gross margin by farm type, 2005 and 2002

Farm group	Farm type	2005 %	2002 %	Change % point
Econ. Org.	Arable large	12.8	8.4	4.5
Private	Arable large	7.5	3.2	4.3
Private	Arable medium	5.0	3.3	1.7
Econ. Org.	Permanent Crop	4.6	3.1	1.5
Private	Horticulture	3.3	2.3	1.0
Private	Permanent Crop	2.6	2.4	0.1
Private	Arable small	6.3	6.2	0.1
Econ. Org.	Arable small	4.3	4.8	-0.5
Private	Cattle & sheep	1.8	2.3	-0.5
Econ. Org.	Arable medium	7.5	8.2	-0.7
Econ. Org.	Cattle & sheep	5.1	5.9	-0.9
Private	Mixed	8.3	10.4	-2.1
Private	Pigs & poultry	1.2	3.4	-2.2
Econ. Org.	Mixed	22.5	25.6	-3.1
Econ. Org.	Pigs & poultry	7.3	10.5	-3.2
Total		100.0	100.0	0.0

Source: Authors' calculations based on FADN results.

The distribution of national farm income by farm type in each year is shown in **Figure 8.27**, where farm types in the private sector are shown in lower case and those under the economic organisation grouping are shown in upper case. As with changes in gross margin, changes in farm income reflect shifts in favour of arable farms, whose incomes had increased most by 2005. The chart also shows that the majority of the private farm types, after correction for labour costs, were loss-making in both years.

Figure 8.27: National farm income by farm type

Source: FADN and authors' calculations.

An indication of the extent to which the compositional changes in terms of farm type may have been due to changes in output and input prices is given by the data in **Table 8.16**. Output prices over the three year period generally fell, with only sugar beet and maize recording increases. Coupled with large falls in the prices for eggs and milk, this suggests perhaps relative price movements favouring arable farming. However, the price of sunflowers and rye also showed large falls over the period. Prices of all variable inputs rose, the highest rise recorded by energy and the lowest by feedstuffs. The movement in output and input prices clearly shows a price squeeze, but it is difficult to observe any particular farm type being favoured over others as a result of these relative changes. Farmers' decisions are likely to have been influenced also by policy changes, in particular in anticipation of EU accession, and by expected changes, relative and absolute, in levels of support.

Table 8.16: Agricultural Output and Input Prices in Hungary, 2005 and 2002

	Unit	2005	2002	% change
<i>Output</i>				
Sugar beet	Ft/kg	9.63	8.68	10.9
Grain maize	Ft/kg	21.2	21.14	0.3
Pigs (liveweight)	Ft/kg	272	273.33	-0.5
Potato	Ft/kg	30.44	31	-1.8
Winter barley	Ft/kg	21.02	21.72	-3.2
Wheat	Ft/kg	21.69	23.18	-6.4
Milk	Ft/litre	66.53	72.88	-8.7
Rye	Ft/kg	17.89	20.05	-10.8
Eggs	Ft/egg	10.94	12.81	-14.6
Sunflower	Ft/kg	49.76	63.61	-21.8
<i>Input (2000=100)</i>				
Energy & Lubricants		128.0	100.2	27.7
Seeds		152.6	133.3	14.5
Chemicals		124.7	114.0	9.4
Fertilisers		128.2	120.9	6.0
Feedstuffs		117.0	110.6	5.8

Source: Authors' calculations.

5 AGRICULTURAL SUBSIDIES

The distribution of agricultural subsidies, as recorded in the FADN survey, across the different farm types is shown in **Table 8.17**, with the farm types ordered by the percentage point change in share. Economic organisation mixed farms received the largest share (20 %) in 2005, with the private horticultural farms and pig and poultry farms (<1%) in receipt of the smallest shares. The changes to the distribution over the three years show a clear shift in favour of arable farms which is even more pronounced than that reflected by changes in

gross margin shares. Arable farms, which increased their share of national gross margin by 9 percentage points between 2002 and 2005, increased their share of total subsidies by 20 percentage points, at the expense of most animal and mixed farms. However, all farms received more direct subsidies in 2005 than in 2002 because of the near doubling in the total amount of direct subsidies paid.

Table 8.17: Share of agricultural subsidies by farm type, 2005 and 2002

Farm group	Farm type	2005 %	2002 %	Change % point
Private	Arable large	12.1	5.3	6.8
Econ. Org.	Arable large	14.0	8.1	5.8
Private	Arable medium	7.3	4.6	2.7
Econ. Org.	Arable medium	9.6	7.5	2.1
Econ. Org.	Arable small	5.7	3.7	2.1
Private	Mixed	8.7	7.6	1.1
Private	Permanent crop	2.0	1.5	0.5
Private	Arable small	6.9	6.4	0.5
Private	Cattle & sheep	2.3	1.9	0.4
Private	Horticulture	0.8	0.7	0.1
Econ. Org.	Permanent crop	1.8	3.2	-1.4
Private	Pigs & poultry	0.5	2.7	-2.1
Econ. Org.	Cattle & sheep	4.2	8.2	-4.0
Econ. Org.	Mixed	20.4	26.6	-6.2
Econ. Org.	Pigs & poultry	3.6	11.9	-8.3
Total		100.0	100.0	0.0

Source: Authors' calculations based on FADN results.

Total subsidy payments to arable farms in 2005 were nearly three times (+194 %) those in 2002 (**Table 8.18**). This was due to a more than doubling in the subsidy per hectare (+130 %), but also to an increase in the total arable area (+28 %), arising mainly from an increase in the number of arable farms. Interestingly, farm numbers increased in all arable farm types.

Table 8.18: Composition of change in arable subsidy, 2005/2002

							(%change)
	Private – Arable			Economic Org. – Arable			Total
	Small	Medium	Large	Small	Medium	Large	
Area	-12	28	92	53	-3	44	28
of which:							
nos. Farms	6	29	108	32	29	62	17
ha./farm	-17	-1	-8	16	-24	-11	9
Subsidy/ha.	131	134	123	92	148	124	130
Total subsidy	103	198	329	193	141	222	194

Source: Authors' calculations based on FADN results.

Without subsidies, all farm types in 2005 were loss-making. Furthermore, the income situation in that year worsened for 10 of the 15 farm types, including all six arable farm types. Any "without-subsidy" income positions should not be interpreted as measures of likely income levels in the long run, if subsidies were to be removed. In this case, asset prices, particularly those for land, would be expected to adjust, with positive repercussions for income. However, the subsidies are clearly a vitally important component of farm income.

An alternative description of the distribution of agricultural subsidies across farm types is given by the Gini coefficient, which shows that the overall distribution of subsidies was slightly more equal in 2005 (Gini coefficient 0.72) than in 2002 (0.75).¹²

6 SUMMARY AND CONCLUSIONS

The paper highlights some significant changes in the structure of the Hungarian "national farm" over a relatively short period, 2002-2005. Gross value of production changed little, but with the introduction of the SAPS and CNDP, direct agricultural subsidies nearly doubled and their contribution to total gross margin rose from 15 % to 26 %. The number of farms under the economic organisations grouping increased by 30 %, but their share of agricultural subsidy payments decreased by 14 %, with private farms gaining a considerably larger share.

There was a marked structural shift from animal and mixed farms to arable farms, which affected both private farms and economic organisations. Large arable farms' share of the national gross margin increased by nine percentage points between 2002 and 2005. The shares of pigs and poultry and mixed farms each fell by over five percentage points.

Changes to the distribution of agricultural subsidies show a shift in favour of arable farms which is even more pronounced than that reflected by the changes in gross margin shares. Arable farms increased their share of total subsidies by 20 percentage points between 2002 and 2005 (from 36 % to 56 %). Overall, the distribution of subsidies, whilst highly unequal in both years, was slightly more equal in 2005 under the SAPS.

What is not clear from this descriptive analysis is the direction of causality between changes in structure of the national farm and changes in the distribution of subsidy payments. Were farmers chasing subsidies over this period? Or were subsidy payments, under the SAPS, reflecting structural changes that were being driven by other factors, for example market prices or competitive effects of the Single Market? The latter are destined to become more important as adoption of the Single Farm Payment further decouples production decisions from subsidy payments.

¹² In calculating the Gini coefficients for the two years, the ordering of the farm types (classes) changes.

There are two caveats. The analysis focuses only on two years' data and these may be atypical in terms of output and input prices, farmers' decisions of what to produce and climatic conditions. Also, FADN only covers those farms which are commercially viable, ignoring the very large number of small units which account for the vast majority of private farms in Hungary. Nevertheless, the paper highlights some interesting changes in Hungarian agriculture around the time of EU accession and points to some possible avenues for further exploration.

REFERENCES

AKI (2006): *Agroeconomic Information, Results of Hungarian FADN Farms, 2005*. Research Institute for Agricultural Economics, Budapest.

AKI. RESULTS OF HUNGARIAN FADN FARMS. <http://www.akii.hu/>.

HUNGARIAN CENTRAL STATISTICAL OFFICE (2004): *Agriculture in Hungary 2003, Farm Structure Survey – Volume I*. Budapest.

HUNGARIAN CENTRAL STATISTICAL OFFICE (2006): *Agriculture in Hungary 2005, Farm typology*. Budapest.

HUNGARIAN CENTRAL STATISTICAL OFFICE (2006): *Statistical Yearbook of Agriculture 2005*. Budapest.

HUNGARIAN CENTRAL STATISTICAL OFFICE (2006): *Agriculture in Hungary 2005, Farm Structure Survey – Volume I*. Budapest.

HUNGARIAN CENTRAL STATISTICAL OFFICE (2006): *Economic Accounts for Agriculture 2005*. Budapest.

KESZTHELYI, S. (2006): *A teszüzemek 2005. évi gazdálkodásának eredményei*. Agrárgazdasági Információk, Vol. 6. Agrárgazdasági Kutató Intézet, Budapest.

KESZTHELYI, S., KOVÁCS, G. (2004): *A teszüzemek 2003. évi gazdálkodásának eredményei*. Agrárgazdasági Információk, Vol. 2. Agrárgazdasági Kutató Intézet, Budapest.

KESZTHELYI, S., KOVÁCS, G. (2001): *A teszüzemek 2000. évi gazdálkodásának eredményei*. Agrárgazdasági Információk, Vol. 2. Agrárgazdasági Kutató Intézet, Budapest.

CONSEQUENCES OF THE TWO RECORD YEARS OF CEREAL INTERVENTION IN HUNGARY

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1 INTRODUCTION

Cereal intervention as a market measure was already known in the Hungarian cereal sector prior to accession. However, this market scheme had not been used before accession. Prior to Hungary's accession to the EU, ad hoc policy measures were applied on the country's cereal market (mainly with the aim of damping the defeating effects of the very frequent oversupply on the domestic market) instead of the EU conform market intervention.

Therefore, the adaptation of EU cereal intervention on the cereal market in Hungary was a new task for both, for the agricultural administration and, for the market participants, as well. This task involved two types of duties. First a rather general undertaking, the establishment of a paying agency certified by the EU (implementing cereal intervention – among many CAP schemes) and secondly, the national adaptation of basic EU cereal CMO regulations (No. 1784/2003/93/EC and No. 824/2000/EC). This paper discusses the latter, only the adaptation process and then checks the effectiveness of the system on the two record large Hungarian cereal intervention in the seasons 2004/05 and 2005/06. (The process of setting up the Hungarian paying agency is analysed in another study (RIEGER, TÖRÖK, 2000).¹³

¹³ For this paper it is important that according to relevant EU regulations cereal intervention can be implemented only by an accredited paying agency. In recent EU practice there can be more than one paying agency in a member state, but Hungary decided for one paying agency which implements all CAP measures, include intervention. This institution is the Agricultural and Rural Development Agency (ARDA). Hereinafter when we use in the text phrases "intervention agency", "cereal intervention agency" or "paying agency", in all cases we refer to ARDA.

2 ADAPTATION OF CAP CEREAL INTERVENTION IN HUNGARY

This adaptation incorporated three important decisions for Hungarian authorities: (a) resolving the minimum quantity eligible for intervention; (b) designation of the intervention centres; and finally, (c) the determination of minimum requirements for cereal warehouses storing intervention stocks.

(a) Resolution of the minimum quantity for intervention. According to the pertaining regulations: "Any holder of a homogeneous batch of not less than 80 tons of common wheat, barley, maize harvested within the Community, shall be entitled to offer the batch to the intervention agency" (No. 824/2000/EC, article 1). Consequently, the member state may apply a higher quantity for minimum, as many countries – based on the characteristics of their cereal sector – in effect do.

Hungarian decision makers aimed to guarantee a relatively good access to intervention for Hungarian market participants. Therefore, the lowest allowable batch – 80 tons – was established as the minimum. Basic consideration behind this decision was that the 80 tons minimum would favour direct participation of farmers (cereal producers), and in this case the price defending effect of intervention wouldn't appear at the wholesale price level but instead, directly at the producers' price level.¹⁴ On the other side, decision makers having chosen the minimum set in the Regulation were aware of the fact that as a consequence of this decision producers would gain on the costs of the state budget because the low minimum increases the number of intervention offers and makes intervention more expensive for the member state.

(b) Designation of the intervention centres. Alike the determination of intervention minimum, the designation of intervention centres basically influences the intervention process. Intervention centres as a matter of fact are reference points for the calculation of delivery costs. Concerning delivery costs, relevant EU regulation enacts as follows: "Transport costs from the place where the goods are stored when the offer is made to the intervention centre to which they can be transported at least expense shall be borne by the offerer" (Article 2, Points 2, Paragraph 2, EEC. Reg. No. 824/2000).

The above regulation also incorporates a method for the calculation of delivery costs which the offerer of the cereal batch has to pay. Accordingly, the offerer should pay in all cases for the distance between his or her storehouse and the nearest designated intervention centre, without reference to which intervention storehouse the cereal is delivered. In cases when this effective delivery distance

¹⁴ Calculating with an average yield of 5 tons for cereals the eligible 80 tons quantity can be produced on an area not more than 16 hectares (or 39,54 acres) which size, taking into account sizes of Hungarian cereal producing farms, would make a direct sell for intervention possible for many farmers.

is shorter than the above distance the delivery cost-difference will be deducted from the paid intervention price. In contrast, when this distance is longer the cost surplus connected to the delivery of offered cereal will be added to the paid intervention price.¹⁵

Consequently, the actual intervention price paid to offerers will be influenced by the average delivery distance of cereal lots, as the average distance will be determined by the number and geographical distribution of intervention centres in the member state.¹⁶

Since the balance of delivery costs connected to the intervention purchase of cereals should be financed by the Community's budget, the minimum requirements for the designation of intervention centres are resolved in the pertaining Community regulations. These reference points should be located in regions with a significant oversupply of cereals and abundant number of cereal warehouses. Reference point should also have "special importance as a market inside and outside the Community" (EEC. Reg. 2273/93, article 1). In a geographical region fulfilling the said requirements, warehouses can be designated to intervention centres provided that this particular warehouse is technically well equipped (permitting the taking over, handling and discharge of a sufficiently large quantity of cereals) and has favourable transport connections to the taking over – and, which is more important – to discharge of cereals (article 2, EEC. Reg. No. 2273/93).

Hungary's proposal for the designation of her cereal intervention centres submitted to the Commission was prepared on the grounds of a paper based on very detailed Hungarian cereal statistics (AKII, 2002). The priority of the Hungarian nomination was taking into account the connection between nominated intervention centres on one side and cost of intervention on the other side to set up a cheap intervention system. Therefore Hungary aimed to have accepted by the Commission as many intervention centres as she could. The Commission accepted all of the 75 Hungarian proposals and published them in the OJ on 19th October 2004.¹⁷

(c) Requirements for intervention storehouses. Warehouses in intervention centres are not automatically intervention storehouses, only if the owner is ready to rent storage to the intervention agency, and the intervention agency – taking into account the cereal market situation – considers, that it is necessary to hire

¹⁵ The purpose of this rule is to secure unchanged delivery conditions for cereal offerers, independent from the storehouse supply (capacity) of the national paying agency.

¹⁶ For Hungary in our estimation ± 10 kilometres (6,21 miles) difference in average delivery distance evokes $\pm 0,5$ percent price deviation in paid intervention price.

¹⁷ In our calculations in Hungary less than 40 thousands hectares cereal area belongs to one intervention centre, and the average paid distance of offers was less than 20 kilometres from which means that in the two intervention periods the cereal offerers had to pay in average approximately 300 HUF/ton (1,2€/t) delivery cost, which sum is about 1,2% of the intervention price.

warehouse capacity in the specific region. Otherwise the EU doesn't determine any specific requirements for storehouse capacities in which intervention stocks can be stored. Decisions concerning this issue fall within national jurisdiction. However, there are two general principles which indirectly regulating the requirements for intervention storehouses. The first principle is that the quantity and quality of intervention stocks can not be endangered during the storage period by insufficient storage conditions. The second principle resulting from the first issue is that: The member state bears full and indirect financial responsibility for the preservation of intervention stocks. (Practically, the EU settles such losses not against individual storekeepers in the member state, but the member state pays for losses and then the member state has to clear these debts with storage keepers.)

As a result, the member state has three different priorities at hiring intervention capacities. First of all, the risk of preserving intervention stocks has to be minimized. Secondly, sufficient capacity should be available for the intervention buying in during the specific intervention period. The third considerable issue is the price of the hired capacity, given that if the member state pays higher price than the EU reimbursement unit for warehouse, the difference should be borne by the member state's budget. Among the three aforementioned issues, decisions makers in Hungary have given absolute priority to the first one, and even to the first one (risk minimizing) very one-sided, so that they minimized (only) technical requirements for hired intervention capacities. This concept – given the record number of intervention offers – has resulted in a severe shortage of intervention capacity, which practically blocked the start of intervention buying-in for several months and endangered the successful implementation of intervention in the first intervention period. In the subsequent months, under an increasing political pressure by various farmers' organisations (!) the government was forced to reduce requirements for storehouses in many stages to near storage supply to the capacity demand of intervention buying in.

3 MAIN FIGURES OF THE TWO RECORD YEARS OF CEREAL INTERVENTION IN HUNGARY, IN 2004/05 AND 2005/06

It was well known before starting the intervention that Hungary is a country with significant oversupply on the cereal market as compared to the domestic demand. As a consequence of this unbalanced domestic cereal market, Hungary became a very big player especially with the dramatic decrease of her husbandry production in the European cereal market in the nineties. In this pre-accession period, main destinations for Hungarian cereal exports were first of all the Balkans' region, Poland and Northern African countries, the low price regions of the European cereal market.

Under such circumstances, it was not surprising that after the accession intervention substituted low-priced exports in the Hungarian cereal sector.¹⁸ That stands behind the first two period size buying up – in the intervention periods 2004/05 and 2005/06 – when there was exceptionally good cereal harvest in the country. During these two intervention periods, Hungary bought in more than 8 million tons of cereals for intervention, and at that time – in the Spring 2006 – it seemed that this trend would continue for many years. But due to various factors, conditions in the world cereal market dramatically changed during the harvest of the 2006 year's cereal production when prices went up so high that intervention buying-up neared to zero even in the "land-locked" Hungarian cereal market.¹⁹

In the first intervention period 2004/05 buying-up was considerably delayed in Hungary. There was an acute risk that the Hungarian intervention agency would not be able to buy up all valid offers only by the end of August with effective support from the Commission. To avoid this failure, the Commission extended the deadline for the delivery of intervention offers to intervention warehouses from 31st July to 31st August for the ten new member countries, and prolonged the length of the submission of valid intervention offers from four to seven months in the intervention period 2004/05. It was also part of the relevant Community regulation that the commission reimbursed extra storage costs of intervention offers from the EU budget. The offerers got the monthly EU storage reimbursement from the EU budget, if the length of the offer exceeded four months (EEC Reg. No. 49/2005).

Apart from the above support from the EU, the Hungarian paying agency enlarged its capacity by other measures as well to be able to buy up all valid intervention offers. In addition to the aforementioned reduction of requirements for storage capacities and the support from the EU the paying agency enlarged its control capacity at buying up by involving the control capacity of the public warehouses into the intervention' buying-in process. The take-over of offers was significantly speeded up by the fact that the agency introduced take-over "on-the-spot": If the warehouse of the offerer fulfilled the minimum requirements than the agency bought up the cereal and hired the storage capacity at the same time. In this manner, the batch of cereals was stored in the same storage space without moving the crop. Due to these measures, the intervention agency was able to buy up all valid offers in the first intervention period, which had been

¹⁸ The size of the Hungarian cereal export prior to accession was, depending on weather conditions, from 1 up to 3 million tons, yearly.

¹⁹ These very hectically movements in the Hungarian cereal market caused economic and political tensions in both relations, within Hungary and between the Commission and Hungary as well. The conflict within the country was between participants on one side and the Hungarian paying agency on the other side. Businesses blamed the Hungarian authorities that it misled the market. It evoked a boom in the Hungarian storage sector which turned out to be sufficient in the altered market conditions. Concerning the Commission – member state relations this tension came to light in the dispute about the future (abolishment) of maize intervention.

closed with a record quantity of 3.89 million tons, out of which 2.25 million tons were maize and 1.53 million tons were wheat. – Barley intervention is not significant in Hungary compared to other European member states, it was not more than 0.11 million tons in the intervention period 2004/05.

In the second intervention period 2005/06, implementation of the record intervention buying in caused less problems as compared to the previous year. In 2005/2006, Hungary bought in 4.22 million tons, of which the quantity of wheat was less than in the previous year ("only" 0.93 million tons), and the quantity of maize was 3.2 million tons. The large volume of maize bought in shocked not only the Hungarian authorities, but even more the Commission. Development of the system is shown by the fact that in 2005/06 the percentage of "on the spot buying-up" decreased from 88 % in the previous period to 73 %.

In the third intervention period, by the time when Hungary had acquired all conditions (including well equipped storage capacities), market conditions changed in whole Europe (including Hungary), and cereal intervention buying up was less than 10 thousands tons in EU-27 (in Hungary 1,5 thousand tons of maize were bought up during this period).

3.1 The two record years of cereal intervention in Hungary in comparison to the EU, and the consequences thereof

Hungary implemented the ever-largest intervention in the history of CAP in intervention periods 2004/05 and 2005/06. In average, Hungarian authorities had to buy-in 26,2 % (!) of the production of the main intervention crops during the two intervention periods, compared to the average ratio of 2,7 % in the other member states.

Table 8.19: Hungarian cereal intervention in comparison to the EU (EU-25=100)

	Wheat	Maize	Barley	Total
Intervention period 2004/05				
Cereal production in 2004	5.0 %	18.7 %	2.3 %	7.0 %
Intervention buying in	22.7 %	93.0 %	5.5 %	34.9 %
Intervention period 2005/06				
Cereal production in 2005	4.6 %	23.1 %	2.3 %	7.6 %
Intervention buying in	33.7 %	84.9 %	4.6 %	49.3 %
Average for the two periods				
Cereal production in 2005	4.8 %	20.8 %	2.3 %	7.3 %
Intervention buying in	25.9 %	88.1 %	5.0 %	41.2 %

Source: Own calculations.

In an other comparison, the Hungarian production of the selected main intervention crops totalled up to only 7.3 % of the production of the EU-25, whereas the same ratio for intervention buying up is 41.2 %. Concerning Hungarian intervention, not

only the size of intervention but its crop-structure was even a bigger problem for the Commission. Namely, Hungary bought-in 31.3 % of her maize production for intervention in the average of the two intervention periods 2004/05 and 2005/06 as compared to 0.9 % in the EU-24. As a consequence, the ratio of the buying-up of maize in Hungary amounted to 88.1 % of the total quantity of the enlarged EU.

This was the first time in the history of the EU, when she had to confront with significant maize intervention stocks. The "maize problem" seemed to be insolvable for the Commission before the harvest of 2006. Prior to Hungary's accession, the EU was a net importer of maize, and her cereal policy suited to this condition. Therefore, at that time it appeared that the EU cereal policy had to be changed to enable the EU to handle the huge Hungarian maize surplus. Instead of changing the cereal policy, a more effortless way was chosen by the EU, namely, a regulation limiting maize intervention for two years and eliminating it up to the third year was issued (Council Reg. 735/2007).²⁰

Another important consequence of the first two record years of Hungarian intervention buying in was that it revealed for European decision makers that the production capacity (oversupply) of the Hungarian cereal sector had been underestimated to a great extent prior to the accession. These problems connected to the size and crop-structure of the Hungarian cereal intervention stocks will force the Commission to reconsider recent CAP cereal policy on the long term, and these reconsiderations should cover a much more comprehensive issue than that of the problem of maize, or even the cereal policy.²¹

3.2 The participation of cereal farmers in the intervention system "tailored to farmers' needs"

As stated above, during the adaptation of the EU cereal intervention in Hungary the priorities were to create a system which makes it possible for farmers to participate in intervention directly (80 tons minimum eligible quantity), and to establish a relatively cheap intervention system (applying a dense network of intervention centres).

Hereinafter, we will analyse the data of intervention purchases to get a realistic idea of its features.

²⁰ It demonstrates only the lowliness of the decision-making because by the time when this regulation had been published (11th of June, 2007) the world and European cereal market with big price increase superseded EU intervention up to the due CAP supervision, the "health check".

²¹ This big Hungarian overproduction in the cereal sector first reveals the recent low integration level of the enlarged "single market" and secondly, if the CAP in the future would like to preserve any efficiency character, then on the long term it should force a geographical redistribution of the whole European agricultural production on the basis of effective use of capacities.

For this purpose we classified offerers into three categories. The first category involves offerers submitting less than one thousand tons for intervention (these are – most probably – farmers). In the next category, there are businesses which sold a volume between one thousand and ten thousand tons for intervention (these businesses may be both farmers and traders). Finally, in the third group involves offerers having sold a volume over ten thousand tons for intervention (these are – most probably – traders).

During the intervention period 2004/05, a total quantity of 3,896.8 thousand tons of cereals were bought up by the Hungarian intervention Agency. This quantity was offered by 983 market participants, and the size of the average offer was 4 thousand tons. These are the most general figures for this intervention period.

Analysing intervention by the different categories, in 2004/05 there were 504 offerers (51.3 %) who sold less than 1000 tons for intervention. The total quantity of offers in this category was 112 thousands tons. This quantity is 2.9 % of the total intervention in that period and 0.7 % of the yearly production.

The number of offerers in the next category – between one thousand and 10 thousand tons – is 411 (41.8 %). These businesses sold 1.4 million tons of cereals for intervention (35.8 % of the total purchase in 2004/05 and 8.9 % of the year's production).

Table 8.20: Main categories of offerers participating in cereal intervention in Hungary during the intervention period 2004/05

Categories*	Offerers		Total quantity offered	
	Number	Total=100	Thousand tons	Total=100
Tons				
Oq< 1 000	504	51.3	112.0	2.9
1 000<Oq< 10 000	411	41.8	1,400.0	35.9
10 000<Oq	68	6.9	2,383.8	61.2
Total	983	100.0	3,895.8	100.0

Source: Own calculations.

Note: * Oq = quantity offered.

Finally in the last category of sales over 10 thousand tons per offerer, the relevant number was 68 (6.9 %). These offerers – most probably traders – sold 2.4 million tons (61.3 %) of cereals for intervention which was quantity 13.2 % of the annual production.

Evaluating the volume of intervention sales in 2004/05, we can conclude that wholesalers' participation was dominant whereas direct involvement of farmers was insignificant in the Hungarian cereal intervention in 2004/05. Concerning the number of farmers taking part in intervention was relatively high (over 50 %) in 2004/05, although, in comparison with the number of producers who took part in the area based direct payments scheme in 2004 there is a different scenario. In this context, the ratio was much lower: Only 0.5 %. We can arrive at the

conclusion that only 0.5 % of the cereal farmers could enjoy a direct price protection effect of cereal intervention in the marketing season 2004/05 in Hungary.

The same data for the subsequent intervention periods are summarized in **Table 8.21**. In 2005/06 the total Hungarian cereal intervention was 4,207.4 thousand tons, 8.3 % more than in the previous period, but even with a significant increase of intervention purchase, the number of businesses taking part in intervention decreased by 4.7 % to 937. From this comes that the average size of intervention purchase increased by 12.5 % from 4 thousands tons to 4.5 thousand tons in this intervention.

Table 8.21: Main categories of offerers taking part in cereal intervention in Hungary in the intervention period 2005/06

Categories, tons	Offerers		Total quantity offered	
	Number	Total=100	Thousand tons	Total=100
Oq< 1 000	413	44.1	107.4	2.5
1 000<Oq< 10 000	438	46.7	1,600.0	37.9
10 000<Oq	86	9.2	2,510.6	59.5
Total	937	100.0	4,218.0	100.0

Source: Own calculations.

Note: * Oq = quantity offered.

When analysing figures in **Table 8.21**, it turns out that the importance of the category of offerers with sales less than 1000 tons (farmers) dropped down proportionally. The number of sellers in this category decreased by 18 %, while the quantity they sold decreased by 4 %. (Even in the situation when the total quantity purchased increased by 8.3 %!)

Concerning the category of offerers selling quantities between one thousand and 10 thousand tons, both the number of businesses and the volume they sold for intervention increased. The number of market participants in this group increased by 7 % in 2005/06 and the volume they sold raised by 14 % as compared to the previous intervention period.

Finally, in view of the third category of offerers with intervention sales over 10 thousand tons (traders) the number of sellers remained unchanged as compared to the previous year, whereas the volume of sales by these participants increased by 5 % in 2005/06.

4 CONCLUSIONS

After assessing the two Hungarian intervention periods, it can be concluded that an intervention scheme "tailored to farmer' needs" does not exist. Intervention took place in both periods at the level of wholesale traders, even though the sizes of cereal farms are relatively large in Hungary, and the possible lowest minimum for

the quantity eligible for intervention was established. Based on the Hungarian experiences, the following statement can be made: Setting a too low minimum quantity eligible for intervention does not influence significantly either the volume or the composition of market participants in intervention.

We did not study the impact of intervention on producer prices in the Hungarian domestic market. Apart from this result, another important outcome of cereal intervention could be observed in the two records year in Hungary. Namely, there was a considerable development in traders' post-harvest activities. As a result of participating in the process of intervention, traders – not having involved in the physical processes of the cereal chain before – have built new storehouses and they had to supervise the preservation of intervention stocks.

It is also very important to observe, that this large Hungarian surplus showed us how low the level of integration of the enlarged agricultural single market was, when the impact of measures aiming at price equalisation in the cereal market could not be discovered even though there was severe drought in the Iberian Peninsula.

As to the dimensions of the two record years of Hungarian cereal intervention, the potential capacity of the Hungarian cereal sector was revealed. During these periods, it turned out that the EU cereal policy is very sensitive to maize surplus because it was originally created for an import market of feed, and by the autumn of 2006 there was an acute danger that the Commission would not be able to handle Hungarian maize surplus with the available measures of the EU cereal policy. The restriction and after that the abolishment of EU maize intervention doesn't seem to be a sufficient solution. Minor mistake in this decision is to take these unnecessary measures before due assessment in a situation when the European and world market prices of cereals, including maize are 20-30 % above the EU intervention price. The Authors consider that it caused unnecessary tensions in the relationship of a new member state (Hungary) and the Commission.

We are afraid that a more severe mistake is that this measure distracts the attention from the fact that the Hungarian maize-surplus should be handled as an indicator of the insufficient use of European agricultural capacity which makes it necessary to redistribute the European agricultural production.

REFERENCES

- SZÖKE, GY. (1998): Warehouse issues in the Hungarian Cereal market policy. *Agricultural Studies* Nr. 10, Agricultural Research Institute, Budapest, p. 74.
- LACZKÓ, A. – SZÖKE, GY. (2000): The effect of AGENDA 2000 on the Cereal regime in the EU and Hungary. *Agricultural studies*, Nr. 6, Agricultural Research Institute, Budapest, p. 150.

POTORI, N. (2002): Theoretical basis for the nomination of intervention centres and a proposal for the number and geographical allocation for the domestic cereal intervention centres. Agricultural Research Institute, Budapest, p. 25.

RIEGER, L., TÖRÖK, A. (2002): The Main Facts of the Development of the Paying Agency System in Hungary. Study for the Prime Minister's Office, Hungary, p. 18.

RIEGER, L., JANCZOK, ZS., KATÓ, N. (2005): Cereal Intervention – How to Move on? AGRÁRFÓRUM, Nr. 16. pp. 4-7 .

RIEGER, L., JANCZOK, ZS., KATÓ, N., NÓGRÁDI, J. (2005): The Role of the Public Warehouses in the Cereal Intervention. Agrárfórum, Nr. 17, pp. 4-5.

RIEGER, L., JANCZOK, ZS., KATÓ, N., NÓGRÁDI, J.(2005): The First Experiences of the Cereal Intervention. Európai Tükör, 10(6), pp. 49-61.

RIEGER, L. SZÓKE, GY. (2006): The Characteristics of Cereal Intervention in Hungary for 2004-2005. Európai Tükör, 11(2), pp. 64-78.

RIEGER, L. (2006): Hungary as a Superpower in the EU Cereal Intervention. Paper presented at the "Challenges and Opportunities in a globalizing market" Cocerec Congress Hungary, Budapest, May 11-12, 2006. p. 9.

SUSTAINABILITY DIMENSIONS AND INCOME PROSPECTS FOR FARMING SYSTEMS IN THE NEW MEMBER STATES

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1 INTRODUCTION

The accession at 1 May 2004 to the European Union (EU) of ten new Member States (EU-N10) is a key element at the time of shaping the European model of sustainable agriculture. The agricultural policy agenda reflects sustainability-related concerns building on the Amsterdam Treaty (1997) that first included sustainable development as an EU objective. Since the beginning of the Cardiff process in 1998, subsequent European Councils reaffirmed the commitment to integrate sustainable development concerns into all Community policies and to develop appropriate indicators to monitor such integration. Against this background, this paper aims to contribute to the understanding of the sustainability dimensions at the farming system level in the EU-N10 context. The underlying assumptions of the approach are that (a) sustainability is a dynamic and site-specific characteristic of farming systems, and that (b) assessment of sustainability can be made in relative terms, via comparisons and ranking of farming systems.

The remaining of the paper is organised as follows. Section two provides the broad background to the appraisal of sustainable agriculture and a brief overview of selected EU-N10 countries. Section three describes the methodology. Section four reports the farming systems identified, as well as the potential position of their gross farm income in 2013 under the prospective policy setting-ups and alternative managerial options. Section five concludes.

2 BACKGROUND TO SUSTAINABLE AGRICULTURE APPRAISAL

The definition of sustainable agriculture often depends on the discipline, professional background, or researcher's particular interests (RUTTAN, 1994). The aims of sustainable agriculture can include (1) food sufficiency, (2) stewardship of natural resources, (3) social or community well-being (PETERSON, NORMAN, 2001),

(4) sustenance of welfare over time or (5) meeting consumers' concerns. This diversity of views is somehow justified by the fact that agricultural sustainability tends to be site-specific, and developments at higher levels (i.e. national policies, globalisation trends, or international markets) strongly influence it. The debate reaches also detailed technical aspects of production. Most definitions of agricultural sustainability seem to converge to an agreement about the multidimensionality of the concept, which encompasses at least three dimensions and associated goals, namely economic efficiency, environmental stability, and intergenerational equity (PANNELL, SCHILIZZI, 1999). Ideally a holistic appraisal of agricultural sustainability should integrate at least these three dimensions. ZHEN and ROURAY (2003) note that sustainable agriculture is a time- and space-specific concept and its assessment should be closely linked to the context in which the specific farming system exists.

Farming systems have been defined at the farm level (DE KOEIJER et al., 2002; HELANDER et al., 2004), and seldom at higher aggregation levels such as homogeneous populations (MAZOYER, 1988) or regions. At the farm or community levels, it is possible for actors to weigh up, trade off, and agree on the criteria for assessing sustainability trends. At more aggregated levels it becomes increasingly difficult to trade off in a meaningful way. That is why most of the research on sustainable agriculture was carried out at the farm level and fewer references regarding a territorial approach to the assessment of agricultural sustainability dimensions exist. When a regional approach is adopted (DIXON et al., 2001) studies do not refer to the agricultural activity in particular but to general economic and social developments.

The challenge when measuring the sustainability of farming systems is how to construct spatially and temporally acceptable indicators, and how to apply and integrate such indicators for assessing whether a particular practice/system is sustainable or not. Lists of sustainability indicators have been developed by various national and international organisations (e.g. OECD, 2001). Some indicators are summaries of national agricultural censuses or repeated survey data, others are calculated using existing or newly developed mathematical models or formulas and an integration of census data, and sometimes custom data sets. One of the main issues of these approaches is the lack of a systematic approach of elaboration of synthetic global indexes that should allow comparison among countries. Recent attempts were made to develop synthetic indicators which should integrate the different variables of sustainability, enabling their comparability (GONZALEZ LAXE, MARTÍN PALMERO, 2004).

3 METHODOLOGY AND DATA – FARMING SYSTEMS AND THE ASSOCIATED DIMENSIONS OF SUSTAINABILITY

The analysis was carried out using the Czech Republic and Lithuania as case studies. The aim was to illustrate, apart from two different regional contexts

(Baltic vs. Central Europe), contrasting situations in terms of importance of agriculture and agricultural employment in the national economy, as well as the take-up rate of sustainable farming practices (here, only organic farming rate of adoption was considered given the support its taking-up receives under the CAP).

As the selected unit of analysis is the farming system linked to a certain territory, identification and delimitation of agricultural homogeneous regions was carried out at Local Administrative Unit (LAU 1) level, the lowest territorial unit for which detailed statistics relevant for this study were available in both countries. The final outcome (regions and farming systems) was validated by consulting national experts in both countries. Next, each territory-linked farming system (hereafter farming system) was identified and characterised using detailed information about agriculture and related social, environmental and economic aspects. Identification, delimitation and description of the farming systems relied on a set of determinants clustered in five general criteria (land use, agro-climatic characteristics, livestock, property and holding size, population characteristics). The rationale for using the selected criteria was to adopt a multidimensional approach of the concept of farming system, and not being limited exclusively to agronomic aspects. To each criterion, a set of determinants was further attached (e.g. variables attached to land use include total area of the system; share of the total national area; share of land under organic crops of total land of the system etc.). Inter-countries comparisons of the farming systems identified are not recommended, as the lack of suitable data from LAU 1 level made that some of the variables used did not coincide in both countries.

Indicators associated to the economic, social and environmental dimensions were then computed using secondary data associated to the territory each farming system covered. An extensive review of the relevant literature was the base for selecting the indicators and variables that (a) were among those proposed by different official organisations like EC and OECD; (b) reached the three sustainability dimensions; (c) included qualitative and quantitative information, (d) were representative for the different farming systems, and (e) could be obtained from secondary data. They include: Livestock density, land erosion, nitrate pollution, share of land under organic farming, and agro-ecosystem biodiversity (for the environmental dimension); density of farmers per agricultural land, share of elderly population, variation of the rate of population, unemployment, and concentration of farming land (for the social dimension); farming structure, yields of main crops; income of farmers, and share of LFA in agricultural land (for the economic one). The remaining steps included computing each variable at the LAU 1 level (resulting in a unique value for each farming system); standardisation of each unique variable (to allow comparison and grouping into indicators); computing their arithmetic averages for each sustainability dimension, and normalisation of the standardised variables allowing a subsequent ranking. The standardised

values were obtained as $Z_{si} = \frac{X_i - \bar{X}}{\sigma}$, for those variables considered having a direct link with sustainability, and $Z_{si} = \frac{\bar{X} - X_i}{\sigma}$, for those with an inverse link, where Z_{si} = value of the standardise variable at farming system level, \bar{X} = mean of the distribution at farming system level, X_i = value of a variable at farming system level, and σ = standard deviation of the distribution at farming system level. For those indicators containing more than one variable, the standardised value was computed as arithmetic mean. Normalisation made that the value obtained for each sustainability dimension become a normal standard percentile taking values from nil (lowest rank position) and 100 (highest rank position). Finally, a global Farming System Sustainability Index (FSSI) was obtained as the arithmetic mean of the percentiles calculated for each sustainability dimension. This global index was used to establish the overall sustainability ranking of the farming systems. It is not an absolute sustainability value but indicates the position of a given farming system reached for the specific sustainability dimension in relation to the other systems of the country concerned.

The policy scenarios exercise defined first a standard (non-organic) farm and then evaluated what its agricultural income would be in 2013 under three policy settings (see below) and three alternative managerial options, i.e. if the farm continued being (a) non-organic farm, (b) converted to organic farming, or (c) introduced energy crops in the crops rotation ("energy crops" farm; only rapeseed considered). Standard farms (one per farming system) were constructed using the average values of 2001-2003 FADN. For defining the organic farm (i.e. a non-organic farm that by 2013 became an organic one), the differences in costs, productivity, and prices with regard to *non-organic farms* were based on information from relevant literature and own field survey in the two countries carried out in 2005. For 2013, the full amount of organic payment plus a 10 % increase was considered (except for "No Accession" scenario). For the "energy crops" farm, the working hypothesis was a change in the cropping structure by 2013, i.e. 100 % of the set-aside land in 2001-2003 and 50 % of the FADN category 'other field crops' (potatoes, sugar beet etc.) area would be cultivated with rape, making the farm eligible for "energy crops" payments. The approach was based on remarks that about 15 % of utilised agricultural land in each country is set-aside (i.e. farmers receive subsidies for energy crops for the 50 % of above-mentioned area; this assumption was applied on for the Czech farms as Lithuania did not provide subsidies for energy crops during pre-Accession). The impact of managerial decisions was then evaluated under the three policy scenarios developed at the 2013 time horizon without looking at the intermediate years. "Business as usual" (baseline) scenario reflected the post-Accession situation in the two countries (i.e. implementation of the CAP and its most probable trend it will follow until 2013). The other two scenarios simulated a non-EU accession situation ("No-Accession" scenario), and a hypothetical effort of the CAP to

accelerate the adoption of more environmentally friendly and sustainable farming practices ("Environmental CAP" scenario).

For the policy support under the "Baseline", calculations were made with 100 % value of Single Farm Payment (SFP). Since little was known at the time of this study about the future implementation of the SFP, and to simplify the simulations, the future SFP was considered to be similar to Single Area Payment Scheme (SAPS) applied in these countries. For the organic farm option, the SFP amount per hectare was set for the year 2013, the amount varying according to the production profile of the farming system. For energy crops, a specific CAP aid per hectare was also set as foreseen in CAP and national documents. In the "no-Accession", the pre-accession agricultural policy applied in Czech Republic and Lithuania was assumed to continue. For the "non-organic farm" option, the assumption was that exclusively pre-accession national subsidies (computed as 2001-2003 FADN averages) will be available in 2013. For the "organic farm" option, the payments per hectare were fixed at the level existing before EU co-financing (years 2001-2003), amount that was added to the national payments. For the "energy crops farm" option, the payments of the pre-accession period were assumed to continue. The "Environmental CAP" developed on the structure of "Baseline", the main differences being on the assumptions related to the future of the policy instruments considered: Higher rates of payments for the organic farm and "energy crops" farm (resulting from reductions of the SFP amount so that the agricultural budget would not be overshot, i.e. a 10 % increase of organic or energy crops subsidies came with a 1 % cut of the SFP).

The scenarios exercise focused only on the economic dimension, owing to time and financial constraints. The main quantitative variable reported here is the *gross farm income* (GFI). In all simulations, yields, prices, costs and taxes for the year 2013 were adjusted for inflation using information from OECD/FAO (2005), and EC (2005) projections (i.e. the accumulated inflation for 2004-2013 applied was 20.71). Increases of crop and livestock yields until 2013 were assumed the same for organic, non-organic, and energy crops farms, despite differences in yields between organic and non-organic farms (mainly obtained from own field survey). World market price projections for 2013 were used with some adjustments (e.g. where available, producer instead of retail prices were used). Percentage differences of prices of organic and non-organic produce were estimated using different sources, including both primary information and secondary sources. In all alternative options, taxes were adjusted by the accumulated inflation to 2013. No variations of production costs in real terms (apart from inflation) were considered given the tediousness of such endeavour for the farming systems defined. Differences in terms of costs between organic and non-organic farms, mainly obtained via own field survey, were applied for the "organic farm" option. Subsidies were not assumed to increase with inflation.

4 RESULTS – SUSTAINABILITY DIMENSIONS OF THE FARMING SYSTEMS IDENTIFIED

Homogeneous regions were first identified at LAU 1 level and attached to them five farming systems in the Czech Republic and six in Lithuania were defined. **Table 8.22** reports the result of evaluating the sustainability dimensions at the farming system level.

Table 8.22: Sustainability dimensions at the farming system level

Country	Farming system	Dimension:			FSSI
		environmental	social	economic	
Czech Republic	Crops-Oriented Sugar Beet (COSB)	49.82	93.72	100.00	81.18
	Crops-Oriented Maize (COM)	0.00	56.72	58.93	38.55
	Mixed-Oriented Grassland (MOG)	91.26	58.96	43.26	64.49
	Livestock-Oriented (LO)	93.99	50.26	54.41	66.22
	Mixed-Oriented Potatoes (MOP)	92.35	58.99	70.82	74.05
Lithuania	Livestock-Oriented (LO)	51.52	48.73	76.98	59.08
	Crops-Oriented (CO)	36.51	29.82	82.97	49.77
	Crops-Marginal (CM)	49.92	4.60	0.00	18.17
	Livestock-Marginal (LM)	61.36	76.10	47.61	61.69
	Urban-Oriented (UO)	44.55	100.00	53.78	66.11
	Intermediate System (IS)	64.51	49.13	47.03	53.56

Note: FSSI (Farm Synthetic Sustainability Index). Each index is associated to a sustainability ranking scale that takes value from nil (lowest) to 100 (highest).

Among the Czech farming systems, COSB reports maximum values for the social (93.72) and economic (100) dimensions. The negative value of population age structure indicator influences the result of the social dimension. The high value for the economic dimension is the result of a positive value for all but one associated indicators, the highest values being related to those of the holdings structure (low land share in holdings of less than 10 ha, and low LFAs share). The peculiarity of COM system is associated with the nil value reported for its environmental dimension, justified by the highly negative values of almost all associated indicators (mainly those related to land erosion, low livestock density, and crop diversity). Based on FSSI value, the Czech systems rank from Crops-Oriented Sugar-beet system (the highest) to Crops-Oriented Maize system (the lowest). In Lithuania, CO system ranks the last among all systems when its environmental dimension is considered, a high nitrate pollution being the main reason for this outcome. For the social dimension, negative values are reported for the farming land concentration index and population density. The high value for the economic dimension is the result of a good holdings structure and a low LFAs share. The low value of the environmental dimension for the CM system is the result of low livestock density (0.16 LU/ha agricultural land) and high land erosion, somehow balanced by a high percentage of organic farming area (2.66 %).

In the overall ranking based on the FSSI value, Urban-Oriented system ranks the first and Crops-Marginal system the last.

Table 8.23 reports the gross farm income (GFI) of Czech farming systems under the policy scenarios and managerial options considered. GFI value under Baseline scenario is taken as reference for comparisons. (a) The non-organic farm \times "Business as usual" option reports a significant increase of GFI values compared to "No-Accession" scenario. In relative terms, depending on the farming system, values in "No-Accession" are 13 % to 25 % lower than in baseline scenario. The higher amounts of CAP subsidies induce such outcome (since total output and intermediate consumption (not reported here) do not change). The effect of "Environmental CAP" in non-organic farms is rather modest (compared to "Business as usual"). Depending on the farming system, the 1 % reduction of SFP induces a 0.49 % to 0.33 % GFI decrease. (b) Organic farm option: According to simulation results, the accession of Czech Republic entails a significant increase of the GFI for organic farms compared to the non-accession alternative. While in the "No-Accession" scenario exclusively national subsidies are considered, the "Baseline" scenario includes organic aids and SFP, implying higher amounts. Differences among the standard farms also appear owing to their diverse agricultural structures. Under the "Environmental CAP", GFI increases if specific payments to organic farming increase compared to "Business as usual". Payments increase leaves relatively unaffected the GFI: A 10 % increase of the organic aids hardly produces a 3 % rise in GFI. (c) Under Energy crops farm option differences between "Business as usual" and "No-Accession" are observed. Compared to "No-Accession", the GFI increase rates of energy crops farm in "Baseline" is similar to the differences observed for the non-organic farms. Here the increases are slightly higher, in the sense that they include CAP payments for SFP and energy crops. The reduction of SFP triggered by a 10 % increase of energy crops payments explains this outcome.

Table 8.23: Gross farm income at the 2013 time horizon under alternative policy scenarios and managerial options in the Czech Republic

Managerial options and Policy scenarios	CZ1	CZ2	CZ3	CZ4	CZ5
	Crops-Oriented Sugar Beet System	Crops-Oriented Maize System	Mixed-Oriented Grassland System	Livestock-Oriented System	Mixed-Oriented Potatoes System
	(€/ha)	(€/ha)	(€/ha)	(€/ha)	(€/ha)
'non-organic farm' option					
"Business as usual" (baseline)	487.40	457.08	280.25	482.16	357.71
"No-Accession"	370.02	344.27	244.61	390.47	268.23
"Environmental CAP"	485.68	455.4	278.87	480.56	356.09
'organic farm' option					
"Business as usual"	406.62	440.02	235.05	384.57	348.65
"No-Accession"	202.23	220.94	158.67	226.45	196.36
"Environmental CAP"	419.02	454.42	241.86	394.47	358.25
'energy farm' option					
"Business as usual" (baseline)	530.11	500.29	299.89	515.74	390.72
"No-Accession"	427.05	400.36	269.37	435.01	310.36
"Environmental CAP"	528.9	499.07	298.69	514.52	389.42

Table 8.24 reports the results of simulations for Lithuanian farming systems. (d) non-organic farm option × "Baseline" triggers a 50 % increase of GFI (compared to "No Accession") in 2013 (as SFP amount received represents a large share of the farm income). (e) Under organic farm option × "No-Accession", GFI values in are rather low for organic farms. This outcome is influenced by the data from 2005 field survey, i.e. organic yields are significantly lower than non-organic ones. Under "Baseline" assumptions, SFP and specific organic payments induce a notable GFI increase compared to "No-Accession" scenario. In "Environmental CAP", 10 % increase of organic subsidies generate more than 5 % rise in GFI in all but one (LT4) farming systems. (f) Energy crops farm option: The GFI differences under baseline "No-Accession" are similar to the case of non-organic farm option. For example, LT4 has a 58.02 % of the GFI, the highest one among standard farms in relative terms (the lowest is 46.67 % of the LT2 system). Overall, the differences among systems in terms of GFI are not very large, the SFP and energy crops accounting for most of the increase. Under the "Environmental CAP", GFI values are lower than under Baseline. As in the case of Czech systems, these results imply that the increase of energy crops payments does not compensate for the GFI loss caused by the decrease in SFP.

Table 8.24: Gross farm income at the 2013 time horizon under alternative policy scenarios and managerial options in Lithuania

Managerial options and policy scenarios	LT1	LT2	LT3	LT4	LT5	LT6
	Livestock-Oriented System	Crops-Oriented System	Crops-Marginal System	Livestock-Marginal System	Urban-Oriented System	Inter mediate System
	€/ha	€/ha	€/ha	€/ha	€/ha	€/ha
'non-organic farm' option						
"Business as usual" (baseline)	405.79	387.92	333.23	351.82	383.13	382.8
"No-Accession"	267.99	257.84	217.47	217.38	253.45	242.7
"Environmental CAP"	404.08	386.33	331.69	350.11	381.5	381.05
'organic farm' option						
"Business as usual"	628.73	650.99	512.46	505.5	564.13	565.28
"No-Accession"	149.67	159.28	158.27	175.23	134.45	159.19
"Environmental CAP"	667.84	692.62	540.46	528.39	598.55	596.09
'energy farm' option						
"Business as usual" (baseline)	446.69	430.93	360.19	372.12	417.18	413.38
"No-Accession"	302.61	293.81	240.16	235.49	283.42	268.62
"Environmental CAP"	445.61	430.05	359.08	370.62	415.95	412.11

5 CONCLUSIONS

The results regarding sustainability dimensions reported here are highly influenced by the methodology applied, at its turn highly dependent on the data available. More than anything else, they should be view as illustrating the method than definitive rankings of systems in terms of sustainability. The value of the methodology applied here rests in its flexibility. The results of the policy scenarios indicate that in 2013, under Baseline scenario assumptions, Czech non-organic farming systems would reach the highest average GFI when adopting energy crops (447.3 Euro/ha compared to 412.9 Euro/ha in case of "no change" option and 363 Euro/ha for the "convert to organic" option), the additional payments and output explaining such outcome. In Lithuania, the Baseline scenario results suggest that conversion to organic farming would lead in 2013 to the highest average gross farm income (571.2 Euro/ha compared to 374.1 Euro/ha of the "no change" option) and "introduce energy crops" option (406.7 Euro/ha). The lowest average gross farm income is reported for the conversion to organic farming under No Accession Scenario alternative (200.9 Euro/ha in the Czech Republic and 156 Euro/ha in Lithuania). The high share of organic subsidies in the gross agricultural income of organic systems (over 70 % in the Czech Republic and above 80 % in Lithuania) under

the Baseline scenario reflects a situation in which organic farming cannot be maintained on the long-term without subsidies, and more, that high payments do not automatically would enhance the economic sustainability. Obviously, the future of agriculture and rural areas in EU-N10 must involve coordination of sustainable activities, which should be environmentally respectful, economically viable, and socially acceptable. As agriculture continues to be one of the main economic activities in most of the EU-N10, further identification and analysis of the characteristics of existing farming systems from a sustainability perspective will be valuable input to the policy debate.

DISCLAIMER

This paper reports the results of a larger study commissioned from Empresa Pública Desarrollo Agrario y Pesquero S.A. (Spain) by the Institute for Prospective Technological Studies (IPTS)²², and does not represent the official position of the European Commission. Usual disclaimers apply.

REFERENCES

- DE KOEIJER, T. J., WOSSINK, G. A. A. STRUIK, P. C., RENKEMA, J. A. (2002): Measuring agricultural sustainability in terms of efficiency: The case of Dutch sugar beet growers. *Journal of Environmental Management*, 66, 9-17.
- DIXON, J., GULLIVER, A., GIBBON, D. (2001): *Global Farming Systems study: Challenges and priorities to 2030. Synthesis and overview*. FAO: Rome.
- EUROPEAN COMMISSION (2005): *Prospects for agricultural markets and income 2005-2012*. Directorate-General for Agriculture. <http://www.europa.eu.int/comm/>.
- FAO (1993): *Guidelines for land-use planning*. FAO Development Series. <http://www.fao.org/docrep/T0715E/T0715E00.htm/>.
- GONZÁLEZ LAXE, F. I., MARTÍN PALMERO, F.G. (2004): Diseño de un índice sintético de desarrollo sostenible y aplicación a la Unión Europea. *Economía Agraria y Recursos Naturales*, 4(7), pp. 3-26.
- HELANDER, C.A., DELIN, K. (2002): Evaluation of farming systems according to valuation indices developed within a European network on integrated and ecological arable farming systems. *European Journal of Agronomy*, 21, pp. 53-67.
- MAZOYER, M. (1988): *Réconfiguration Critique des Systèmes de Production*. Paper for Séminaire sur les Perspectives des Déséquilibres Mondiaux, INA, Paris.

²² CÁCERES CLAVERO, F., CRUZ GÓMEZ, J. C., GARCÍA COLLADO, R., SERRANO JAÉN, E., AGUILAR MONTILLA, S., AUGAITYTĖ, S., LUCENA COBOS, B., MÉNDEZ RODRÍGUEZ, M. A., MANRIQUE GORDILLO, T., PARRA HERAS, T., CRISTOIU, A. (2007): *Sustainable Farming Systems in the New Member States*. Summary Report. Institute for Prospective Technological Studies, Seville, Spain (forthcoming).

OECD (2001): Environmental indicators for agriculture, Vol. 3: Methods and results. OECD: Paris. Available at: <http://www.oecd.org/dataoecd/0/9/1916629.pdf>.

PANNELL, D. J., SCHILIZZI, S. (1999): Sustainable agriculture: A question of ecology, ethics, economic efficiency or expedience? *Journal of Sustainable Agriculture*, 13(4), pp. 57-66.

PETERSON, J., NORMAN, D. (2001): Sustainable Farming Systems in the Central and Eastern European (CEE) Countries. Seminar on Sustainable Agriculture in Central and Eastern European Countries: The Environmental Effects of Transition and Needs for Change, 10-16 September, Nitra, Slovakia.

RUTTAN, V. W. (1998): The transition to agricultural sustainability. Paper presented at Plants and Populations: Is There Time? Colloquium National Academy of Sciences. Irvine, CA, 5-6 December.

ZHEN, L., ROUTRAY, J. K. (2003): Operational Indicators for measuring Agricultural Sustainability in Developing Countries. *Environmental Management*, 32(1), pp. 34-46.

ASSESSING THE IMPLICATIONS OF EU ENLARGEMENT FOR CEEC AGRI-FOOD TRADE SPECIALISATION

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1 INTRODUCTION

Changes in trade specialisation can occur as a consequence of deep structural changes in the economic system of a country. Given the considerable economic and political changes in Central and Eastern European Countries (CEECs), in the European and global environment context, attendant shifts in the structure and dynamics of trade specialisation patterns are assumed.

Existing studies focusing on the analysis of revealed comparative advantages and trade specialisation patterns of transitional economies differ in various aspects. The number and structure of commodities under scrutiny are determined by the level of aggregation and the classification system in which the trade flow data are reported. The length of the period analysed also alters. HINLOOPEN and MARREWIK (2004) analysed the dynamics of Chinese comparative advantages over the period 1970-1997; ZAGHINI (2005) examined the evolution of trade patterns in the new EU-10 Member States (2004 enlargement) between the years 1993 and 2001; and trade specialisation in the EU and CEECs in 1995-2002 was investigated by FERTÖ and SOÓS (2006).

FERTÖ and HUBBARD (2003) concluded that the extent of specialisation of the CEECs agri-food exports to the EU exhibited a downward trend. Furthermore, they found that the specialisation indices of individual CEECs have converged rather than polarised over the period analysed. WÖRZ (2005) analysed the dynamics of trade specialisation in six geographical regions – OECD North, OECD South, East Asia, South Asia, Latin America, and CEECs – and found a global tendency towards a decrease in the intensity of specialisation, together with regional convergence. ZAGHINI (2005), however, found an increase in trade specialisation of EU-10 Member States.

The paper analyses the structure and dynamics of agri-food trade flows of individual CEECs that became new EU Member States in 2004 and 2007 (the Czech Republic, Latvia, Lithuania, Slovakia, Slovenia, Bulgaria and Romania) and their trade groupings over the period 2000-2005. Over this period the most important factors influencing CEEC agricultural trade were accession to EU; gradual agri-food trade liberalisation; changes in WTO commitments (as non-EU and EU members); and reform of the Common Agricultural Policy.

We examined the magnitude of the dynamics of agri-food trade specialisation of these countries using the Lafay index and the degree of change in agri-food trade specialisation using various approaches. The paper does not, however, address the changes in absolute values of trade flows; nor does it deal with the evolution of the quality of internationally traded goods.

The paper is organised as follows. The following section is devoted to the methodology applied and data used. The third section presents the results, while the last section draws conclusions.

2 METHODOLOGY AND DATA

To assess the possible implications of CEEC accession to the EU for their agri-food trade structure and trade flows in the period 2000-2005, the following issues were analysed: (1) changes in CEEC trade structure; (2) the most competitive commodities and their level of processing by individual CEECs; and (3) the dynamics of agri-food trade specialisation with their trade groupings.

Identification of the most competitive commodities and an analysis of the evolution of agri-food trade specialisation were based on calculation of the Lafay index (LFI) (LAFAY, 1992) of trade specialisation. This was adjusted, for the reasons explained below, as follows:

$$LFI_j^i = \begin{cases} 0, & \text{if } x_j^i = 0 \wedge m_j^i = 0 \\ 100 \left[\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{i=1}^N (x_j^i - m_j^i)}{\sum_{i=1}^N (x_j^i + m_j^i)} \right] \frac{x_j^i + m_j^i}{\sum_{i=1}^N (x_j^i + m_j^i)}, & i = \overline{1, k}; \text{ otherwise} \end{cases} \quad (1)$$

where

x_j^i – export of commodity j of country i to a selected trade grouping;

m_j^i – import of commodity j of country i from a selected trade grouping;

N – number of commodities for which the LFI is calculated;

k – number of countries/groupings.

The sum of LFI values for all commodities is zero. A value for a commodity can therefore be either positive or negative, meaning either comparative advantage or disadvantage.

The LFI is used in this study rather than the BALASSA (1965) RCA index because of the nature of the data, which show the presence of intra-industry trade. This choice is also underpinned by recent studies by FIDRMUC, DJABLÍK (2003) or CATEANO, GALEGO (2006), which produced evidence that the role of intra-industry trade in CEEC – EU-15 relations has increased. FONTAGNÉ and FREUDENBERG (1997) argue that a significant proportion of intra-industry trade may appear due to insufficient sectoral disaggregation. However, this is unlikely to be the case with our data because of the HS 6 code we used. A major advantage of the LFI is also its ability to eliminate the influence of cyclical factors on trade specialisation (ZAGHINI, 2005).

We identified the most competitive commodities of the seven countries by three conditions that had to be met simultaneously. First, ten commodities with the highest LFI values were selected. The number of items is arbitrary but it reflects the fact that LFI values fell significantly by order of commodity. The second condition came from the assumption that a commodity reveals comparative advantage if a country trade also specialises in it over a fairly long period of time (in our case at least for four out of the six years examined). The third condition considered an item's share of exports to a selected trade grouping out of total exports to that grouping. BERGSCHMIDT and HARTMANN (1998) approach was applied for classification of commodities by level of processing. A higher level of processing is assumed to mean higher value added.

Trade flows at the beginning of the period analysed (before enlargement) and at the end (after enlargement) were compared. To eliminate extreme fluctuations in trade flows, we averaged the respective trade flows of 2000 and 2001 and 2004 and 2005.

To analyse a change in trade specialisation, we used the Galtonian regression:

$$LFI_{ij}^{T_2} = \alpha_i + \beta_i LFI_{ij}^{T_1} + u_{ij} \quad (2)$$

where

T_1 – beginning of the period analysed;

T_2 – end of the period analysed;

α_i , β_i – regression coefficients;

u_{ij} – disturbance term;

i – country pair (e.g. Slovak trade with Hungary)

j – commodity.

By definition, β_i can take the following values:

$\beta_i < 0$ means a complete reversal of trade specialisation,

$\beta_i \in (0;1)$ denotes that on average the specialisation pattern remained the same but previously uncompetitive commodities improved their positions and *vice versa*,

$\beta_i = 1$ indicates structural stability,

$\beta_i > 1$ shows that a country became more specialised in commodities in which it had already been specialised.

Analysis of the regression coefficient itself is not sufficient to draw conclusions about the relation between comparative advantages/disadvantages and the degree of specialisation. Thus, adopting the approach of ZAGHINI (2003) and HINLOOPEN and VAN MARREWIK (2004), we computed the ratio

$$\frac{\sigma_{it_2}^2}{\sigma_{it_1}^2} = \frac{\beta_i^2}{R_i^2} \quad (3)$$

where

R_i^2 – coefficient of determination of the stochastic equation (3),

$\sigma_{it_1}^2$ and $\sigma_{it_2}^2$ – variances of regressor and regressant from (3), respectively.

Equation (4) shows that no intra-distribution dynamics occurred if $\beta_i = R_i$; a country's agri-food trade specialisation increased if $\beta_i > R_i$; and it fell if $\beta_i < R_i$.

2.1 Trade specialisation development

The development of agri-food trade specialisation over time was investigated by Markov transition matrices. We used the approach of QUAH (1993), PROUDMAN, REDDING (2000), REDDING (2002). The elements of transition probability matrices are probabilities of transition from one stage (of trade specialisation) in time τ to another stage in time $\tau + n$. The transition probabilities were calculated by counting the number of transitions out of and into each stage. The sum of elements in a row of transition probability matrix is equal to unity.

The construction of probability matrices first needed a decision as to how many intervals to divide the group of LFI values into. The trade specialisation literature does not take a unified approach to this. In our study, the zero LFI values were controlled for by dividing the LFI group into five intervals of unequal size. The middle (third) interval included all values related to commodities with no mutual trade. The remaining edges of the LFI range were split into two equally sized intervals, according to the number of commodities.

Development of agri-food trade specialisation was investigated over a short time span (between successive years) and over the whole period (2000-2005). In the first case, we computed five one-year matrices for each reporter-partner pair. Next, we averaged those five matrices to find out how agri-food trade specialisation developed from a short time perspective. In the second case, we analysed the development of agri-food trade specialisation over a longer period of time by calculating transition matrices between 2000 and 2005. Comparison of the two results shows the development of agri-food trade specialisation.

2.2 Data

In this study individual CEECs trade flow data from the period 2000-2005 were analysed using the six-digit code of the Harmonised System (HS), which presents 729 commodities each year and country. We considered the following trade groupings/partners of individual CEECs: Old EU Member States (EU-15); eight new EU Member States (NMS);²³ Accessing countries²⁴ (ACC) – Bulgaria and Romania; the Commonwealth of Independent States (CIS); the United States (USA); the Rest of the World (ROW); and total agri-food trade. Data expressed in euro are from the National Statistical Offices and were collected under the TRADEAG²⁵ FP6 project.

3 RESULTS

3.1 CEEC agri-food trade in 2000-2005

The composition of individual CEEC agri-food trade by trade grouping shows that, for all the CEECs considered except Bulgaria and Slovenia, the EU-15 and NMS were the most important trading partners (**Table 8.25**). Slovenia had very intensive trade relations with the ROW, which may be attributed mainly to substantial trade with the countries of former Yugoslavia. Lower trade shares with the ROW for all countries except Latvia in 2005 than in 2000 point to a possible trade diversion effect of the 2004 EU enlargement.

The most intensive agri-food trade with the NMS was observed in the case of Slovakia. Trade with the ACC, CIS and the USA appeared to be of minimum importance for the majority of CEECs.

Agri-food trade of all CEECs by trade groupings was specialised in a relatively small number of commodities (**Table 8.26**). This is particularly evident in trade with the ACC, CIS, ROW and the USA, i.e. countries that were not the main trading partners of the countries analysed. Specialisation in exported commodities was generally higher than in imported ones. The results presented in **Table 8.26** also point to the legitimacy of a detailed analysis of trade flows.

The most competitive commodities do not show clear trends in respect of the level of processing. However, the results presented in **Table 8.27** indicate that Bulgarian and Romanian processed agri-food commodities were not competitive on the EU-15 market. Insufficient compliance with food quality and safety requirements on those markets may be a possible explanation. Both countries exported

²³ The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, Slovenia.

²⁴ As of 2005.

²⁵ TRADEAG ("*Agricultural Trade Agreements*") is 6FP project No 513666, financed by the European Commission.

mainly live animals, carcasses, cereals and oilseeds to the EU-15. Unlike Bulgaria and Romania, agri-food exports from the Czech Republic and Slovenia to the EU-15 specialised in highly processed commodities, which indicates their better ability to penetrate the EU-15 market.

Contrary to CEEC agri-food exports to the EU-15, intra-NMS agri-food exports showed a stronger tendency towards highly or semi-processed commodities. NMS exports to ACC were heterogeneous in the level of processing. Semi and highly processed commodities prevailed in CEEC exports to the Commonwealth of Independent States. NMS (with the exception of Bulgaria and Romania) agri-food exports to the ROW was dominated by commodities with a higher level of value added.

Table 8.25: Composition of individual CEEC agri-food exports/imports by trade groupings^[PTZ2] (%)

Country		Trading partners/groupings											
		EU-15		NMS		ACC		CIS		USA		ROW	
Ex.	Im.	Ex.	Im.	Ex.	Im.	Ex.	Im.	Ex.	Im.	Ex.	Im.		
2000	BG	33	38	6	7	2	2	4	1	5	3	50	49
2005		40	45	4	7	6	1	2	1	3	1	45	44
2000	CZ	38	50	41	22	1	0	8	0	1	4	11	24
2005		43	63	42	27	1	0	4	0	1	1	10	9
2000	LT	35	28	22	15	0	1	26	9	11	2	6	15
2005		47	45	26	33	0	0	22	7	1	3	5	12
2000	LV	25	47	38	35	0	1	27	4	6	3	3	10
2005		27	42	37	44	0	0	22	5	5	1	9	7
2000	RO	46	32	14	22	2	1	4	3	1	4	33	39
2005		55	38	9	15	5	1	4	2	1	9	26	35
2000	SK	22	39	63	44	2	0	7	1	0	1	6	15
2005		31	40	59	50	2	1	3	1	0	1	5	10
2000	SI	21	54	5	35	1	1	2	0	3	1	71	27
2005		43	58	1	4	0	1	4	0	1	1	48	24

Source: Own calculations based on the TRADEAG CEEC database.

Note: BG – Bulgaria, CZ – the Czech Republic, LT – Lithuania, LV – Latvia, RO – Romania, SK – The Slovak Republic, SI – Slovenia; Ex. – Export; Im.-Import.

3.2 Structural stability and intra-distribution dynamics of agri-food trade specialisation

Agri-food trade of individual Central and Eastern European Countries with the ACC, CIS and the USA revealed a rather high degree of specialisation in both periods examined – 2000-2001 and 2004-2005. Trade with the other groupings was specialised to a lesser extent and in some cases specialisation even decreased.

The degree of revealed comparative advantage increased in particular in trade with the ACC. Latvian and Romanian agri-food commodities witnessed an increase in

revealed comparative advantages in relation to the majority of trade groupings, which was not the case of the other countries.

Table 8.26: Share of the ten most important commodities in exports/imports by value to/from trade grouping in 2000-2005 (%)

Reporter	Partner	Export		Import		Reporter	Partner	Export		Import	
		min.	max.	min.	max.			min.	max.	min.	max.
Bulgaria	EU-15	55.7	67.2	32.3	38.9	Romania	EU-15	58.8	68.5	38.0	50.2
BG	NMS	75.5	84.9	44.1	60.8	RO	NMS	66.7	80.8	45.1	58.5
	CIS	68.8	86.3	79.2	97.1		CIS	57.5	68.2	74.1	94.1
	ACC	82.0	94.7	79.7	93.5		ACC	79.9	87.0	69.5	88.8
	ROW	53.9	60.8	53.0	72.6		ROW	81.0	87.6	58.4	72.4
	USA	82.5	95.5	69.3	85.2		USA	87.8	98.0	90.0	93.2
	Total	47.3	55.6	33.0	42.3		Total	54.7	64.5	39.8	46.2
Czech Republic	EU-15	45.4	54.0	28.9	33.3	Slovakia	EU-15	40.6	64.8	28.9	38.7
	NMS	30.7	41.1	28.5	32.7	SK	NMS	30.3	38.5	32.2	37.5
CZ	CIS	58.5	80.4	59.2	76.3		CIS	76.4	85.1	80.4	95.3
	ACC	53.5	77.6	58.0	82.8		ACC	81.3	90.2	76.1	89.3
	ROW	63.3	70.9	44.9	57.1		ROW	58.2	80.3	41.5	57.7
	USA	88.1	93.2	81.6	88.6		USA	91.3	99.8	72.6	80.2
	Total	36.4	41.7	24.8	28.1		Total	30.3	39.3	26.1	30.5
Latvia	EU-15	76.4	85.2	29.9	35.4	Slovenia	EU-15	56.3	63.4	25.2	29.4
LV	NMS	37.7	46.8	32.3	42.0	SI	NMS	54.1	79.0	45.1	76.4
	CIS	67.0	87.2	48.0	70.5		CIS	91.8	97.6	84.7	98.0
	ACC	97.6	100.0	95.9	100.0		ACC	80.4	94.8	86.4	95.4
	ROW	79.6	90.8	41.5	48.9		ROW	47.0	57.9	41.4	52.1
	USA	91.9	98.1	71.5	80.0		USA	89.9	95.2	69.3	75.5
	Total	47.8	64.1	25.3	30.5		Total	41.5	52.2	23.9	27.7
Lithuania	EU-15	66.6	85.3	31.0	39.7						
LT	NMS	34.9	58.4	28.8	36.4						
	CIS	60.5	83.5	52.1	75.2						
	ACC	93.3	100.0	99.1	99.7						
	ROW	74.7	95.5	48.3	55.8						
	USA	84.9	97.4	88.0	98.3						
	Total	49.9	68.6	23.1	31.8						

Source: Own calculations.

For the majority of CEECs, the specialisation pattern in respect of their trading partners as a whole did not change, but the degree of specialisation decreased. In other words, commodities revealing significant comparative advantage saw their positions worsen due to the decline in competitiveness, while commodities in a very weak position at the beginning of the period of observation saw their positions improve in terms of comparative advantage. There were, however, several exceptions to the overall decrease in specialisation. In trade with the ACC, CEECs deepened their comparative disadvantages in commodities (mainly primary ones)

that performed badly at the beginning of the period analysed. After the 2004 EU enlargement import of those commodities from Bulgaria and Romania to NMS increased.

The year-by-year development of specialisation patterns was analysed using Markov transition probability matrices. We found rather significant rigidity, expressed by high diagonal probabilities, of commodities in trade with the EU-15, NMS, ROW and total agri-food trade. This was especially true of items that, each year, showed either significantly comparative disadvantage or, on the contrary, revealed high comparative advantage. On the other hand, there was much higher probability of agri-food competitiveness changes in CEEC trade with the ACC, CIS and the USA, which means higher dynamics in that trade.

Table 8.27: Level of processing of the most competitive export commodities by trade groupings

Trade grouping	Exporting country							
	BG	CZ	LV	LT	PL	RO	SK	SI
EU	M	H	S	S	S	R	Inc	M, H
NMS	H	S, H	M, H	H	H	S, H	S, H	S, H
ACC	R	Inc	H	S, H	H	M, S	Inc	M, H
CIS	H	S, H	S, H	S, H	H	S, H	Inc	S, H
USA	H	S, H	H	H	H	H	R, H	H
ROW	Inc	S, H	H	S	S, H	R, M	S, H	H
Total	Inc	S, H	H	S, H	S, H	R, M	S, H	S, H

Source: Own calculations.

Note: R – raw commodities, M – minimally processed, S – semi-processed; H – highly processed, Inc – inconclusive decision.

Over a one-year span, it was rather difficult for CEECs to improve the position of comparatively disadvantageous commodities with regard to individual trade groupings. On the other hand, it is also true that, once obtained, a comparative advantage, the countries were able to maintain this commodity position over the period analysed.

NMS trade with the ACC, CIS and the USA showed a high share of the same non-traded commodities over a one-year span. This situation may be due to high transaction costs. Moreover, in NMS trade with those three groupings over a one-year span there was a rather stable structure and high specialisation of traded commodities. An exception was Czech trade with ACC, where a significant shift in agri-food commodity trade position was observed.

Five-year transition matrices revealed significant dynamics of agri-food trade specialisation of individual CEECs according to trade groupings. We observed a gradual expansion in the number of mutually traded commodities in CEEC trade

with the EU-15, NMS, ROW and in CEEC total agri-food trade, which, however, made the level of trade specialisation decrease over the period analysed.

Furthermore, the magnitude of the five-year diagonal probabilities leads to the conclusion that over the period analysed, CEECs were more likely to see their trade positions in comparatively advantageous commodities worsen than their positions in comparatively disadvantageous ones improve.

To summarise, over the five-year period noticeable structural changes were observed in the agri-food trade patterns of NMS countries with Bulgaria, Romania, the CIS, USA and ROW. Taking into account the 2007 EU enlargement, the CIS, USA and ROW are third countries for the EU. Changes in the structure and dynamics of agri-food trade could be explained by the implementation of EU policies in the new Member States. Gradual agri-food trade liberalisation with the EU-15 before accession, mutual CEEC trade liberalisation after accession and insufficient flexibility to a changing environment affected the pattern of agri-food trade specialisation. Changes in commitments in relation to the WTO (as non-EU and EU members) and reform of the Common Agricultural Policy (CAP) of the EU also contributed to the structural changes.

4 DISCUSSION AND CONCLUSIONS

Over the period analysed, CEECs intensified trade with the old EU Member States, while their share of agri-food trade with the rest of the world declined; this is possibly a trade diversion effect of enlargement.

A noticeable feature of individual CEEC agri-food trade is their high level of specialisation in a relatively small number of commodities (by value). In most cases the ten most exported commodities by value were well in excess of 30 % of total agricultural export.

The most competitive CEEC commodities in trade with the EU-15 in 2000-2005 do not show a clear tendency as regards their level of processing. Country specifics, however, imply that the Czech Republic and Slovenia succeeded in exporting highly processed commodities to the EU-15, while Bulgaria and Romania exported predominantly commodities with low value added. Semi and highly processed commodities, i.e. with higher value added, were predominant in CEEC exports to trade groupings other than the EU-15. Dairy products were generally the most competitive CEEC commodities on all the markets considered.

Individual NMS agri-food trade with the ACC, CIS and the USA revealed a rather high degree of specialisation. Trade with the other groupings was specialised to a lesser extent and in some cases specialisation even decreased. A drop in revealed comparative advantages of the majority of the most successful commodities over the period analysed was detected. CEECs did not maintain positions

of their comparatively advantageous commodities, but at the same time the positions of a number of previously uncompetitive commodities improved.

CEEC accession to the EU, mutual trade liberalisation, gradual agri-food trade liberalisation, changes in WTO commitments (as non-EU and EU members) and reform of the CAP may be considered to be the prime factors influencing the comparative advantages, composition and dynamics of CEEC agri-food trade.

REFERENCES

- BALASSA, B. (1965): Trade liberalization and "revealed" comparative advantages. The Manchester School of Economic and Social Studies, 32(2), pp. 99-123.
- BERGSCHMIDT, A., HARTMANN, M. (1998): Agricultural Trade Policies and Trade Relations in Transition Economies. Institute of Agricultural Development in Central and Eastern Europe. Discussion Paper No. 12.
- CAETANO, J., GALEGO, A. (2006): In Search for Determinants of Intra-Industry Trade within an Enlarged Europe. Universidade de Évora, Departamento de Economia. February.
- FERTŐ, I., HUBBARD, L. J. (2003): The Dynamics of Agri-Food Trade Patterns. The Accession Countries' Case. Contributed paper presented at the International conference "Agricultural policy reform and the WTO: Where are we heading?" Capri (Italy), June 23-26, 2003.
- FERTŐ, I., SOÓS, K. A. (2006): Trade Specialisation in the European Union and in European Former Communist Countries. INDEUNIS Papers.
- FIDRMUC, J., DJABLIK, M. (2003): Intra-industry Trade between the EU and the CEECs. The Importance of FDI in Trade Structure. Contributed paper presented at the East-West Conference 2003, November 2-4, 2003.
- FONTAGNE, L., FREUDENBERG, M. (1997): Intra-Industry Trade Methodological Issues Reconsidered. CEPIL, document de travail No. 97-01.
- HINLOOPEN, J., VAN MARREVIJK, C. (2004): Dynamics of Chinese comparative advantage. TI 2004-034/2 Tinbergen Institute Discussion Paper, March 2004.
- LAFAY, G. (1992): The Measurement of Revealed Comparative Advantages. In: DAGENAIS, M. G., MUET, P. A. (eds): International Trade Modeling, Chapman & Hill, London.
- PROUDMAN, J., REDDING, S. (2000): Evolving patterns of international trade. Review of International Economics, 8(3), pp. 373-396.
- REDDING, S. (2002): Specialization dynamics. Journal of International Economics, 58(2), pp. 299-334.
- QUAH, D. (1993): Empirical Cross-Section Dynamics in Economic Growth. European Economic Review, 37(2/3), pp. 426-434.
- WÖRZ, J. (2005): Dynamics of Trade Specialisation in Developed and Less Developed Countries. Emerging Markets Finance and Trade, 41(3), pp. 92-111.
- ZAGHINI, A. (2003): Trade Advantages and Specialisation Dynamics in Acceding Countries. ECB Working paper No. 249, August 2003.
- ZAGHINI, A. (2005): Evolution of trade patterns in the new EU member States. Economics of Transition, 13(4), pp. 629-658.

THE AGRICULTURAL EXPORT-GROWTH NEXUS IN THE EU-27 AND THE COUNTRY RISK

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1 INTRODUCTION

The EU agriculture is undergoing an important process of liberalization and global integration. The process is taking place in an environment that is witnessing the most remarkable institutional harmonization and economic integration among nations in world history and that, since the 1990s following the collapse of communism, has opened to the emerging of a dominant global economic system. Most programs of the eastern Countries have been the integration of the national economy with the world economy with trade liberalization one of the measures (SACHS, WARNER, 1995).

In this context, agricultural growth becomes one of the key issues particularly in view of the targets of convergence and competitiveness set by the Community. The aspect is traditionally analysed with respect to the regional level (NUTS 2), where data constraints often represent a serious limitation. One of the missing aspects is the understanding of the implication of agricultural exports on the sector growth due to the unavailability of specific trade indicators at that level of analysis.

Even if theoretical positions on the export-growth nexus can be very divergent, the empirical studies seems to have supported the standard positions of the neoclassical type suggesting that the good export performance and outward orientation should make major contributions to economic growth (BALASSA, 1978; CHENERY, 1979; RAM, 1986; MICHAELY, 1977; GYLFASON, 1999a).

According to the literature exports affect growth mainly by increasing specialization and expanding the efficiency-raising benefits of comparative advantage; offering greater economies of scale due to an enlargement of the effective market size; affording greater capacity utilization; and inducing more rapid technological change (GYLFASON, 1999b).

A recent analysis has shown that accession has intensified agricultural trade in both old and new Member States without diverting trade from third countries. In addition, exports performance in high-value processed products has improved as a likely result of the restructuring process of food processing industry in the new Member States. In this context, the lacking aspect refers to the implications of these tendencies on agricultural growth.

The paper faces this issue. Its goal is the understanding of the openness degree of the agricultural sector in the EU-27 and its implication on the differential of agricultural labour productivity at the country level, which is the lowest territorial level at which agricultural export data is available. The preliminary analysis provided by the paper is based on a cross-country data from EUROSTAT, during the time period 2000/2004, with t-test and F-test used to determine the statistical significance of the empirical regularities observed. The regression line is only intended to allow the raw data to provide a rough impression of the pattern that would be expected to emerge in the absence of any other influences on agricultural productivity and on the openness degree. As these two variables are endogenous, a conclusive demonstration of the relationship estimated would consider other explanatory variables that exert an exogenous influence on them. In this respect, not only tariff protection is relevant but also the country risk that relates to the political, economic, or financial instability of a country. It determines the likelihood that changes in the business environment will occur reducing the profitability of doing business in that country and, thus, carries additional risk not present in domestic transactions (MELDRUM, 1999). Despite the key role of this component of the business transaction across international borders, the empirical literature on the topic is still lacking. For this reason, the paper analyses the impact of these typologies of risk on the export-growth nexus on the basis of the International Country Risk Guide (ICRG) data for 2000-2004, provided by The Political Risk Service (PRS) Group. More precisely, the empirical analysis has been structured as followed:

- The ratio of agricultural exports to the sector value added, adjusted by the country size, has been regressed on its main hypothesized determinants across countries;
- The 2000-2004 average growth of the real agricultural productivity has been regressed on the determinants of export performance.

2 OPENNESS INDEX

The ratio of agricultural exports to agricultural value added has been the first indicator of openness to external trade. Its 2000/04 average value across the countries of the sample ranges from 2.19 % of Greece to 79.47 % of Latvia (Figure 8.28).

Classifying the countries according to their size, it should be noticed that the inverse relationship between exports and the country size suggested by the literature is confirmed (GYLFASON, 1999b) (**Figure 8.29**). This is also true for the change over time (**Table 8.28**).

The relationship pointed out has suggested making reference to a more accurate index of openness unaffected by the size of population in order to estimate a significant explanatory variable particularly in the regression that explains the agricultural growth. Following GYLFASON (1999a) the index has been calculated as follows.

First, the elasticity of the agricultural export ratio ($\frac{X_A}{AVA}$) to population (pop) for the whole sample on 2003 has been estimated through a cross-country regression, with the OLS method, according to the following equation:

$$\frac{X_A}{AVA} = \alpha + \beta \ln(pop) + \mu \quad (1)$$

By substituting for each country the population size, a predicted agricultural export ratio has been calculated. It has been subtracted from the actual export ratio finding a measure of openness adjusted by the population size.

Figure 8.28: Average Agricultural Exports in percent of Agricultural Value Added by EU-27 countries in order of population size – 2000/04 (%)

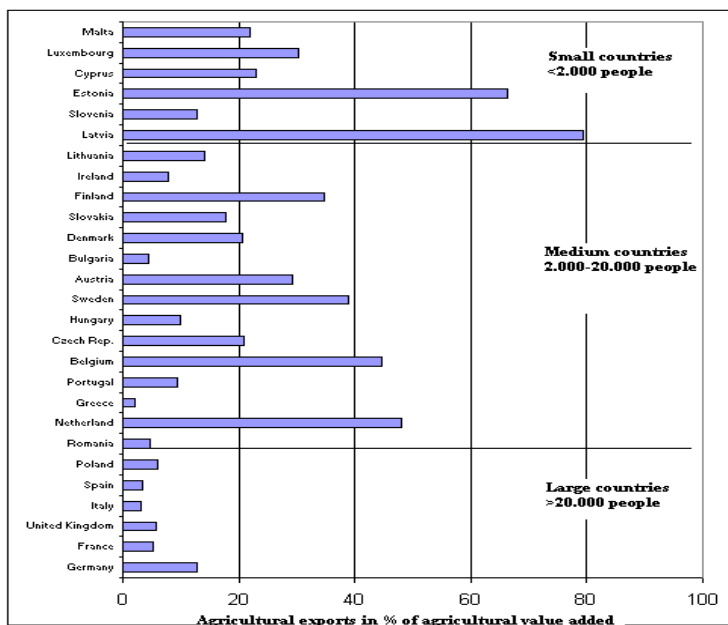
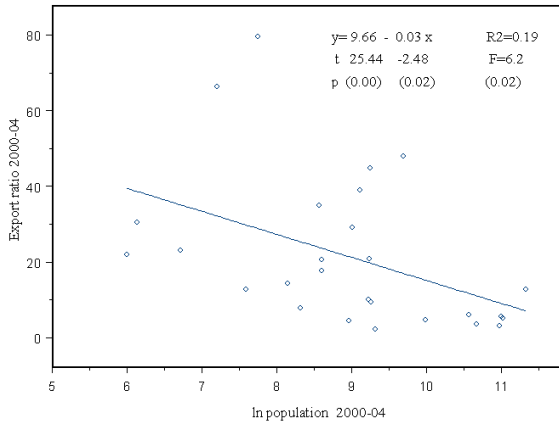


Figure 8.29: Agricultural export ratio and population**Table 8.28: Average Agricultural Exports in percent of Agricultural Value Added by sub-group of countries according to the population size and % change – 1990/94 - 2000/04**

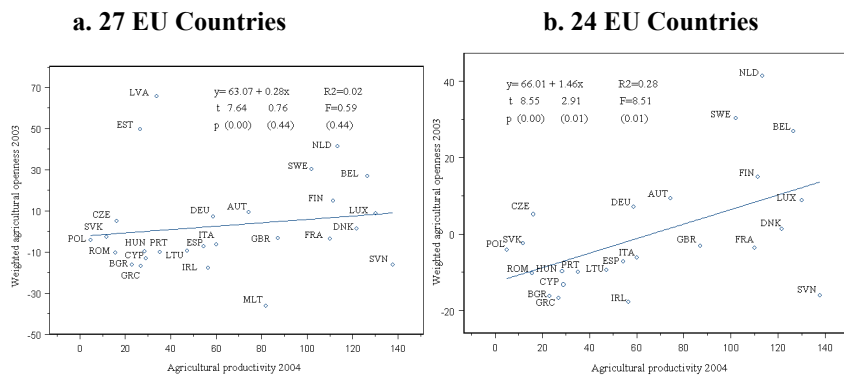
	2000-2004	% change 1990/04-2000/04
Small	38.97	1446.48
Medium	20.49	116.85
Large	5.99	59.02

According to this indicator the country in the sample can be classified into two subgroups: Open countries, with an adjusted openness index greater than the average value (Belgium, Germany, Luxembourg, Netherlands, Austria, Finland, Sweden, Estonia, Latvia, and Czech Republic) and closed countries, with a weighted index lower than the average (France, Italy, Denmark, Ireland, United Kingdom, Greece, Portugal, Spain, Cyprus, Lithuania, Malta, Poland, Slovakia, Slovenia, Hungary, Bulgaria, Romania). The gap between the two classes is wide, approximately 50 % above and below the average respectively, suggesting the absence of countries with an agricultural sector characterised by an adjusted openness degree close to the average value.

3 OPENNESS AND AGRICULTURAL PRODUCTIVITY

Figure 8.30a illustrates the agricultural export-growth nexus across the countries of correlated to the pattern of agricultural exports and population. However, the graphic representation has suggested to exclude Latvia, Estonia and Malta as outliers. Referring to the restricted sample made of 24 EU countries, the correlation between weighted agricultural openness and labour productivity is positive and statistically significant (**Figure 8.30b**).

Figure 8.30a-b: Weighted agricultural openness and agricultural productivity



Furthermore, there is a clear separation between the new and old Member States, with the former characterised by the lowest agricultural productivity levels and all in the sub-group of the closed economy, a part from the Czech Republic. Another exception is Slovenia with the highest agricultural productivity and a very low weighted openness.

4 OPENNESS AND COUNTRY RISK

The relationship between agricultural openness and the country risk has been first assessed through the political, financial and economic risk indexes provided by The PRS Group. The political risk index gauges the political stability of a country at a specific time. Beginning with Tinbergen (1962) the literature pointed to political risk as an important impediment to international trade because it represents an additional transaction cost. The financial risk index is a measure of a country's ability to finance its official, commercial and trade debt obligations. The economic risk index assesses a country's current economic strength and weaknesses. For all the three indexes, the lower the risk point total, the higher the risk and *vice versa*.

According to **Figures 8.31-8.33**, a low the political, economic and financial risk is positively and statistically significantly correlated to the weighted agricultural openness. The success of the regressions in predicting the values of the dependent variables is relatively highest when the economic risk index is considered (40 %), followed by the financial (30 %) and political (20 %) risk

The graphic representation has allowed distinguishing the countries according to the intensity of the specific risks. The classification has been based on the criteria suggested by the PRS Group: Moderate, low and very low risk. The majority of

the observations are in the very low risk class while only very few of them are in the moderate risk sub-group.

Figure 8.31: Weighted agricultural openness and political risk

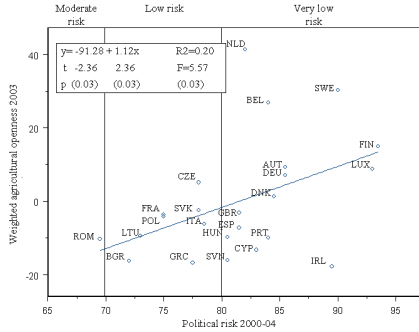


Figure 8.32: Weighted agricultural openness and financial risk

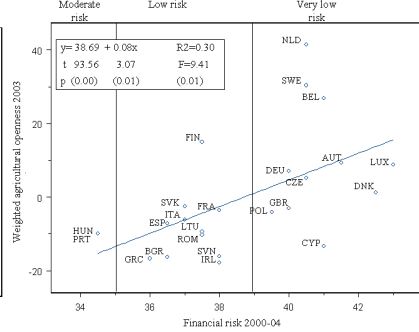
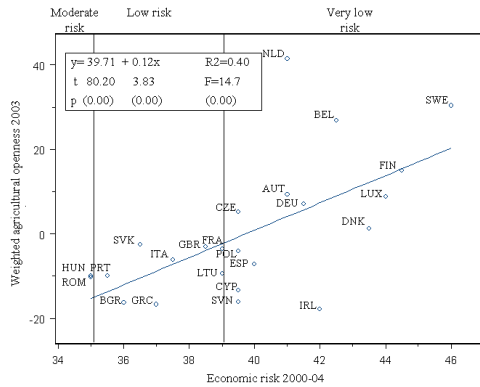


Figure 8.33: Weighted agricultural openness and economic risk



Combining these information with those referred to the agricultural productivity certain common dynamics emerge. They concern:

- Netherlands, Sweden, Belgium, Luxembourg and Denmark that are characterised by above average level of agricultural productivity, a very low country risk and the highest agricultural openness;
- Germany and Austria with an agricultural productivity on average, a very low country risk

- Spain and Ireland that have an agricultural productivity on average, a low financial risk, a very low political and economic risk and a low weighted agricultural openness;
- Greece, Bulgaria and Lithuania with a below average agricultural productivity, a low country risk and a low openness degree;
- The Czech Republic and Poland that have a below average agricultural productivity, a low political risk, a very low financial and economic risk and a low openness.

The majority of the countries in each group share the borders suggesting a likely influence of the intra-country trade, aspect that should be better understood.

5 DETERMINANTS OF THE AGRICULTURAL LABOUR PRODUCTIVITY GROWTH

In order to understand the role of agricultural openness on the sector growth, the following equation has been estimated:

$$\Delta \frac{AVA_i}{AL_i} = \alpha + \beta \Psi_i + \delta \Gamma_i + \gamma \Theta_i + \varphi \Omega_i + \mu_i \quad (2)$$

where $\Delta \frac{AVA_i}{AL_i}$ is the 2000-04 annual average growth of the agricultural labour productivity, Ψ_i is the vector of the political risk components, Γ_i that of the financial risk determinants and Θ_i of the economic risk variables, all of country i and referred to the 2000-04 average values, Ω_i is the control variable of the influence of the business cycle represented by the level of agricultural productivity in 2000 and μ_i is the error term. A step-wise model selection has been adopted for choosing the best model that is illustrated in **Table 8.29**.

Table 8.29: Dependent variable annual change Agricultural labour productivity (2000-04)*

Variable	Coefficient value	t value	Pr(> t)
Intercept	39.80	2.87	0.0094
Annual inflation rate risk index	1.35	2.71	0.0134
Real GDP growth risk index	-1.16	-2.85	0.0100
Budget balance risk index	0.66	2.19	0.0406
Current account risk index	0.51	2.98	0.0075
Socio-economic risk index	-1.36	-2.70	0.0141
Investment profile risk index	3.22	2.91	0.0089
Corruption risk index	-1.45	-1.73	0.0987
F-statistic	8.54		0.00009
R ²	0.7589		

Note: * OLS method.

All the explanatory variables have an estimated coefficient with a marginal significance level less than 5 %, a part from the Corruption risk index. The fraction of the variance of the dependent variable explained by the independent variables is pretty high, almost 76 %, and the F-test is highly significant.

Concerning the independent variables, four of them are components of the economic risk index (Annual inflation rate risk index, Real GDP growth risk index, Budget balance risk index and Current account risk index) while the others concern the political risk index (Socio economic conditions risk index, Investment profile risk index and Corruption risk index).

As the direction of the relationship, the results confirm also for the agricultural sector what the literature underlines for the overall economic development. The analysis suggests a negative correlation between the change in agricultural labour productivity and the risk of inflation, budget deficit, current account deficit, deterioration of investment environment. On the contrary, the correlation between the dependent variable and the risk of low economic development rate and of deterioration in socio-economic conditions is positive.

The relationship between inflation and growth remains a controversial issue in both theoretical and empirical literature (HOSSAIN, CHOWDHURY, 1996; BRUNO, 1996). In this context, the analysis developed suggests that price stability should be a prerequisite for the agricultural productivity growth. The several possible pathways of the interaction between inflation and growth suggested by the literature whose positive effects seem also to affect agricultural productivity growth deserve further investigation to be better understood.

The size of Government expenditure and its impact on growth has been analysed for decades and has represented a major public choice issue facing economies in transition. However, the literature, essentially of empirical nature, is controversial. On the one side, there are those supporting the pro-market view according to which an increase in government expenditure constraints economic efficiency, productivity and overall growth (BARRO, 1991; LANDAU, 1983, 1986; GHALI, 1998). Several arguments are produced to support this view. Among them, there is the fact that the public sector is not responsive to market signals and the possible crowding-out effect on private investment. In this respect, the empirical findings pointed out seem to confirm this position. However, it should be noted that the result might also be connected to the low quality and allocation issues of the public expenditure that should undermine the implications suggested by the macroeconomists, particularly the Keynesian.

Concerning the current account balance, although a deficit does not mean necessarily that a country is weak, the literature underlines that its reversal represents a significant damage for the economy due to its often negative impact on economic performance (see, for example, CALVO, 1988, 2000; MORENO, 1999; BARRO, 2001; EDWARDS, 2001). It is signal of potential imbalances that could lead a country to

restrict certain typologies of foreign capital flows that cannot be substituted by domestic capital or generated domestically by increasing savings. Interpreting the risk of current account deficit as a signal of this tendency, the results achieved seem to support this view.

The strongly developed theoretical and empirical body on the relationship between investment, productivity and long-term economic growth find its foundation into two basic schools of thought: The neoclassical referred to the pioneer approach by SOLOW (1956) and the new growth theory, or endogenous theory, first articulated by ARROW (1962), ROMER (1986) and LUCAS (1988). Even though differences between them have significant implications on the mechanisms that determine the impact of investment on productivity and economic growth, they both emphasise the positive impact of investment on growth (for a review see, for example, STIROH, 2000), relationship confirmed by the empirical findings of the analysis developed.

The results achieved have also supported the tendency for the level of development and socio-economic conditions to be inversely correlated to agricultural productivity through the impact on agricultural output (CHENERY, ROBINSON, SYRQUIN, 1986).

6 CONCLUSIONS

The analysis has confirmed the positive nexus between the agricultural productivity level and the weighted sector openness. This latter variable has resulted significantly affected by the country risk and particularly by the economic environment providing new insights towards a better understanding of the factors affecting agricultural growth that is today understood as one of the most pressing issue in the enlarged EU.

Regressing the agricultural productivity on the single determinants of the export performance related to the country risk, the results are broadly consistent with the literature and open new grounds on how to proceed in exploring the topic and consisting in the investigation of the possible pathways through which the components of the country risk affects agricultural development. This is a priority topic particularly from a policy point of view: Not only agricultural intervention but also those affecting the country stability should have a role in determining the sector growth.

Furthermore, a conclusive demonstration of the relationships pointed out would required a more detailed econometric scrutiny not only in terms of methodologies adopted (through, for example, panel data and dynamic methods) but also of other relevant variables, particularly of political nature.

REFERENCES

- ARROW, K. J. (1962): The economic implications of learning by doing. *Review of Economic Studies*, 29(3), pp. 155-173.
- BALASSA B. (1978): Exports and Economic Growth: Further Evidence. *Journal of Development Economics*, 5, pp. 181-189.
- BALASSA B. (1973): Exports, Policy Choices, and Economic Growth in Developing Countries after the 1973 Oil Shock. *Journal of Development Economics*, 18, pp. 23-35.
- BARRO, R. J. (2001): Economic Growth in East Asia before and after the Financial Crisis. *NBER Working Papers Series*, n. 8330.
- BARRO, R. J. (1991): Economic Growth in a Cross Selection of Countries. *Quarterly Journal of Economics*, 106, pp. 407-444.
- BRUNO, M. (1996): Inflation and Growth: In Search of a Stable Relationship. *Review Federal Reserve Bank of St. Louis*, 78(3), pp. 139-146.
- CALVO, A. G. (1988): Capital Flows and Capital-Market Crises: The simple economics of Sudden Stops. *Journal of Applied Economics*, 1(1), pp. 35-54.
- CALVO, A. G. (2000): Balance-of-Payment Crises in Emerging Markets: Large Capital Inflows and Sovereign Governments. In: KRUGMAN P. (ed.): *Currency Crises*, University of Chicago Press, Chicago, Illinois.
- CHENERY, H. B. (1979): *Structural Change and Development Policy*. Oxford University Press, New York.
- CHENERY, H., ROBINSON, S., SYRQUIN, M. (1986): *Industrialization and Growth: A Comparative Study*. Oxford University Press, New York.
- EDWARDS, S. (2001): Does the Current Account Matter? *NBER Working Papers Series*, No. 8275.
- GHALI, K. H. (1998): Government Size and Economic Growth: Evidence from a Multivariate Cointegration Analysis. *Applied Economics*, 31, pp. 975-987.
- GYLFASSON, T. (1999a): Exports, Inflation and Growth. *World Development*, 27(6), pp. 1031-1057.
- GYLFASSON, T. (1999b): *Principles of Economic Growth*. Oxford University Press, New York.
- HOSSAIN, A., CHOWDHURY, A. (1996): *Monetary and Financial Policies in Developing Countries*. Routledge, London.
- LANDAU, D. (1986): Government and Economic Growth in Less Developed Countries: An Empirical Study for 1960-80. *Economic Development and Cultural Change*, 35, pp. 36-75.
- LANDAU, D. (1983): Government Expenditure and Economic Growth: A Cross Country Study. *Southern Economic Journal*, 49(3), pp. 789-792.
- LUCAS, R. E. (1988): On the mechanics of economic development. *Journal of Monetary Economics*, 22, pp. 3-42.
- MELDRUM D. H. (1999): Country risk and foreign direct investment. <http://www.nabe.com/am99/meldrum.pdf/>.
- MICHAELY, M. (1977): Exports and Growth: An Empirical investigation. *Journal of Development Economics*, 4, pp. 49-53.

- MORENO, R. (1999): Deprecation and Recessions in East Asia. Federal Reserve Bank of San Francisco Economic Review, 3, pp. 27-40.
- RAM, R. (1986): Government Size and Economic Growth: A New Framework and some Evidence from Cross-section and Time-series Data. American Economic Review, 76, pp. 281-284.
- ROMER, P. (1986): Increasing returns and long run growth. Journal of Political Economy, 94(5), pp. 1002-1037.
- ROMER, P. (1987): Growth based on increasing returns due to specialization. American Economic Review, 77(2), pp. 56-62.
- SACHS J. D, WARNER, A. (1995): Economic Reform and the Process of Global Integration, *Brooking Papers on Economic Activity*, 1, pp. 1-118.
- SOLOW, R. (1956): A contribution to the theory of economic growth. Quarterly Journal of Economics, 70(1), pp. 65-94.
- STIROH, K. J. (2000): Investment and Productivity Growth: A Survey from the Neoclassical and New Growth perspective. Industry Canada Research Publication Program. *Occasional Paper*, 24, June.
- TINBERGEN, J. (1962): Shaping the World Economy. Twentieth Century Fund, New York.

THE EFFECT OF CAP PAYMENTS ON TERRITORIAL COHESION

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1 INTRODUCTION

As a member state of the European Union, from 1 May 2004 Hungary has been adapting the regulations of the Common Agricultural Policy (CAP). New measures came into force and the budget for agriculture and rural development doubled. This paper examines whether or not agricultural payments have had an impact on territorial cohesion in Hungary. Three payments are examined for the year 2005.

The 100 % EU-financed Single Area Payment Scheme (SAPS) represents the most important type of support, related to CAP Pillar 1 (EUROPEAN COMMISSION, 2004, p. 7), affecting the widest sphere of farmers regardless of the type of crop cultivated on the particular plot of land. SAPS payments give the 31 % of the Hungarian agricultural budget in 2007 (total budget in 2007 was EUR 1823 million). It represents an increasing percentage of the budget as a result of the Accession Treaty (OJ, 2003, p. 346).

Before 2004 the Special Accession Programme for Agriculture and Rural Development (SAPARD) was the first possibility for Hungary to obtain funds for rural development from the EU. From 2004 till 2007 two programmes were prepared for the disbursement of funds of the EAGGF for rural development: Agricultural and Rural Development Operative Programme (ARDOP) and Hungarian National Rural Development Plan (NRDP). From 2007 the New Hungary Rural Development Programme (NHRDP) gives the basis for funds from European Agricultural Fund for Rural Development.

The first rural development payment (CAP Pillar 2) analysed is agri-environment measures (AEMs). In Hungary the financial resources of measures similar to AEMs were first available in 1997 (about ten years later than in the EU-15), when farmers who wanted to begin organic farming on their land could apply for it. Between 1997 and 2001 about EUR 2 million was available for this purpose. It was followed by the National Agri-environmental Protection Programme, based on EU principles, which provided EUR 10 and 18 million from the national budget in 2002 and 2003 respectively for farmers taking part. After accession to

the EU, Hungary prepared the NRDP with the aim of getting funds from the Guarantee Section of EAGGF, including Hungarian regulations for AEMs. AEMs account for nearly 10 % of the budget in 2007, and gives about 50 % of NRDP funds.

The other, CAP Pillar 2 payment analysed is assistance to investments in agriculture, giving more than 60 % of SAPARD and over 50 % of ARDOP funds. This measure accounts for over 10 % of the budget in 2007. A big difference between the two examined CAP pillar 2 payments is, that contrary to investment payments agri-environmental payments do not need own resources.

2 MATERIAL AND METHODS

This paper is based on database for SAPS and AEMs from the Hungarian National Agricultural and Rural Development Agency and the database of investments in agriculture for the North Great Plain Region from the database of the National Development Agency for the year 2005.

Firstly, data of SAPS payments, more than 200,000 contracts were analysed at the NUTS 3 level. Territory of NUTS 3 regions (counties) under SAPS and contracts per counties were totalled.

Secondly, data on the number of applications and area under AEMs and SAPS were grouped on a settlement basis of the North Great Plain Region (NUTS 2 region, **Figure 8.34**), which is made up of the counties Hajdú-Bihar, Jász-Nagykun-Szolnok and Szabolcs-Szatmár-Bereg.

Following the principles of the EU, the North Great Plain Regional Development Agency prepared its Regional Operational Programme (NGPROP, 2006) for the period 2007-2013. In this programme the settlements of the region are grouped in spatial categories according to the economic and social characteristics of the settlements. Three main groups were created, with sub categories as follows:

- (1) Regional development poles and sub-centres
 - (a) The Debrecen regional development pole
 - (b) The Nyíregyháza and Szolnok regional development sub-centre
 - (c) Regions in the agglomeration of regional poles and their sub-centres
- (2) Dynamic regional centres and regional centres that can be dynamised
- (3) Regions awaiting convergence
 - (a) Settlements serving as micro-regional centres for those living in vicinity
 - (b) Potential spaces of the utilisation of rural resources

The distribution of SAPS and AEMS payments and, thirdly, investment in agriculture payments of ARDOP were grouped according to the categories given in the Operative Programme.

The correlations between the calculated data from the SAPS database and the selected factors from the available dataset of the Hungarian Central Statistical Office (HCSO, 2006a) were examined.

3 RESULTS

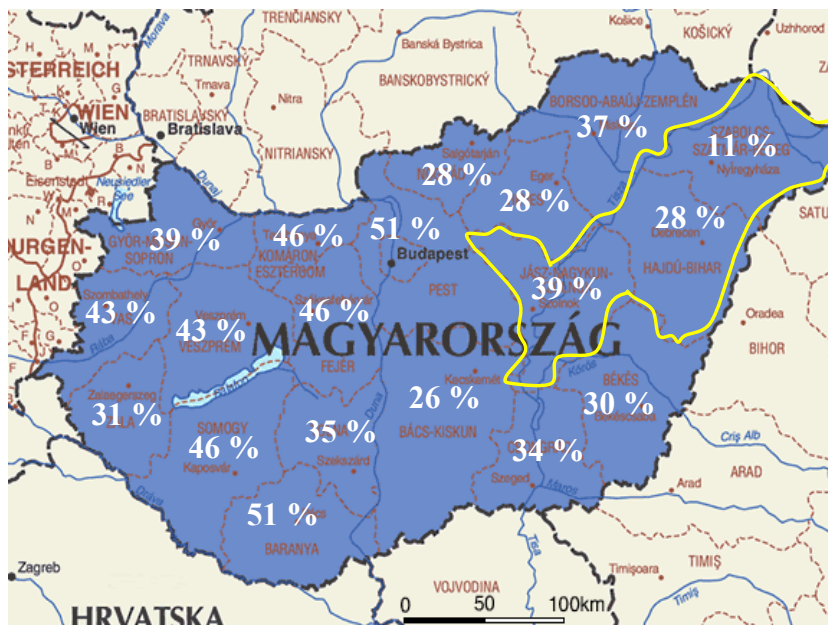
Results of analysed database of SAPS on NUTS 3 level show that SAPS area covered by contracts over 500 hectares from the total SAPS area of counties are the highest in those counties which are in the western part of Hungary (see: **Figure 8.34**). Those counties where this rate is lower, represents a higher percentage from the number of the contracts. There is a negative correlation, 0.66 at the 0.01 level (2-tailed), between the SAPS area under contracts above 500 hectares/total SAPS area of the county related to the distribution of contracts' number between the counties. There is a positive correlation between the average size of contracts for SAPS below 500 hectares and the SAPS area under contracts above 500 hectare/total SAPS area of the county. In this case Pearson Correlation is significant 0.618 at the 0.01 level (2-tailed).

Area under SAPS related to the counties' utilised agricultural area (UAA) was also calculated. Area under SAPS/UAA is 85 % on country level, which means that only 15 % of the UAA is not involved in SAPS payments. The lowest is the percentage of SAPS/UAA in Heves (51 %) and in Nógrád (65 %) county, in the northeast of Hungary and the highest is 107 % in Pest county, central Hungary. It has to be added that the location of the land and the settlement where the applications were submitted can differ, especially in the case of main cities.

DAX (2006) states that Pillar 1 support is distributed in a way that tends to benefit richer regions with larger farms. This statement was examined according to the results in SAPS/UAA²⁶ correlated to data GDP per capita, and unemployment rate in the counties of Hungary from the database of HCSO (2006a, p. 56; 2006a, p. 38). There is no significant correlation. In case of SAPS/UAA correlated to GDP/capita result was 0.433, while in the case of SAPS/UAA correlated to unemployment rate result was negative, -0.337.

²⁶ As SAPS payments are area based and are the same in the case of every contract, 86.21 €/ha in 2005, the result of SAPS area/UAA can be used as SAPS support/UAA.

Figure 8.34: SAPS area under contracts above 500 ha/total SAPS area on NUTS 3 level (2005/2006)



Source: Own calculation. Map of Euro Info Centre (2006:1). The line around three counties indicates the boundaries of the North Great Plain Region (NUTS 2).

Results of SAPS data analysis on NUTS 3 and settlement level (grouped according to the categories after NGPROP, 2006) are shown in Table 8.30. Every settlement has SAPS contracts. The average of SAPS area per contract in Jász county is higher than the country's average, while in Hajdú and Szabolcs it is lower. The lowest is the average SAPS area in the categories called potential spaces of the utilisation of rural resources and regions in the agglomeration of regional poles and their sub-centres. In every county about 60 % of SAPS belongs to those categories, defined as regions awaiting convergence.

Table 8.30: Breakdown of SAPS payments (2005/2006)

County	Settlement category	Number of settlements	Number of settlement with SAPS contract	Number of contracts for SAPS	UAA (ha) under SAPS	SAPS (ha)/contract	Distribution of county's UAA (%)
Hajdú-Bihar	1.1	1	1	2,607	60,028	23	7
	1.3	17	17	3,886	53,647	14	13
	2	5	5	5,200	104,267	20	20
	3.1	15	15	5,491	114,152	21	27
	3.2	44	44	4,678	95,476	20	33
Jász-Nagykun-Szolnok	1.2	1	1	593	20,390	34	5
	1.3	13	13	1,132	37,276	33	10
	2	8	8	3,192	121,037	38	30
	3.1	15	15	3,282	111,899	34	29
	3.2	41	41	3,451	100,288	29	26
Szabolcs-Szatmár-Bereg	1.2	1	1	1,977	30,240	15	9
	1.3	31	31	5,454	52,735	10	16
	2	6	6	2,314	33,323	14	10
	3.1	18	18	3,556	47,186	13	14
	3.2	174	174	14,631	163,110	11	51
Total		389	389	61,444	1,145,054	19	

Source: Own calculations based on data from Agricultural and Rural Development Office.

Those regions which are in the eastern part of Hungary have a higher interest for AEMs. The three NUTS 2 regions in the eastern part of the country give 54.4 % from the total territory of the programme and 71.4 % from the applications. The examined north great plain region gives the 20.6 % from the total territory of the programme and 28.7 % of the applications.

Results of the AEMs database are shown in **Table 8.31**. Over 90 % of the settlements applied for AEMS. The average area per application in the NGPR is 36 hectares. High average of AEMs areas is a result of the fact that high percentage of these areas belongs to National Park. Similar to SAPS payments in every county about 60 % of AEMs area belongs to those categories, defined as regions awaiting convergence.

Table 8.31: Allocation of agri-environmental measures (2005/2006)

County	Settlement category	Number of settlements	Number of settlement under AEMs	Number of contracts	Average AEM area (ha)/application	Distribution of area covered by AEMs on county level
Hajdú-Bihar	1.1	1	1	447	45.5	15.3
	1.3	17	17	253	47.5	9.0
	2	5	5	562	47.4	20.1
	3.1	15	15	655	78.2	38.5
	3.2	44	39	737	30.7	17.0
Jász-Nagykun-Szolnok	1.2	1	1	40	52.1	2.7
	1.3	13	10	64	34.1	2.8
	2	8	8	329	75.3	31.8
	3.1	15	14	339	68.3	29.8
	3.2	41	36	274	93.5	32.9
Szabolcs-Szatmár-Bereg	1.2	1	1	237	44.1	10.9
	1.3	31	26	768	17.8	14.3
	2	6	6	489	25.4	13.0
	3.1	18	18	614	25.6	16.4
	3.2	17	4	163	2,493	17.4
Total		389	360	8,301	36.9	

Source: Own calculations based on data from Agricultural and Rural Development Office.

Finally results of Assistance to investments in agriculture payments are summarized in **Table 8.32**. This measure has six sub-measures which are cumulated, these sub-measures are: Facilities related to animal husbandry; investments in plant production and horticulture; purchase of machinery; construction and improvement of immovable property; restructuring of apple, pears and peaches orchards; establishment and development irrigation systems; and investments for on-farm amelioration activities.

Regarding the number of settlements having contract for investment funds, 58.5 % of the total applied for it. Less than in the case of AEMs, which measure as mentioned earlier does not need own resource. In general payments represented the 38 % of the total cost of the investment. In the case of Jász the percentage of the payments from the total cost is the smallest in the less developed regions. The average payments per contracts are the smallest in the rural areas of the NUTS 3 regions.

Table 8.32: Breakdown of investments in agriculture measures (2005/2006)

County	Settlement category	Number of settlements	Number of settlement under of AVOP	Number of contracts	Average payments/contracts (euro)	Payments/Total cost %	Allocation of payments on county level (%)
Hajdú-Bihar	1.1	1	1	15	81,018	38	4.6
	1.3	17	13	38	126,531	38	18.5
	2	5	5	69	129,527	39	34.3
	3.1	15	14	49	97,129	40	18.3
	3.2	44	35	79	80,000	39	24.3
Jász-Nagykun-Szolnok	1.2	1	1	2	81,654	40	1.0
	1.3	13	8	13	53,652	40	4.0
	2	8	7	43	137,715	35	34.6
	3.1	15	14	57	122,587	38	40.8
	3.2	41	20	45	74,638	35	19.6
Szabolcs-Szatmár-Bereg	1.2	1	1	14	113,936	39	6.0
	1.3	31	19	46	115,726	38	20.0
	2	6	5	27	177,962	38	18.0
	3.1	18	11	38	155,540	39	22.1
	3.2	174	72	123	73,635	38	33.9
Total		389	226	658	106,170	38	

Source: Own calculations based on data from National Development Agency.

4 DISCUSSION AND CONCLUSION

Results on the SAPS database tend to support those of DAX (2006) who reported that Pillar 1 support is distributed in a way that tends to benefit richer regions with larger farms. In the western part of Hungary high percentage of the SAPS area is covered by contracts over 500 hectares (behind contracts different forms of farms exists, from the 0.3 hectare land-user to the limited and other type of companies formed from former cooperatives).

The average farm size in case of those farms getting SAPS payments and below 500 hectares (their number is above 200 000, supposing that 1 contract = 1 farm) is similar to the EU-25 average. The average EU-25 farm size is 16 hectares with large variations between Member States (MS). Variations among MS and regions are even greater when measuring the economic size. On average, the economic size of farms in the new (2004) MS is six times lower than in the EU-15 (the Czech Republic is the only new MS where the average economic size of farms

is above the EU-25 average). For example in Hungary from the 964,460 farms nearly 90 % are under the economic size 2 European Standard Unit, while for example in the Netherlands 78 % are above 16 ESU (KOVÁCS, without year). High percentage of the contracts for SAPS are 1 hectare or below. Subtracting the contracts number of SAPS from the total 964 thousand farms, there are 700 thousands which are still very small. Presumably these farms are situated in those areas where SAPS area covers less part of total UAA areas (e.g. Nógrád, Heves counties).

One of the reasons for difference between the percentages of involvement in SAPS between counties can be the information flow. This statement is firm by the results gained for Pest county. The area under SAPS related to the UAA of Pest county (including Budapest, the capital of Hungary) was 107 %. (As earlier was mentioned it has to be added that the location of the land and the settlement where the applications were submitted can differ, especially in the case of main cities.) The results obtained in another study about Less Favoured Areas (LFA), (KATONA et al., 2006, p. 3) brought similar results for Pest county. Applications for LFA funds related to the total LFA areas in Pest county, defined according to article 19 and article 20 of Council Regulation (EC) No 1257/1999 (OJ, 1999, pp. 89-90), were much higher than the average for the country. While the area covered by applications was 34 % and 18 % respectively from LFA 19 and LFA 20 total area in Hungary, it was 90 % and 59 % respectively for Pest county.

The results of analysis on NUTS 3 and settlement level shows better relation between CAP payments and territorial allocation, as around 60 % of these payments go to those areas categorised as regions awaiting convergence. One reason for this of course comes from the definition of rural areas. The NHRDP (2007, p. 13) states that *"rural areas comprise a special type of region characterised by low population density, heavy reliance on land as a source of livelihood, and a non-urbanised settlement structure (typified by villages, small towns, and, in certain regions, by isolated farms)"* It is stated that these areas are heavy reliance on land. The results of SAPS payments analysis in Hungary underlines the statement of the Commission document, that agriculture is often based on more extensive farms in rural areas as, in most cases, the economic size of farms is lower in rural areas. (EUROPEAN COMMISSION, 2006) Despite this 60 % allocation, all of the three payments presented in the paper are related to agricultural production, which gave only the 4.3 % of the GDP in Hungary in 2005. (HCSO, 2006b, p. 17). So "investing in agricultural production" may not have the result of territorial cohesion. Adding the facts raised by AHRENS (2004) firstly that entrepreneurial spirit is essential for development in these regions (which is missing in a lot of cases, although there are some good examples) and secondly that agricultural policy boosts income and employment in the upstream and downstream sectors, however these effects increasingly accrue in non-rural regions as a result

of concentrated processes taking place in the sectors concerned, show the problem around CAP.

Results on settlement basis show big differences between regions. For rural development analysis, there is a need for a detailed geographical breakdown. (EUROPEAN COMMISSION, 2006) There are a lot of reasons for this, for example:

- in many settlements there is a contract covering more than 1000 hectares SAPS area, as former cooperatives are located here which are continuing to operate in other forms of organisation. Other settlements have never had such big areas concentrated under a single ownership,
- density of settlements differs between regions (e.g. Szabolcs-Jász counties),
- attendance of National Parks (e.g. Hajdú county).

Finally, to increase the cohesion impacts of the CAP in the future, the proposal of the Commission in July 2002 (COM, 2002), related to modulation, should be followed and a ceiling of 300,000 euro should be placed on payments for each farm.

REFERENCES

- AHRENS, H. (2004): Agricultural Policy and Rural Development: Theoretical and Empirical Aspects. *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, 25, Halle (Saale), IAMO pp. 340-355.
- COM (2002): Communication from the Commission to the Council and the European Parliament of 10 July 2002 – Mid-term review of the common agricultural policy COM (2002) 394 – Not published in the Official Journal [www document] (accessed 22 May 2007) <http://europa.eu/scadplus/leg/en/lvb/l11062.htm/>.
- DAX, T. (2006): The Territorial Dimension of CAP and Spatial Cohesion. *EuroChoices*, 5(2), pp. 12-19.
- EURO INFO CENTRE (2006): Country Profile Fact Sheet Hungary. January 2006. <http://ec.europa.eu/enterprise/networks/eic/pdf/profile-hungary.pdf/>.
- EUROPEAN COMMISSION (2004): Proposal for a Council Regulation on support to Rural Development by the European Agricultural Fund for Rural Development. Commission staff working document, COM(2004)490final. http://europa.eu.int/comm/agriculture/rur/publi/propimpact/text_en.pdf/.
- EUROPEAN COMMISSION (2006): Rural Development in the European Union. Statistical and Economic Information. Report 2006. Directorate-General for Agriculture and Rural Development, August 2006.
- HCSO (2006a): Hajdú-Bihar megye statisztikai évkönyv, 2005 [Statistical Year Book of Hajdú-Bihar county]. Központi Statisztikai Hivatal Debreceni Igazgatósága. Debrecen, 2006 [Debrecen Directory of Hungarian Central Statistical Office (HCSO)].
- HCSO (2006b): Mezőgazdasági Statisztikai Évkönyv, 2005 [Agricultural Statistical Year Book, 2005] Központi Statisztikai Hivatal [Hungarian Central Statistical Office], Budapest.

HUBBARD, C., GORTON, M., HUBBARD, L. (2007): The Common Agricultural Policy and the Challenges for Rural Development in an Enlarged European Union. School of Agriculture, Food and Rural Development, University of Newcastle.

KATONA-KOVÁCS, J., KISS, ZS., SZABÓ, G. (2006): A Nemzeti Vidékfejlesztési Terv intézkedései a kedvezőtlen adottságú területekre [The LFA measures of the Hungarian National Rural Development Plan]. In: KIRÁLY, ZS. ET AL. (eds): Gyöngyös X. Nemzetközi Agrárökonómiai Tudományos Napok "Agráralkalmazkodás a változó gazdasághoz" előadások összefoglalói, pp. 167, (CD).

KOVÁCS, G. (without year): A Magyar Tesztüzemi Információs Rendszer és annak statisztikai háttere [Hungarian FADN system and its statistical background] [www document] (accessed: 20 March 2007). http://www.akii.hu/videkfejl/_frames.htm/ (under vállalkozáselemzés diabemutató – PowerPoint presentation).

NGPROP (2006): The North Great Plain Regional Operational Programme 2007-2013, Government of the Republic of Hungary, 134 pp. [www document] (accessed: 27 February 2007). http://www.nfu.gov.hu/index.nfh?r=&v=&l=&d=&mf=&p=umft_opprog/.

NHRDP (2007): New Hungary Rural Development Programme 19th February 2007, Government of the Republic of Hungary, [www document] (accessed: 20 March 2007). http://www.fvm.hu/doc/upload/200702/nhrdp_070220.pdf/.

OJ (1999): Council Regulation (EC) No 1957/1999 of 17 May 1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations. Official Journal L 160, 26/06/1999, pp. 80-102.

OJ (2003): Documents concerning the accession of the Czech Republic, the Republic of Estonia, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the Republic of Slovenia and the Slovak Republic to the European Union. Annex II: List referred to in Article 20 of the Act of Accession 6. Agriculture Official Journal L 236, 23/09/2003, pp. 346-444.

FACTORS OF EFFICIENCY CHANGE OF ASSETS ON THE EU-15 AND HUNGARIAN FARMS FROM 1990S

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1 INTRODUCTION

The analysis of main factors of agriculture's means and capital efficiency is strongly related to the factors of technical development. The present paper follows the complex approach of technical development according to the definition the European agro-economists in 1955, Helsinki (HUSTI, 2003). It states that the technical development of agriculture is based on four pillars, namely biological, chemical, technical and human factors, among which "technical" includes mechanization and architecture, too. This definition basically corresponds to what.

The content of definition of technical development is permanently expanding. By today – due to the general technical and social progress – the above mentioned factors should be complemented with further factors, especially with information (KÉSMÁRKI GALLI, 2006).

The development of agricultural production factors hides a deliberate human action which is part of an innovation activity system influencing production factors. As we have seen, however, in Hungary in the 1990s, its continuity and flow depends also on the social condition system. The key to development is in innovation activity, which highlights the satisfaction of market needs, thus combining knowledge and entrepreneurial drives, skills and possibilities (HUSTI, 1998).

Regarding the analysed topic, it is important to explore the way of measuring technical development and its efficiency. KÉSMÁRKI GALLI (2006) gave detailed treatment of this topic. The present paper systematizes only those points which support the approach of our research introduced below.

The involvement of technical development into expansion theory models started only in the 1950s. KALDOR (1957) was the first to introduce the function of technical progress, which included all the types of technical development. It said that the main driving force of economic growth is the technical change: New technologies require new investments and the growth can be explained only with

the common changing of capital/production quotient. A lot of authors contributed significantly to the development of growth theories, but SOLOW (1957) must be highlighted, because he complemented the general formula of production function by considering the impact of technical progress: $Q=f(K,L,t)$, where "t" means the impact of technical progress in relation to time. He improved this in his subsequent works and highlighted that productivity has much bigger role in the growth of production than the expansion of production factors.

The measurement of impact of technical development is a complex task, because technical development includes all those changes in the production process in relation to time which produces more (or more valuable) products by using the same (or less) production factors, and produces the same (or more valuable) products with less production factors. Technical progress in general should increase output as a result, should change its structure positively, and cut production costs. (ANDRÁSSY, 1998) The interrelation of these two factors determines the efficiency. In case of this we have to distinguish technological efficiency (relation of income and cost) from economic efficiency (proportion of production value and production cost) (NEMESSÁLYI ZS., NEMESSÁLYI Á., 2003).

One of the most widespread analysing method of technical development efficiency is the calculation of partial efficiency, where the change of productivity (y/L) is determined in the function of productivity of labour and the productivity of capital: As the multiplication product of capital efficiency (y/K) and technical equipment (K/L):

$$\frac{y}{L} = \frac{y}{K} \cdot \frac{K}{L}$$

Internal or international comparison of this index points out that the productivity differences can refer back to the differences between capital productivity and capital supply (capital stock per head) (KÉSMÁRKI GALLI, 2006).

Therefore, the changes of efficiency of means, embodying capital, are the result of a complex process. We can gather information about the changes of each factor in an empirical way: We can see that the production potential of biological basis (varieties involved in production) has grown in the last decades as the result of technical progress. In our days this objective is served by biotechnology, too, in addition to traditional breeding means; the chemical background of production has been growing dynamically; a lot of new methods enhancing nutrient utilization have been introduced; and new materials have been implemented to fulfil the micro-element needs of crops and animals. Environmental protection criteria have been observed more precisely; the quantity of pesticides has been reduced, new technologies have been introduced (for example precision farming) (TAKÁCSNÉ GYÖRGY, 2006), with the appropriate modern, heavy-duty machinery. Technical development serves the idea of sustainable development more and more significantly.

The research aimed to explore the changes of factors which influenced the means and capital efficiency in the last fifteen years in the former 15 member countries of the European Union and primarily in Hungary among the countries being integrated in 2004. We have examined the possible impact of identified factors on the competitiveness of Hungarian farmers and their ability to react on the changes of world economy and the results of technical development of competitors.

2 MATERIAL AND METHODS

The examination has used secondary data: Data of EUROSTAT, the Hungarian Central Statistical Office and the FADN database of the European Union. The examined period was from 1989 to 2004. Data were available arranged (in 6 groups) according to economic farm size (ESU) for 12 countries up to 1994, 15 countries up to 2003 and 25 countries from 2004. Out of the 152 standard variables in the database, the following variables have been used for the research: Number of represented farms, average labour use, average area utilized, average yield of winter wheat and maize, average milk yield, gross production value, total means, invested means, out of this machinery. 10646 data per variable were available for the examinations.

The examinations were made with simple statistical methods (average, standard deviation, coefficient of variation calculation).

Efficiency is a general concept. Expression of economic efficiency can be approached in multiple ways, but the primary evaluation is mostly done by productivity indices. Productivity means for us the output (product quantity, production value) produced with one resource unit used in production.

In order to analyse partial efficiency, we calculated the changes of technical equipment (K/L) and capital efficiency (y/K) for the EU-12/15/25 countries.

Furthermore, for the evaluation of research results we have also applied grouping on the basis of relative deviation from the average of grouping points (X, Y), for the elements of partial efficiency (capital efficiency, technical equipment), according to the following relation:

$$P(x,y) = \left(\frac{(x_i - \bar{X})}{\bar{X}}; \frac{(y_i - \bar{Y})}{\bar{Y}} \right)$$

The elements have been divided into four groups (G1-G4) according to their deviation from the average. Identifying names have been given to the groups on the basis of their characteristics.

The introduction of results – due to their size – is made only for countries which have significant role in the agricultural production of the Union. More than 80 % of gross added value of the EU-25 member and two later accessed countries was produced by 7 countries in 2005: (**Table 8.33**) Germany, Greece, Spain, France,

Italy, the Netherlands, and the United Kingdom. Within the Eastern-Central European region, the performance of Poland was significant. Hungary has only a 1.4 % share from it, in spite of the fact that its share from the resources is 3.6 % regarding agricultural land and 4.6 % regarding agricultural labour use. Following the Pareto principle, only these countries are examined in the following, although in this way some countries which have model development and high-level agriculture in some aspects, will be left out.

3 RESULTS

The development of the European agriculture in the 1990s and 2000s lacked the development dynamics of the former decades. Priorities have changed, instead of the former production intensification, the stabilization or small improvement of income situation of farmers has become the objective without increasing the output volume. The implementation of more extensive production methods (land resting, organic production) has been definitely supported. At the same time, technologies utilising the results of technological development have emerged which helped to carry on rational farming – with more and more expensive means – thus contributing to the decrease of input and stabilization of yields. It can be seen that the development has led to farm concentration and to the increasing of labour productivity, which ultimately resulted that significant labour capacity became redundant. The experiences are supported by the figures, as it can be seen below.

3.1 Farm concentration

The process of farm concentration is obvious in the European Union. The number of farms (**Table 8.33**) shows a decreasing tendency, the break is caused by the extension processes (Eastern-German provinces in 1991; Scandinavian countries and Austria in 1995; integration of the Eastern and Central European countries in 2004).

Restructuring can be observed in farm structure: The average economic farm size is growing. While the number of farms was decreasing, the land under cultivation did not decrease, but slightly increased. During the observed period the number of farms decreased by 15 % in the EU 15 countries, and the largest changes was in the smallest economic size category (0-<4 ESU), where the number of farms decreased by 59 %, and in the highest category (≥ 100 ESU), where the number of farm increased by 131 %.

Concentration has based the implementation of modern and efficient technologies and given indirect proof of increasing productivity (efficiency) in agricultural holdings, the possible source of which is the technical development. The next question is: How the efficiency of labour has changed.

3.2 Changes of labour utilization and its productivity

Labour use has been permanently decreasing. Labour use in the EU-15 country group has been reduced by about 40 % (annual labour capacity of 2.2 million persons) in 14 years. At the same time, the efficiency of labour has shown significant differences between farm groups. The efficiency has shown increasing tendency in all groups, the rate of growth was quicker in the smaller plant size categories. The productivity of labour in large-scale farms was almost 7-fold of that of small-scale farms 15 years ago. This difference has been decreasing (**Table 8.34**).

When examining the productivity of labour in arable land crop production in some of the member countries, it is presumable that the proportion of part-time farms is big, that's why the productivity index is more positive in this category than in medium-scale farms. The natural productivity index of labour in Hungary is above the EU average in most of the size categories.

The production value made per one labour unit is very changeable (**Table 8.34**). In 15 years, the productivity of labour has grown by 41 % in the average of the EU-12/15 and 33 % in the EU-25. When examining by economic size, there is 10-fold difference between the smallest and the largest size category. This difference is due to the technical development, especially to the differences of mechanization. The productivity differences between countries are very considerable in the smaller farm-size categories. The highest standard deviation is almost 23-fold (the Netherlands) compared to the average of the given size category. The variance of upper size categories is significantly smaller which can be definitely explained – as it was experienced – with the similar technical-technological level.

Table 8.33: Number of agricultural holdings in the European Union (2005)

	Utilised agricultural area	Distribution	Gross value added	Distribution	Agricultural labour force	Distribution
	1000 ha	%	MEUR	%	1000 AWU	%
EU-27	164 051	100.0	127 162	100.0	9 804	100.0
EU-15	130 547	79.6	116 758	91.8	6 290	64.2
<i>Hungary</i>	<i>5 864</i>	<i>3.6</i>	<i>1 747</i>	<i>1.4</i>	<i>463</i>	<i>4.7</i>

Source: EUROSTAT (2007).

Table 8.34: Changes of natural productivity of labour in the EU-12/15/25 country groups (ha/AWU)

Year	0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	≥ 100 ESU	Total
	Labour natural productivity index for all the represented farms						
1990	4.7	7.5	12.6	21.0	29.9	30.7	16.6
1995	4.9	7.4	13.9	23.8	35.0	36.8	20.1
2000	5.6	7.5	14.6	24.3	36.9	39.4	23.2
2004	6.5	7.8	13.1	24.2	37.6	35.3	21.5
Member countries	Labour natural productivity index in field crop production in 2004						
EU-25	8.0	10.2	18.4	31.8	55.2	54.8	31.2
Germany	41.6	41.6	n.a.	31.5	50.2	67.7	n.a.
Spain	12.6	23.7	36.0	54.1	85.2	24.3	42.3
France	52.4	52.4	19.2	35.0	61.9	76.0	55.8
Italy	19.2	7.7	12.5	17.5	30.6	35.4	17.1
Netherlands	19.3	19.3	19.3	12.2	18.1	37.8	21.6
United Kingdom	63.7	63.7	n.a.	56.3	65.6	88.3	n.a.
Hungary	21.0	24.0	43.2	58.8	55.5	47.7	40.9
Poland	6.6	8.2	12.9	23.6	46.5	60.5	13.0

Source: Own calculation of the basis of FADN.

3.3. The changes of performance (yield) of biological bases

The biological bases have not changed significantly during the examined period. The variance of national averages is relatively small (coefficient of variation is 4-6 %) while the differences between countries are large. There are high average values (above 7 t/ha) in cereal production of Belgium, Denmark, Germany, France, Ireland, the Netherlands and the United Kingdom. In these countries the chemical use (fertilizers and pesticides) is also above the average. Medium yields (4-7 t/ha) are registered in cereal production of Italy, Luxembourg, Austria and Sweden and low yields (below 4 t/ha) in Greece, Spain, Portugal and Finland, with rather high (14-22 %) coefficient of variation. During the recent years (following a significant decline in the early 1990s), Hungary has returned from the low-average-yield group to the medium yield category again, but the yield uncertainty is high. The reason for the low yield is in the low level of inputs because the biological bases are mostly able to produce the same performance. The yield increase is due to the gradual growth of active agent utilization.

The other important performance indicator is the milk yield, which is very characteristic for the level of animal husbandry. The differences between countries are smaller than in arable land yields. The country averages are around 6-7000 kg/year in milk yield. The coefficient of variation of average yield is usually low (2-8 %). As regards the average productivity, only Greece is beyond the level of the other countries, the coefficient of variation is above 70 %.

The balanced high yields show the common effect of high-performance biological bases, the high input and adequate technology, which can compensate the quality differences of soil and the impact of unfavourable and changeable weather under open-air conditions, too.

3.4. Changes of fertilizer and pesticide use

There is a high value of fertilizer and pesticide use in the countries of the European Union. The value per area unit has not changed significantly during the 15-year period. With small fluctuations, it has remained on the same level, 90-100 EUR/ha was spent on fertilizers and 80-90 EUR/ha for pesticides in the EU-15 level. The cost of agents is increasing together with the farm size in almost linear tendency. It is varied between 60-110 EUR/ha in case of fertilizers and 35-120 EUR/ha in case of pesticides. Agriculture of the Netherlands and Belgium is using these agents significantly above the average.

3.5. Changes of productivity of labour and capital employed in production

Following the examination of factors of technical development, the changes of efficiency were also analysed. **Tables 8.35-8.36** and **Figure 8.35** demonstrate some numerical results of analyses. The productivity of labour utilised in agricultural holdings is obviously showing an increasing tendency. In 14 years, the average growth rate of gross production value per head was about 500 EUR per year in the EU average. The EU extension in 2004 caused the decline of this index (**Table 8.35**), due to the moderately developed agricultural sector of the integrated countries.

The average level of technical equipment was high in the agricultural holdings of the European Union member countries and this level has been constantly rising (**Table 8.36**). The technical equipment of smaller farms is significantly higher than in the other economic size groups. This raises means efficiency problems, that is the production value produced with one unit of means is lower than the average.

The member countries and farm types were grouped on the basis of partial efficiency indices (**Figure 8.35**). On the basis of deviation from the Union average, the countries were put into four groups, namely as follows: *Group 1*: countries with above-the-average technical equipment and capital efficiency (the clever rich) (Denmark, Germany, Belgium and the Netherlands); *Group 2*: technical equipment is above the average, but the capital efficiency is below the average (the waster rich) (Luxembourg, Austria, Finland, Sweden, and France); *Group 4*: Technical equipment is below the average, but the capital efficiency is above the average (the clever poor) (Great Britain, Spain and Slovakia); *Group 3* and the other 12 have both the technical equipment and the capital efficiency below the average (the waster poor). As regards the comparison by farm types, the horticultural farms, grazing animal husbandry and the farms with permanent crops show good performance. The dairy farms are in bad situation, the arable land crop

production farms are well-mechanized, but they utilize their means with a capital efficiency below the average. When examining farm assets in three levels (machinery, fixed assets, total assets), the movement between efficiency groups was obvious due to the impact of equipment structure.

4 CONCLUSION

The European Union is the community of countries with moderately or highly developed agriculture. During the last decades, considerable resources were spent on the technical development of the branch through the agricultural policy of the Union and the nations. The result of the process is that the technical supply increased in many countries, and the indices of technical equipment have high values. At the same time, however, the efficiency of production has deteriorated.

Table 8.35: Productivity of labour in the EU-12/15/25 country groups

Year	Average of the EU-25 (EUR/capita)	Labour productivity compared to the EU-25 average (%)					
		0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	≥ 100 ESU
1990	15,441	117.6	63.2	62.5	97.8	108.7	100.0
1995	17,990	115.0	62.6	63.6	88.4	107.7	100.0
2000	20,868	121.6	59.5	49.9	88.4	104.8	100.0
2004	18,814	116.1	47.9	59.9	99.8	124.9	100.0
Member country	Deviation of labour productivity from the EU average (%)						
EU-25		100	100	100	100	100	100
Germany		167	160	n.a.	207	100	89
Spain		12	22	76	87	71	70
France		156	152	n.a.	140	86	78
Italy		92	28	83	109	90	111
Netherlands		271	265	643	15	171	191
United Kingdom		163	156	n.a.	3	165	110
Hungary		n.a.	15	65	64	33	39
Poland		12	18	46	50	40	51

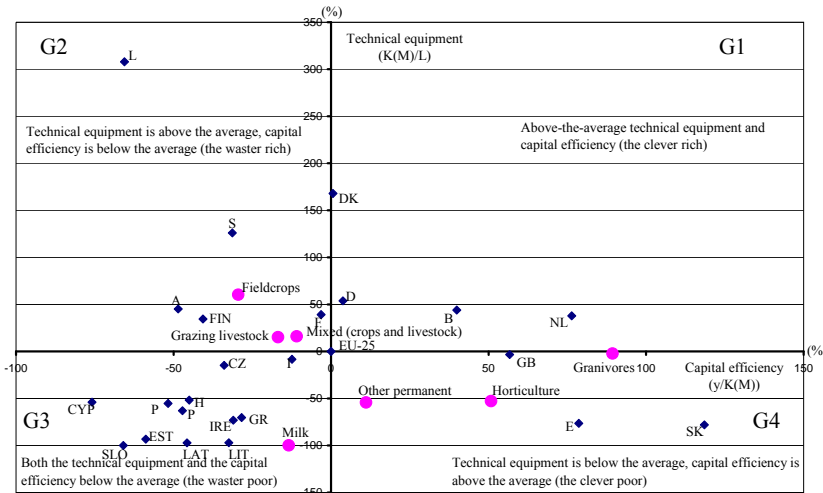
Source: Own calculation on the basis of FADN.

Table 8.36: Technical equipment in the EU-12/15/25 country groups

Year	Average of the EU-25 (EUR/capita)	Technical equipment compared to the EU-25 average (%)					
		0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	≥ 100 ESU
1990	25,232	131.3	48.6	56.3	74.4	62.5	100.0
1995	27,716	131.0	54.4	57.5	64.1	56.5	100.0
2000	32,622	139.5	54.3	47.0	57.5	62.5	100.0
2004	29,870	135.3	57.3	61.4	60.6	70.1	100.0
Member country	Deviation of technical equipment from the EU average (%)						
EU-25		100	100	100	100	100	100
Germany		149	143	n.a.	102	108	119
Spain		13	17	35	44	49	47
France		161	156	0	96	101	72
Italy		101	39	115	118	151	121
Netherlands		133	131	309	21	156	190
United Kingdom		160	153	n.a.	5	68	83
Hungary		n.a.	39	120	104	86	105
Poland		23	28	93	103	102	115

Source: Own calculation on the basis of FADN.

Figure 8.35: Classification of the EU-25 countries according to partial efficiency (technical equipment and capital efficiency) (2004)



Source: Own figure on the basis of FADN.

The final conclusions of examinations on the basis of statistical and FADN databases are as follows:

- The productivity of labour has increased in the EU agriculture, which resulted that the annual labour use has decreased by more than two million persons in the last 15 years, besides increasing output;
- The biological bases ensure stable production in the EU, and the potential fertility has not changed significantly (the effect of GMO has not appeared in Europe yet);
- Production in a group of countries is made with high input, which contributes to the balancing of production, but the cost impact is also significant;
- When forming efficiency groups, it is obvious that the dominance of the wasting poor is significant (almost half of the member countries belong to this group and most of them from the newly accessed countries);
- The agriculture of Hungary is at competitive disadvantage in this comparison. The preparation decade was spent with extensive development, climbing back to the former level, which is behind the level of the most developed and some of the moderately developed countries.

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REFERENCES

- ANDRÁSSY, A. (1998): A mezőgazdaság termelésítényező-arányainak elemzése neoklasszikus termelési-növekedési elmélet alapján. Aula Kiadó, Budapest.
- EUROPEAN COMMUNITIES (2007): Europe in figures. Eurostat yearbook, 2006-07. European Communities, Luxembourg.
- HUSTI, I. (1998): Problems and possibilities of the Hungarian agricultural innovation. *Hungarian Agricultural Engineering*, 11, pp. 39-41.
- HUSTI, I. (2003): Az agrárműszaki fejlesztés elméleti alapjai. In: FENYVESI, L. et al.: Fejezetek a mezőgazdaság műszaki fejlesztéséből Dimény Imre akadémikus 80. születésnapjára. FVMMI, Gödöllő, pp. 12-15.
- KALDOR, N. (1957): A Model of Economic Growth. *Economic Journal. Royal Economic Society*, 67(268), pp. 591-624.
- KÉSMÁRKI GALLI, SZ. (2006): A műszaki fejlesztés szerepe a magyar mezőgazdaság fejlődésében. Doktori értekezés. Szent István Egyetem, Gödöllő.
- NEMESSÁLYI, ZS., NEMESSÁLYI, Á. (2003): A gazdálkodás hatékonyságának mutatórendszere. *Gazdálkodás. Mátra-tan*, 47(3), pp. 54-60.
- SOLOW, R. M. (1957): Technical Change and the Aggregate Production Function. *Review of Economics and Statistics*, 39, 214-320.
- TAKÁCSNÉ GYÖRGY, K. (ed.) (2006): Növényvédő szer használat csökkentés gazdasági hatásai. Szent István Egyetem Kiadó, Gödöllő, pp. 135-148.

THE EUROPEAN REGIONAL POLICY IN HUNGARY: AN EVALUATION OF THE OBJECTIVES AND INSTRUMENTS FOR THE COHESION

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1 INTRODUCTION

The European Union "East" enlargement occurred on 1st May, 2004 (and its prosecution to Romania e Bulgaria in 2007) has represented a great challenge for both the European institutions and the new member States: In fact, this is the first time that ten Countries join the Union together, bringing about 70 millions of new European citizens, doubling the hectares committed to agriculture and the labour force in that sector (FORGÁCS, 2004).

The governments of eight of the candidate Countries, that were under the pervasive influence of Moscow till 1989, had to continue the reforms required by the transition process while trying to accomplish the requirements established by the EU Commission in the pre-accession document to get the membership. On the other side, the European institutions had to cope, in the guidelines proposed to the joining States, with "new" problems linked to the different needs for intervention in those Countries due to their political, economic and social history of the second half of the XIX century (BLANCHARD, 1997). In order to help the future members to start a process of external and internal *convergence*, the European Commission has predisposed and co-financed several means and programs of intervention, the most important of which (in terms of financial assistance) are the structural funds and the cohesion fund (http://ec.europa.eu/regional_policy/index_it.htm/).

The aim of this paper is to conduce a preliminary evaluation of the objectives and instruments offered by the EU to Hungary to undertake the problems emerged during the ongoing transition process, to fulfil the tasks of the *aquis communautaire* before the membership and to establish a convergence path. I've chosen Hungary because it has been considered (WB, 2002) one of the "best performers" among the transition Countries and the new European States. Contemporary I've examined the role played by the European institutions, especially by the European

Commission as promoter of the objectives and instruments reserved to Hungary by the cohesion policy and I've proposed a preliminary evaluation of them.

The evaluation of the efficiency of European funds in the new member States and their effects on the convergence is quite new both for the structure of the analysis proposed and for the implications found. In a moment of *impasse* for the European Union, dealing with internal institutional reforms and planning a new enlargement round (Balkans and Turkey), it's important to understand the whole impact of Community aids for new members to justify financial disbursements to the sceptical Countries and to learn from this experience to better face new possible joining.

The structure of the paper is the following: I start with an overview of the current regional reality in Hungary, underlining its main features and problems emerged in the last years and examining the roles of the authorities responsible for that. In the second chapter I introduce the European instruments for the cohesion policy in Hungary, analyzing the contribution given by the structural funds and the cohesion fund while in the third one I show the convergence/divergence effects at the regional level.

2 AN OVERVIEW OF REGIONAL REALITY IN HUNGARY

Thanks to its central position between Europe and the Balkans, to the presence of the river Danube and for its fundamental historical role in the European facts (BIANCHINI, PRIVITERA, 2004), Hungary represents an important gathering point between Eastern and Western Europe. Nowadays the Country has circa 10 millions inhabitants²⁷, it extends for 93,029 km², 96 % of which considered mainly agricultural following OECD classification. Its main regions, classified followed the NUTS 2 parameters, are seven: Central Transdanubian, Western Transdanubian, Southern Transdanubian, Central Hungary, Northern Hungary, Northern Great Plain and Southern Great Plain. Since 1998, as required for acquiring the membership, Hungary has introduced a regional and sub-regional territorial classification, counting also 19 Counties (NUTS 3 level) other than the capital, Budapest, 168 sub-regions (LAU 1) and 3,145 among cities, towns and villages (LAU 2), all of them with their own independent local governments²⁸. By the way, decentralizing governmental powers hasn't avoided the coming out of efficiency and coordination problems, especially in dealing with the application of regional policies.

2.1 The players of regional policy

In order to follow the requirements in Chapter 21 of the *Aquis Communautaire* and to become able to achieve and manage the Community funds for the cohesion policy, Hungary has established a renewed institutional and administrative system.

²⁷ The data refers at 2005. Source: Inforegio.

²⁸ <http://forum.europa.eu.int/irc/dsis/regportraits/info/data/en/>.

By the way, regional entities has just played a *limited role* in the decision making regarding regional policy because of the lack in managing abilities and because of the initial instability (due to the opposition of powers among Counties). So, the control on the regional development programs remained to the Central Government, specifically to the Ministry for Environment and Regional Policy, created in 1990 and initially endowed with few powers because of the high number of tasks, the scarcity of resources and the sharing of responsibility with the Minister of Interiors (who planned the disbursements) (BACHTLER et al., 1999). Summing that to the lack of a strategically direction of the tasks, we can easily understand why that Ministry started to fully work just at the end of the 90s.

In 1996, the competencies for the Ministry about regional and spatial development were indicated by the Regional Development Act. After the 1998 elections, the new Ministry for Agricultural and Rural Development (MoARD) has been responsible for regional policy, under the supervision of the *Independent Smallholder's Party*²⁹ (*Független Kisgazdapárt*) that unofficially contributed to determines the policy provisions adopted. This new Ministry gathers the governmental competencies about regional policy and the previously detached Unity for the EU Integration, dealing with the management of EU co-financed programs (as PHARE). Other than MoARD, other Ministries take part in regional policy because this one has been traditionally sub ordered to part interests, as it also happens now. Even thou the strengths to enforce the ministerial cooperation, a *slow path of coordination* emerges in regional development activities and among these and other initiatives coming from single ministries, with a limited spatial impact. This element represents a strong obstacle to the programming and to the enforcing of the interventions on regional scales, due to the fact that there are several offices with related tasks.

3 THE EUROPEAN INSTRUMENTS FOR COHESION IN HUNGARY

Agenda 2000 established the interventions supporting the cohesion policy in the former candidate Countries for the programming period 2000-2006: We principally refer to the *cohesion fund* and to the *structural funds* which represented a disbursement, for Hungary and for the other CEEs, equal to the 4 % of GDP in the EU-25 (VIESTI, PROTA, 2005). With these instruments the EU pursues the objectives of regional policy: As in the Title XVII – Economic and Social Cohesion – of the Treaty establishing the European Community and in its art. 158, in order to *promote the harmonic development*, the Community works to design and actuate actions for the strengthening of the economic and social cohesion among its members. Particularly, the Community aims to *diminish disparity in different regional development levels*, the backwardness of the disadvantaged and peripheral ones and the islands, including rural areas. For this reason, more than 2/3 of the

²⁹ A minor party in the right-wing coalition.

financial endowment for structural funds (more than 135 billion euro) was designated to the backward areas classified as Objective 1³⁰ because their per capita GDP (p.p.p.) is less than 75 % of the European average³¹. In order to diminish regional disparities doubled after the 2004 enlargement³² (the EU average income decreases of circa 12.5 %, population living in backward regions increases from 20 % till 25 %) and *pursuing the convergence* inside the EU, according to the criteria established in the Council Regulation No 1260/1999 regarding structural funds, Hungary was completely shifted in Objective 1 for the period 2004-2006³³.

Structural funds finance development programs endowed with an own balance and presented by the Government of the State interested in the eligibility for the financial assistance in a *programming document* covering several years. This plan must be implemented by the interested Government just after the EC approval. During the drafting of that document, *national and regional authorities are assisted by the EC* which, in the "Further Indicative Guidelines for the Candidate Countries"³⁴ (EC Communicate 2003), indicates the guidelines that should consider the *specificity* of every involved Country. Priorities are related to the problems each State is facing and to the commitments undertaken under the *Aquis Communautaire*³⁵.

In the first programming period 2004-2006, Hungary could benefit from structural funds and cohesion fund disbursed on the basis of the *Hungarian National Development Plan* which identified the priority objectives for development and in which the modalities of employment of the European funds are explained. The scope is the identification and the subsequent correction of the causes generating disparity *at the national level*. In the HNDP, *four objectives* are considered as priority:

- (1) Increase in the competitiveness of the productive sector.
- (2) Rise of employment and human resources development.
- (3) Infrastructural improvement and environmental safeguard.
- (4) Strengthening of regional and local potentials.

These points should be realized by five *Operational Programs* which identify the specific actions and establish the economic private/public operators competing with own projects for the achievement of the Community funds.

³⁰ With the programming period 2007-2013, the Objectives remain three but they get a new denomination: Convergence, Regional Competitiveness and Employment, European Territorial Cooperation.

³¹ European Union website, section regarding regional policy management.

³² EC Third Relation on Social and Economic Cohesion. Brussels, 17/05/2005.

³³ EC Document, Financial Outlook 2007-2013.

³⁴ Commission Communication of 12 March 2003 – Further indicative guidelines for the candidate countries.

³⁵ They are also in accordance with the guidelines of the EU Community Strategy 2007-2013.

Finally, the *cohesion fund* provides disbursements for infrastructural projects regarding environment protection (potable water, waste...) and transports (motorway, airports...).

It's important to underline that the EU acts as a co-financer for the projects: The entitled Country has also to take part in the financing (with lower quotas).

4 FIRST POSITIVE RESULTS AND BLACKLASHES IN THE ANSWER TO THE INCREASING INEQUALITY

With the beginning of the transition process and the explosion of socio-economical problems linked to that, Hungary, as the other CEEs³⁶, posed the basis for the development of a regional-European like-policy to solve these new problems and to open the way for the European membership. Some internal differences already existed in the previous planned economy but they drastically increased during the reform period, before and (still) after the joining the EU. In fact, the *level of inequality*³⁷_[PTZ3] among the Hungarian regions has continuously augmented. The *explosion of internal divergence* accompanied the introduction of a market economy, while in the socialist period it was more limited because the rapid industrialization gave impulse to urbanization also in the less developed regions. As a consequence, between 1948 and 1989 the data showed an increase in economic convergence³⁸.

In the transition years, instead, two factors appeared in the Hungarian regional policy as in the other CEEs: The clear *East-West demarcation*; the *dominant role of the Capital town* and its border areas for the development of the Country. It's possible to identify a *winner* and two *losers*, whereas the Capital and the main cities belong to the first group while rural areas and Eastern peripheries to the second one (IARA, TRAISTARU, 2003). The increase in internal divergence in the rate of development showed above goes hand in hand with a pronounced (at least till 2005) *external convergence (catching up)* with the EU-27 average level of p.c. GPD. In fact, after a structural fall in GDP around 40 %³⁹ between 1989 and 1995, a new and quite steady growth trend imposed so that, in 2001, Hungary could exceed the 1989 one. Few months after the European membership, Hungarian p.c. GDP was circa 60 % lower than the EU-25 average, comparable to the poorest regions as Iperios (Greece) or Açores in Portugal. Even if the growth in GDP has decelerated in 2006 (+3.5 %) (EBRD, 2006) and in 2007/40 (+2.6 %), in the current programming period the region in which Budapest is located

³⁶ Central and Eastern European Countries.

³⁷ EUROPEAN COMMISSION (2001a).

³⁸ By the way, we must always take care about the affordability of the data proposed.

³⁹ In comparison with the pre-transition level.

⁴⁰ Prevision of the Economist Intelligence Unit, end of 2006.

(Közép-Magyarország) is classified as *phasing in*⁴¹; by the way, we must keep in mind that the joining of Romania and Bulgaria in 2007 has generated a *statistical effect* (due to a comparative numerical improvement, greater than the real one).

This slow but constant approach to the Community economic levels demonstrates, from one side, that the European disbursements contributed to start a growth process in Hungary but they weren't able to oppose and reverse the impressing increase in internal disparity. In order to highlight the different aspects of this situation we can compare two examples among better off and worse off regions during the ongoing approaching to the EU parameters.

4.1 The winning and losing areas

Following this division, in the first grouping we find Budapest, able to lead the bordering area in the way of development. This event was predictable because already in the ex satellites Countries, as in the ex Soviet bloc, the Capital town had a leading economical and political role. An interesting news is represented by the Győr and Sopron Counties, located at the North-West border: These areas got the second position according to the economical performance, thanks to a revitalized economic growth along the Austrian border, to the fast transformation of the main cities (Sopron, Győr) and to the improvement of tourism facilities around the lake Balaton.

The reason of the success of these areas remains in the ability to develop the *services sector* and to reorganize production in the manufacturing sector, *reallocating its workers* and *attracting FDI*. These Counties are characterized by the growth of new enterprises in which coagulated a considerable amount of FDI (already in the middle of the '90, the half of all the foreign direct investment in Hungary reached Budapest) and contributed to determine a lower level of unemployment. This could happen because of the good endowment in infrastructures (the M1 motorway as ex.) which encouraged the delocalization of several international joint ventures (HORVÁTH, 2002). While Budapest attracted mainly activities linked to the tertiary sector and finance, the Győr-Moson-Sopron and Vas Counties had become specialized centres for industrial production (RECHNITZER, 2000). Moreover, since the years preceding 2000, this advantage has continuously increased following up the positive uninterrupted growth trend: Here more than 70 % of employed works in the tertiary and 50 % of people dealing with R&D in Hungary (BACHTLER et al., 1999) finds place, thanks also to the numerous Universities located in the Capital. The productive evolution in both areas *reflects on the wages*: In Budapest the medium wage is 34 % higher than the national average.

⁴¹ Phasing in regions are the ones (NUTS 2 level) previously covered by Objective 1 and presenting a GDP superior to the EU-15 average. They are eligible till 2013 for decreasing support.

On the other side we find rural areas, regions once characterized by the presence of heavy industry and *Eastern peripheries* which present a worse socio-economical situation, due to the problems of industrial re-conversion and workers' retraining (in the three Eastern Counties 35 % of unemployed and less qualified workers live). The main weaknesses, contributing to enhance the *centre-periphery dichotomy*, can be briefly listed: Problems of re-conversion of the production; the still remaining heavy industry from the past system; the prevalence of small towns and villages; the presence of traditional (*ibid.*) and mono-farming dating back the socialist time. This spatial partition follows the historical pre-socialist one where the dividing line consisted in the Danube River: Till the World War II, Western regions showed a development path similar to the Western European ones while in the Eastern areas agriculture was the leading factor inside the economical structure. Moreover, as COMECON finished in 1991, the Northern and Southern Great Plain weren't able to find other markets for the exchange of their products and the membership in the EU hasn't recovered the import-export of the precedent era and *agricultural areas* aggrieved by problems of re-conversion from extensive mono-farming (that endangered also the quality of the land) to individual farming and dealing with restructuring of cooperatives suffer now from the concurrency of cheaper products coming from Bulgaria and Romania. At the end, these areas result to be less attractive for FDI because of *the lack of transport infrastructures and services* for enterprises.

In order to underline the relevance of the increase of internal inequality in Hungary we can compare the evolution of p.c. GDP level in the Hungarian richest and poorest regions with the one related to Eastern and Western division in Germany, whereas Germany has been the Country showing the highest internal income disparity, since the Reunification, in Europe. Surprisingly, while the data about the variation between Hamburg and Dessau is negative, the one related to the Hungarian case is strongly positive.

Table 8.37: Income disparity between richest and poorest regions, in Hungary and Germany

Country	Richest region (2)	Poorest region (3)	Percentage (2)/(3) of GDP p.c. in 1995 (4)	Percentage (2)/(3) of GDP p.c. 2000 (5)	Percentage (2)/(3) of GDP p.c. 2003 (6)	Variation (6)/(4) (7)
Hungary	Közép-Magyarország	Észak-Alföld	2.02	2.40	2.45	+21 %
Germany	Hamburg	Dessau	2.88	2.83	2.60	-9.7 %

5 THE LIMITS OF THE COMMUNITY STRATEGY FOR REGIONAL POLICY

One year after the conclusion of the first programming period, Hungary has reached important goals in socio-economical development. Concretely, several projects, specially the ones linked to INTERREG for trans-border cooperation and for the sustain of SMEs have realized. Also the management of the tenders and financings regarding rural development has improved so that individual farmers can face now fewer bureaucratic obstacles for applying Community aids. Moreover, Hungary could move near the EU-27 average level of p.c. GDP, approaching the convergence objective. By the way, a lot of rubs appeared along the development path and the explosion of regional disparity could be assessed as a clear example. So, in the prevision of future EU enlargements⁴², it's important to understand whether some problems could be avoided carrying on a different policy: If some errors have been committed, could they be prevented in the future?

To answer this question I've examined EC documents published before the Hungarian membership in 2004: In the thousands of collected pages evaluating the path of development reached by the Country during the pre-accession years, lots of deficiencies in the application of the requirements for the 31 Chapters composing the *Aquis* emerge. As in 1999⁴³ the EC reported Hungary satisfied the *Copenhagen Criteria*, pointing out the only areas in delay regarded the discriminatory situation of Roma people and the fight against corruption, four years later⁴⁴ the same EC had a less optimistic vision. Considering the agricultural sector and the statistical adaptation, the outcomes achieved often don't conform to the general evaluation: In 1999, in fact, the EC noticed that, even thou the introduction of a law about the agricultural census, the problem of statistical adjustment was postponed in the evaluation proposed by the Committee of expert, the same that in 2003 underlined that "Hungary registered just limited progresses in arranging the progressive introduction of the Common Agricultural Policy". At the end, in the 2003 Report in which the EC exposes the general adherence level to the chapters of the *Aquis* reached before the membership, it underlines again the importance of a punctual and effective application of the binding laws regarding agriculture from the managing authority.

⁴² For the realization of which it's better to learn from these errors, in order to prevent serious problems and to save community money.

⁴³ CE 1999 Regular Report of the Commission on Hungary's Progress toward Accession.

⁴⁴ CE Comprehensive Monitoring Report on Hungary's Preparation for Membership, 2003.

6 CONCLUSIONS

2004 and 2007 have been characterized by a fundamental event for the future of the EU: The enlargement to ten Eastern European Countries. This step has led to the modification of the European cohesion policy, mainly regarding the programs (43 more) and the Community instruments. The increase in financial resources hasn't always comported the development of the benefiting Countries and Hungary can be taken as a good example of that: in fact the Country shows a process of external convergence with the average UE-27 income level but, at the same time, it experiences an explosion in internal divergence. North-western regions and the Capital town could benefit of the impulse given by the Community aids in a greater extent than the Eastern peripheries. This bi-frontal result can be considered as the consequence of the (easy predictable) lack in managing and planning abilities of the Hungarian governments but it can be also derived by the scarce supervision of the European institutions (*in primis* the EC), both in the Hungarian process of approaching the EU and in the post-membership, resulting in an underestimation of the increasing internal inequality. In the end, the EC approval of the legislative agricultural reforms regarding the restitution of the land and the restructuring of Cooperatives hasn't encouraged productive and quality increases in agriculture.

The picture emerged from this analysis shows an uncertain future not only for the results of the reforms enacted in Hungary but also for the evolution of the EU, facing the consequences of the new memberships and probable next enlargements to the Balkans and to Turkey (with the following required adjustments of the community policy). If the EU wants to continue its "growth" successfully, promoting the principles of the cohesion policy among its members without facing continuously with the ex-post "unexpected" problems, it should rethink the policy prescriptions for the candidate Countries. This would prevent the appear of contrasting results from the utilization of the Community funds: Weak signals of economical convergence among the EU States together with the worsening of the divergence among its regions.

REFERENCES

- BACHTLER, J., DOWNES, R., ET AL. (1999): Regional Development Policies in the Transition Countries. *Regional and Industrial Policy Research Paper*, No. 36.
- BIANCHINI, S., PRIVITERA, F. (2004): Guida ai Paesi dell'Europa Centrale, Orientale e Balcanica. *Annuario politico-economico, edizione 2003*, Il Mulino, Bologna.
- BLANCHARD, O. (1997): The Economics of transition in Eastern Europe. Clarendon Press, Oxford.
- EBRD (2006): Transition report.
- EC Comprehensive Monitoring Report on Hungary's Preparation for Membership, 2003.

FORGÁCS, C. (2004): The Challenge of Integrating CEEs Agriculture into the EU. In: *Studies in Agricultural Economics*, No. 100. AKII, Budapest.

HORVÁTH, G. (2002): The perspectives of Hungarian Regional Development. *Discussion Papers*, Centre for Regional Studies of the Hungarian Academy of Sciences, Pécs.

Hungarian National Development Plan for the Implementation of the EU Structural funds – Single Programming Document 2004-2006.

IARA, A., TRAISTARU, I. (2003): Integration, Regional Specialization and Disparities in EU Accession Countries: Evidence from Hungary. Paper prepared for the Conference on "Cohesion Reform in a Larger Union", College of Europe, Brugge, 3-4 April, 2003.

RECHNITZER, J (2000): The Features of the Transition of Hungary's Regional System. In: *Discussion Papers*, No. 32, Pécs, Centre for Regional Studies, 74.

VIESTI, G., PROTA, F. (2005): Le Politiche Regionali dell'Unione Europea. Il Mulino, Bologna.

WB (2002): Report on transition Countries.

9 POSTERS

9.1. LAND POLICY, LAND USE – STRUCTURAL CHANGES

LAND POLICY AND FARM EFFICIENCY: THE LESSONS OF MOLDOVA

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Abstract

One of the main features of Moldovan agriculture is its structural duality, manifested in the existence of a small number of large corporate farms at one extreme and a large number of small and very small individual (or family) farms at the other. There are virtually no "medium-sized" individual farms, the main organizational form in the agricultural sector in established market economies.

Our analysis applying national statistics and survey data to two farm dichotomies shows that (a) individual farms are more efficient than corporate farms; and (b) small farms are more productive and more efficient than large farms. The second result is based on a mixed sample that includes both individual and corporate farms, which overall show decreasing returns to scale. On the other hand, a homogeneous sample comprising only corporate farms shows increasing returns to scale. Similarly in a homogeneous sample comprising only individual farms, family well-being (a proxy for farm performance) increases with farm size. We thus conclude that among farms of the same type size has a beneficial effect on performance. Based on these findings we tend to believe that the differences in performance are determined primarily by organizational form: Small farms do better than large farm not because of a size effect, but because individual farms (which happen to be small) outperform corporate farms (which happen to be large).

This finding does not necessarily mean that corporate farms should be eliminated and replaced with family farms. Corporate farms do exist in market economies, where they compete successfully with individual farms. The market economies have achieved an equilibrium farm structure, which includes a mix of individual farms (the dominant majority) and corporate farms (a small minority) determined by resource availability, managerial capacity, and personal preferences of farmers and investors. The main policy advice for Moldova is to abandon the traditional bias in favor of large corporate farms and ensure an even playing field for farms of all types.

TRANSFORMATION AND ITS IMPACT ON STRUCTURAL CHANGES IN POLISH AGRICULTURE

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Abstract

The following article analyses the structural changes of the Polish agriculture, which have been influenced by the transformation processes. These processes have been caused and influenced by phenomena of a various scope and impact, but from the point of view of functioning of agricultural farming a few major factors may be outlined. Amongst the mentioned factors one can find: Price decontrol and liberalisation, which have influenced the processes of price and agricultural products realisation, international trade realisation, which have "forced" the increase of business competitiveness in the rural areas, liquidation of state owned and monopolized farming institutions, the lack of which has given those areas the push towards individualized entrepreneurship and finally the processes of the privatization of the social agricultural sector, which have caused the flux of land ownership but has also become the cause of potential problems for post-State owned agricultural areas.

Keywords: Transformation, structural changes (transformations), agriculture, Poland.

CHANGES IN AGRICULTURAL HOLDINGS STRUCTURE DURING THE TRANSITION PERIOD IN SLOVENIA

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Abstract

The paper presents the socio-economic restructuring of Slovene agricultural holding due to different transitional processes, such as denationalisation and privatisation, as the biggest property right transformation processes in Slovenia during transition period, as well as agricultural property transactions and will discuss other factors (loss of jobs, unemployment, accession etc) which influenced the recent development. At the end also the future possible development trends in agricultural holdings structure are presented.

Keywords: Farm structure, transition, socio-economic types of farms, Slovenia.

LARGE FARMS IN POLAND FOUNDED ON THE BASIS OF THE PROPERTY OF FORMER STATE-OWNED FARMS (PGRS)

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Abstract

This paper presents economic results of three groups of large farms, in the years 2000-2005, which were founded on the basis of the property of former state – owned farms in Poland. They were divided according their legal and organisational form into: Farms purchased, farms on lease and shareholder companies of the State Treasury. On the basis of the results of the analysis it was concluded that all three groups are economically effective, however, farms purchased, as a legal and organisational form, are protected against the production and market risk in the highest degree. Hence, the final direction of privatisation in Poland at the present stage of restructuring should be the purchase of farms. It does not mean, however, that there is a need to liquidate shareholder companies of the State Treasury which due to their specificity play a significant role in implementing biological progress in agriculture.

Keywords: Economic efficiency, shareholder companies of the State Treasury, farms purchased, farms on lease, Poland.

CHANGES IN LAND UTILIZATION IN HUNGARY SINCE THE TRANSITION

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Abstract

The paper discusses the fluctuation of the proportion of cultivation, the development of agrarian operating and organizational structure, the separation of estate tenancy and land use, along with the change of law. In the backward areas and territories with adverse endowment, further questions remain open during the temporal changes of land use. My study is not only limited to the description of changes, but also aims to illustrate general conclusions relating to the preferred structure and proportion of land use in Hungary.

Keywords: Land utilization, farm structure, farm size.

TRANSFORMATION OF AGRICULTURAL SECTOR OF UKRAINIAN ECONOMY: SOME SOCIAL AND ECONOMIC RESULTS

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Abstract

Agricultural sector of Ukrainian economics is in the period of transformations, which are accompanied by increase of negative tendencies in the social sphere: depopulation of significant territories, worsening of living conditions for rural population, increasing of mass poverty, growing unemployment, sharp income differentiation. High social losses against a background of development of large-scale commercial production, land concentration and capitalization of production are leading to increase of social tensions in society thus hampering country's exit from the crisis.

Keywords: Agricultural transformations, rural development policy, depopulation of rural territories, social factors of economic growth.

9.2. RISK ANALYSIS AND FINANCING

SURVIVAL ANALYSIS OF CULLING REASONS AND ECONOMIC EXAMINATION OF PRODUCTION PERIOD IN SOW CULLING*

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Abstract

The culling of the sows is an important task of the breeders and farmers, besides it is a determining factor of profitable pork production. During our research we have surveyed the data of 1969 sows in a Hungarian large-scale pig farm. For the calculation of our results we used one of the non-parametric forms of survival analysis, the Kaplan-Meier analysis. For the quantification of death intensity we applied another survival analysis model, the log-rate exponential model. We have found out the risk values of various culling reasons from the point of view of culling. Besides, we tried to quantify by an economic model how the production period of sows influences the average costs of piglets and the average costs of piglets per kilo at 2006 prices. We calculated that the 5th farrowing is the minimum cost place.

Keywords: Sow culling, risk analysis, sow productivity, average costs of piglets.

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THE EFFECT OF FUNDING THE INVESTMENTS IN THE ROMANIAN AGRICULTURAL HOLDINGS THROUGH THE PRE-ACCESSION PROGRAMS

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Abstract

In the pre-accession period, in addition to the support to all agricultural holdings by EU-funded programs, specific national measures were also applied, together with massive allocation of funds from the national budget in order to support the agricultural producers. The present paper is analyzing the results of SAPARD Program implementation (measure 3.1 "Investments on agricultural holdings"), as well as of the nationally funded programs. One third of the total funds were allocated for this measure. The present paper is analyzing the eligible projects, as compared to those under the nationally funded investment programs, their distribution by counties and development regions, investment types and volumes, and legal status of the applicant farms, as well as the impact of investments upon the establishment of new farms. At the same time, the private consultancy and design firms, as well as the agricultural consultancy offices at county level had an important contribution in supporting the farmers to carry out over 3600 eligible projects.

Keywords: Investments on agricultural holdings, SAPARD Program, Romania.

THE INSTITUTIONAL SUPPORT OF AGRICULTURAL LOANS AND ITS ROLE IN CZECH AGRICULTURE*

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Abstract

The paper deals with the analysis of the institutional support of agricultural loans and its role in Czech agriculture based on the dynamic optimal model. The dynamic optimization problem is solved by the Lagrange method. The application of the theoretical model shows that the lower is the interest rate paid by the farmer the lower is the optimal consumption and consequently the farmer is willing to employ higher part of the capital in the production. Thus, the initial capital is more effectively employed. The time series analysis shows that the SGAFF's activities significantly support the farmer's investments. In spite of the problems in the setting of the SGAFF's policy, the role of the SGAFF in financing of agricultural activities can be regarded to be positive in the analyzed period.

Keywords: SGAFF (Supporting and Guarantee Agricultural and Forestry Fund), dynamic optimization, agricultural output, investments.

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TECHNOLOGICAL AND ECONOMIC RISK ANALYSIS OF LAYING HEN BREEDING APPLYING SIMULATION

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Abstract

In order to analyse risks and to choose from different decision-making strategies simulation models are often applied in several areas of animal breeding. We developed an improved Monte Carlo model for analysing laying hen breeding combined with Bayes' statistics. On the basis of data from a company breeding broiler parents, our paper examines the technological and economic risks of breeding a laying-hen stock with a simulation program developed by our team. During modelling we take individual cost elements and the most significant factors (different forage costs, price of sold eggs, unsuitable eggs, installing day-old chicks and old animals) affecting returns into consideration. The results can be presented in tables and graphs for both sexes as well. Specific production value, cost and revenue indicators can also be formed separately, thus the simulation allows the quantification of farming risks. Both the mathematical background of the program and its applicability in risk and economic analysis are presented.

Keywords: Monte Carlo, Risk analysis, Chicken production, Bayesian statistics, foraging.

IMPACT ASSESSMENT ON MILK INCENTIVE POLICIES IN TURKEY: ANTALYA PROVINCE CASE

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Abstract

Agricultural policy instruments are implementing in different ways among all agricultural based activities. These instruments have been performed for livestock including dairy cattle and milk for many years in Turkey. Until the year 1950, agricultural support system was organized according to genetically improvement, animal illnesses and veterinary services. Nowadays, agricultural support composition has changed. Milk incentive premium is one of the supports given to producers to achieve high quality level for milk. The idea behind this premium was to provide well organized milk distribution channel from producers to modern enterprises. In this study, milk producers were chosen for face to face survey in Antalya province. It was examined from the study if premium system is accomplished through the idea. The secondary outcomes of the research were to determine the influence of the premium on producer's attitudes, income level, product quantity, as well as membership tendency for cooperatives or unions.

Keywords: Milk incentive premium, milk marketing, producer surplus, Antalya.

9.3. COMPETITIVENESS – TECHNOLOGICAL DEVELOPMENT – CONSUMPTION

FROM SUBSISTENCE TO EFFICIENCY IN THE ROMANIAN AGRICULTURE DURING TRANSITION

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Abstract

In Romania's farming sector are currently working 3.6 million people, representing 32.1 % of the total country's labour force. Yet, they contribute by only 8.5 % to total GDP (2005). Besides the sectoral restructuring efforts, there are at present social problems that have to be solved up, namely the diminution of the huge agricultural labour force and the improvement of life quality in the rural areas. The importance of completing the tasks that remained uncompleted during the transition period, namely the privatization of land still in state ownership, competitiveness improvement, development of a market-compatible institutional framework became a pressing need at present, in spite of the many difficulties.

Keywords: Subsistence, labor excedent, net importer, quality of life, rural areas, Romania.

LONGITUDINAL STUDY OF FRUIT AND VEGETABLE CONSUMPTION IN HUNGARY

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Abstract

30 % of Hungarian population meets the 400g/day minimum consumption level. 14 % of the Hungarians consume fruit and vegetable 3 times a day. Hungary is under the European average in this case. Health consciousness is not primary related to fruit and vegetable consumption in this country. There is contradiction between consumption and the positive moral attitude towards these products.

After 1993 as a whole, the consumption structure of vegetables is stabile, but the structure of fruits is volatile. Processed products have more effect on the consumption of fruits than in the case of vegetables. Majority of vegetables show changing annual consumption data, but some show decreasing tendency, like cucumber, green beans, lettuce, and kale. Pear, sour cherry, plum and sweet cherry consumption decreased gradually also. Consumption of watermelon and Mediterranean fruits is increasing gradually since 1997.

"Conservative" or "traditional" segment consumes more fruit and vegetable than the average in Hungary.

Keywords: Marketing, produce, data, market research.

COMPETITIVENESS OF THE POLISH FOOD SECTOR AFTER THE ACCESSION TO THE EUROPEAN UNION

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Abstract

The paper focuses on the competitiveness as a driving force of market economy. The analyses of the results of foreign trade in agricultural and food products confirm that Polish agro-food sector is well prepared for operation on the Common European Market. Food producers have taken advantage of their competitive edge, mainly in terms of pricing. Nevertheless, consumers from other EU countries also accept quality features of Polish food. However, in order to maintain their position on the Common European Market, Polish producers should attach even greater attention to the promotion of their products.

Keywords: Competition, competitive edge, agricultural and food products, foreign trade, prices.

AGRICULTURAL TECHNOLOGY ADOPTION AND LAND PRODUCTIVITY: EVIDENCE FROM THE RICE-PRAWN GHER FARMING SYSTEM IN BANGLADESH

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Abstract

Rice-prawn gher (RPG) farming system is an indigenous agricultural technology solely developed by farmers since mid 1980s. The present study aims to estimate the land productivity of modern varieties (MV) paddy production under RPG and (year-round modern varieties) YRMV paddy farming systems in the southwest Bangladesh. The RPG farming system has significant impacts on inputs used in MV *boro* paddy production. The findings of the study indicate that more chemical fertilizers were used in per ha MV *boro* paddy production under YRMV paddy farming in comparison with RPG farming. Similarly, per ha cost of irrigation, pesticides and land preparation were also higher in MV *boro* paddy production under YRMV paddy farming system compared to RPG farming system. The inputs usage for MV *boro* paddy production under two farming systems showed statistically significant difference with each others. Although fewer inputs were being used in MV *boro* paddy production under RPG farming system, yield was higher (statistically significant) than YRP MV paddy farming system. Therefore, it could be concluded that land productivity of MV paddy production under RPG farming system was significantly higher than YRMV paddy farming system. The TFP of MV *boro* paddy production was higher in RPG farming system compared to YRMV paddy farming system. Moreover, the TFP varied widely within the farms between the two farming systems.

Keywords: Rice-prawn gher farming, year-round MV paddy farming, land productivity.

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