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"A comparative analysis of structural adjustment patterns and determinants of structural change in five selected NMS"

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ABSTRACT

The report provides a conceptual and methodological framework and statistical evidence on structural adaptation on agricultural holdings in five EU New Member States (NMS): Bulgaria, Hungary, Romania, Poland and Slovenia. Review of statistical evidence on structural change in agriculture comprises of a brief presentation of long-term developments (structural changes since the start of the economic transition), and of a more detailed review of the recent changes in farm structures. Similar approach is used for a quantified description of factors affecting farm structural change. Results of the statistical review suggest that farm structural change in EU NMS has recently slowed down or even reversed. However, when basic structural indicators (farm size, labour input) are observed together with indicators of economic performance (economic size of farms, labour productivity), one can see that the absence of structural adaptation in agriculture is only fictitious. Small-scale, marginal producers have been leaving the sector on the account of growing larger production units. Structural adaptation can be perceived also in qualitative sense with intensified modernisation, increase of productivity and market orientation of agricultural producers. EU accession thus resulted in strengthened representation of large, efficient producers in the size structure.

EXECUTIVE SUMMARY

Structural change in agriculture – attributes and determinants, research methods and data

Literature distinguishes between several dimensions of farm structural change as it can be recognised as changes in size distribution, farm types, tenure systems, changes in structure of farm income, specialisation, pluriactivity, etc. Conceptual framework of this study however remains focused on three attributes of structural change, which are considered elemental in this particular research: (a) farm size, survival and growth, (b) labour allocation decisions on agricultural households and consecutively, (c) adaptation strategies of agricultural households (eg. specialisation of agricultural production, income diversification, pluriactivity). It has to be noted that these attributes (dimensions) are highly interrelated and no clear-cut hierarchical relationship between them can be specified. Rather, a chosen dimension of structural change can act as independent variable (ie. determinants) in theoretical model, and in estimation of (the remaining dimensions of) structural change.

In order to base relevant hypotheses on farm structural change in the observed countries (Bulgaria, Hungary, Poland, Romania and Slovenia, often referred to as NMS-5) on a conceptually sound basis, determinants of farm structural change are synthesised in a typology of determinants affecting farm structural change. In the broad sense, the typology distinguishes between

(a) factors external to the agricultural household

- general economic and social conditions (long-term trends, specific, one-off occurrences),
- conditions on production factor markets (esp. land ownership and transferability, conditions on the (non-agricultural) labour markets),
- conditions for agriculture (natural conditions, agricultural markets, agricultural and rural development policy), and

(b) factors intrinsic to each individual unit of observation

- characteristics of farm holdings (eg. farm production type, physical size of agricultural holding, farm revenues)
- household structure (illustrated by eg. number of household members, dependency ratio, available labour input), value judgements and social norms
- individual characteristics (eg. age, education, gender, individual's status in the household) and cues (such as eg. lifestyle, personal preferences)

As for the methodological tools for empirical analysis of (various dimensions of) farm structural change, most of the studies have been mainly based either on conventional regression analysis or qualitative response models. Due to the necessity to interlink social and economic considerations in farm enterprise specific research, particularly qualitative response models (also called probability models) are seen as methodologically very appropriate.

With respect to data requirements, the use of micro-data is so to say the most suitable, from which reason it has also been utilised in the majority of related research work. Availability and the quality of such data are therefore crucial for such analysis. In reality, however, particular objective circumstances, such as individual data protection acts or derogated set of potential variables, may hinder both, availability and quality of micro-data required. Another barrier is limited availability of statistical data for several time periods, and the possibility that data from different time periods are not actually comparable. For particular research issues (eg. time allocation, income structure), research based on primary data gathering (albeit expensive and prone to bias) remains the only feasible option.

Recent developments of farm structures in NMS-5

The latest structural changes have been illustrated by comparison of the Farm Structure Survey (FSS) results 2003 and 2005. These are the only two periods for which FFS data are available for all five analysed countries. In terms of farm size, there are surprisingly no major differences between NMS-5. They all lag behind the EU-27 average; none of them reaches 50% of the EU-27 average size. However, there are sharp differences in the size structure of agricultural holdings. In countries where private land ownership was a norm also during the socialist era (Poland and Slovenia), rather fragmented farm structure remained unchanged until late 1980s, when, the number of farms started to drop steadily and significantly. This affected the size distribution of farms, which got closer to a normal size distribution (ie. bell-shaped, with a peak at the mean). In the pre-accession period and immediately after it, structural change has slowed down. In Slovenia the number of farms has been stagnating since 2003, whereas farm number in Poland even increased.

Countries with more pronounced experience of land collectivisation and/or egalitarian approach towards land redistribution (Hungary, Romania and Bulgaria) are characterised by a sharply dual size structure of farms: small-scale (usually subsistence oriented) farms on one side, and large farms (agricultural enterprises) on the other. As for the latest structural developments,[2] a strong decline in the number of farms was recorded in Bulgaria. The decline happened mainly on the account of marginal, small scale, subsistence producers, who left the sector. Less profound decrease in number of farms was been recorded in Hungary and Romania. In the case of Hungary, this coincided with an increase in the value of agricultural output, implying that it was the marginal (small-scale, subsistence) producers left the sector.

[2] The latest structural changes are illustrated by comparison of the Farm Structure Survey (FSS) results 2003 and 2005. These are the only two periods for which FFS data are available for all five analysed countries.

The analysed countries vary considerably in terms of productivity of agricultural land and labour. Returns on production factors are particularly low in Bulgaria and Romania, countries characterised by a sharply dual agricultural structure with a strong small-scale, subsistence oriented production). In these two countries, agriculture remains not only a strong economic, but also social category.

With regard to the labour input engaged in agriculture, the initial labour market conditions were characterized by unfavourable age structure and decline of agricultural workforce in the analysed NMS. Recent years brought decline in the total labour input in all analysed countries.

In terms of gross agricultural output, the analysed countries share similar adjustment patterns. After a decline in the first years of transition, agricultural output stabilised somewhat below the pre-transition figures in late 1990s. As reflected from the recent statistical data on agricultural output, the pre-accession and early post-accession years brought most notable increase of agricultural output in Poland and Romania.

Results of the Economic Accounts for Agriculture (EAA) suggest that economic performance of farm sector in the analysed countries has been generally improving. This can be attributed to a favourable market and policy environment. Price gaps with the rest of the EU started to diminish. Public expenditure on agriculture has been steadily increasing, most notably by CAP direct payments and rural development expenditure. Improved economic performance has to do also with technological progress and other improvements. One should therefore look not only to quantitative indicators of structural change, but also its qualitative attributes (eg. technical progress, specialisation of production market orientation).

Conclusions and policy implications

To underline the results of the survey of secondary statistical data, it becomes apparent that the absence of structural adaptation in agriculture in NMS-5 after the EU accession is only fictitious. The general observation is that small-scale, marginal producers have been leaving the sector on the account of growing larger production units. This is understandable as benefits of favourable market and policy conditions (converging prices, direct payments, and access to investment support) are increasing with farm scale. Structural adaptation can be perceived also in qualitative sense with intensified modernisation, increase of productivity and market orientation of agricultural producers. EU accession thus resulted in strengthened representation of large, efficient producers in the size structure.

On the other side of the coin, a surprisingly high number of small scale subsistence farm persists, suggests that a problem of rural poverty trap persists. It threatens especially socially vulnerable groups, such as aged households, or households affected by lack of off-farm employment opportunities. They persist in small scale, mainly subsistence oriented farm production. The CAP measures are biased against small farms, which are not able to capitalize the market opportunities and favourable policy conditions. It is therefore not surprising that CAP measures, including the one designed especially for marginal producers (so called 'support for semi-subsistence farms'), merely mitigates social hardships of the target group. In extreme cases, the problem of disappearing small-scale producers can escalate to rural exodus. This is particularly dangerous in areas with marginal conditions for agricultural production, poor physical and social infrastructure, and few non-farm employment opportunities.

Intensified international trade and improved market infrastructure inevitably affect the agri-food chain, especially in urban areas. So called 'retail revolution' brings both opportunities and threats to domestic producers along the food chain. Evidence from EU NMS suggests that economic performance of agri-food sector dropped the most when firms (or sectors in general) were previously enjoying high rates of (direct or indirect) market support. As performance of the food processing and retail sector directly affects its downstream linkages, agricultural producers and rural economies in general are particularly vulnerable in the process of international market integration.

To conclude, the intensity of structural change in agriculture has been, and will be, determined by external macroeconomic environment. With persisting economic downturn (characterised by dwindling aggregate demand, credit crunch and tightened balance of public finances), pressures towards agricultural producers will deepen and the problem of increasing rural poverty is likely to escalate further.

Insight to the latest structural trends in selected NMS-5 allows us to underline some policy implications of wider significance. Likewise to other economic policies, agricultural policy should not try to reverse market trends, but merely mitigate short-time negative market effects and create conditions for effective structural adaptation.

- In order to legitimize transfers of public funds to agriculture on the long run, economic argumentation of CAP Pillar 1 payments, LFA compensatory allowances and Agri-environmental payments should be improved (eg. improved competitiveness, clearly defined public goods).
- Overlaps between CAP Pillar 1 and Pillar 2 (Axis 2) payments should be dispatched (prevention of multiple payments for same or similar public goods / services).
- As it comes to measures addressing farm structures (eg. CAP Pillar 2, Axis 1), targeted schemes should be developed for social groups of long-term importance for rural development (eg. young farmers, young job seekers in rural areas). Rural development measures should not discriminate domestic producers (not negatively, nor positively) from their EU counterparts, nor should they favour certain groups of producers (eg. big Vs. small). The persisting problem of rural poverty should be addressed by special schemes for vulnerable social groups (eg. providing social safety nets for rural poor and elderly), separated from agricultural policy.

- Competitive position of producers should be further improved by better market access and access to capital; either through public support (eg. improvement of physical and market infrastructure, investment support, support for producer groups), or indirectly through private initiatives (eg. stimulating micro-credit schemes).
- As a response to competitive pressures from the changing retail structure and consumption patterns, innovative approaches towards marketing of agri-food products (eg. vertical integration, local supply chains) and adding value to agricultural products (quality labels, gastronomy) should be stimulated.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

Deliverable builds on findings of the preliminary analysis of farm structure evolution in the EU New Member States (NMS) from Central and Eastern Europe (D.2.1, Chapter 7). In contrast to a popular wisdom that these countries form a relatively homogenous group, the report pointed out heterogeneity of their initial structural conditions and a varying magnitude of structural change throughout the period of economic transition and accession to the EU. All this resulted in a situation, where diversity of farm structures in the EU NMS today is much greater than before the start of the transition.

Preliminary analysis of the D.2.1 is limited to description of initial conditions and different pathways until early 2000s. Different modalities of transition, including different initial ownership structure, restitution and allocation of land property rights, functioning of the land markets, procedures for restructuring of former state and collective farms, contributed to the today's diversity of farm structures: from relatively large and efficient agricultural enterprises in Hungary to small-scale subsistence oriented agricultural households in NE Bulgaria, to diversified small-scale farms in Slovenia.

In contrast to this, Workpackage 5 attempts to reveal the recent trends of structural change in agriculture in five selected EU NMS[3] and tries to decipher whether there are common adjustment patterns. The most intriguing question there is whether the accession of these countries to a common market (EU) and the adoption of the common agricultural policy (CAP) environment accelerated or slowed down the structural change. Among other relevant research questions, the following can be pointed out: Which dimensions of structural change can be perceived and which not? Can we identify any common pathways? Which are the factors that influenced recent structural developments in selected countries the most?

As a first step, a review of relevant empirical literature was carried out in order to establish a sound conceptual and methodological framework for (i) presentation of farm sector adjustment patterns in selected countries (ii) a structured review of factors potentially affecting structural developments and (iii) empirical analysis of pathways and determinants of structural change from regional (NUTS 3) and individual (survey) data.[4]

The report starts with a review of possible methodological approaches and data provision strategies in analysing farm structural change. A special accent is given to the questions of data provision, data accessibility and quality. This is followed by a systematic presentation of various attributes of farm structural change, and their determinants, illustrated by the findings of Farm Structural Surveys 2003 and 2005. The report concludes with the discussion on implications for empirical analysis (which is subject of the Deliverable D.5.2), and on policy implications of the findings.

[3] Bulgaria, Hungary, Poland, Romania and Slovenia.

[4] Deliverable 5.1 deals with parts (i) and (ii). Part (iii) will be dealt within Deliverable 5.2.

2 STRUCTURAL CHANGE IN AGRICULTURE – CONCEPTUAL AND METHODOLOGICAL FRAMEWORK

When it comes to analysing structural changes that agricultural sector has undergone in the last decades, much of the focus has been on decreasing number and increasing size of farms. However, the structural changes can also be recognised as changes in size distribution, farm types, tenure systems, changes in structure of farm income, specialisation, pluriactivity etc (Brinkman, 1981). This chapter provides a theoretical baseline and reviews important empirical findings on the following dimensions of agricultural structural change, which can be considered elemental in this particular research:

a) farm survival and growth with deriving changes in farm size,

b) labour allocation, including labour productivity and off-farm labour market engagement and

c) specialisation/diversification of agricultural production.

The listed dimensions (or better, attributes) of structural change are discussed in a greater detail below. It is worth to emphasise that these attributes (dimensions) are highly interrelated and no clear-cut hierarchical relationship between them can be specified. Rather, a chosen dimension of structural change can act as independent variable (ie. determinants) in theoretical model, and in estimation of (the remaining dimensions of) structural change.

2.1 Dimensions / attributes of structural change

2.1.1 Farm size, growth and survival

Expansion/contraction of farms that did not exit the sector is recognised as one of fundamental elements of structural change (Weiss, 1999). Besides, farm exits are closely related to those changes, as well as one of their main drivers, since, according to Roe (1995), after a farm exits, additional land and labour is being available for reallocation, either among remaining farms, or into non-agricultural uses. The existing literature, which analyses changes in farm size, usually derives from economic theory on firm growth and survival. Between various alternative models that attempt to explain firm growth, the Gibrat's law of Proportionate Effects is often used as a starting point of standard firm growth models (Hallam, 1993; Sutton, 1997; Cefis et al, 2007; Lotti et al, 2008) as well as in the analysis of farm growth (Weiss, 1995; Weiss 1999; Hallam 1993; Rizov and Mathijs, 2001).

The basic equation for testing the law is:

$$\ln S_{it} = \alpha + \beta \ln S_{it-1} + \varepsilon_{it}$$

Where S_{it} represents the size of a firm i in time t. From the equation one can observe that the growth of a firm is determined by three factors, symbolised by α, β and ε, where α

represents the rate of market growth, common to all firms, β is systematic tendency of firm growth, dependent on initial size of a firm, and ε represents all random factors. Gibrat's law holds when β equals 0, implying that Gibrat's law rests on the assumption that growth of a firm is determined by stochastic factors which are independent of initial size of a firm. As a consequence, one can infer that the size distribution will not be symmetric. As indicated by Weiss (1995), the insight into farm size structure in most cases does reveal their asymmetric distribution, which suggests that farms confront similar conditions to grow, as their actual growth depends on random factors. From this reason Gibrat's law, although lacking microeconomic argumentation and being rather parsimonious, remains an important point of departure for analysing farm enterprises.

Empirical evidence on Gibrat's law is becoming more an exception than a rule. Researchers have found fault with the assumptions of the law and their empirical work showed that it does not hold, especially when applied to a complete size distribution of farms. Weiss (1995) reviews two empirical tests of the law and finds one case from England and Wales confirming it and one from Canada that rejects it. The latter study gives the evidence that the initial farm size affects growth, or more specifically, that smaller farms grow faster than larger ones. The latter finding is consistent also with those from, e.g. Evans (1987), Rizov & Mathijs (2001), Musso & Schiavo (2007). In addition, in his own study, Weiss (1995, 1999) comes to similar conclusions by analysing individual farms in Upper Austria, however he goes a step further when arguing that farm growth dynamics lean towards two gravitation points or "centres of attraction". Garcia, Offnutt and Sonka (1987) report similar results for U.S. and Hungarian agricultural sector. Two size thresholds imply polarisation in growth, and due to middle size farms being at least stable in their growth dynamics, the studies supports the notion of a "disappearing middle" (Buttel, 1982) being an important attribute of structural change. However, the "disappearing middle" phenomenon was subject of research mainly in countries with a steadily evolving agricultural structure. The evidence about farm growth pattern in post-transition economies was less thoroughly studied.[5] Since agricultural sectors in CEE-Countries experienced some distinctive patterns of structural development (Lerman, 2000; Czaki and Nucifora, 2002), it would be worthwile exploring whether the phenomenon of a "disappearing middle" fits also to the conditions where agricultural development was characterised by strong structural 'breaks'.

As mentioned above, although stochastic model based on Gibrat's law adequately characterises many crucial aspects of farm growth and survival, its primary weakness is that random processes embrace also systematic factors that are of great interest from a social science perspective. Therefore, the model has been superseded by theoretical

[5] To the authors' knowledge, two studies on this subject were carried out in CEE: Rizov and Mathijs (2001) analysed survival and growth determinants of farm enterprises in Hungary, and Juvancic (2006) analysed the subject on a panel dataset of family farms in Slovenia.

models of entrepreneurial choice (e.g. Lucas 1987) and evolutionary models, based on Jovanovic's (1982) work (e.g. Pakes & Ericson 1987; Cabral, 1995). The step forward of those is the consideration of individual characteristics of manager in firm's growth dynamics.

Although the number of studies stressing the importance of human capital, experience and other individual characteristics for firm growth is extensive, detailed empirical work for the case of agriculture going beyond the testing of Gibrat's law is rather uncommon. Even if being rare, some studies are very consistent in view that farmer's attributes are an important determinant affecting farm growth (see e.g. Sumner and Leiby, 1987; Upton and Haworth, 1987; Weiss, 1999; Rizov & Mathijs, 2001). The net effect of human capital on growth and survival is being reasonably unclear, since it may triggers two counterproductive effects. On the one hand it improves the effectiveness of a farm operator in allocating resources and adopting new technologies (Zepeda, 1990; Sumner and Leiby, 1987; Boehlje, 1992) implying higher growth and survival rates, and on the other, it stimulates well-educated farmers to find work off-farm, where incomes are higher (Gardner, 1992; Goddard, 1993), therefore discouraging farmers to continue with (full time) farming[6]. With respect to "education" (especially agricultural specific) and "age" of the farm operator, Rizov and Mathijs (2001) find a positive effect on growth rates, although for "age", this is true only if the operator is younger than 54 years. The effect of age on survival of the farm is positive only for young farmers up to the age of 37, whereas education has positive, but non-linear effect (the threshold is 9 years of education). Their results are in line with the life-cycle theory of enterprise development and in addition, they also support the hypothesis that younger, well educated operators might have a better earning capacity in non-agricultural sectors. Furthermore, these authors also find that living in the same settlement have a significant effect for survival possibility whereas the fact that the farm operator always lived in rural area plays a significant role in growth of farms.

Besides human capital (farmer and his/her family characteristics) and common forces of structural change in the economy (e.g. technological change, changes in prices[7], demographic factors, economic growth and public programmes[8]), the earlier research also observes other significant determinants of farm (firm) growth and survival. A few to be mentioned are: access to financial capital (Musso & Schiavo, 2007), off-farm labour market

[6] The relation between off-farm work, size of farm, growth and survival is more in details discussed in one of the following sections.

[7] Variability of farm prices affects middle size farms more than larger and smaller ones (due to better risk management strategies of larger farms and additional off-farm income sources, typical for smaller ones), (Tweeten, 1984).

[8] See Goddard (1993) for extensive literature review for the case of agriculture.

engagement (Zepeda, 1995; Weiss, 1999), access to market[9], availability and functioning of factor markets[10] and minimum efficient scale (MES) in production specialisation subsectors (Rizov & Mathijs, 2001). One could also expect the share of owned land to influence a decision whether to stay in agriculture or exit the sector. Apart from these, one could intuitively add some more reasons to the question of staying or exiting the agricultural sector: quality of land and profits derived from land use, the relatedness to rural traditions and embeddedness in traditional agricultural societies/networks. disposal with machinery (and knowledge how to use it). There are also incentives coming from the agricultural policy (and tax reasons) not to stop farming activities. Clearly, the causes of structural change are not mutually exclusive, but rather interrelated.

Farm size dynamics are obviously recognised as a major attribute of structural change, influenced by various internal (e.g. individual characteristics) and external factors (e.g. general economic and social environment). Another important aspect of agricultural sector dynamics is related to labour decisions of farm household members, which directly determines labour input in agriculture, the structure of farm income as well as possibly affects farm growth and survival. In the following section we discuss the importance of labour decisions for shaping agricultural sector and provide an overview of empirical results on this matter.

2.1.2 Labour allocation

As already noted above, structural change can also be recognised in labour reallocation dynamics within and away from agricultural sector. Decline in labour input, farmer's other gainful activities and off-farm engagements are anticipating and accommodating changes in the structure of agriculture.

A rapid outflow of labour employed in agriculture is far from being a new phenomenon and can be already viewed as a general economic trend. One of the reasons for such intensive decline is technical progress and accompanying increase of total factor productivity.[11] The latter has caused the change in the share and level of inputs used. The drop of the labour input was the most considerable as the capital was its reasonable substitute (Goddard, 1993). Due to the relatively lower price of capital to labour, such occurrence is indeed economically viable. Kislev and Peterson (1982) provide the empirical evidence that the

[9] Proximity to e.g. county capital, train station, village centre.

[10] Land, credit, labour and product markets and quality of contract enforcement.

[11] In the beginning of the transition process, we could observe in some countries an opposite process of labour-inflow (e.g. Caucasus countries, Bulgaria, Romania) as a reaction to political and economical risks, and agriculture was attributed a role of the 'social buffer'. This can however be seen as an anachronistic, transitional phenomenon stimulated by transitional economic recession and accelerated by some distinct patterns of land restitution.

growth rate of wages, relatively to machinery price is a significantly important factor affecting structural change.

A decline in agricultural labour requirements is often seen as a motive for off-farm employment as well as for on-farm diversification. Decline in labour requirements in agriculture resulted in underemployment, and from this reason multiple job holding can be understood as an aspiration for full employment and as a strategy dealing with income variability and risk (see e.g. Mishra and Goodwin, 1997). It supports and stabilises the income and therefore enables smaller farms to better handle uncertainty (McNamara&Weiss, 2001). On the other hand, off-farm labour market participation is often seen as a step in the way out of agriculture. Clearly, the growing amount of farms reporting off-farm work, points to structural shift away from agriculture and to the altered structure of farm total income. Thus, employment decisions of farm operators (as well as their spouses) caught much attention among researchers, and the last decades have provided us with substantial volume of empirical studies on how various demographic, geographical, economical and political factors impact this phenomenon.

Huffman's (1980) seminal work on off-farm labour decisions empirically proves the positive correlation of education on propensity to off-farm work participation. Based on studies that followed (e.g. Sumner, 1982; Huffman and Lange, 1989; Huffman, 1991; Lass et al, 1991; Benjamin, 1996; McNamara&Weiss, 2001; Chaplin et al, 2004; Alasia et al, 2009) one can speculate that individual characteristics (e.g. age, gender, education, experience, degree of risk aversion, position in the family) and household attributes (e.g. size, presence of young children) play a vital role in such decision making. Authors find general education[12] to be strongly and positively related to off-farm work, whereas age and size of a household are negatively associated with employment diversification (see e.g. Goodwin & Mishra, 2004; Chaplin et al., 2004; Alasia et al, 2009).

Presence of young children tends to reduce the supply of off-farm labour of spouses (Goodwin&Mishra, 2004). Similar relationship is noted if a person is engaged in domestic work, therefore women can be recognised to have lower propensity for off-farm work (Alasia et al, 2009).

Studies also examine farm characteristics and local/regional characteristics as possibly important factors determining off-farm labour decisions. Goodwin and Mishra (2004) find a negative relationship between the net value of a farm and the tendency towards off-farm labour market engagement. The authors also point out the negative effect of farming efficiency on off-farm labour supply, which is being consistent with the prediction that efficiency leads to higher farm wage and thus lowers farmer's motives to seek for off-farm employment.

[12] Agricultural specific education has no clear effect on off-farm work engagement due to inconsistency among studies. Benjamin (1994) and Mishra and Goodwin (1997) find negative correlation, whereas Chaplin et al (2004) find it vary among countries.

Furthermore, Alasia et al. (2009), examining Canadian agricultural sector, and Benjamin and Kimhi (2006), using French farm census data, ascertain a significant and inverse relationship between farm size and off-farm work, the relationship being especially evident for smaller farms. Similarly, McNamara and Weiss (2001) find a significant but non-linear correlation, implying that first off-farm diversification increases with the size of a farm, and then decreases.

With respect to the type of farming, Alasia's et al. (2009) study is consistent with some previous ones on the notion that dairy operators are universally less likely to seek off-farm work, due to higher labour requirements in this subsector. In addition, specialisation, and therefore presumably increased productivity of farming, lowers the probability that a farmer will become engaged in other work off-farm. The authors also conclude that probability of off-farm work decreases with hired labour, meaning that hired labour complements rather than substitutes an operator's labour. On contrary, Benjamin and Kimhi (2006) report that hired labour appears to be a substitute, while based on earlier results from France, hired labour was found to be complementary, but only for male farm labour (see Benjamin et al. 1996). The authors also conclude that the demand for hired work in France is found to be positively related to farm size and specialisation, implicating that certain factors outside of the agriculture sector that affect availability of labour, e.g. immigration policy, are being potential to shape the process of structural change on family farms in the country.

Employment growth in the CEE region in the last decade, unemployment rate and degree of employment specialisation in the area also play an important role in labour decisions. In line with expectations, farmers living in the region/area with higher employment growth, lower unemployment rate and higher diversification of work are more likely to engage in off-farm labour market (Alasia et al. 2009). In addition, Chaplin et al. (2004) acknowledge availability of public transport as an important factor in the propensity in work diversification in two of the analysed countries (Hungary and Poland). Additionally, factors such as agricultural support policies can have an impact on on-farm/ off-farm labour allocation decisions, depending of course on the total volume and on the modalities of agricultural support.

Authors having examined labour decisions among farmers have found a variety of factors affecting these decisions. Based on the findings reviewed, it comes obvious the factors worth being included in the analysis are a) farm operator characteristics, such as age, gender, education and experience, b) family characteristics, e.g. the presence of young children, the size of a household, total income c) farm characteristics, e.g. type of farming, the size of the farm, specialisation, labour hired, farming efficiency and d) (regional) market characteristics, such as unemployment and employment dynamics, proximity to urban centre etc.

2.1.3 Production specialisation/diversification

Farm specialisation is, besides the changes in farm size and farm labour adjustments, another important aspect of farm dynamics. The empirical testing of factors affecting shifts in agricultural production has been narrowed down to investigating the relationship between farm size and farm specialisation and in majority conducted for US agricultural sector.

Rather limited studies provide mixed empirical evidence, so the relationship between farm size and specialisation of production seems ambiguous. This is due to two competing hypotheses that imply different directions of causality between size and specialisation. Firstly, increased farm size and the presence of economies of scale make specialisation more attractive. Secondly, the relationship might be negative due to increased risk that larger production has been associated with, and the actuality that diversification of production can be an efficient mechanism for risk reduction (Kimhi and Rekah, 2005). Which effect will dominate determines the result of empirical assessment.

Weiss and Briglauer (2002) in the case of Austria, similarly as Pope and Prescott (1980) in the case of California, find that smaller farms are more diversified and tend to increase their degree of specialisation faster than larger farms. Their empirical evidence also relate higher degree of specialisation with older, less educated and part-time farm operators. The latter is possibly due to the fact that off-farm work diversifies total farm income and therefore can already be considered as a strategy for risk reduction.

Looking to the issue of farm specialisation in a more narrow sense, White and Irwin (1972) report the finding that larger farms are more specialised, while Evenson and Huffman (1997) find that the relationship between farm size and livestock specialisation is negative in both direction, size positively affects crop specialisation, but crop specialisation has no significant effect on size. Evenson and Huffman (1997) also note that increased specialisation among US farms has increased crop and livestock sector productivity. They find input prices to be a dominant factor increasing crop specialisation, while technology (resulting from research) seems to be the key driver for livestock specialisation.

To the best of our knowledge, no such empirical analysis has been done for agricultural sector in transition economies in Central and Eastern Europe (CEE). One should note that the results from abovementioned empirical studies do most likely do not reflect the actual dynamics in countries that report remarkably smaller average farm size, comparing to the average farm size in US (and also EU-15). The rationale is that very small farms are reasonably related to subsistence farming, and therefore their production is, with the intention to satisfy alimentary needs of the family, rather diversified.

In the above sections we have emphasised and discussed three major attributes of structural change in agriculture and, based on empirical research reviewed, provided an overview of various factors possibly affecting them. In the following section the factors determining structural dynamics are being classified and discussed further.

2.2 Determinants of structural change

In relatively abundant conceptual and empirical studies on structural change in agriculture, there is no uniform classification of determinants affecting these processes. In order to base relevant hypotheses of farm structure evolution on a surveyable and conceptually sound basis, we have attempted to develop a typology of farm structural change determinants. The typology has been broadened and adapted from studies analyzing the farm household decision making processes, particularly those dealing with labour allocation (Quaranta and Marotta 1998, Huffman 1991, Huffman 2000, Andermann et al., 2000, Hanuschek and Kimko, 2000). Typology is graphically presented below (Figure 1).

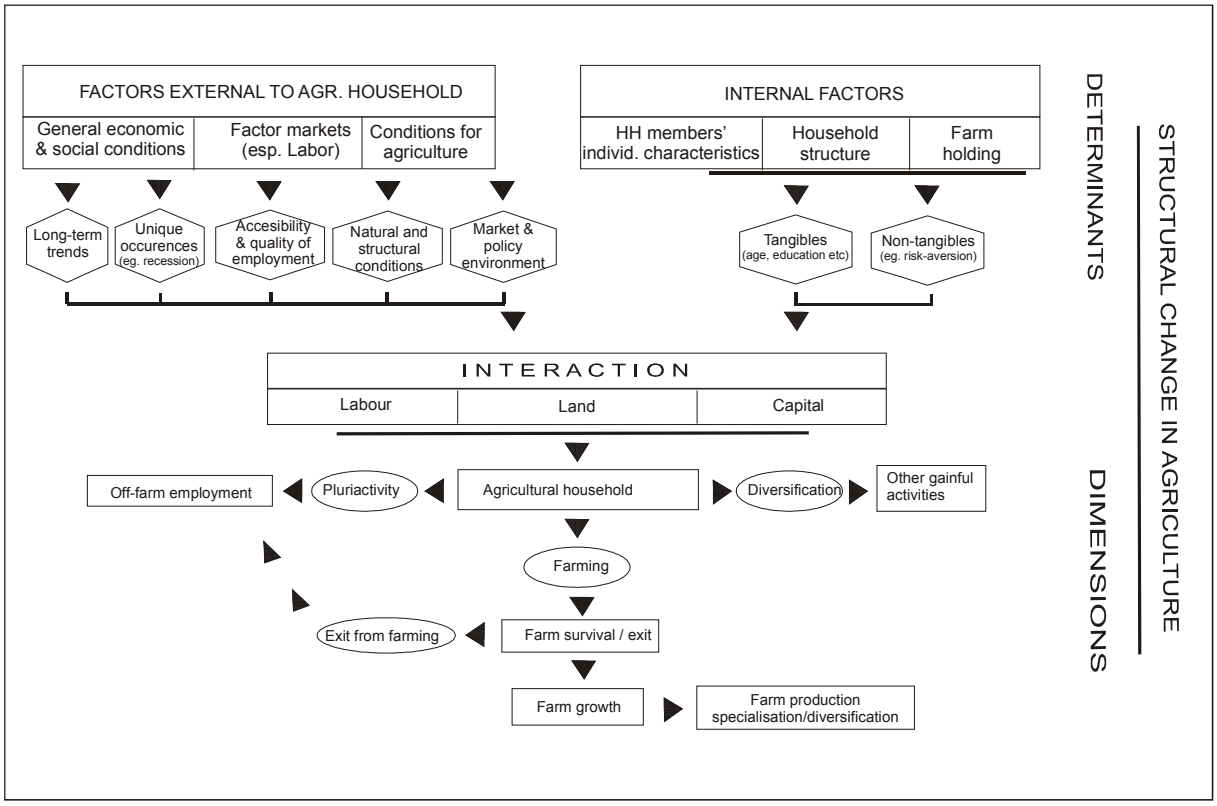


Figure 1: Determinants affecting structural change in agriculture

In the broadest sense, we can distinguish between factors external to the agricultural household, and factors intrinsic to each individual unit of observation. Each of these two groups is divided further as suggested in Figure 1 and further described in sections that follow.

2.2.1 General economic and social conditions

Apart from the direct impact on gross value added, the development trajectory of economy can be reflected also in a changing structure of economic activities, or in a changing spatial pattern of economic growth. Decreased relative importance of agriculture and labour outflow from this sector can be considered as the general long-term trend (Von

Meyer, 1997). This can be attributed to a rapid technological progress in the sector and a corresponding sharp decrease in labour demand. Outflow of labour from agriculture is an obvious labour allocation strategy of agricultural households in their aspirations towards the achievement of income parity with non-agricultural households.

Structural change can be accelerated and irreversibly affected also by specific, one-off occurrences. Radical structural change in agriculture of CEE and CIS countries (Czaki and Lerman, 2000) as a consequence of transition to a market economy comes as an obvious example. Transformation of market and institutional environment in EU NMS after the accession to the EU is another occurrence that can strongly affect their agricultural structures. In the nearby future, consequences of the global economic downturn can be expecting not only in trade patterns, but also in allocation of the factors of production in all sectors, including agriculture.

2.2.2 Markets with factors of production (esp. labour markets)

As pointed out by Lerman et al. (2002), emergence of functioning markets for factors of production (esp. land ownership and transferability), emergence of credit institutions, new capital investment patterns, and conditions on the (non-agricultural) labour markets led to a massive restructuring of agriculture in transition economies. Profound structural changes in agriculture can be expected also in the case of less obvious changes on the markets with factors of production. As suggested by Davis and Pearce (2000), the decision of an individual member of an agricultural household to combine agricultural work with off-farm employment can also be a consequence of favourable conditions on off-farm labour markets (‘ demand pull’), or due to the necessity to combine meagre farm incomes with additional off-farm work (‘distress-push’). Physical or perceived accessibility of the factor markets can play important roles. This is the case with development of road infrastructure and public transport systems (increased mobility of labour and goods), or with development of IT infrastructure, which diminish the ‘digital divide’ between rural and urban areas and thus improve their comparative position at the off-farm labour markets.

2.2.3 Agricultural situation (agricultural output, markets, policy)

Obviously, agricultural output is highly dependent on natural conditions for agricultural production. These conditions differ regionally and sometimes even locally and they can be regarded very important in individual decision-making. However, the impact of natural conditions for agricultural production on the decision-making process of agricultural households can not be unanimously determined. Impacts of natural conditions on decision-making process often come in conjunction with other relevant factors affecting agricultural structures, such as eg. physical remoteness, development of market infrastructure, or with the situation on the markets with production factors (esp. labour).

Changes in above listed accompanying factors can lead towards profound changes in the structure and volume of agricultural output.

The decision-making process on agricultural households can be significantly affected by changing market conditions, or by public interventions in the spheres of agricultural and rural development policies (Weiss, 1997; Kimhi, 1994). Changes in market conditions, trade regimes or policy environment can have profound and long-term structural impacts.[13]

2.2.4 Individual characteristics of agricultural household members

The decision-making process of agricultural households is a result of interactions on various levels: (i) abilities and personal fondness of individual household members, (ii) reconciliation of interests between household members and (iii) labour demand and capital-related requirements of agricultural holding.

Individual characteristics (such as eg. age, education, gender, individual's status in the household) and cues (such as eg. lifestyle, personal preferences) play the most important role in labour-allocation decisions in agricultural households (Huffman, 2000). As the dimensions of structural change are interrelated, individual characteristics can in turn affect also other dimensions of structural change (farm survival and growth, specialisation of agricultural production, diversification).

2.2.5 Household structure

Analysing the decision-making process at the level of agricultural household needs to take into account also the relations and interactions between household members (Ellis, 1988). This is especially the case in labour allocation – related decisions, where the individuals' status is not freely determined, but rather conditional on the value judgements and social norms (Altonji and Dunn, 2000). This can be reflected in eg. gender-related allocation of work responsibilities.

Quantitative research of interactions within household members usually explores in greater detail relationship between the holder and the spouse (Weiss, 1997; Corsi, 2000; Juvančič and Erjavec, 2005). Other household characteristics are usually discussed only at the level of aggregated indicators, such as eg. number of household members, dependency ratio, annual working units (AWU).

[13] Nevertheless, analyses quantifying impacts of market or institutional changes (eg. enlargement of the EU) are usually limited on analysing direct effects, such as prices and incomes. The issue of structural impacts has so far been neglected in such analyses.

2.2.6 Characteristics of agricultural holding

Virtually all empirical analyses dealing with the decision-making process of agricultural holdings put a special emphasis to the characteristics of the farm, especially those carrying economic implications. Outcomes are usually significantly related to economic characteristics (eg. size, incomes) of the farm. Theoretically, the most appealing approach would be to introduce farm-income related data into empirical research. However, the farm income-related data can be usually estimated only indirectly (at least in the case of farm structure with prevailing family farms). The higher dependence on various assumptions, the lower is data reliability. The authors therefore usually use statistical proxies of economic potential of the farms: (i) farm revenues (Lass and Gempeshaw, 1992; Oluwole and Findeis, 2001), (ii) physical size of agricultural holding (Weiss, 1997, 1999; Rizov et al., 2000), or (iii) farm production type (Benjamin, 1996; Corsi and Findeis, 2000).

2.3 Methodological approach

2.3.1 Analytical toolkit

Empirical studies analysing determinants of farm dynamics and factors affecting labour allocation decisions have been mainly based either on conventional regression analysis (e.g. Sumner and Leiby, 1987; Kimhi and Rekah, 2005; Musso and Schiavo, 2007) or qualitative response models (e.g. Benjamin et al, 1996; Weiss 1999; Goodwin and Mishra, 2004; Alasia et al.2009). An overview of studies and methodological approach applied can be found in Table 1.

Due to the necessity to interlink social and economic considerations in farm enterprise specific research, particularly qualitative response models (also called probability models) are seen as methodologically very appropriate. As pointed out by Barthez (1994), the complexity of decision making process of farm household members cannot be fully captured with general econometric models. Besides, qualitative response models prevail over conventional regression models by enabling the analyses where dependent variable has a discrete outcome, such as “yes” and “no” (Green, 1997). Namely, the use of conventional regression models is appropriate only when dealing with dependent variables that can take any real value. Among quality response models, the appropriate approach for analysing farm enterprise and household dynamics is the use of logit or probit models, or one of their derivatives.

In studies focusing on labour decisions of farm operator and their spouse (e.g. Huffman and Lange, 1989; McNamara and Weiss, 2001) a bivariate probit model is reasonably applied. This approach enables application of different combination of independent variables and therefore examines possible dissimilarities in decision motives of both studied persons.

Furthermore, authors often use a multinominal logit model, which enables observation of dependent variable with more than two outcomes. This approach if frequently applied when examining how appointed factors determine e.g. various aspects of diversification

(Chaplin et al., 2004), as well as pluriactivity of household members (Benjamin and Kimhi, 2006) or farm labour allocation among operator, spouse and hired labour (Benjamin et al., 1996). The weakness of the model, however, remains the challenging interpretation of its results as well as the deficiency that various outcomes of dependent variable are being explained by the same combination of independent factors. Notwithstanding, the multinominal logit model seems to be relatively popular among the researchers.

Besides logit, probit and conventional regression models, tobit models can also be found in farm enterprise empirical studies. Tobit model is another important kind of limited dependent variable model, however it can be viewed as "a compromise" between standard regression and logit/probit models. The variable outcome can be continuous over strictly positive values, or zero for nontrivial fraction of population (Wooldridge, 2006). This approach is reasonably applied in studies analysing individual's labour allocation, within particular branch, and an income earned (see e.g. Mishra and Goodwin, 1997; Goodwin and Mishra, 2004)[14].

Moreover, as it is pointed out by Heckman (1979), there is a risk of obtaining biased results when using non-random selected data samples in the models analysing behavioural patterns. As a possibility to avoid this problem, Heckman (1979) proposes estimation of a two-stage model. As seen in the Table 1, some more complex research questions demand the employment of these "combined" procedures. This approach is typical for econometric estimation of farm growth determinants (see e.g. Weiss 1999; Rizov and Mathijs, 2001), since there is a risk of obtaining biased results due to sample attrition (farm growth can only be estimated for those farms that have survived). In this particular application of two-stage model authors first estimate probability of up-keeping of agricultural production during the analysed period ('farm survival'). Based on the probit model results, an inverse of the Mill's ratio λ_i (Heckman, 1979) is calculated for each observation. This is a monotonously decreasing function of probability that an observation is included in the sample for estimation of farm growth. Estimates of λ_i are used as additional explanatory variables in the second stage of the analysis, which consists of a simple OLS estimation of a farm growth model[15].

[14] If a farm operator does not work off-farm, the outcome value equals zero, if a farm operator work off-farm, the outcome value equals the actual amount of income earned off-farm.

[15] A more technical description of estimation procedure is presented in Heckman (1979) and Maddala (1999).

Table 1: An overview of methods and data used in empirical studies on farm growth and survival, labour decisions and farm specialisation.

Author(s)	Country	The subject of research	Data	Method
Ahituv and Kimhi, 2002	ISR	Off-farm employment (state dependence) + investment decisions	Agricultural Census 1971 and 1981; panel dataset (n=ca. 20.000)	2-stage; multinomial Probit + switching regression
Alasia et al., 2009	CAN	Off-farm labour	Combined data Agricultural + population census	Probit
Benjamin et al, 1996	FR	Labour decisions (Farmer, spouse, hired labour y/n)	Agricultural Census, (n=ca. 7.000)	Multinomial logit
Benjamin and Kimhi, 2006	FR	Pluriactivity: Labour decision of farm couples	Agricultural Census 2000, (n=ca. 65.000)	Multinomial logit
Chaplin et al., 2004	CZ, H, PL	Farm HH labour diversification	Survey (n=900)	Multinomial logit
Evenson, Huffman, 1997	USA	Employment status, the rate of specialisation, the size of a farm	Synthetic dataset of state multifactor productivity (1950-1982)	3-stage regression
Goodwin and Mishra, 2004	USA	Pluriactivity (hours worked off-farm) and farm income (proxy for farm efficiency)	National farm survey (n=ca.7700)	Tobit
Hennessy and Rehman, 2008	IRL	Off-farm labour and working hours	National farm survey (n=ca.1000)	2-stage; Probit and multiple regression
Huffman, 1980	USA	Human capital and employment decisions	Agricultural Census; grouped data	2-stage; Probit and multiple regression
Huffman and Lange, 1989	USA	Employment decisions of farm operators and their partners	Survey (n=771)	Bivariate probit
Juvančič and Erjavec, 2005	SLO	Employment status of farm holder (n-1, n)	Agricultural Census 1991 and 2000; panel dataset (n=ca. 20.000)	Probit
Kimhi, 2000	ISR	On/Off-farm labour, exit from farming	Annual farm survey, panel dataset (employment status n-1, employment status n)	Multinomial logit
Kimhi and Rekah, 2005	ISR	Farm specialisation and farm growth	Annual farm survey, panel dataset; different forms of agr. holdings, (n=950)	2 separated models, both regression-based
Lerman et al., 2008	RUS	Farm diversification (non-farm self employment), y/n	Survey (n=ca.2000)	Logit
Mc Namara and Weiss, 2001	AUT	Farm HH labour diversification (full-time, part-time), farmer+spouse	Agric. census, panel data (n=ca.40.000)	Bivariate probit
Mishra and Goodwin, 1997	USA	Income variability and off-farm labour suplly	Survey (n=618)	Tobit

Table 1 (continued):

Musso and Schiavo, 2007	FR	*Firm* survival and growth 1996-2004	EAE Survey (Book-keeping data of firms >20 employees), panel dataset 1990-2004	2 separate models, both regression based
Rizov and Mathijs, 2001	HUN	Farm survival + farm growth period 1993-1997	Hungarian micro survey data - subsample (n=740)	2-stage; Probit and multiple regression
Serra et al., 2005	USA	Off-farm employment (y/n)	Farm accounts network (similar to EU FADN)	Probit
Weiss, 1999	AUT	Farm survival + farm growth	Agricultural Census; panel dataset (n=ca.50.000)	2-stage; Probit and multiple regression
Weiss, Briglauer, 2002	AUT	Farm household characteristics and farm diversification	Agric. census, panel data (n=ca.50.000)	Instrumental-variable regression

2.3.2 Data requirements –review and implications for research

With respect to data requirements in structural change analysis, the use of micro-data is so to say the most suitable, from which reason it has also been utilised in the majority of related research work. Availability and the quality of such data are therefore crucial for such analysis. In reality, however, particular objective circumstances, such as individual data protection acts or derogated set of potential variables, may hinder both, availability and quality of micro-data required. Besides, it is worth mentioning that only a minor part of reviewed works focus on agricultural sector dynamics. To the certain extent this may be due to another barrier in obtaining the data required, i.e. its limited availability for several time periods, and the possibility that data from different time periods are not actually comparable. Both are clearly necessary when investigating structural change in agriculture.

According to the methodological specification described in the above subsection, it comes obvious that econometric analysis of discussed topics requires a panel dataset. One can view that the majority of studies use panel data from standard statistical investigations, either agricultural census (e.g. Benjamin et al, 1996; Weiss 1999; Juvancic and Erjavec, 2005; Alasia et al. 2009), national farm surveys (e.g. Goodwin and Mishra, 2004; Kimhi and Rekah, 2005) or similar. Besides, authors also report empirical research based on primary data gathering (e.g. Chaplin et al, 2004; Lerman et al., 2008). An overview of studies and data sources can also be found in Table 1.

Certainly, both, standard statistical investigations and primary data gathering have their advantages and disadvantages. The magnitude of a sample is surely the strongest advantage of an agricultural census and national farm surveys, while the size of a sample

from author's own survey has to be, due to high financial requirements, rather limited. On the other hand, standard statistical investigations collect fairly general data, which may not comply with data requirements of particular research. Particularly information, such as time allocation or income structure, which is of great importance for analysing off-farm labour decisions, is almost fully bound to specialized surveys.

Following the above, it comes reasonable that the modelling work in SCARLED WP5 would require a panel dataset. In order to make the econometric estimation of farm structure evolution on nationally representative samples, the dataset should preferably be based on statistical micro-data from standard statistical investigations (Agricultural Census (AC), 2000-02; Farm Structure Survey (FSS), 2005-07), which was conducted in all of the analysed countries and which we were aimed to acquire.

Nevertheless, national statistical offices are not permitted to give access to micro-data for agriculture, which is why SCARLED requested support from the Eurostat services. However, although the data is stored in Eurostat databases, also Eurostat is bound by certain restrictions when it comes to data disclosures. The confidentiality rules are very strict, so micro-data, although without identification codes and only as limited set of variables, is not publicly available for research work yet. This possibility is now formally regulated (regulation EC/ 831/2002), however, the actual procedures of de-individualising the data were not yet fully agreed by all national statistical offices in EU Member States.[16]

Additionally, primary data gathering, which is a second-best option for acquisition of modelling data, has been established for the purpose of SCARLED project. To the best of our knowledge, there is no published study investigating structural change in agriculture in five different countries, where data would be acquired through the identical questionnaire. Indeed the advantage of such data collection approach is that the data is relatively comparable. Especially it is valuable to gather comparable qualitative data, which is, as mentioned above, not covered in standard statistic investigations. However, such approach has also its risks. The cross-country analyses may end with biased results due to (i) identical questions investigating diverse structural situations among countries and (ii) possible disparity in understanding/defining certain phenomena (e.g. other gainful activity, part-time farming etc) among analysed countries.

In our specific case, besides possible risks mentioned above, we came across a reasonable suspicion that the sample from primary gathered data does not reflect significant differences in farm structures between the two time periods observed. Thus, the data analysis may not have valuable contribution to the understanding of structural adjustment patterns and determinants of structural change in the analysed countries.

[16] From this reason, we cannot expect micro-data from this source being available any time soon. Alternative solution was applied (building of aggregated AC/FSS panel dataset for five analysed NMS).

Arising from the abovementioned impediments, the compromise solution had to be reached. As an alternative to micro-data, to investigate structural adjustment patterns data on NUTS-3 level can be analysed instead. However, being so, the scope of analytical possibilities is relatively limited, since econometrical modelling, as the most suitable method for such analysis, is not feasible. Nevertheless, such data may be investigated with multivariate statistical methods (eg. by discriminant analysis).

3 STRUCTURAL ADJUSTMENT PATTERNS IN SELECTED EU NMS

3.1 Farm number, size and scale

As discussed in greater detail in D.2.1, economic transition brought tectonic changes to the farm structure throughout the region. Notwithstanding vast differences in initial circumstances (general economic situation, land ownership and transferability, significance of individual farms, prevailing organisation, types of farms), these changes were dominated by two distinct processes: privatisation of agricultural land and individualisation of farming (Lerman, 2000). Intensive restructuring of the sector was typically combined with transitional fall in the terms of trade, resulting in significant productivity falls (Deininger, 2002).

In terms of the total number of agricultural holdings and their size distribution, there is no uniform pattern of transitional restructuring. In Poland and Slovenia, that already had a large private sector in agriculture structural reform has been less marked.[17] Although land restitution and individualisation of farming was a norm throughout the region, the corporate farm sector remained relatively strong (with some exceptions, eg. Slovenia and Poland), although affected by significant downsizing. Individual holdings (household plots and family farms), on the other side, gained in importance, either in terms of social buffer (subsistence farming), or in terms of increased tradable output. By applying (Lorenz) land concentration curves, Lerman (2000) identified three different trajectories of structural adaptation. They resulted in three distinct structural patterns: (i) 'over-fragmented' farm structure, (ii) 'normal' size distribution (including Poland, Slovenia), and (iii) sharply polarised dual structure (including Romania, Bulgaria and Hungary).

The most recent structural developments in the analysed five EU NMS are presented in the table below.

[17] In particular in Poland the small scale and fragmented nature of private farming remains has been perceived a long term structural handicap (CEC, 1998).

Table 2: Basic structural data for selected EU NMS

		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
Number of farms (in 1000)	2000	na	966.91	na	na	86.47	na	na
	2003	665.55	773.37	2,172.21	4,484.89	77.15	8,726	15,021
	2005	534.61	714.80	2,476.47	4,256.15	77.17	8,579	14,479
	2007	na	626.33	2,390.96	na	75.34	na	na
	I 05/03	**80.33**	**92.43**	**114.01**	**94.90**	**100.03**	**98.32**	**96.39**
Utilised agricultural area (in 1000 ha)	2000	na	4,555		na	486	na	na
	2003	2,904	4,352	14,426	13,931	486	46,645	172,794
	2005	2,729	4,267	14,755	13,907	485	46,903	171,878
	2007	na	4,229	15,477	na	489	na	na
	I 05/03	**93.97**	**98.03**	**102.28**	**99.83**	**99.79**	**100.55**	**99.47**
Livestock status (in 1000 LSU)	2000	na	3,098		na	611	na	na
	2003	1,628	2,669	11,172	7,249	586	28,499	141,063
	2005	1,327	2,502	10,565	6,603	524	26,440	137,141
	2007	na	2,409	11,118	na	554	na	na
	I 05/03	**81.51**	**93.73**	**94.57**	**91.09**	**89.37**	**92.77**	**97.22**
Economic size of farms (in 1000 ESU)	2000	na	1,643		na	404	na	na
	2003	1,076	1,757	7,511	5,113	355	18,627	148,247
	2005	931	1,946	8,265	4,700	354	19,205	151,978
	2007	na	2,033	8,673	na	444	na	na
	I 05/03	**86.52**	**110.73**	**110.04**	**91.92**	**99.70**	**103.10**	**102.52**

Data source: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

In contrast to the other four analysed countries, Bulgaria recorded the sharpest decline in number of farms and other basic structural attributes from 2003 to 2005. The considerable decrease in number of farms recorded is mainly due to marginal, small scale, subsistence producers leaving the sector and/or amalgamating – concentration of land. The latter can be inferred from the fact that the decline in total Economic size units (ESU) is lower than decrease in farm number which in addition gives rise to irreversible abandoning of cultivation in remote rural areas. The sharp decrease can also be seen in the livestock sector, possibly attributed to a set of factors, such as: (i) tightened technological conditions which producers had to comply with;[18] (ii) increased productivity of the growing class of specialised producers; (iii) price increase for inputs (eg. animal feed), or (iv) abandonment of production due to increased competitive pressures.

Less profound decrease in number of farms is recorded in Hungary and Romania, whereas Utilised Agricultural Area (UAA) in those countries even remained more or less unchanged. In addition, data on total ESU for Hungary shows that this attribute in fact increased, which leads to the similar supposition as in Bulgaria that decrease in farm number goes mainly on the account of marginal (small-scale, subsistence) producers leaving the sector.

[18] eg. tightened hygiene standards in milk production

In Slovenia, both the number of farms and UAA are stagnating. The sharp decline in those figures that characterised the country's agricultural sector in the period 1990-2003 has stopped. Supposedly this is due to increased level of direct payments, LFA and agri-environmental support, which encouraged producers to remain in production. An increase of LSU that Slovenia reports during 2003 and 2005 may be partly attributed to favourable market and policy conditions after the accession in beefmeat and dairy sectors.

On the contrary, Poland records significant growth in the number of farms. The marginal increase in UAA is also evident, while Poland, as other analysed countries, records a decrease in livestock status. One could speculate that favourable market and policy conditions after accession to EU encouraged owners of agricultural land to re-activate their arable production and to increase specialisation in livestock production (dairy?), which all resulted in increase of ESU.

The data in table 3 shows that there are no major differences in the average farm size between NMS-5. However, the presented figures blur marked differences between the analysed countries in size distribution of agricultural holdings (see Figure 2). A small-scale and fragmented farm structure is characteristic for all five countries analysed. A considerable lag with respect to the EU-27 average is apparent in all three observed indicators reflecting size of agricultural holdings. The largest discrepancy can be found in the economic size of farms, which is perhaps also the most relevant indicator reflecting the economic potential of farms. Here, none of the analysed NMS reaches 50% of the EU-27 average (Table 3).

Table 3: Average farm size with regard to utilised agricultural area, livestock status and economic size

farm size		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
Utilised agricultural area (ha/farm)	2003	4.36	5.63	6.64	3.11	6.31	5.35	11.50
	2005	5.11	5.97	5.96	3.27	6.29	5.47	11.87
	2007	na	6.75	6.47	na	6.49		na
	I 05/03	**116.99**	**106.06**	**89.71**	**105.19**	**99.76**	**102.27**	**103.20**
	I 07/03	na	**119.96**	**97.47**	na	**102.89**		na
Livestock status (LSU/farm)	2003	2.45	3.45	5.14	1.62	7.59	3.27	9.39
	2005	2.48	3.50	4.27	1.55	6.78	3.08	9.47
	2007	na	3.85	4.65	na	7.35		na
	I 05/03	**101.47**	**101.41**	**82.95**	**95.98**	**89.35**	**94.36**	**100.86**
	I 07/03	na	**111.45**	**90.41**	na	**96.78**		na
Economic size of farms (ESU/farm)	2003	1.62	2.27	3.46	1.14	4.60	2.13	9.87
	2005	1.74	2.72	3.34	1.10	4.59	2.24	10.50
	2007	na	3.25	3.63	na	5.90		na
	I 05/03	**107.71**	**119.81**	**96.52**	**96.86**	**99.68**	**104.87**	**106.36**
	I 07/03	na	**142.84**	**104.91**	na	**128.11**		na

Source: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

Figure 2 reveals concentration of agricultural output (measured in units of standardised gross margin, ESU). As it can be clearly seen, all analysed countries are characterised by a skewed farm distribution, where share of small scale holdings is disproportionately high and their contribution to total agricultural output (measured in ESU) is low. This is less explicitly expressed in Romania and Slovenia, although also in this case about 70% of holdings contribute to only 25% of total output.

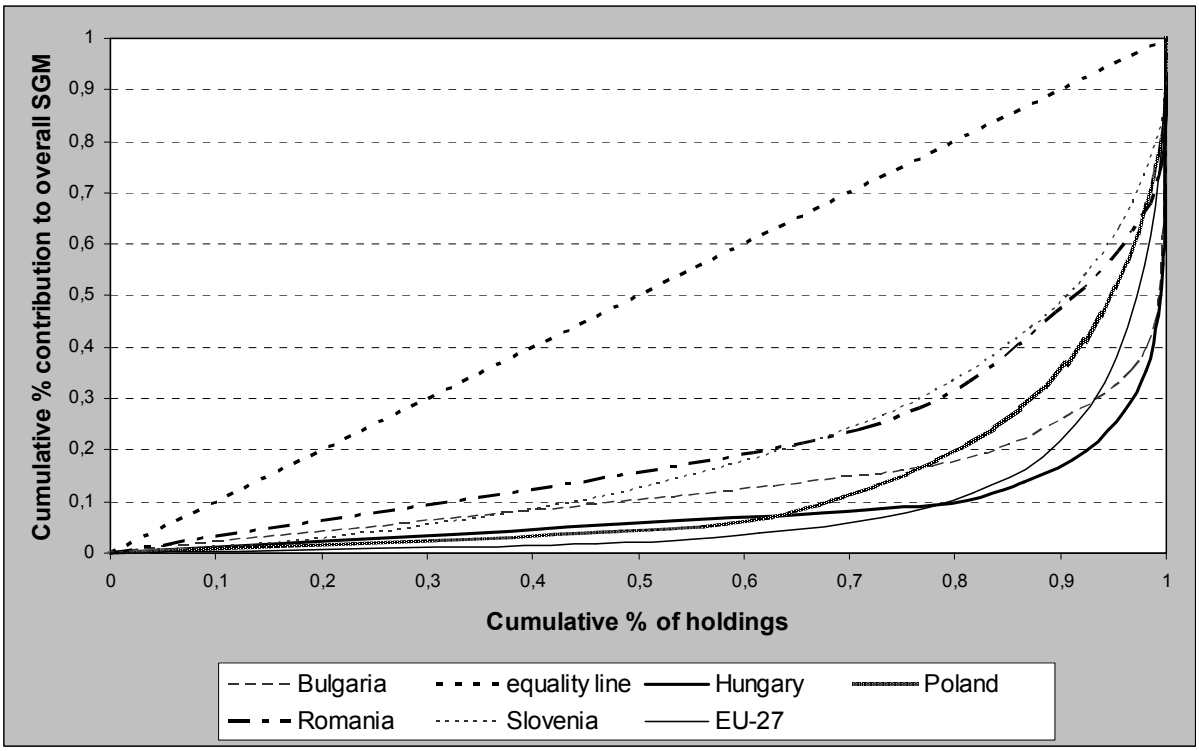


Figure 2: Concentration of agricultural output in EU27 and selected five NMS.

Size distribution of farms in selected NMS is further illustrated in Table 3. Sharply dual farm structure, with a numerous small scale, subsistence-oriented holdings on one side and a strong corporate farm sector on the other, is the most explicitly expressed in Bulgaria and Hungary. In Bulgaria above 90% of the holdings is below 2 ESU threshold and cultivates only 13% of UAA, whereas 48% of UAA is cultivated by holdings above 100 ESU, representing only 0.5% of all farms. In Hungary the figures are similar. About 85% of farms cultivates 9% of UAA, whereas less than 0.3% of farms cultivates 42% of UAA.

No significant changes can be noticed in the period 2003-2005. Somehow surprisingly, the number of small scale (subsistence?) producers increased in Poland.

Table 4: Number of holdings by ESU size

ESU size structure		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
less than 1	2003	499,540	555,160	1,093,250	3,093,530	15,730	5,883,690	7,089,020*
	2005	404,710	509,430	1,384,950	2,888,980	16,280	5,698,000	6,659,310*
	2007	na	430,180	1,253,080	na	13,810		na
	I 05/03	**81.02**	**91.76**	**126.68**	**93.39**	**103.50**	**96.84**	**93.94**
	I 07/03		**77.49**	**114.62**	na	**87.79**		na
from 1 to less than 2	2003	106,240	66,580	311,610	862,250	21,990	1,488,240	2,381,710*
	2005	73,170	59,570	324,540	848,740	21,020	1,454,620	2,243,160*
	2007	na	50,630	360,950	na	18,540		na
	I 05/03	**68.87**	**89.47**	**104.15**	**98.43**	**95.59**	**97.74**	**94.18**
	I 07/03	na	**76.04**	**115.83**	na	**84.31**		na
from 2 to less than 4	2003	31920	42,550	283,700	267,230	18,900	690,740	1,703,350
	2005	25,940	40,340	291,200	288,690	19,130	726,700	1,681,920
	2007	na	34,290	299,650	na	18,560		na
	I 05/03	**81.27**	**94.81**	**102.64**	**108.03**	**101.22**	**105.21**	**98.74**
	I 07/03	na	**80.59**	**105.62**	na	**98.20**		na
from 4 to less than 8	2003	8660	24,240	238,750	50,850	11,080	353,440	1,264,190
	2005	7,930	26,000	228,210	64,660	11,390	360,020	1,255,110
	2007	na	22,720	221,380	na	12,640		na
	I 05/03	**91.57**	**107.26**	**95.59**	**127.16**	**102.80**	**101.86**	**99.28**
	I 07/03	na	**93.73**	**92.72**	na	**114.08**		na
8 and more	2003	8,450	23,680	217,350	25,510	9,430	310,180	2,583,140
	2005	8,780	27,020	236,910	30,190	9,330	339,960	2,642,500
	2007	na	28,130	245,060	na	11,740		na
	I 05/03	**103.91**	**114.10**	**109.00**	**118.35**	**98.94**	**109.60**	**102.30**
	I 07/03	na	**118.79**	**112.75**	na	**124.50**		na

*- incomplete data

Source: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

3.2 Labour input

As discussed in greater detail in D.2.1 (pp. 13-19), initial labour market conditions were characterized by the decline of agricultural workforce. Decline of agricultural labour input generally surpassed the EU-15 figures, although at a varying extent. Two of the analyzed NMS-5 lie at the extreme ends of structural adaptation. Hungary experienced the sharpest decline of agricultural employment in the region. Romania at the other end sought a significant increase in agricultural labour.[19] There were for instance no significant changes

[19] The employment in agriculture has increased as the sector absorbed a considerable amount of labour force made redundant in other sectors (the social buffer role played by the agriculture)Increase of agricultural labour input goes mainly on the account of small-scale, (semi-)subsistence oriented production.

in agricultural employment in Slovenia, which was combined with a sharp reduction of agricultural work input.

Table 5: Agricultural work input (AWU) in selected EU NMS ion the period 2003-2005 (2007)

labour input		Bulgaria	Hungary	Poland	Romania	Slovenia
AWU total	2003	794,170	525,780	2,276,760	2,734,360	95,610
	2005	624,660	462,740	2,266,450	2,617,620	95,270
	2007	na	409,700	na	na	83,950
	I 05/03	**78.66**	**88.01**	**99.55**	**95.73**	**99.64**
AWU total (sole holder holdings)	2003	735,250	431,130	2,190,870	2,574,560	92,220
	2005	572,250	377,060	2,231,730	2,539,590	91,820
	2007	na	330,120	2,230,670	na	81,050
	I 05/03	**77.83**	**87.46**	**101.87**	**98.64**	**99.57**

Source: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

As revealed from the data presented in Table 5, in the period 2003-2005 all analysed countries show a decline in total labour input. This decrease was the most pronounced in Bulgaria (22%) and Hungary (13%), where labour input rates also outscore the rates of farm number decrease (20% in Bulgaria and 8% in Hungary). In Hungary this is also followed by a large increase of agricultural output (11%), which suggests a large improvement in labour productivity.[20]

In Romania a 5% drop in farm number was followed by only a marginal decrease in farm labour input by 1%, which confirms the thesis of increasing subsistence sector. Presumably from the same reason (ie. subsistence farms), farm number has increased in Poland. Here, the number of farms increased by 14%, whereas the labour input increased by only 2%.

No significant changes in total labour input were recorded in Slovenia between 2003 and 2005. Comments of stagnating labour input should however be treated with some caution. Farm structure survey data 2007 recorded a drop of total labour output in agriculture by nearly 12 per cent.

As a rule, the age structure of farm labour input in the analysed period (see Figure 3) is worsening. In most of the countries the share of holders and spouses below 44 years decreased, the only exception to this trend is Hungary, where labour input of holders and spouses in this age group slightly increased (by 0.5%). The problem of ageing labour input is most vividly expressed in Romania and Bulgaria, where labour input of holders and spouses above 65 years of age is close to 40% and has from 2003 to 2005 even increased. Also other analysed countries are faced with the problem of ageing labour input, however the rise in labour input of holders and spouses above 65 years is rather marginal. Again,

[20] The trend of decreasing total labour input in Hungarian agriculture has continued; Farm Structure Survey data for 2007 recorded a drop of additional 12 per cent with respect to 2005.

only Hungary records more favourable trend, where the ageing labour force is superseded by younger generations.

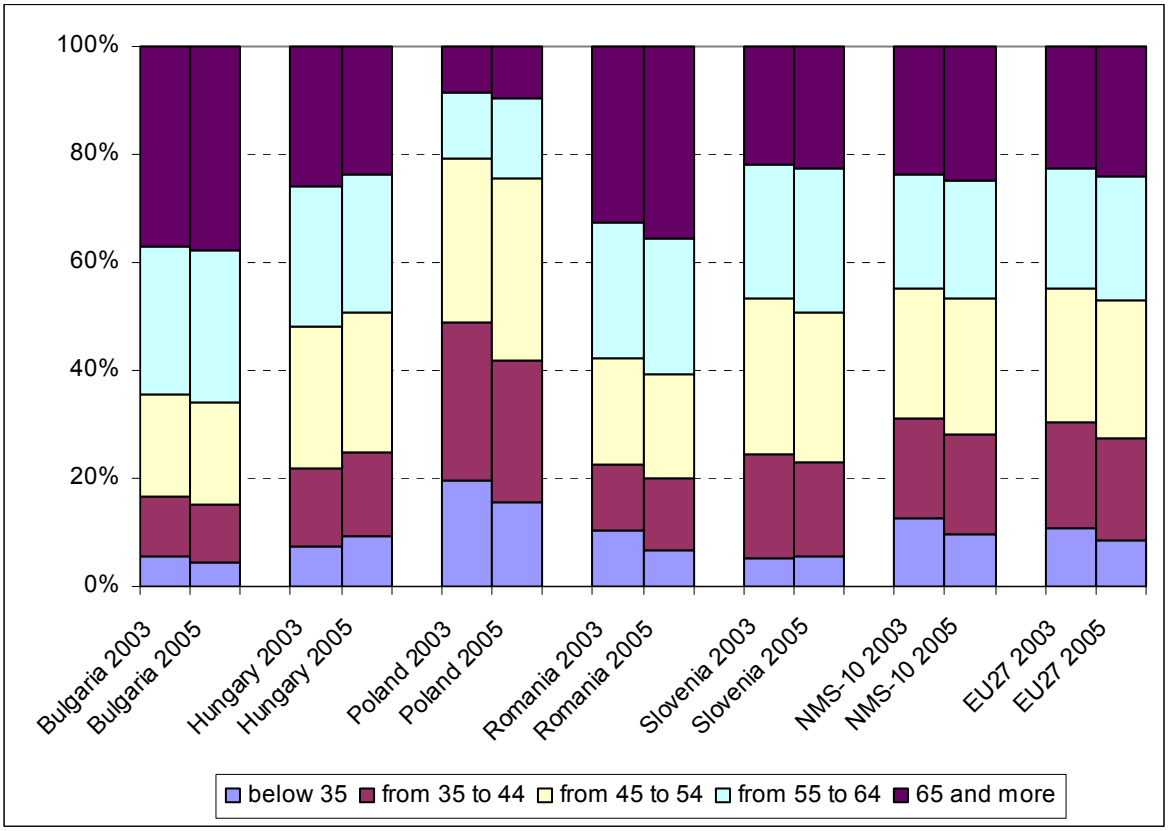


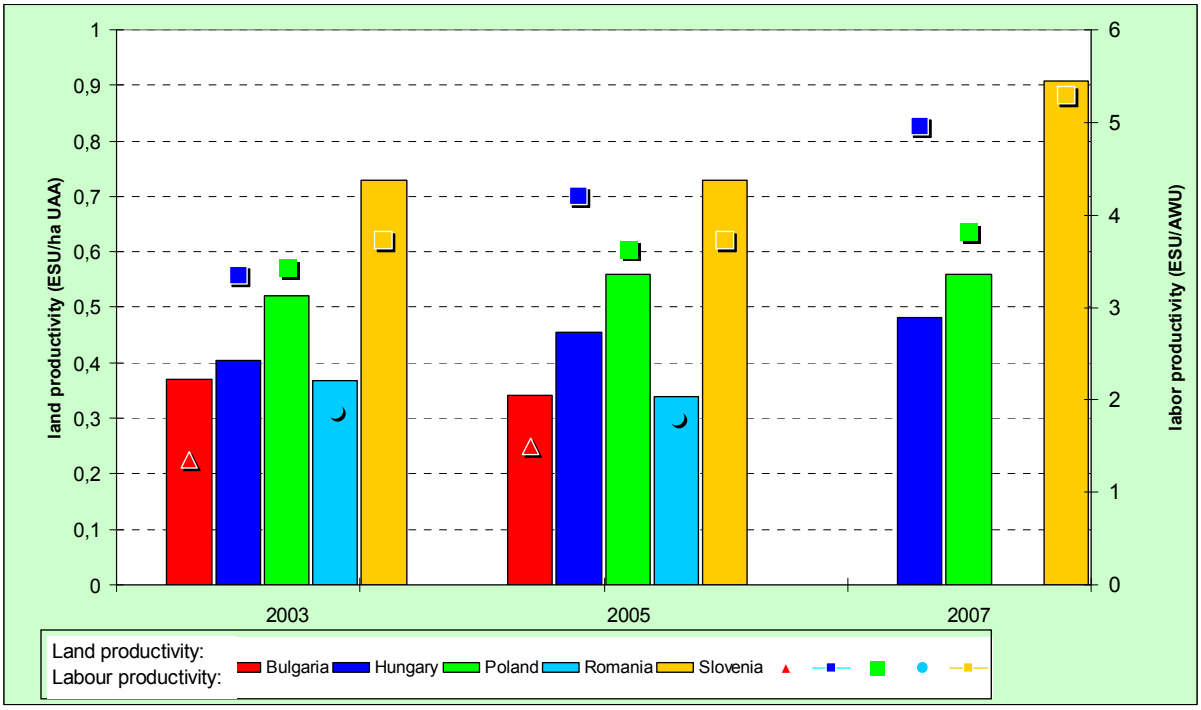
Figure 3: Structure of AWU by age groups (holder and spouse)

3.3 Farm productivity (intensity, specialization)

Structural adaptation of agricultural sector in transition countries often resulted in over-fragmented or dual farm structure, in both cases negatively affecting agricultural productivity. This was combined with decline of input use and output of agricultural sector, caused by cuts in producer and consumer subsidies reduced demand with falling incomes (Deininger, 2002). The extent to which agricultural production was able to recover since 1990s was affected by the initial level of economic development, the type of macro-economic and privatization policies and the extent to which these policies were pursued (Csaki, 2000).

Since 1990s, heterogeneity of the analysed countries with respect to the level of economic development, land endowments and importance of agricultural sector has increased. It is therefore hardly surprising that today, the analysed countries vary considerably in productivity of agricultural land and labour. As inferred from the graphical depiction (Figure 4), Bulgaria and Romania are recording the lowest returns on production factors.

This can be due to a highly fragmented farm structure and a strong subsistence orientation of agricultural holdings, which lead to the situation, where agriculture is not only an economic, but also an activity that reduces rural poverty (social role of agriculture).



Source of data: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

Figure 4: Returns on agricultural land (in ESU per hectare UAA) and labour (in ESU per Annual Work Unit)

As for labour productivity, Lerman et al. (2002) suggest that, in the absence of data on total factor productivity, a partial measure of productivity should be calculated as the ratio of agricultural output to agricultural labour. According to this, agricultural labour productivity increased markedly and steadily throughout the first decade of transition. The improvement in agricultural labour productivity has been largely due to sharp reductions of agricultural employment, and less so due to growth of agricultural output. In the future, the ability to increase agricultural productivity depends on improving the land and the factor (e.g. labour and capital) markets (Deininger, 2002).

As presented in Figure 4, the pathways of labour productivity after 2000 are less straightforward. Hungary witnesses a large discrepancy between land and labour productivity. Low land productivity could be explained with prevailing extensive crop (mainly grain) production.

In comparison with the other three analysed EU NMS, Poland and Slovenia both observe relatively high returns on land and labour, partly also due to the structure of agricultural production (intensive livestock prevailing in Slovenia).

Table 6: Number of holdings by type of farming/ production types

Type of farming		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
specialist crop production	2000	na	237,950	na	na	13,990		na
	2003	124,350	248,740	887,110	802,730	10,910	2,213,580	6,031,930
	2005	115,000	221,530	885,680	970,630	12,680	2,333,760	5,842,750
	2007	na	197,180	809,640	na	12,270		na
	I 05/03	**92.48**	**89.06**	**99.84**	**120.92**	**116.22**	**105.43**	**96.86**
	I 07/03	na	**79.27**	**91.27**	na	**112.47**		na
specialist livestock	2000	na	228,980	na	na	38,720		na
	2003	171,210	165,420	327,580	952,800	22,670	1,709,400	3,160,450
	2005	169,660	157,110	472,500	759,510	26,850	1,672,060	3,055,560
	2007	na	162,870	524,930	na	31,900		na
	I 05/03	**99.09**	**94.98**	**144.24**	**79.71**	**118.44**	**97.82**	**96.68**
	I 07/03	na	**98.46**	**160.24**	na	**140.71**		na
mixed	2000	na	364,080	na	na	41,500		na
	2003	328,670	251,060	989,110	2,156,990	56,040	4,719,690	5,669,340
	2005	224,900	232,300	957,820	2,510,330	49,390	4,379,010	5,322,990
	2007		175,280	949,710	na	40,720		na
	I 05/03	**68.43**	**92.53**	**96.84**	**116.38**	**88.13**	**92.78**	**93.89**
	I 07/03	na	**69.82**	**96.02**	na	**72.66**	na	na
non-classifiable	2000	na	9,780	na	na	60	na	na
	2003	2,250	5,580	27,540	47,860	0	83620	na
	2005	860	9,610	150,100	33,640	10	194480	na
	2007	na	12,090	111,350	na	0	na	na
	I 05/03	**38.22**	**172.22**	**545.03**	**70.29**	**1,000.00**	**232.58**	na
	I 07/03	na	**216.67**	**404.32**	na	**100.00**	na	na

Source: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

The level of specialisation of agricultural production in NMS-5 is relatively low (Table 6). Mixed production systems are the most widespread. Crop-livestock system is the most numerous production type in Slovenia (33%), Romania (17%), Poland (19%) and Bulgaria (18%), while Hungary deviates from this pattern. Although the crop-livestock system is numerous (20%), the specialist granivore production is the most strongly represented production type (22%).

The period 2003-2005 sought some significant changes in the structure of farm production types. The share of agricultural holdings engaged in specialised crop production has increased in Romania, Bulgaria (both by 3 percentage points) and Slovenia (by 2 percentage points). This might be due to increased market-price support and direct payments in Romania (Cionga, Luca and Hubbard, 2008) or, in the case of Slovenia, through increased direct payments. Contrary to this, in Poland and Hungary the share of agricultural holdings engaged in specialised plant production decreased by 1, and 4

percentage points, respectively. In terms of the value of agricultural production[21] however, the group of holdings specialised in plant production increased their relevance in gross agricultural output in all analysed countries with the sole exception of Romania. This implies a strong consolidation of agricultural holdings specialised in plant production in Hungary, whereas just the opposite is the case of Romania. In Hungary, (presumably) the rate of marginal producers leaving the sector is high and the remaining producers not only compensate, but also increase the total value of production. Opposite is the case of Romania, where new specialised plant production farms are emerging, but the total value of production has decreased by 5 percentage points.

The share of holdings specialised in livestock production increased in Bulgaria (6 percentage points), Slovenia (5 percentage points) and Poland (4 percentage points). In Slovenia the increase is due to grazing livestock while in Bulgaria the livestock production raised on account of granivores.[22] In the structure of agricultural output (in terms of ESU), the picture is slightly different. In Slovenia and Bulgaria, the share of specialised grazing production has increased. In Poland it is the granivore production which sought increase of relative importance (in terms of %GVA) in farm production structure. This implies that strong consolidation process has occurred in specialised granivore sector in Poland, and in specialised grazing production in Bulgaria. On the other hand, the number of farms engaged in specialised livestock production fell in Romania which is also reflected in the decrease of economic importance of specialised granivore production (eg. pigs, chicken) in the country. Contrary, in the period 2003-2005, the output of specialised grazing livestock sector more than doubled, which implies that small-scale granivore sector is diminishing, both in number and in terms of output, As a general trend, mixed production systems are decreasing both in terms of number (Table 6) and in terms of economic significance. Romania is the only exception to this trend as the number of mixed agricultural holdings increased by 5 percentage points between 2003 and 2005.

[21] Source: http://nui.epp.eurostat.ec.europa.eu/nui/show.do?dataset=ef_r_farm&lang=en

[22] Data was extracted from the Eurostat database with Farm Structure Survey data (see http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database) and then aggregated for better clarity of presented data.

4 FACTORS AFFECTING STRUCTURAL ADJUSTMENT

Based on typology of farm structural change determinants, presented in the section 2.2., the groups of factors affecting structural adjustments in the five analysed countries are a) general economic conditions, b) market factors of production (especially labour market), c) special conditions for agriculture (natural conditions, markets and policy), d) individual characteristics of agricultural household members, e) household structure and f) characteristics of agricultural holding. As already pointed out, in various empirical studies these factors are recognised as potentially important for shaping agricultural structural change. In this section we describe the situation in the analysed countries in line with the above typology and discuss the associated dynamics (where reasonable), presumably fundamental for the occurrence of structural dynamics in the observed countries, that were presented in the previous sections.

4.1 General economic and social conditions

As emphasized in IAMO (2004), the scope and speed of structural changes in agriculture and rural areas are strongly dependent on the development of the national economy. Although rarely pointed out in discourse on agricultural structures, there was considerable heterogeneity between the CEE countries in terms of the level of economic development, land endowments, and relative importance of agricultural sector also prior to transition. These differences can be illustrated by the fact that the pre-transition per capita GDP figures were differing within a range 1:4. The first ten years of transition have only increased this gap. The first decade of transition has been characterized by highly divergent paths of growth among the transition economies. By 1999 the central European transition economies had either regained (eg. Poland, Slovenia), were close to their pre-transition GDP levels (Hungary), or were still struggling with the transformational recession (UN-ECE 2000). After the year 2000, the paths of growth were more uniform (Table 7). It can be inferred that in all the observed countries, except in Poland, the total GDP was constantly increasing, the most prominently in Romania and Hungary, followed by Bulgaria. Poland, on the other hand, reports a slight drop in GDP levels in 2003 and 2004 comparing to the base year, however, in the following years GDP at the basic price ascended again. In all the analysed countries, except Slovenia, the growth of GDP is still noticeably greater than in EU15/EU27. As in the pre-transition, the 2007 GDP per capita figures presented still reflect some major discrepancies, although slow-moving convergence within the countries and towards EU can be noted.

Table 7: Indices of total GDP and share of agriculture in the total GDP (price indices; 2000=100)

GDP total	2000	2001	2002	2003	2004	2005	2006	2007
Bulgaria	100.0	107.3	108.5	109.7	114.4	117.9	126.7	137.1
Hungary	100.0	111.2	127.6	128.3	133.8	139.6	136.9	151.2
Poland	100.0	113.1	109.3	96.3	98.2	112.8	118.2	125.2
Romania	100.0	105.3	108.1	109.9	118.1	147.4	167.4	199.4
Slovenia	100.0	102.9	106.0	108.2	109.6	111.5	113.5	118.1
EU15	100.0	102.0	104.5	105.2	107.4	109.2	111.2	113.7
EU27	100.0	102.3	104.9	105.3	107.7	110.0	112.3	115.2
GDP agriculture	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Bulgaria	100.0	106.9	99.7	103.3	103.2	106.2	111.2	133.2
Hungary	100.0	96.6	113.1	109.8	87.5	87.1	91.3	129.3
Poland	100.0	110.6	95.0	82.1	95.8	101.8	109.5	123.7
Romania	100.0	105.0	103.6	108.5	115.3	121.8	133.7	148.0
Slovenia	100.0	98.5	100.2	99.4	101.9	109.6	108.5	135.0
EU15	100.0	105.5	102.1	106.2	99.1	93.5	94.0	100.6
EU27	100.0	105.6	102.1	104.9	99.4	95.1	96.7	104.7

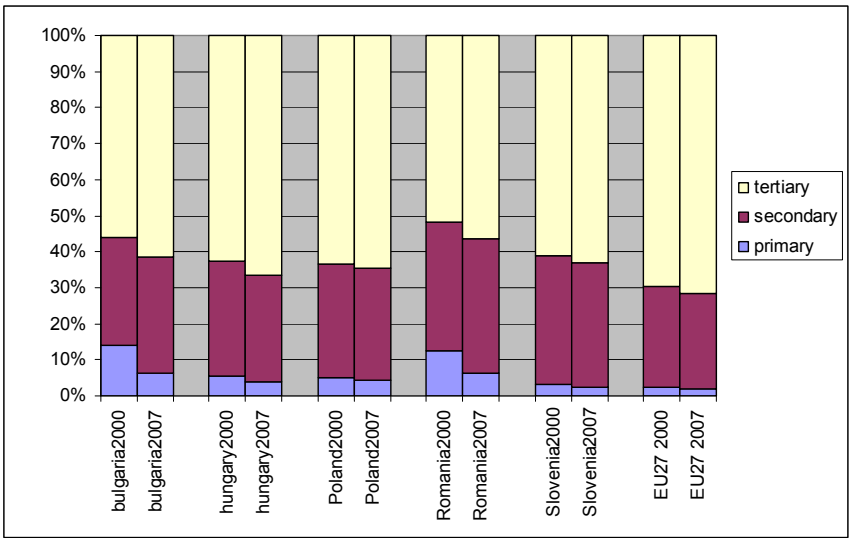
Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data

Regarding the structure of GDP by three main sectors, it comes to no surprise that GDP of primary sector in all analysed countries gives the minor contribution to the total GDP of the economy and is still declining (Table 8, Figure 5). Still, Bulgaria and Romania report rather high shares even in 2007, although at the same time, the share of GDP in primary sector in these countries experienced the most considerable drop between 2000 and 2007. This comes from the fact that they also started with high figures. Moreover, as the economy as a whole thrives it is expected that the agricultural GDP to decrease as opposed to the GDP in the tertiary sector which increases.

Table 8: structure of GDP by sectors (% of total); primary sector

GDP in primary sector	2000	2001	2002	2003	2004	2005	2006	2007
Bulgaria	13.9	13.4	12.2	11.7	11.0	9.4	8.5	6.2
Hungary	5.4	5.2	4.6	4.3	4.8	4.3	4.1	4.0
Poland	5.0	5.1	4.5	4.4	5.1	4.5	4.3	4.3
Romania	12.4	14.7	12.6	13.0	14.1	9.5	8.8	6.4
Slovenia	3.3	3.0	3.3	2.5	2.7	2.7	2.4	2.4
EU27	2.4	2.4	2.2	2.2	2.2	1.9	1.8	1.8
EU15	2.2	2.2	2.1	2.0	2.0	1.7	1.6	1.6

Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data



Source of data: http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data

Figure 5: Structure of GDP by sectors; in percent of total

Further to the demographic situation in the observed countries, the age structure in the recent years more or less followed the general trend of ageing population (Table 9). The highest decrease in the youngest population is reported by Poland and Romania. However, although EU-27 trend shows the most significant fall of the youngest population in predominantly rural regions,[23] among analyzed countries this is true only for Poland; in other analysed NMS, the highest outmigration rates are not associated with predominantly rural areas.

[23] Wherever practicable, the overview of socio-economic indicators is carried out with the of areas according to their degree of rurality. According to the OECD typology of rural areas, there are three types of areas: predominantly rural, PR (more than 50% of rural population); significantly rural, SR (more than 15% and less than 50% of rural population, and predominantly urban areas (PU) with less than 15% of rural population.

Table 9: Comparison of the change in the age structure between predominantly rural, significantly rural and predominantly urban areas in the period 2000-2005

change in age structure 2000-2005		Bulgaria	Hungary	Poland	Romania	Slovenia	EU-27
PR	0-14	-1.6	-1.4	-3.1	-2.7	na	-1.8
	15-64	1.0	1.0	2.2	1.9	na	1.1
	65 and older	0.7	0.4	0.9	0.8	na	0.8
SR	0-14	-2.1	-1.5	-2.7	-3.0	na	-1.2
	15-64	1.0	0.9	1.7	2.3	na	0.3
	65 and older	1.2	0.6	1.1	0.7	na	0.9
PU	0-14	-2.1	-0.6	-2.7	-2.9	na	-0.6
	15-64	1.3	0.8	1.4	2.8	na	-0.1
	65 and older	0.8	-0.2	1.3	0.1	na	0.7

na- data not available; PR = Predominantly Rural; SR= Significantly rural; PU=Predominantly Urban

On contrary to old EU member states, the high proportion of the area in NMS is rural, leading to a high proportion of population being settled in those areas, especially in predominantly rural regions. For a better overview, the data on the settlement structure of the population is gathered in the table below. Based on the data provided, one can infer that in all the observed countries the population is changing their settlement, mostly from predominantly rural areas to intermediate regions (Bulgaria, Romania, Slovenia and Hungary) or predominantly urban regions (Poland, to the certain extend also Bulgaria and Romania). In Bulgaria the switch is the most apparent, however, one should interpret these data with caution, since such significant change most likely happened due to sudden change in the status of particular regions, which could be associated to a variety of possible factors.

Table 10: Settlement structure of the population by type of by their degree of rurality

% population in rural areas		Bulgaria	Hungary	Poland**	Romania	Slovenia	EU-27**
% Predominantly rural	2003	58.4	47.1	29.8	47.1	61.7	15.6
	2004	25.1	41.5	29.8	40.9	57.7	10.1
	2005	24.9	41.4	29.8	40.9	57.6	12.8
	I05/03	**42.7**	**88.0**	**100.0**	**86.8**	**93.4**	**81.8**
% Significantly rural	2003	26.3	36.0	57.8	44.0	38.3	47.2
	2004	59.2	41.6	51.1	50.2	42.3	47.1
	2005	59.2	41.8	51.1	50.2	42.4	46.7
	I05/03	**225.5**	**115.9**	**88.4**	**114.0**	**110.6**	**98.9**
% Predominantly urban	2003	15.4	16.9	12.4	8.9	n.ap.	37.2
	2004	15.6	16.8	19.1	8.9	n.ap.	42.8
	2005	15.8	16.8	19.1	8.9	n.ap.	40.5
	I05/03	**103.1**	**99.6**	**154.2**	**100.4**	n.ap.	**109.1**

n.ap-not applicable

**- not based on NUTS3 regions but on NUTS2 regions

4.2 Markets with factors of production (labour, land)

Labour

In most CEE countries, the share of agriculture in total employment was high in relation to the countries with high levels of GDP per capita (Lerman et al. 2002). Also here, differences between the analysed countries were pronounced. Romania and Poland entered transition with over 25% share of agricultural employment. On the other side, share of agricultural employment in Slovenia was below 10%, which still deviated from most of the Western European counterparts.

Same as other aspects of transition in agriculture, labour adjustment patterns have been diverse. Transition brought a sharp decline in agricultural employment (eg. Hungary). In contrast to this, agricultural employment increased in some countries (eg. Romania). Some countries sought an increase in the relative importance of agricultural labour in mid-1990s (eg. Bulgaria).

Swinnen et al. (2005) draw a distinction between two strands of literature describing determinants of agricultural labour adjustment. The first theory emphasizes the surplus of labour in agriculture as a legacy of the central planning system, subsidies, and controls on labour reallocation. The second theory focuses more on the transition process itself and argues how agriculture has played a buffer role during transition, absorbing labour laid off in other sectors, as a source of income and social security during economic hardships of transition times.

In their empirical analysis of agricultural labour adjustment patterns during transition, Swinnen et al. (2005) found that the differences are due to variations in initial conditions and differences in reform policies and effects. The removal of price distortions and subsidies caused price and wage adjustments, which led to a reduction in labour demand in agriculture. Surplus labour outflow from agriculture was further stimulated by the privatisation of farm assets as they improve incentives for optimising factor allocation. The shift to individual farms, which was especially pronounced in labour-intensive production systems with low labour productivity of agriculture, has reduced the outflow from agriculture.

Further to the recent changes in the employment structure in the analysed countries, the dynamics of the employment structure by sectors are shown in the table below. Clearly, the employment in the primary sector is still diminishing, regardless of the country or how rural/urban the area is; however the rates of decreasing among the countries are rather heterogeneous. The sharpest decrease of primary sector employment in the period 2000-2005 was present in predominantly rural areas in Bulgaria, as well as in intermediate regions in Romania. A rather sharp decrease is also obvious in Poland, whereas Hungary and Slovenia experienced the fall in primary sector employment to much lower extent than EU-27 average. Diminishing share of the employment in primary sector clearly changed the employment structure and consequently altered the share of employment in secondary and tertiary sector. From Table 11 it can be inferred that from 1990 to 2005 some of the countries experienced an overall increase in agricultural employment (Bulgaria, Romania,

Slovenia). However, this increase in the share of agricultural employment may be mainly due to the increase in the first years of the transition (Czaki and Lerman, 2000). Namely, in the period 2000-2005 all the countries experienced an overall fall in the agricultural employment.

Table 11: Comparative review of change in the structure of employment in predominantly rural, significantly rural and predominantly urban areas by sectors between 2000 and 2005

change in the structure of employment 2000-2005		Bulgaria	Hungary	Poland	Romania	Slovenia	EU-27
PR	primary	-18.5	-2.5	-10.6	-8.4	-2.0	-6.3
	secondary	4.3	-0.1	2.3	3.0	-1.5	0.5
	tertiary	14.2	2.6	8.3	5.4	3.4	5.8
IR	primary	-2.6	-1.1	-7.6	-12.5	-1.3	-2.0
	secondary	-1.1	-1.2	-0.2	6.1	-3.5	-0.8
	tertiary	3.8	2.3	7.8	6.3	4.7	2.8
PU	primary	-3.4	-0.4	-6.7	-4.6	n.ap	-0.5
	secondary	-3.3	-2.5	-0.7	-4.1	n.ap	-0.9
	tertiary	6.7	2.9	7.4	8.7	n.ap	1.8

n.ap- not applicable

Land

Land reform was the major component of the transition agenda. It incorporated establishment of private property rights in land, and transformation of socialist farms to legal entities. In some of the analysed NMS (Poland, Slovenia), private ownership of land was a norm also during the socialist period. The property of most individual landowners remained untouched, although most often land transactions were legally restricted and favouring the socialised farm sector. This resulted in decline and fragmentation of individual sector and, on the other hand, strengthening of the state or cooperative farms. Legal rules concerning land ownership and land transactions were developing differently from one country to another.

Privatisation of land was typically based upon restitution to former owners. Between the analysed NMS, only Hungary and Romania have decided to combine land restitution with distribution of land to agricultural workers in order to serve the interest of social equity (Lerman 2000).

Land restitution is based on return of agricultural land to the original (pre-nationalisation or pre-collectivisation) owners or their heirs. Of course, different restitution mechanisms were devised in different NMS: bidding for land through a market driven auction process for value-denominated certificate owners (Hungary), or by returning land in original location (Romania, Bulgaria).

Yet the land ownership issue is only the prerequisite for further structural adjustment of agriculture. Another important source of productivity gains in agriculture is associated with the transfer of agricultural land to more efficient producers through a functioning land

market. This flow is enabled by a variety of land transactions. As Lerman (2000) points out, transferability of land and development of land markets are as important as privatisation of land. This flow is enabled by a variety of land transactions, which include buying and selling of land, as well as various leasing and renting arrangements. If land transactions are restricted, there are no mechanisms for transferring land to more efficient producers. The Polish and Slovene experience have proved that restriction of transfer rights throughout the socialist period is a serious obstacle to efficiency improvements, regardless the fact that agricultural land was mainly used by individual farms.

The land reform agenda in all CEE countries included liberalisation of legal regulations concerning land transfer (in both aspects, buying/selling, or leasing). Currently, there are no legal barriers of land transactions, although various pre-emptive conditions still limit free functioning of the land market. According to results of the World Bank Survey carried out in 2000, land markets have not really developed across the region (Lerman et al 2002). The frequency of land transfers (from 1 to 5 per cent) appeared to be lagging behind the EU average transfer rate (7%).

4.3 Agricultural situation (agricultural output, markets, policy)

Natural endowments, agricultural output

The share of agricultural land in total land differs among the analysed regions. This reflects both the influence of natural conditions, (climate, soils, relief) which are decisive for agricultural vs. forestal land use, and the population density, which affects development of urbanised areas and infrastructure. A low share of agricultural land is characteristic for Slovenia and Southwestern Bulgaria, whereas Central Poland, and parts of Romania, Southern and Southeastern Hungary and Northern Bulgaria have high shares of above 60%. A high share of arable land in total agricultural land of more than 70% is observable in Poland, Hungary and the plain areas of Romania and Bulgaria. In contrast, the mountainous regions of Slovenia, Central Romania and Southwestern Bulgaria have a high share of absolute grassland and a low share of arable land.

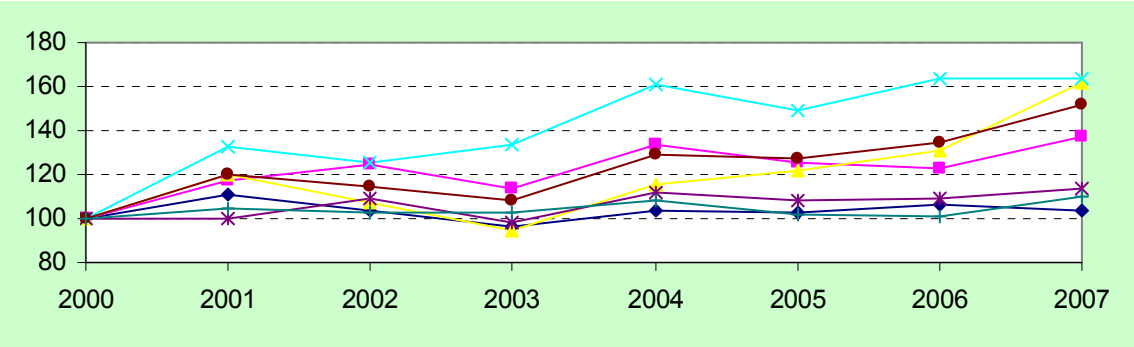
With some notable exceptions (eg. Hungary in dairy production), yields are considerably lower than the EU-15 average. As mentioned, natural endowments play only a limited role here. IAMO (2004) points out other factors, such as reduced use of fertilizers and pesticides, fragmented farm structure, insufficient technical equipment and unfavourable climate. In addition to those factors, IAMO (2204) identifies also managerial problems, such as the low level of education, farmers' insufficient skills for handling modern technologies and participating in markets, or structural problems such as the large share of self-subsistence (Romania, Bulgaria) and part-time farms (Slovenia, Poland).

In terms of natural endowments for agricultural production, the analysed countries therefore differ a lot, which obviously reflects in the structure of agricultural output. In combination with structural conditions and level of technological development, different

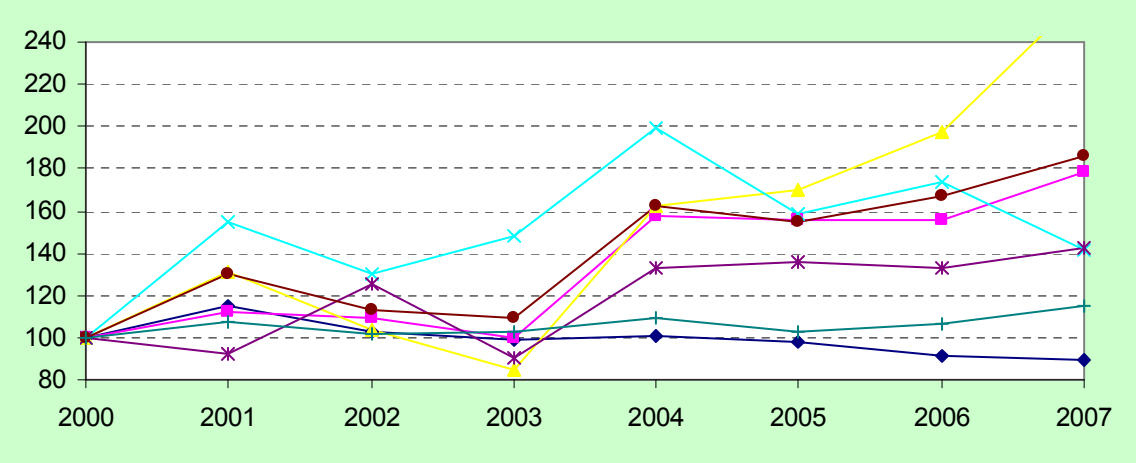
natural endowments obviously yield in productivity disparities. However in terms of the dynamics of agricultural output, similar adjustment patterns can be perceived.

After a clear decline in the volume of agricultural output in the first years of transition, agricultural output stabilised somewhat below the pre-transition figures in late 1990s. Only in Slovenia and Romania output levels exceed or have returned to pre-transition levels (CEC, 1998). In other countries a combination of various factors led to increasing pressure on agriculture. Input prices such as for energy and fertilisers increased significantly, while agricultural output prices tended to stagnate or rise much less in the face of falling demand. More severely affected was the livestock sector. In the crop sector, which initially adapted by cutting inputs, stabilisation of input-output price relationships led to a certain recovery in input use and higher output levels. As reflected from the recent statistical data on agricultural output (see Figure 6), the pre-accession and early post-accession years brought most notable increase of agricultural output in Poland and Romania.

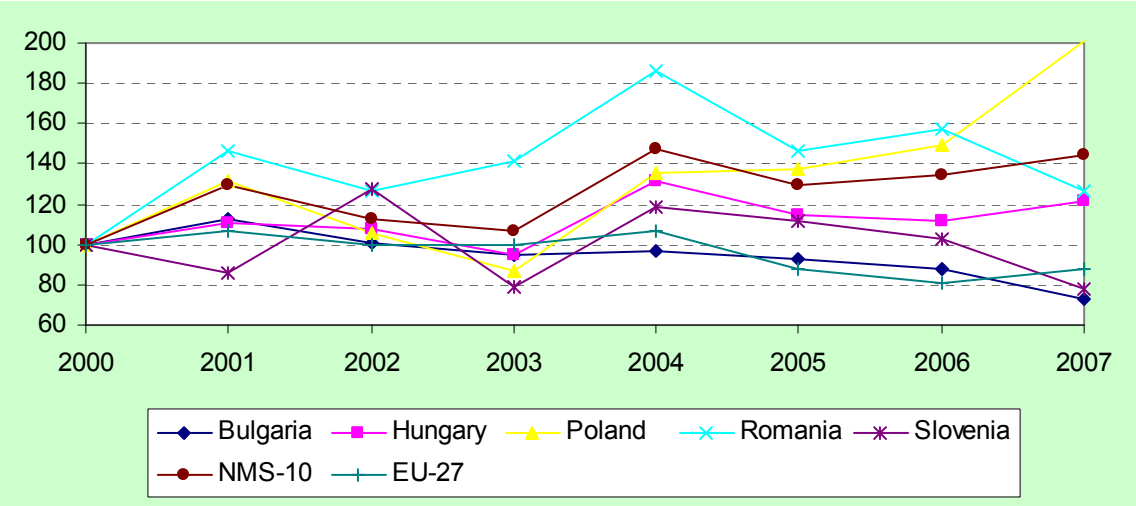
Output



Factor income



Net Value added



Source of data: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

Figure 6: Selected EAA indicators in NMS5 for the period 2000-2007

More pronounced is the dynamics of net value added of agricultural production and factor income of agriculture. Countries that acceeded to the EU in 2004 have experienced an upward trend in both indicators. This coincides with accelerated convergence of agricultural prices to the EU level, and with the adoption of the CAP Pillar 1 Direct payments.

Market conditions, market policy:

The analysed countries departed from similar initial conditions. Product markets and input supply channels were largely controlled by the state. In large collective or state-owned farms lack of transparency added to the difficulties of management. The goal was to meet centrally prescribed targets established with little consideration to profit or hard budget constraints, and their survival relied on write-offs and subsidies, and in political connections (Deininger, 2002).

IAMO (2004) reports about several phases of agricultural policy developments after the formal transition of the analysed countries to a market economy. These developments are reflected also in the changing volume and in the structure of agricultural support.

Summing up briefly policy developments in the first decade from formal transition to a market economy, the policy evolution is characterised as follows. In the first phase, agricultural policy regimes were liberalized and subsidies abolished. Consumer prices increased, while real incomes often declined, and domestic demand fell. Foreign market access deteriorated as the traditional agricultural export markets dwindled and because EU remained closed to the CEE agricultural exports. Farm input prices greatly increased relative to producer prices, causing a decline in agricultural terms of trade and renewed demands for government support.

This phase was followed by policy interventions in the agricultural sector to protect consumers and producers against negative real income effects of agricultural and macroeconomic reforms. IAMO (2004) stipulates that due to a lack of experience, governments and their administrations in the emerging market economies reacted to unanticipated policy effects by sudden and frequent policy changes, thereby adding to the uncertainty induced by general economic reforms.

Only after these liberalisation and adaptation shocks, governments started to formulate comprehensive long-term-oriented agricultural policies. 'Common Agricultural Policy (CAP)-style' agricultural policy instruments were put into place, therefore including the systems of guaranteed prices, production quotas, export subsidies, and (variable) import levies. However, the introduction of these CAP-style policies had been taken place more or less on an ad-hoc approach. In some cases, the governments intervened on markets where the EU provides only limited support to EU-farmers (eg. pork in Poland).

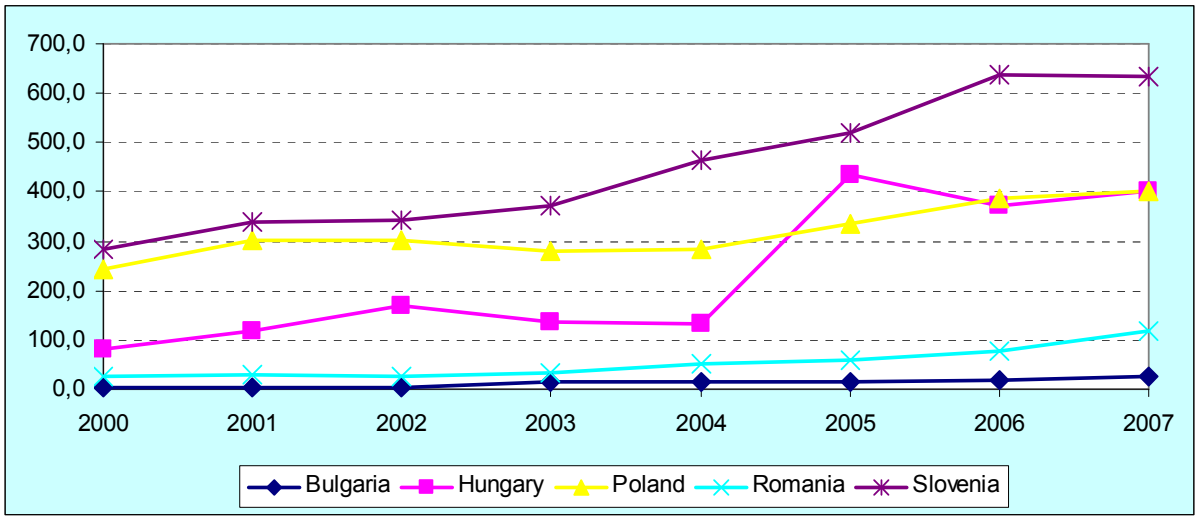
Since then, IAMO (2004) reports that agricultural policies have undergone various degrees of modifications, both to comply with international agreements (bi- and multilateral trade agreements) and to bring the level and kind of intervention more in line with those of the EU. Most of the new Member States have changed their policy mix to include more direct

payments and other subsidies with somewhat less reliance on market price support. Bulgaria, which until recently discriminated against its agricultural sector, significantly modified and liberalised its agricultural policy regime. Again, this adaptation of CAP-style policies was not done systematically. In some cases, governments neglected the fact that their budget and markets did not have sufficient depths to maintain these intervention policies.[24] In many cases, suppliers of agri-food products faced markets with limited export possibilities and limited regional integration. In this situation, the farmers faced rapidly changing policies in highly volatile markets bearing high market and policy risks. As a consequence, this unstable political environment affects many elements of farm behaviour, e.g., investments. As a long-term effect, the pre-accession period brought only a slow movement towards competitive farm structures.

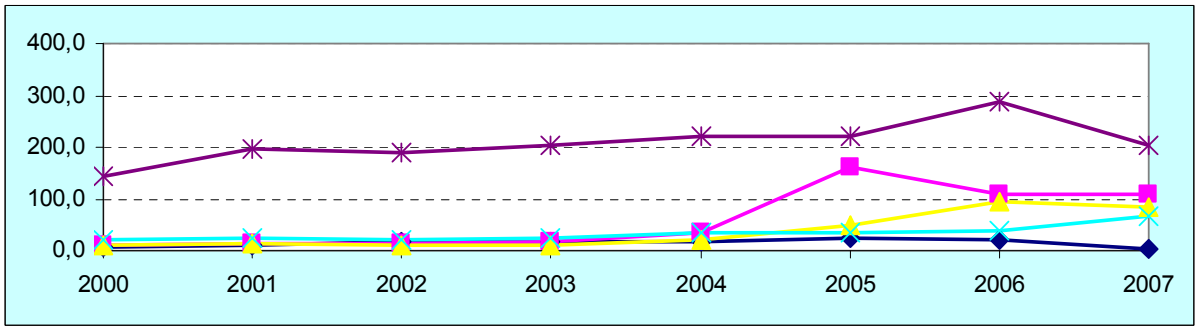
Since the late 1990s, public transfers to agriculture have started to gradually increase (Figure 7). This trend coincided with agricultural trade liberalisation, started by inclusion of agricultural goods to the CEFTA trade agreements, and continued by gradual liberalisation of agricultural trade with the EU. Tariff-based policy mechanisms had been slowly replaced by other types of agricultural support: from different types of price aids (eg. premia, production aids), social payments (Poland), to CAP-comparable mechanisms such as payments based on area planted or animal numbers (Slovenia). This period also sought an increase in rural development expenditure, triggered or at least stimulated by, the matching EU public expenditure: first by the pre-accession financial mechanisms (Phare, SAPARD), and after accession by the CAP Pillar 2 (Rural development) expenditure. All this has reflected in an increased public expenditure on agriculture (Figure 7).

[24] Since 1997, only in Slovenia has the level of protection exceeded that of the EU. In 2001, the Slovenian percentage PSE amounted to 40% compared to 35% in the EU. Farmers in the other analysed countries have been granted less support than their colleagues in the EU. In 2001, the percentage of PSE in Romania reached two thirds of the EU level, while it amounted to less than half of the EU level elsewhere. In Bulgaria, farmers were discriminated against until 2000, and since then have been granted a very low level of support. However, as the accession year was nearing, the level of support slowly converged towards the EU-15 level.

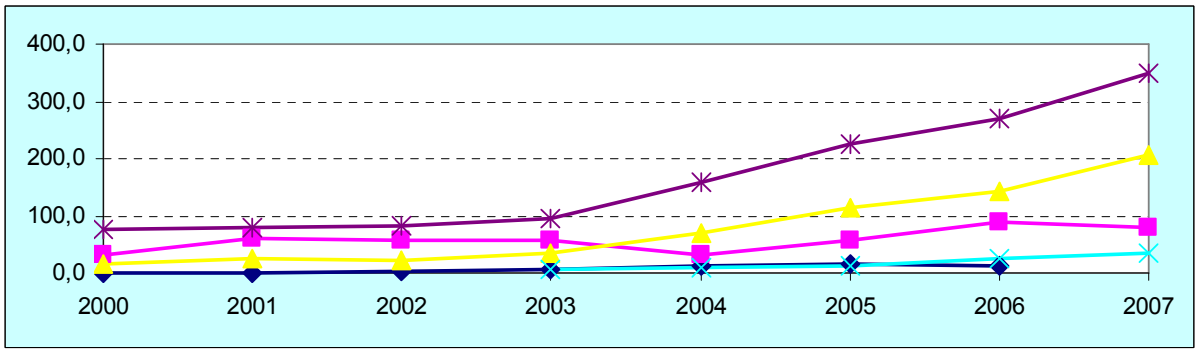
Total budgetary transfers to agriculture (€ per hectare, current prices)



… of which market-price support (€ / hectare, current prices)



… of which structural aids and rural development (€ / hectare, current prices)



Sources of data: 7 EU FP AgriPolicy (2009), OECD (2009), European Commission (2008)

Figure 7: Structure and volume of agricultural support in NMS-5 in the period 1997-2007

EU-accession brought stabilisation of the market and policy environment. As a general pattern,[25] price gaps with the rest of the EU have started to diminish and are expected to come rather close or equal to the EU-15 average in the next few years. IAMO (2004) stipulates that the upward trend of farm incomes is going to continue as a direct result of CAP implementation. Among the main factors contributing to the positive development, the following ones are pointed out: (i) higher subsidies after implementing the direct payments and other CAP and measures[26]; (ii) an increase in prices of some agricultural commodities; (iii) productivity increases resulting from technological progress and other improvements.

Rural development policy

Particularly since the adoption of Agenda 2000, one can perceive a shift in the emphasis of the Common Agricultural Policy (CAP) towards rural development, food safety, and environmental measures ('CAP Pillar 2'). Increase of public awareness, and of public funding within the rural development policy domain is probably the most notable change in agricultural policy of the analysed countries in the years before the EU accession pre-accession and, even more pronounced, after the accession to the EU.[27] Prior to the accession, policies promoting rural development in the analysed countries were not systematically introduced into the public support instrumentary. If existing, they were low in terms of financial volume and rather fragmentary in terms of contents/measures.

Structural and regional development policies have been at the core of the pre-accession policy efforts of the acceding countries. After the accreditation of SAPARD agencies, several programmes have been started which aim at improving farm businesses and the processing and marketing of agricultural and food products as well as infrastructure in rural areas. Measures implemented in the analysed countries within the SAPARD programme are listed in Table 15 (Annex).

A major part of the pre-accession Rural Development public expenditure was channelled into agricultural and agrifood processing. In line with the introduction of direct payments, all countries except Slovenia used the SAPARD for introduction of special programmes to support environmentally-friendly farming or farming in less favoured areas (LFA).[28] Some funds were also used for measures aimed at supporting integrated rural development. As for the latter, all five analysed countries decided to support diversification of rural

[25] Due to various factors, most notably due to problems linked with compliance to the EU quality standards and low competitiveness of the food processing and marketing sector, price disparities of som commodities (eg. milk, beef) with the EU-15 level are expected to sustain (IAMO, 2004).

[26] With the sole exception of Slovenia, the pre-accession levels of income support were significantly lower than what the CAP provides (see figure 7).

[27] See Figure 7 for an illustration of increased public expenditure on rural development measures.

[28] In the pre-accession period, Slovenia carried out these measures through national schemes.

incomes (mainly through support of rural tourism on farms, or direct processing of agricultural commodities), and the improvement of infrastructure in rural areas.

With the accession of Hungary, Poland and Slovenia to the EU in 2004, the pre-accession support was replaced by participation in EU Rural Development Policy. Above all, this reflected in a significantly increase of available EU funding (see Figure 7). This resulted in setting more ambitious Rural Development Programmes (Table 16, Annex), both in terms of stated objectives, and in terms of measures. The structure of expenditure changed considerably. This is partly due to the rigid programming rules,[29] additional measures designed for New Member States,[30] possibility to complement CAP Pillar 1 direct payments,[31] gained experience from the pre-accession period, and probably also due to farm income considerations.[32]

As it can be gathered from converging prices of agricultural and food products, increased national budgetary expenditure on agriculture (Figure 7), introduction of CAP Pillar 1 direct payments, together with more generous rural development expenditure coincides well with the upward turn of EAA indicators reflecting income situation of agriculture (net value added, factor income). It would be worthwhile testing whether increased public expenditure on agriculture in the pre-accession period and in the first years after the accession has influenced the structural change in agriculture.[33] This linkage should be tested empirically.

Rural development policies and funding available after accession to the EU have accelerated the possibilities of generating non-farm incomes. However, these policies have not immediately reduced unemployment and/or provide opportunities for generating

[29] In the programming period 2000-2006, rural development support was split between two financial sources (EAGGF Guarantee and Guidance), which increased administrative complexity of the policy (in the case of New Member States, this meant preparation of two different programmes, one for each section of the EAGGF), and thwarted flexibility of choice between measures. In the case of New Member States with imbalance between EAGGF Guarantee and Guidance budgetary appropriations (eg. Slovenia), this brought profound changes in the balance of the Rural Development public expenditure (eg. in the case of Slovenia, heavy increase in LFA and Agri-environmental measures, and stagnation in investment-related support).

[30] Support for semi-subsistence farms undergoing restructuring, support for adaptation or meeting of EU standards, support for Producer groups.

[31] Farmers in the New Member States are not eligible to CAP Pillar 1 Direct Payments in full extent (35% of EU-15 level in 2004, gradually increasing until 100% in 2013). Some New Member States (including Slovenia and Poland), where such level of direct payments would jeopardize farm incomes were allowed to complement these from the national budget and partly from the EAGGF Guarantee Rural Development budget.

[32] This can be stipulated in the case of Less Favoured Areas compensatory allowances and, to some extent, agri-environmental measures (eg. support for less demanding agricultural practices, such as crop rotation, integrated production etc.).

[33] The issue is subject of empirical analysis in the subsequent deliverable (D.5.2) of this project.

additional farm income, since the effects of structural measures, unlike those of direct payments, will come gradually and more in the medium-term horizon.[34]

As revealed from Tables 18 and 19 (Annex), the current programming period (2007-2013) brought an additional increase in the range of available measures, and in the volume of available budgetary resources.[35] The analysed countries have chosen somewhat different pathways for promoting integrated rural development. With the sole exception of Slovenia, support for restructuring of the agri-food sector ('Axis 1') still represents the highest share of Rural Development public expenditure, most notably in Hungary (46% of public expenditure). On the other hand, Slovenia decided to continue with large public expenditure (52% of total) on environmental and spatial public goods deriving from agricultural production ('Axis 2'). Bulgaria and Romania decided to invest considerable public funding (27% and 25%, respectively) in measures promoting diversification of rural economies and improvement of living conditions in the countryside ('Axis 3').

4.3.1.1 Up- and downstream sectors

Similarly as in the case of primary production, the food processing sector in the analysed countries experienced a sharp drop output during the early years of transition (IAMO, 2004). However, EU accession implies new challenges of a similar dimension for the food processing sector, which is strongly represented in the GDP structure especially in Hungary and Romania. Food industry employment in the analysed countries is on a downward trend (Poland with above-average and increasing share of employment in this sector is the notable exception). Lower quality, oversupply and low production costs are most commonly listed as the main reasons for the deviation from the EU average price level. Another reason is the competitiveness of the food processing and marketing sector, which is often still rather low (IAMO, 2004). Industry profitability remains low and many countries continue to experience excess capacity, particularly in the primary processing sectors such as meat and dairy processing and grain milling. Having been aware of the problems related to the access to finance for reinvestment, or difficulties in meeting EU food quality and hygiene standards, intensive consolidation of the sector is taking place. Foreign companies have played a leading role in this process (Csaki, 2008).

The investment cycle was partly stimulated also through rural development programmes. Results are rather mixed and location-specific.

Structural change in the food industry is evident when some branches are growing or contracting either in terms of output or employment, more rapidly than other branches. …

[34] In this respect, feasibility of the initially planned empirical impact analysis of selected rural development measures (eg. early retirement, support for young farmers) on the pace of structural change seems rather questionable.

[35] The latter holds especially for Romania and Bulgaria, where the pre-accession support was replaced by full participation in EU Rural Development Policy.

The meat and dairy sectors have generally decreased their share of overall food industry output; exceptions here are Hungary (whose dairy sector increased in importance) and Slovenia (where meat processing increased in importance) (IAMO, 2004).
As it comes to the main structural developments in the food sector as a result of the EU enlargement, the following can be pointed out (Csaki, 2008): (i) increased vertical integration as a direct effect of the so called 'retail revolution', and (iii) increased regional specialization of food industry. As the developments in the food industry have repercussions for the whole of agribusiness, these changes are particularly important for structural developments in the primary sector. Especially small farms are facing additional difficulties in associating themselves to newly emerging chains.

4.4 Individual characteristics of agricultural household members

Besides the factors external to farm holding (presented above), the decision making process of agricultural households, and thus the dynamics of entire agricultural sector, are significantly affected by internal factors such as individual characteristics of household members.
With respect to age structure of farm holder, as the important attribute, one can infer rather unfavourable age structure in the countries analysed. Poland also reports an increasing number of older farm holders, however, the trend is not as clear as in Romania and Bulgaria. In Romania and Bulgaria the continuous ageing of farm holders and obvious lack of intergenerational transfer leads to situation that is the most disadvantageous among all the analysed countries. On the other hand, a slight improvement in the age structure can be seen especially in Hungary and partially in Slovenia.

Table 12: Age structure of farm holders

Age structure- Farm holders		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
below 35	2003	34,070	45,630	na	400,410	2,980	524,950*	957,460*
	2005	22,270	55,470	309,570	226,230	3,430	649,700	997,960
	2007	na	47,580	291,640	na	3,010	na	na
	I 05/03	**65.37**	**121.56**	na	**56.50**	**115.10**	**123.76**	**104.23**
	I 07/03	na	**104.27**	na	na	**101.01**	na	na
from 35 to 44	2003	70,060	108,890	na	541,020	11,410	831,230*	1,952,990*
	2005	55,460	105,910	549,800	513,710	11,070	1,330,600	2,330,810
	2007	na	91,570	516,690	na	9,800	na	na
	I 05/03	**79.16**	**97.26**	na	**94.95**	**97.02**	**160.08**	**119.35**
	I 07/03	na	**84.09**	na	na	**85.89**	na	na
from 45 to 54	2003	122,520	204,980	na	846,210	19,160	1,311,030*	2,754,290*
	2005	96,150	185,690	769,550	756,300	18,780	1,948,110	3,318,440
	2007	na	145,340	743,860	na	18,550	na	na
	I 05/03	**78.48**	**90.59**	na	**89.37**	**98.02**	**148.59**	**120.48**
	I 07/03	na	**70.90**	na	na	**96.82**	na	na
from 55 to 64	2003	169,730	184,480	na	993,840	17,400	1,487,350*	2,953,180*
	2005	139,170	173,270	429,040	946,830	17,670	1,827,060	3,218,020
	2007	na	169,810	460,280	na	17,690	na	na
	I 05/03	**81.99**	**93.92**	na	**95.27**	**101.55**	**122.84**	**108.97**
	I 07/03	na	**92.05**	na	na	**101.67**	na	na
65 and more	2003	269,170	229,390	na	1,703,410	26,200	2,399,490*	4,231,280*
	2005	221,560	194,450	418,520	1,813,090	26,220	2,823,860	4,616,810
	2007	na	172,020	378,480	na	26,300	na	na
	I 05/03	**82.31**	**84.77**	na	**106.44**	**100.08**	**117.69**	**109.11**
	I 07/03	na	**74.99**	na	na	**100.38**	na	na

Source: Http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

* - incomplete data

na- not available

Labour allocation as well as productivity is also closely related to farm holder's education, general and agricultural specific. The data on general educational structure of farm holders or other household members is unfortunately not available in secondary sources. Besides, the interpretation of any changes in share of farmers with agricultural training is limited as well, since it is only available for the year 2005. This data, however, reveals that the percentage of farmers with agricultural specific training varies significantly among the countries. Comparing to the EU-27 average (of 20%), the percentage is much lower in Bulgaria and Romania (5.3% and 7.4% respectively), as well as in Hungary (13.4%) whereas

Slovenia but especially Poland record relatively high shares of farmers with basic or full agricultural training (28% and 38.5% respectively)[36].

Moreover, with respect to worktime allocation of farm holders, the table below shows the share of farm work in farmer's total working time. The data again reveals heterogeneous dynamics in working time distribution among the countries.

Poland records a clear decrease in the number of farmers who contributed the majority of their working time (more than 75%) to on-farm work, entirely due to the sharp decrease of genuine full time farmers (contributing 100% of their working time). On the other hand, a sharp increase of farmers who work on farm 75% of their working time or less is obvious.

A similar pattern is also seen in Bulgaria and Hungary, where the numbers of farmers who devote less than 75% of their working time to work on farm relatively increased comparing to farmers in the third group (more than 75% of working time devoted to on farm work).

In Romania there is an increase in the number of farmers who work on farm between 25% and 75%, whereas the number of farmers who work on farm up to 25% slightly increased relatively to the numbers of farmers who work on farm more than 75% of their working time. The decrease of number of farmers working the majority of their time on-farm is, similarly as in Poland, entirely due to extremely sharp decrease in full time farmers (the number of full time farmers decreased by 73 percent).

In the period 2003-2005 in Slovenia the work time distribution leaned towards more farmers working higher shares of their working time on the farm. The number of farmers from the first group decreased the most, while the country reports a clear increase in farmers who work on farm more than 75% of their working time. However, this increase is obviously reflecting only temporarily dynamics. Considering the data from 2000 and 2007, one can notice the completely contrary trend; the number of farmers who only work on-farm up to 25% of their time is increasing, as the number of farmers devoting more than 75% (especially those devoting their full time) of their time to on-farm work fell much below the level in 2000 and 2003. Clearly, to see the overall and clear trend, the data availability from wider time period is the prerequisite.

[36] Source of data: http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

Table 13: Work on the farm (farm holder being a natural person)

work on the farm		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
from 0 to 25% of working time	2003	129,500	379,790	751,670	2,690,730	21,860	4,153,880	6,668,820
	2005	120,350	354,930	1,041,030	2,404,170	20,190	4,109,500	6,397,400
	2007	Na	323,480	952,910	Na	23,540	Na	Na
	I 05/03	**92.93**	**93.45**	**138.50**	**89.35**	**92.36**	**98.93**	**95.93**
	I 07/03	Na	**85.17**	**126.77**	Na	**107.69**	Na	Na
between 25 and 75% of working time	2003	267,070	287,530	561,020	1,395,690	35,220	2,803,050	4,380,930
	2005	211,800	274,660	699,880	1,508,440	33,870	2,972,850	4,451,740
	2007	Na	231,180	721,470	Na	32,280	Na	Na
	I 05/03	**79.31**	**95.52**	**124.75**	**108.08**	**96.17**	**106.06**	**101.62**
	I 07/03	Na	**80.40**	**128.60**	Na	**91.65**	Na	Na
more than 75% of working time	2003	262,550	89,800	847,070	375,640	19,960	1,700,330	3,610,750
	2005	197,170	77,120	731,920	325,290	22,990	1,450,060	3,274,230
	2007	na	63,830	697,720	na	19,390	Na	Na
	I 05/03	**75.10**	**85.88**	**86.41**	**86.60**	**115.18**	**85.28**	**90.68**
	I 07/03	na	**71.08**	**82.37**	na	**97.14**	na	Na

Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

4.5 Household structure

The secondary data on the number of household members, number of children in the household, the age structure of the household or information on farm succession for the five analysed countries for the period 2003-2005 are, to the best of our knowledge, not available. Unfortunately this information, which can in our case obviously be acquired only with primary data survey, includes various important aspects of household characteristics and therefore the important factors that may drive structural change in agriculture.

Besides the above, some household characteristics can also be caught by looking into work distribution among household members. For the five analysed countries the data on labour input allocation within a family is presented in the Table 14. Not surprisingly, the greatest share of labour input on the farm comes from farm holder. This share is high especially in Hungary (60%), followed by Bulgaria and Poland, where the share of holder's labour input is close to EU-27 and NMS-10 average. This share is lower in Romania and especially Slovenia (about 49% and 43% respectively). In Slovenia the holder's work has been mainly complemented with rather high share of work performed by other household members than holder and spouse (more than 25%). On the other hand, Hungary demonstrates very low contribution of others members by reporting the share of their work even below 10%. There are no significant differences among countries regarding the share of spouse's work (in all the analysed countries the share is between 25% and 30%, which is slightly higher than EU-27 average).

Further to the short term dynamics in work distribution among members, one can not notice any drastic changes. In Bulgaria and Slovenia the holder's role in farm work is strengthening, while in Poland and Romania the contribution of other household members is slowly increasing, which is in also line with the trend in EU-27. On the contrary, Hungary

leans towards the increased importance of spouse work. One should note that such dynamics may possibly only be the reflection of some temporary conditions. The unavailability of data for longer time periods may therefore hinder to reveal any long term trends.

Table 14: distribution of the labour input among household members

labour input		Bulgaria	Hungary	Poland	Romania	Slovenia	NMS-10	EU-27
AWU farm holder (% of total)	2003	54.20	60.80	52.97	48.82	42.03	51.78	51.86
	2005	53.95	60.83	50.11	48.78	44.55	50.49	51.58
	2007	na	59.19	49.29	na	45.43	na	na
	I 05/03	**99.54**	**100.05**	**94.60**	**99.92**	**106.01**	**97.49**	**99.46**
	I 07/03	na	**97.36**	**93.04**	na	**108.09**	na	na
AWU spouse (% of total)	2003	29.96	25.48	27.18	25.61	24.69	26.69	22.79
	2005	29.59	27.08	27.69	24.31	24.77	26.38	22.73
	2007	na	26.37	27.09	na	24.34	na	na
	I 05/03	**98.77**	**106.26**	**101.88**	**94.91**	**100.30**	**98.87**	**99.75**
	I 07/03	na	**103.47**	**99.68**	na	**98.59**	na	na
AWU other household members (% of total)	2003	12.45	9.99	17.04	19.47	28.42	16.97	15.84
	2005	11.33	9.44	18.39	19.57	25.17	17.56	15.87
	2007	na	9.02	19.54	na	25.72	na	na
	I 05/03	**91.00**	**94.51**	**107.94**	**100.50**	**88.56**	**103.48**	**100.20**
	I 07/03	na	**90.30**	**114.69**	na	**90.51**	na	na

Source: http://epp.http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database

na- data not available yet

4.6 Characteristics of agricultural holding

Various empirical studies emphasise the importance of farm characteristics in the decision-making process of agricultural holdings. The vital ones are those who are carrying economics implication, such as size and total income as well as production specialisation. Due to a strong interrelation among attributes and factor of structural change, the size distribution and specialisation as important characteristics have already been discussed in previous section. In addition, secondary data does not provide us with any information on income of the holding.

However, observing characteristics of agricultural holdings in post-transition economies, gives us another important dimension - the relationship between individual and corporate farm sector. Namely, privatisation (either by restitution or by distribution) involved allocation of land to beneficiaries. But this did not necessarily mean that landowners decided to cultivate their holdings individually. Actually, it was fairly common that beneficiaries decided to lease their land to large corporate farms or invest it in the equity capital of cooperatives and shareholder structures (Swinnen and Mathijs, 1997).

Also the diversity of corporate farm sector has increased since 1990. As reported by Mathijs and Swinnen (1999), a wide variety of farm organisations, such as (private) cooperatives, joint stock companies, limited liability companies, partnerships and

individual farms have emerged following the transition. The dynamics and extent of restructuring of the corporate farm sector varies and is dependent from the initial structural conditions and selected pattern of land reform. Unfortunately, no comprehensive data are available on the management and operation of these new entities. But case studies (Lerman 2000) suggest that in Hungary, the Czech Republic, Estonia and Lithuania many of the large farms today are market-driven corporations. In Romania, at least some of the large farms have evolved by voluntary pooling of land owners into new associations and cooperatives.

Nevertheless, the share of individual farming has increased continuously since the beginning of transition. Agriculture is now largely individualised in Slovenia and Bulgaria. In Hungary and Romania, and to some extent in Poland, a considerable percentage of land use (and prevailing part of agricultural output) is attributed to the corporate sector.

5 CONCLUSIONS, POLICY IMPLICATIONS AND IMPLICATIONS FOR FURTHER RESEARCH WORK

5.1 Structural adjustment in NMS-5: Main findings

Concerning the recent evolution and likely future changes of farm structure in the analysed five countries (NMS5), a number of observations can be pointed out. As for the average size of the farms, there are surprisingly no major differences in the average farm size between NMS-5. They all lag behind the EU-27 average in terms of the average size of agricultural holdings; none of them reaches 50% of the EU-27 average.

However, there are sharp differences in the size structure of agricultural holdings. In two of the analysed countries where private land ownership was a norm also during the socialist era (Poland and Slovenia), rather fragmented farm structure remained unchanged for decades. In the 1980s and 1990s, the number of farms started to drop steadily and significantly. This affected the size distribution of farms, which is now getting closer to a normal size distribution. In the last decade, structural change has slowed down. In Slovenia the number of farms has been stagnating since 2003, whereas farm number in Poland even increased.

The other three analysed countries (Hungary, Romania and Bulgaria) are characterised by a sharply dual size structure of farms: small-scale (usually subsistence oriented) farms on one side, and large farms (agricultural enterprises) on the other. To a large extent, the initial conditions determine also the latest structural developments.[37] In the case of Bulgaria, there has been a strong decline in the number of farms. The decline happened mainly on the account of marginal, small scale, subsistence producers, who left the sector. Less profound decrease in number of farms has been recorded in Hungary and Romania. In the case of Hungary, this coincided with an increase in the value of agricultural output, implying that it was the marginal (small-scale, subsistence) producers left the sector.

In terms of natural endowments for agricultural production, the analysed countries differ a lot, which obviously reflects in the structure of agricultural output. In combination with structural conditions and level of technological development, different natural endowments obviously yield in productivity disparities.

The analysed countries vary considerably also in terms of productivity of agricultural land and labour. Returns on production factors are particularly low in Bulgaria and Romania, countries characterised by a sharply dual agricultural structure with a strong small-scale, subsistence oriented production). In these two countries, agriculture is not only economic, but also social category.

[37] The latest structural changes are illustrated by comparison of the Farm Structure Survey (FSS) results 2003 and 2005. These are the only two periods for which FFS data are available for all five analysed countries.

With regard to the labour input engaged in agriculture, the initial labour market conditions were characterized by unfavourable age structure and decline of agricultural workforce in the analysed NMS, of which Hungary experienced the sharpest decline of agricultural employment. Romania was an exception to this trend. Agricultural employment actually increased as the sector absorbed a considerable amount of labour force made redundant in other sectors.

Recent years brought decline in the total labour input in all analysed countries. The sharpest decline in agricultural labour input was recorded in Bulgaria and in Hungary. In Hungary, labour input decline coincided with an 11% increase of the economic size of farms (ESU), which suggests improvements in labour productivity. On the other hand, Bulgaria and Romania recorded decrease in the economic size of farms (by 13 and 8 per cent, respectively. Taking into account the fact that Romania sought only a marginal drop in labour input, implying that agricultural labour productivity actually worsened. Similarly to Romania, Poland and Slovenia have recently experienced only a minor drop in labour input.

With some notable exceptions (eg. Hungary in dairy production), yields are considerably lower than the EU-15 average. This can be attributed to lower input use, fragmented farm structure and insufficient technical equipment. In addition to those factors, the lag could be due to managerial problems, such as the low level of education, farmers' insufficient skills for handling modern technologies and participating in markets, or structural problems such as the large share of self-subsistence (Romania, Bulgaria) and part-time farms (Slovenia, Poland).

In terms of gross agricultural output, the analysed countries share similar adjustment patterns. After a decline in the first years of transition caused by an increase of input prices, stagnating output prices and falling demand, agricultural output stabilised somewhat below the pre-transition figures in late 1990s. More severely affected was the livestock sector. In the crop sector, which initially adapted by cutting inputs, stabilisation of input-output price relationships led to a certain recovery in input use and higher output levels. As reflected from the recent statistical data on agricultural output, the pre-accession and early post-accession years brought most notable increase of agricultural output in Poland and Romania.

Results of the Economic Accounts for Agriculture (EAA) suggest that economic performance of farm sector in the analysed countries has been generally improving. This can be attributed to a favourable market and policy environment. Price gaps with the rest of the EU started to diminish. Public expenditure on agriculture has been steadily increasing, most notably by CAP direct payments and rural development expenditure. Improved economic performance has to do also with technological progress and other improvements.

5.2 Policy implications of the research findings

After almost two decades of intensive restructuring of agricultural sector, the statistical evidence suggests that the trends in EU NMS have recently slowed down or even reversed. However, when basic structural indicators (farm size, labour input) are observed together with indicators of economic performance (economic size of farms, labour productivity), one can see that the absence of structural adaptation in agriculture is only fictitious. With integration to the EU markets, the pattern of structural adjustment in EU NMS became systematic and predictable. Small-scale, marginal producers have been leaving the sector on the account of growing larger production units. This is understandable as benefits of favourable market and policy conditions (converging prices, direct payments, and access to investment support) are increasing with farm scale. Structural adaptation can be perceived also in qualitative sense with intensified modernisation, increase of productivity and market orientation of agricultural producers. EU accession thus resulted in strengthened representation of large, efficient producers in the size structure. This is illustrated by recent structural trends in NMS-5, which reveal a continuous improvement in economic performance of agriculture.

Another, darker side of the 'success story' of EU accession is the persisting rural poverty trap for small scale, mainly subsistence oriented producers. The EU Common Agricultural Policy toolkit (based upon direct payments, market support and investment subsidies) contains a hidden bias against small farms. They are not able to capitalize the market opportunities and favourable policy conditions. The CAP measure designed especially for these producers (so called 'support for semi-subsistence farms') merely mitigates the social hardships of marginal producers, whereas it is not realistic to expect that payments amounting up to 1,500 € per year (for a period up to five years)[38] would result in farm restructuring to an extent that would allow them to develop a long-term viable market production. In extreme cases, the problem of disappearing small-scale producers can escalate to rural exodus. This is particularly dangerous in areas with marginal conditions for agricultural production, poor physical and social infrastructure, and few non-farm employment opportunities.

Intensified international trade and improved market infrastructure inevitably affect the agri-food chain, especially in urban areas. So called 'retail revolution' brings both opportunities and threats to domestic producers along the food chain. Evidence from EU NMS suggests that economic performance of agri-food sector dropped most dramatically when firms (or sectors in general) were previously enjoying high rates of (direct or indirect) market support (Kuhar and Erjavec, 2007). As performance of the food processing and retail sector directly affects its downstream linkages, agricultural producers and rural economies in general are particularly vulnerable in the process of international market integration. Short-term gains of market protectionism for agri-food sectors in the pre-accession period can therefore bring significant long-term losses.

Last but not least, the intensity of structural change in agriculture has been, and will be, determined by external macroeconomic environment. With persisting economic downturn (characterised by dwindling aggregate demand, credit crunch and tightened balance of

[38] Article 34(3) of the Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD).

public finances), pressures towards agricultural producers will deepen and the problem of increasing rural poverty will further accelerate.

Insight to the latest structural trends in selected NMS-5 allows us to underline some policy implications of wider significance. Likewise to other economic policies, agricultural policy should not try to reverse market trends, but merely mitigate short-time negative market effects and create conditions for effective structural adaptation.

- As revealed in Section 4.3 of this report, there is a strong correlation between farm incomes in observed NMS-5 and CAP (esp. Pillar 1) revenues. Due to increasing fiscal austerity and due to public expectations from agriculture to deliver public goods, it is essential to legitimize transfers of public funds to agriculture on the long run. Economic argumentation of CAP Pillar 1 payments, LFA compensatory allowances and Agri-environmental payments should be improved (eg. improved competitiveness, clearly defined public goods).
- By the same token as above, overlaps between CAP Pillar 1 and Pillar 2 (Axis 2) payments should be dispatched (prevention of multiple payments for same or similar public goods / services).
- Evolution of farm structures in the observed NMS-5 suggests that opening of trade and withdrawal of policy barriers leads structural adaptation of the farm sector to a competitive market environment. Side-effects of such adaptation reflect in social hardships and persisting rural poverty of marginal producers. These problems should be addressed by special schemes for vulnerable social groups (eg. providing social safety nets for rural poor and elderly), separated from agricultural policy. On the other hand, as it comes to measures addressing farm structures (eg. CAP Pillar 2, Axis 1) targeted schemes should be developed for social groups of long-term importance for rural development (eg. young farmers, young job seekers in rural areas). Measures should not discriminate domestic producers (not negatively, nor positively) from their EU counterparts, nor should they favour certain groups of producers (eg. big Vs. small).
- Competitive position of producers should be further improved by better market access and access to capital; either through public support (eg. improvement of physical and market infrastructure, investment support, support for producer groups), or indirectly through private initiatives (eg. stimulating micro-credit schemes).
- As a response to competitive pressures from the changing retail structure and consumption patterns, innovative approaches towards marketing of agri-food products (eg. vertical integration, local supply chains) and adding value to agricultural products (quality labels, gastronomy) should be stimulated.

5.3 Factors affecting structural change and implications for empirical work

In order to base relevant hypotheses on farm structural change in selected EU NMS on a conceptually sound basis, a typology of farm structural change determinants was developed. In the broad sense, the typology distinguishes between factors external to the agricultural household, and factors intrinsic to each individual unit of observation. In the following section, we refer back to this typology (Chapter 2.2 of this report) and point out

factors which are particularly relevant for empirical analysis of the recent structural developments in the selected NMS.

As for the general economic and social conditions, there are two sets of determinants with an obvious impact on farm structural change. The first one has to deal with rapid economic growth and its uneven spatial pattern (economic growth concentrated in capital cities and along the main transport corridors). Implications for rural labour markets are twofold. In remote rural areas, this implies permanent outflow of labour, possible outmigration and decreased agricultural activity. In areas close to the poles of economic growth, increased outflow of labour from agriculture can be expected, but abandonment of agricultural production and permanent outmigration are less likely. Rather, the structural adaptation could result (depending on agricultural market and local labour market conditions) either in an increased pluriactivity, farm diversification, or in increased farm exit, followed by the growth of specialised farms.

Alocation of production factors in agriculture can be affected also by increased public expenditure on prerequisites for economic development, particularly by investments in infrastructure (eg. transport, broadband network) and in improvement of living conditions (eg. water supply, sewage). In the analysed NMS, access to the EU Cohesion expenditure resulted in such improvements. However, similarly than in the case of economic growth (Fingleton, 2001), the gains are unevenly spread across regions (Lopez-Bazo et al., 1999). Areas with stronger public expenditure on prerequisites on economic development are more likely to experience outflow of labour of agriculture, but also improvements in farm size structure and agricultural productivity.

By and large, farm structural change can be triggered by technological improvements, or by the changes in market and policy conditions. Conditions in the the analysed NMS have been steadily improving throughout the last decade. Convergence of agricultural prices to the EU-15 level, increased availability of investment support, and increased revenues from different types of agricultural support resulted in a better overall economic performance of agricultural sector. On the other hand, favourable market and policy conditions acted also as an incentive for less efficient agricultural producers to stay in the business. This might be one of the main reasons for stagnation, or even increase in resource use (land, labour), and in the number of agricultural holdings in the first years after the accession.

It is however not likely that the slowdown of structural adaptation of agriculture in selected NMS will continue. The pace of price convergence is really slow, but steady (IAMO, 2004). Due to tightened macroeconomic conditions, public expenditure on agriculture in the years to come is likely to decrease (Begg, 2009). The current stagnation of farm structures in the analysed NMS, induced by price gaps and by different types of agricultural support, is therefore likely to accelerate in the years to come.

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7 ANNEX: RURAL DEVELOPMENT MEASURES IMPLEMENTED IN THE SELECTED EU NMS IN THREE PROGRAMMING PERIODS

Table 15: Rural Development measures supported through SAPARD (2002-2006)

	Bulgaria		Hungary		Poland		Romania		Slovenia	
		%		%		%		%		%
Investment in agricultural holdings	X	30.4	X	28.5	X	17.3	X	14.8	X	34.3
Processing&marketing of agric. products	X	23.2	X	20.5	X	37.3	X	16.7	X	39.3
Structures for quality, veterinary controls							X	2.7		
Environm. friendly agricultural practices	X	2.4	X	4.3	X	1.9	X	2.5		
Diversification of activities	X	6.2	X	15.5	X	11.3	X	9.8	X	13.7
Setting up producer groups	X	0.9	X	7.4			X	1.7		
Renovation of villages, protect. of heritage	X	7.7	X	9.1						
Land improvement and reparcelling										
Vocational training	X	4.3	X	1.8	X	2.1	X	5.3		
Rural infrastructures	X	5.6	X	12.0	X	27.3	X	28.5	X	9.8
Water resources management	X	5.4					X	2.8		
Forestry measures, investm., processing/market.	X	8.1					X	10.3		
Technical assistance	X	5.8	X	1.1	X	2.7	X	5.0	X	2.9

Source: own compilation of data based on
http://ec.europa.eu/agriculture/external/enlarge/back/index_en.htm

Table 16: Rural Development measures supported through EAGGF-Guarantee and EAGGF-Guidance, 2004-2006

	HU		PL		SI	
		%		%		%
Investment in agricultural holdings	X	18.1	X	8.0	X	2.3
Setting-up of young farmers	X	1.0	X	3.3		
Training	X	0.5	X	0.4		
Early retirement	X	1.7	X	13.0	X	3.3
Less-favoured areas and areas with environmental restrictions	X	7.2	X	19.8	X	37.3
Agri-environment and animal welfare	X	27.3	X	7.1	X	28.6
Improving processing and marketing of agricultural products	X	4.9	X	8.0	X	3.0
Afforestation of agricultural land and i. other afforestation	X	7.1				
Other forestry measures					X	0.8
Land improvement and reparcelling	X	0.4	X	0.4		
Setting-up of farm relief services and farm management services			X	1.1		
Marketing of quality agricultural products, including the setting-up of quality schemes	X	0.5			X	0.4
Basic services for the rural economy and population						
Renovation and development of villages and protection and conservation of the rural heritage	X	1.2				
Diversification of agricultural activities and activities close to agriculture to provide multiple activities or alternative income	X	0.9			X	1.5
Agricultural water resources management	X	2.0	X	2.5		
Development and improvement of infrastructure connected with the development of agriculture	X	2.0	X	0.7		
Encouragement for tourist and craft activities	X	0.6				
Protection of the environment in connection with agriculture, forestry and landscape conservation						
Restoring agricultural production potential damaged by natural disasters and prevention instruments						
Financial engineering						
Leader-type measure	X	1.6	X	0.4		
Meeting EU standards	X	13.4	X	4.9	X	11.2
Use of farm advisory services						
Participation in food quality schemes						
Promotion of quality products						
Semi-subsistence farms undergoing restructuring	X	2.1	X	7.6		
Producer groups	X	3.0	X	0.5		
Complement to CAP Pillar 1 Direct Payments			X	14.3	X	10.0
Technical assistance	X	4.2	X	1.1	X	1.8

Note: Table not applicable to Bulgaria and Romania (accession to the EU 1/2007)

Source: own compilation of data based on http://ec.europa.eu/agriculture/rur/countries/index_en.htm

Table 17: Rural Development Expenditure in the period 2004-2006 (EU support only, in 1000 EUR)

Country	Type of Fund	2004	2005	2006
Bulgaria	EAGGF-Guidance	-	-	-
	EAGGF-Guarantee	-	-	-
	SAPARD	32.415	67.186	53.826
	TOTAL	**32.415**	**67.186**	**53.826**
Hungary	EAGGF-Guidance	31.283	42.842	146.057
	EAGGF-Guarantee	60.230	136.381	233.053
	SAPARD	26.190	108.585	7.780
	TOTAL	**117.703**	**287.807**	**386.890**
Poland	EAGGF-Guidance	119.269	137.048	292.446
	EAGGF-Guarantee	286.640	662.101	1.149.555
	SAPARD	193.116	339.077	0
	TOTAL	**599.025**	**1.138.226**	**1.442.002**
Romania	EAGGF-Guidance	-	-	-
	EAGGF-Guarantee	-	-	-
	SAPARD	160.706	187.200	147.194
	TOTAL	**160.706**	**187.200**	**147.194**
Slovenia	EAGGF-Guidance	2.357	1.615	5.181
	EAGGF-Guarantee	49.312	69.392	118.934
	SAPARD	11.738	6.358	0
	TOTAL	**63.407**	**77.365**	**124.115**
EU27	EAGGF-Guidance	2.961.999	3.096.721	3.559.839
	EAGGF-Guarantee	5.356.992	6.309.971	7.696.521
	SAPARD	635.637	811.905	209.125
	TOTAL	**8.954.629**	**10.218.597**	**11.465.484**
EU12	EAGGF-Guidance	216.758	290.269	614.503
	EAGGF-Guarantee	628.920	1.414.577	2.115.715
	SAPARD	635.637	811.905	209.125
	TOTAL	**1.481.315**	**2.516.751**	**2.939.343**

Source: own compilation of data based on http://ec.europa.eu/agriculture/rurdev/countries/index_en.htm

Table 18: Rural Development measures supported through Rural Development Plans 2007-2013 (EARDF)

		SLO	HUN	BG	POL	ROM
111	Vocational training, information activities, innovation	x	x	x	x	x
112	Setting up of young farmers	x	x	x	x	x
113	Early retirement	x	x	x	x	
114	Use of advisory services		x	x	x	
115	Establishment of special advisory services for farm management, substitution and farming as well as for forestry		x	x		
121	Modernisation of agricultural holdings	x	x	x	x	x
122	Increasing the economic value of forests	x	x	x		x
123	Increasing the value of agricultural and forestry products	x	x	x	x	x
124	Cooperation for the development of new products, processes and technologies in the agricultural and food-industry sector and forestry		x	x		
125	Improvement and development of infrastructure related to the development and modernisation of agriculture and forestry	x	x	x	x	x
126	Restoring agricultural production potential damaged by natural disasters and introducing appropriate prevention actions			x		
131	Compliance with the rules based on community regulations	x	x	x		
132	Support of agricultural producers participating in food quality systems	x		x	x	
133	Support of producer groups in the field of information and promotional activities pertaining to products, which belong to the framework of food-quality systems	x		x	x	
141	Support of the semi-subsistence farms under restructuring		x	x	x	x
142	Support of setting up production groups	x	x	x	x	x
143	Provision of farm advisory and extension services in Bulgaria and Romania			x		
211	Natural handicap payments to farmers in mountain areas	x		x	x	x
212	Payments to agricultural producers of less favoured areas, other than mountain areas	x	x	x	x	x
213	Natura 2000 payments and payments linked to Directive 2000/60/EC		x	x		
214	Agri-environment payments	x	x	x	x	x
215	Animal welfare payments		x	x		
216	Support for non-productive investments (agricultural land)		x	x		
221	First afforestation of agricultural land		x	x	x	x
222	First establishment of agroforestry systems on agricultural land		x	x		
223	First afforestation of non-agricultural land		x	x	x	
224	Natura 2000 payments		x	x		
225	Forest-environment payments		x	x		
226	Restoring forestry potential and introducing prevention actions	x	x	x	x	
227	Support for non-productive investments (forests)	x	x	x		
311	Diversification of non-agricultural activities		x	x	x	
312	Supporting the establishment and development of micro-enterprises		x	x	x	x
313	Promotion of tourism activities		x	x	x	x
321	Basic services for the rural economy and population		x	x	x	
322	Renewal and development of villages	x	x	x	x	x
323	Conservation and sustainable development of rural heritage	x	x	x	x	
331	Training and information		x	x		

341	Learning of skills, incentives and the setting up and implementation of the local development strategies		x	x		
411	Competitiveness	x	x	x		x
412	Environment/Land management	x	x	x		x
413	Quality of life/diversification	x	x	x	x	x
421	Inter-territorial and trans-national cooperation	x	x	x	x	x
431	Running costs, skills acquisition, animation	x	x	x	x	x
511	Technical assistance	x	x	x	x	
611	Complements to direct payments			x		

Source: own compilation of data based on http://ec.europa.eu/agriculture/rurdev/countries/index_en.htm

Table 19: Rural Development Expenditure - programming period 2007-2013 (in 1000 EUR)

		Axis 1	Axis 2	Axis 3	Axis 4	Technical Assistance	Complements for DP	Total
SLOVENIA	public expenditure	399.487	587.641	132.039	33.760	6.002		1.158.929
	privat expenditure	244.045		132.039	31.831			407.915
	total	643.532	587.641	264.078	65.591	6.002		1.566.844
HUNGARY	public expenditure	2.366.378	1.626.706	690.691	272.356	202.978		5.159.109
	privat expenditure	2.386.734	111.336	460.156	22.696			2.980.923
	total	4.753.112	1.738.043	1.150.847	295.052	202.978		8.140.033
BULGARIA	public expenditure	1.204.867	777.394	877.667	76.988	123.181	181.841	3.241.938
	privat expenditure	778.843	7.134	225.358	25.112			1.036.446
	total	1.983.710	784.528	1.103.024	102.100	123.181	181.841	4.278.384
ROMANIA	public expenditure	3.967.312	2.293.413	2.473.740	235.075	376.120	625.136	9.970.796
	private expenditure							
	total							
POLAND	public expenditure	7.187.532	5.546.002	3.430.184	787.500	266.600		17.217.817
	privat expenditure	6.070.255		1.369.164	403.115			7.842.534
	total	13.257.787	5.546.002	4.799.348	1.190.615	266.600		25.060.352

Source: own compilation of data based on http://ec.europa.eu/agriculture/rurdev/countries/index_en.htm