FARM STRUCTURE AND COMPETITIVENESS IN AGRICULTURE

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Abstract

After the political, economic and social transformation in 1989-1990 the farm structure in Hungary became undoubtedly more diverse than earlier and many unfavourable features have appeared such as: fragmented holding and bipolar property structure, low technical, technological, educational and living standards, and high unemployment rate especially in the rural areas. These disadvantageous points currently exist permanently although a modest improvement has started. The new farm structure is radically different from the characteristics of the main competitors, mainly to other EU Member States.

The past two decades after the political and economic transition have been enough time to appreciate the characteristics and the main changes in the farm structure so current relevance of the topic is unquestionable. Viability, subsistence and competitiveness are significant concepts which could be measured by the profitability of the agricultural holdings. It is very important to define the main criteria of viability, subsistence and competitiveness but we should not forget the multifunctional role of agriculture as this could solve very important challenges especially in maintaining the rural population, helping their livelihoods, providing moral and mental support, and maintaining the landscape. It should be emphasised that this research is only a first to step in examining the main changes in the Hungarian farm structure and in the future the study will be extended.

Keywords: transformation, farm structure, competitiveness, profitability, sustainability

Introduction

The political and economic transition process was marked by a wide divergence in economic performance among the former communist countries. Some countries have prospered, while others have stagnated (Havrylyshyn, 2007). Farm restructuring in formal socialist transition countries has resulted in a broad range of farm types, such as cooperatives, limited liability and joint stock companies, limited and unlimited partnerships, and sole proprietorships. A combination of farm types can be found in most transition countries, but their relative importance differs considerably across the region (Swinnen *et al.*, 2000).

In most Eastern and Central European countries (ECE) and Former Soviet Union (FSU), agricultural production was organised in large-scale collective and state farms based mainly on a central planning mechanism. Economic reforms since 1989 have included both the privatisation of agricultural production assets and the restructuring of state and collective farms (Mathijs and Swinnen, 1997).

The political, economic and social transformations that have taken place in the Central- and Eastern-European countries in the 1990s have also resulted in important changes in the Hungarian agricultural economy: the structure of land use and land ownership has changed, the cooperative farms have been broken up – mainly due to the return of the land to the former owners – and their place has been taken by the private economic organisations and individual farms. There has also been a remarkable decrease in agricultural employment. The transition and the transformation process is examined in a vast literature (e.g. Varga *et al.*, 1995, 1997, 1999; Burgerné *et al.*, 1999, 2003; Dorgai, 2004, 2008; Illner – Andrle, 1994; Blanchard, 1997; Kitschelt, 1999; Gill, 2002; Karadeli, 2004; Havrylyshyn, 2007; Pop-Eleches, 2007; Cerami, 2009; Moller, 2009), but the effects of the structural change of the Hungarian agricultural economy on competitiveness has been neglected.

In Hungary the land ownership and farm structure have changed radically three times during the last 60 years. The first land reform took place during 1945-1948 when small-scale individual farms and relatively large state-owned farms were created, based on 15 per cent of the arable land. The land reform started with the nationalisation of land and followed by land distribution to more than half a million poor peasants of 5 hectares of even smaller land areas. The privately-owned large scale agricultural farm system was abolished for the benefit of peasants without land.

The second land reform, the so-called collectivisation, is when the individual farmers were forced to join cooperative farms. This process had been finished by 1962, when 90 per cent of the total arable land was occupied by large-scale farms, cooperatives and state owned companies. The size of the large-scale farms gradually increased after that time due to the forced mergers according to the central planning mechanism. After this period due to the so-called "economic reform" the agricultural policy included more and more market oriented factors and rules. The small-scale farm households, however, were not fully eliminated, and provided about 35 per cent of the total population, mainly in animal husbandry and horticulture. These farm households worked mostly in an integrated way with the large-scale farms (Tóth, 1997). This farm structure characterised the Hungarian agriculture until the end of the 1980s.

The third land reform took place in the 1990s, when the structure of properties and land use was radically transformed during the political and economic transition period (Dorgai *et al.*, 2004). The compensation and privatisation affected almost three quarters of the whole agricultural area, about 5.6 million hectares of agricultural land were distributed to the ownership of 2.6 million private persons.

An extremely fragmented, bipolar farm structure formed in which the number of small individual farms is disproportionately high. The size of individual farms is highly variable: the number of individual farms which cultivate only 1-2 hectares is very high (although it has decreased in recent years) and those which cultivate 50-100 hectares or more are still few. During recent years the number of private farms which cultivated 50-100 hectares has shown a slight increase but the utilised area is still very low. It means that in Hungary a slight differentiation between farms has started, and several non-viable holdings have begun a moderated land concentration in the last two decades.

Consequently an organic development of the Hungarian farm structure and organisational system of agricultural production was not possible in the last 60 years, and this can constitute an impediment for the improvement of competitiveness.

The economic structure can be analysed from several aspects: on the one hand from the side of production factors, and on the other hand from the efficiency and profitability of farming. It is very important to find answers to the questions about what kind of economic groups have evolved according to field sizes, forms of agricultural holdings, direction of agricultural production and economic farm sizes (ESU) in the last two decades, and what kind of rearrangement and change can we observe in the past and currently. It is also of interest to show the roles the farmers and the agricultural holdings assume in the maintenance of multifunctional agriculture. As the family farms represent a large segment of Hungarian agriculture, it is necessary to analyse the efficiency and profitability of their activities.

The main argument supporting the relevance of this paper is that the effects of Hungarian farm structure changes on competitiveness have not been examined for the last two decades while major economic transformations have been taking place in Hungary. The preparation for the accession of Hungary to the European Union (EU) and the adoption of the Common Agricultural Policy (CAP) after EU accession may also have affected the structure of agricultural production in Hungary. The competitiveness of Hungarian agricultural production has become even more important in this period of economic and financial crises. This paper is only an initial attempt and a more detailed, thoroughly research and more time is needed to answer the questions which have been raised.

Theoretical background

There is an extensive and continuously growing literature that describes the concepts and the methods for quantification of competitiveness, however no generally accepted and used methods exist for measuring competitiveness. It is not the goal of this paper to show all the concepts and methods for measuring competitiveness but some important examples will be presented.

The OECD (1997) defines competitiveness in two ways. One definition states that competitiveness represents the ability to face competition and to be successful when facing competition. The other describes competitiveness as the ability to sell products that meet demand requirements and at the same time ensure profits over time that enable the firm to thrive.

According to Freebairn (1986) competitiveness is an indicator of the ability to supply goods and services in the location and form and at the time they are sought by buyers, at prices that are as good as or better than those of other potential suppliers, while earning at least the opportunity cost of returns on resources employed.

Another approach, expressed by Frohberg and Hartman (1997), is that competitiveness is closely linked to comparative advantage. The only difference between the two is that competitiveness includes market distortions, whereas comparative advantage does not. Both are based on the concept of general equilibrium. Therefore, indicators used to measure competitiveness should make use of general equilibrium approaches, since only these take account of all the interdependencies in an economy.

Competitiveness can be interpreted at the company (micro level), industry or regional (meso level), and national economy (macro level) levels according to Lengyel (2000). Competitiveness at the producer level has been manifested in the correct position, the long-term subsistence and the economically sustainable development (Módos, 2003).

Profitability and success are inherent concepts in competitiveness and Potori *et al.* (2004) also connected viability and subsistence to the definition of competitiveness. Based on the literature sources, those agricultural enterprises are viable which are engaged in production in sectors enjoying comparative advantages both in the domestic and foreign markets, and which are able to generate a socially acceptable normal profit by allocating the available resources efficiently in the actual legal and economic environment. Based on this, those agricultural enterprises are competitive which are able to generate some extra profit above the socially acceptable level in a free, open and competitive market.

Widely applied methods in the literature to measure competitiveness and relevant for this research include following:

- The Global Competitveness Index (GCI) which consists of 12 pillars, the Growth Index (GI) and the Market share Index (MI) are macro-level indicators of competitiveness.

- The Diamond Model of Michael Porter for the competitive advantage of nations (Porter, 1993).

- The revealed comparative advantage (RCA) methodology which basically measures normalised export shares, with respect to the exports of the same industry in a group of reference countries (Serin and Civan, 2008) and which was first formulated by Balassa (1965).

- More complex methods are factor and cluster analyses, and the TFP method (Total Factor Productivity), that is, the totality of the factors productivity.

- The real exchange rate (RER) is a measure of international competitiveness which is the ratio of the price index of tradable commodities and the price of non-tradable ones.

- The export market shares (EMS) are a simple measure of competitiveness. EMS can be measured in terms of quantity or in terms of value (Latruffe, 2010).

- The domestic resource costs (DRC) ratio compares the opportunity costs of domestic production with the value added it generates (Gorton *et al.*, 2001).

- Financial indicators on micro level: return on total output, return on assets and return on net worth.

In this study the last three indicators were examined based on the data from the Hungarian FADN between 2003-2010, and the results are presented below.

Material and Methods

Firstly, the paper tries to identify the significant changes in the Hungarian farm structure after transition and Hungary's accession to the EU. Secondly, it examines the main profitability indicators based on the FADN database between 2003-2010 and tries to show a connection between the farm size categories and the results of these indicators. Panel data were used and the results of 814 agricultural

holdings during this period were examined. Based on the results, the return on total output indicator presents a significant connection between the farm size categories and the profitability of farming.

Results

The changes resulted in Hungary in the dominance of the private ownership of land (83%) which has not changed substantially in the last decade. The changes in ownership have increased the range of owners: most owners are not bound to agricultural production and activities. Land ownership and land use are separated from each other and both are characterised by fragmentation. Amongst the various forms of agricultural holdings the individual farms and the corporate farms predominate, which show opposite trends in terms of their numbers and land use. The majority of the individual farms cultivate only 10 hectares and 90 per cent of them occupy less than 1 hectare. The majority of the corporate farms cultivate more than 50 hectares and there are many farms which cultivate more than 300 hectares. From the point of view of the future and the quality of farming the twin poles of land use is disadvantageous.

The number of agricultural holdings in Hungary decreased by nearly 40 percentage points between 2000 and 2010 while the utilised agricultural area did not change significantly (in 1991 only 2.6 thousand corporate farms and 1395.8 thousand private farms operated in Hungary). The number of corporate farms has shown a modest increase of 2 percentage points in this period, but there was a significant decline in the number of individual farms, which decreased by 40 percentage points over the past ten years (Table 1). Many farms stopped their agricultural activities during this period due to the deteriorating profitability indicators and other reasons. Currently, the productive sectors are in the background, and the dominance of the service sector is continuously increasing (although the global financial crises in 2008-2009 have also had a negative effect on the expansion of the service sector). The productive sectors are playing an important role in meeting the basic food demand and solving the problems of agricultural employment, mainly in the rural areas in Hungary.

Table 1. The number and distribution of area in the agricultural holdings in Hungary in 2000, 2005, 2007 and 2010.

| Agricultural holdings	Holdings engaged in agricultural activities			
	number (1000 bit)	rate,%	area, (1000 ha)	rate, %
2000				
Farms in total	966,9	100,0	6394,1	100,0
from this: corporate farms	8,4	0,9	3779,8	59,1
individual farms	958,5	99,1	2614,3	40,9
2005				
Farms in total	714,8	100,0	5709,9	100,0
from this: corporate farms	7,9	1,1	3441,4	60,3
individual farms	706,9	98,9	2268,5	39,7
2007				
Farms in total	626,1	100,0	6003,5	100,0
from this: corporate farms	7,4	1,2	3740,7	62,3
individual farms	618,7	98,8	2262,8	37,7
2010				
Farms in total	576,0	100,0	6533,8	100,0
from this: corporate farms	8,6	1,5	3822,4	58,5
individual farms	567,4	98,5	2711,4	41,5
Index: 2000 = 100%				
Farms in total	59,6	-	102,2	-
from this: corporate farms	102,4	-	101,1	-
individual farms	59,2	-	103,7	-

Source: General Agricultural Census 2000; Farm Structure Survey 2005, 2007, General Agricultural Census 2010.

After the transformation in 1989-1990 an Agricultural Census was made in Hungary (in 1991) but it was able to report only the beginning of the transition process. A presentation of the main changes of the new developed economic and farm structure could only be made later (Laczka, 2010). Consequently the changes from 2000 were examined because in this year a General Agricultural Census was made by the Hungarian Central Statistical Office.

Over the past ten years, the land use connected to the various forms of farming has been significantly rearranged. The land use in the individual and corporate farms is very uneven from the point of view of the farm structure, the number of agricultural holdings and the proportion of the utilised area. Land is a key resource of agriculture so keeping the use of land under social control could be one priority of a sustainable economy (Takács-György *et al.*, 2011).

The number of corporate farms (mostly the legal successors of the former large-scale farms) compared with the total number of farms is quite low but their proportion by land use is around 60 per cent. The private farms which account for the majority of agricultural holdings (98.5 per cent) cultivated 41.5 per cent of the agricultural area in 2010. The land use in the individual farms, the distribution based on farm size categories, in addition to a strong concentration, is very unbalanced. (Figure 1).

Figure 1. The characteristics of the farm structure in the individual and the corporate farms in Hungary in 2010.
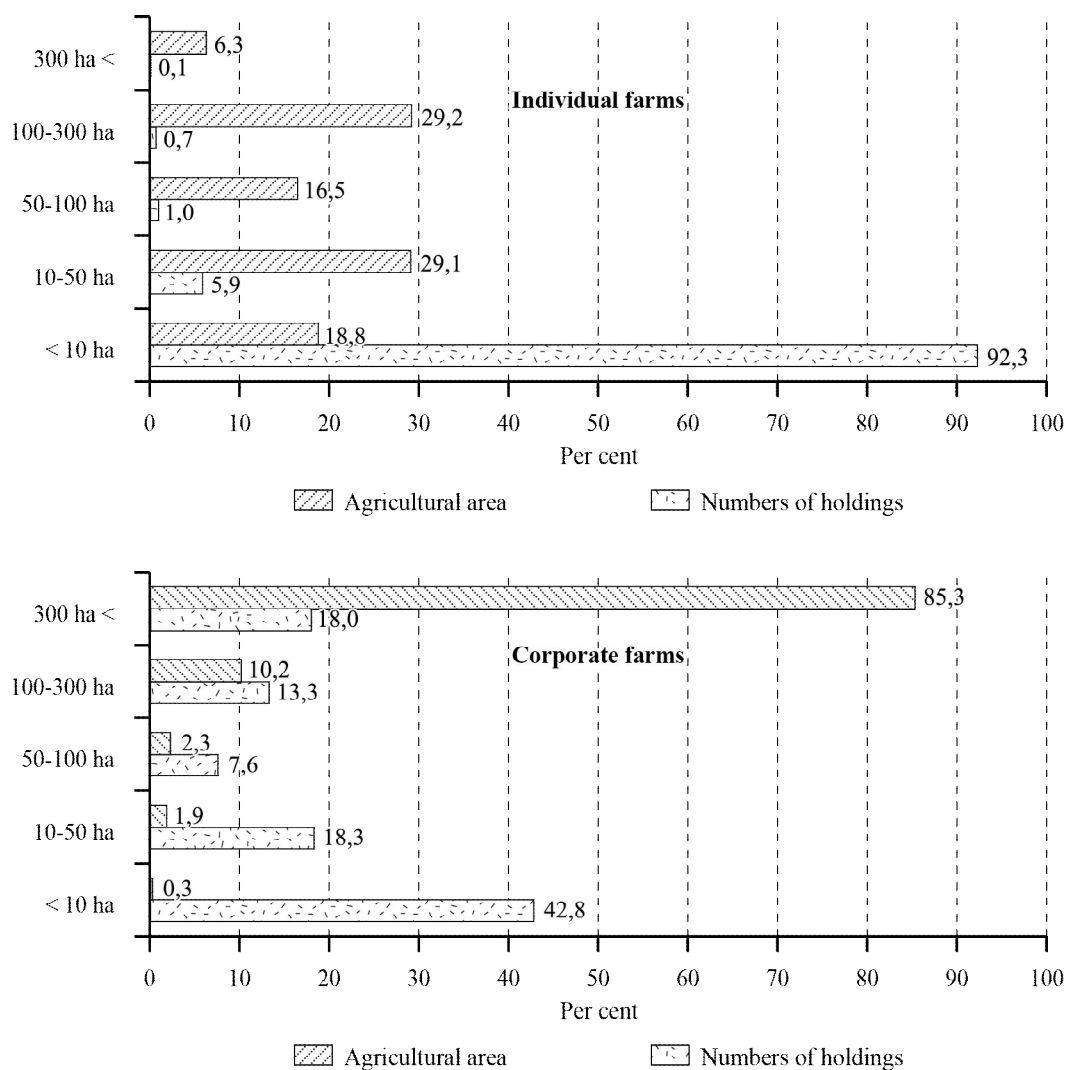
Source: General Agricultural Census, 2010.

In 2010, 92.3 per cent of individual farms – a little more than one-fifth of their whole agricultural area – occupied less than 10 hectares of land. There is also a dominance of private farms under five hectares and nearly three-quarters of them cultivated less than one hectare agricultural land in Hungary. The farms between 10-100 hectares cultivated 45.6 per cent of the whole agricultural area. During recent years, the territorial expansion of farms between 100-300 hectares has increased; they used 29.2 per cent of the whole agricultural area. In terms of land use, individual farms have started a modest concentration in recent years but this process is only a first step towards the final result.

There are too many small farms in Hungary which do not provide secure living conditions. Those small individual farms are characteristic especially in the areas where the high unemployment rate, the permanent unemployment status, low living standards, and many social, moral and mental problems are common. On the one hand, the small farms often hinder or even frustrate the social and economical development. On the other hand, with the production of the basic food demand they can moderate the sharp social tensions (Tóth *et al.*, 2006).

The number of corporate farms is relatively evenly distributed between the farm size categories, while the vast majority of land use belongs to the holdings over 100 hectares. The land use of corporate farms over 300 hectares amounted to 85.3 per cent of the whole agricultural area. Thus, in both forms of agricultural holdings is a very extreme field which indicates the separation and concentration by land use.

The main aims of farming amongst the individual farms were also examined and in 2010 – as in 2000 – most (60.9 per cent) farmed only for subsistence (in other words only for own consumption) and economically they cannot be considered as farms. However, regarding the basic subsistence and additional income in terms of self supply their activities constitute a modest but essential part in subsistence (Tóth *et al.*, 2006).

The other group of farms, which sell the surplus and/or mainly deal with selling accounted for nearly 20 per cent of the number of farms (Table 2). The ratio of those farms which provide only services was quite low in recent years and it has not changed significantly. Only 96 thousand individual farms have completed the main criteria of market competition, which were engaged in producing goods, and their number has increased by about 20 thousand in fewer than seven years (Kapronczai, 2010).

Table 2. Distribution of individual farms in Hungary according to the purpose of production in 2000 and 2010.

(%)

Purpose of production	Distribution of farms	
	2000	2010
Only for own consumption	60,3	60,9
The surplus is marketed	31,5	19,4
Mainly for marketing	8,0	19,6
Exclusively agricultural services provided	0,2	0,1
Total	100,0	100,0

Source: General Agricultural Census, 2010.

In general, a simplified production structure is also characteristic for the private farms; however, in these farms specification is of a low level. Mixed production has priority, and crop production and livestock farming are proportionate. In the production structure labour intensive cultures are dominant: 80-90 per cent of wine and fruit plantations are cultivated by private farms and their role in vegetable production is also significant (Tóth *et al.*, 2006).

The number of individual farms by type of farming has shown a significant rearrangement which was caused by the decrease in the total number of private farms. As the data show, the number of agricultural holdings which deal with crop production has slightly increased between 2000 and 2010, while the livestock farming and the mixed profile farming have dropped considerably (Table 3).

Table 3. The number of individual farms in Hungary by type of farming in 2000 and 2010.

| Type of farming | Agricultural holdings | | | | Change, 2000=100% |
| | number | | rate, % | | |
	2000	2010	2000	2010	
Crop farming	270736	272979	28,2	51,8	100,8
Livestock farming	188333	89334	19,6	16,9	47,4
Mixed farming	492985	164795	51,4	31,3	33,4
Total	958534	527108	100,0	100,0	55,0

Source: General Agricultural Census 2000, 2010.

In Hungary, the decline in livestock is an ongoing trend. Since the transition, the number of livestock declined significantly, caused by the increase in feed prices, the low purchasing prices and other reasons. The majority of private farms established after the transition were mixed profile farms dealing with selling the surplus on the markets, but in the last 20 years this layer has declined the most dramatically. Agricultural production in medium sized, market oriented individual farms is preferred as in the future only these farms can survive in a very competitive environment.

The examination of the profitability indicators

Three profitability indicators were examined between 2003 and 2010 and the source of data is the Hungarian FADN system. The network in Hungary was built gradually from 1996. The Hungarian FADN farm results have been published since 1998 and in this year the data collection was covered by 12 counties. Nowadays, this system consists of circa 1900 sample farms (1920 farms in 2010). The sample represents more than 106 thousand agricultural holdings over 4 thousand euro Standard Output1 (SO). The 106 thousand farms cultivated 93 per cent of the total agricultural area used by all farms that were registered in the framework of Farm Structure Survey 2007 and produced 90 per cent of total SO. The average agricultural area of farms was 48.3 hectares and 1.6 people were employed per farm in 2010. The Hungarian FADN makes accrual accounting not only for corporate farms but also for individual farms. It means that also individual farms have calculated balance sheets and profit and loss statements.

The profitability indicators are calculated in the following ways:

$$\text{Return on total output (\%)} = \frac{\text{income before taxes}}{\text{total output}} * 100$$

$$\text{Return on assets (\%)} = \frac{\text{income before taxes} + \text{interest paid}}{\text{liabilitie s}} * 100$$

$$\text{Return on net worth (\%)} = \frac{\text{income before taxes}}{\text{net worth}} * 100$$

The profitability of individual and corporate farms can not be compared directly, because individual farms do not account the labour of family members as wage costs. Part of the personal income of family members working in the individual farms appears in the accounting as the result of the farming activity. Comparability can be achieved only by correction during which identical wages are assigned to the same workload in both sectors. Comparing the profitability of individual and

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[1] Standard output is a standardised production value related to a unit of agricultural production (one hectare of land or one livestock unit generated in usual weather and production conditions). Standard Output includes sales, farm use, farmhouse consumption and the value of changing of stocks in the case of main and by-products as well. It does not include any direct or other subsidies and also the value of organic manure (Keszthelyi – Pesti, 2010).

corporate farms, we can conclude that individual farms will be competitive only if they are able or willing to keep their labour costs and the consumption of their family members at a low level (Keszthelyi – Pesti, 2012). At present, no attempts have been made to compare the profitability indicators of the two economic groups. The focus was placed of the relationship between farm size categories and the results of profitability.

Table 4 summarises the main profitability indicators in the individual farms and corporate farms between 2003 and 2010. As we examine the results of the individual farms in 2003, the indicators were only positive in the case of the holdings over 50 hectares so it can be assumed that there is a relationship between the farm size categories and the profitability. In 2010, the profitability indicators have significantly improved in the examined private farms. The greatest improvement is shown in the "return on total output" indicator.

A highly unbalanced picture has emerged in the corporate farms in the same period; however. Typically the agricultural holdings over 50 hectares farm size have performed much better. (Table 4). As 2002 was a drought year there was very little rain, so the bad profitability indicators could have been caused by the weather anomalies.

Table 4. The profitability indicators in the individual farms and corporate farms in Hungary in 2003 and 2010.

(%)

Indicators	Individual farms: size categories			
	<5 ha	5-20 ha	20-50 ha	50 ha <
	2003			
Return on total output	-2,60	-6,50	-8,40	2,30
Return on assets	-6,90	-5,10	-1,10	3,90
Return on net worth	1,80	0,00	1,10	4,90
	2010			
Return on total output	3,00	23,60	26,30	23,70
Return on assets	10,50	13,80	12,00	12,70
Return on net worth	10,60	16,30	14,10	15,10
Indicators	Corporate farms: size categories			
	<5 ha	5-20 ha	20-50 ha	50 ha <
	2003			
Return on total output	2,50	-15,10	-9,10	-2,80
Return on assets	2,00	-19,30	-25,60	-10,10
Return on net worth	5,40	-13,40	1,80	0,20
	2010			
Return on total output	1,10	2,50	-0,60	3,80
Return on assets	-1,20	7,20	-0,30	2,10
Return on net worth	3,80	5,90	0,70	6,70

Source: Hungarian FADN data base (panel data), 2012.

It was assumed that there is a connection between the farm size categories and the results of the main profitability indicators. To demonstrate this hypothesis a correlation analysis was made using the following statistical methods. In the further research regression analysis will also be used.

The correlation measures the strength of the linear relationship between numerical variables, for example, the height of persons and their shoe size or height and weight. In these situations the goal is not to use one variable to predict another but to show the strength of the linear relationship that exists between the two numerical variables (Wang, 2009).

Another approach says that correlation is related in the sense that both deal with relationships among variables. The correlation coefficient is always between -1and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive linear sense; a correlation coefficient

of -1 indicates that two variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables (Encyclopedia Britannica, 2012).

Neither regression nor correlation analysis can be interpreted as establishing cause-and-effect relationships. They can indicate only how or to what extent variables are associated with each other. The correlation coefficient measures only the degree of linear association between two variables. Any conclusions about a cause-and-effect relationship must be based on the judgement of the analyst.

Based on the results it can be suggested that there is a medium-strong relationship between the farm size categories and the indicator of return on total output. The changes in the profitability indicators between farm size categories are represented graphically in Figures 2 and 3.

Figure 2. The main profitability indicators based on farm size categories in the individual farms in Hungary in 2010.
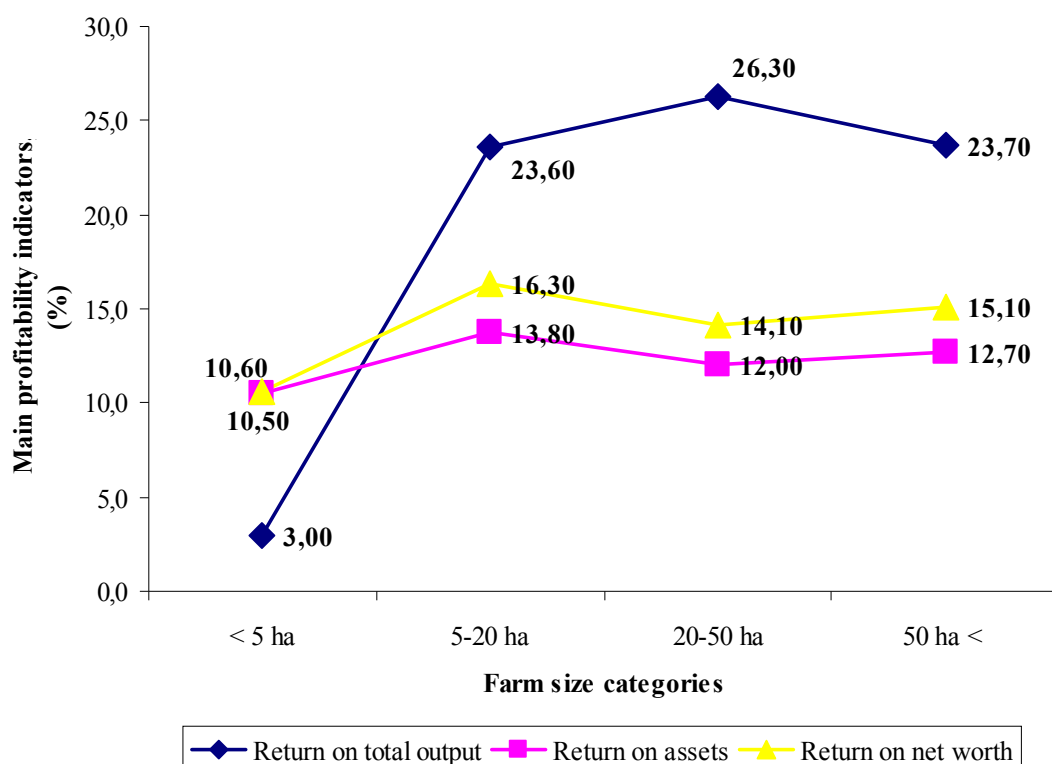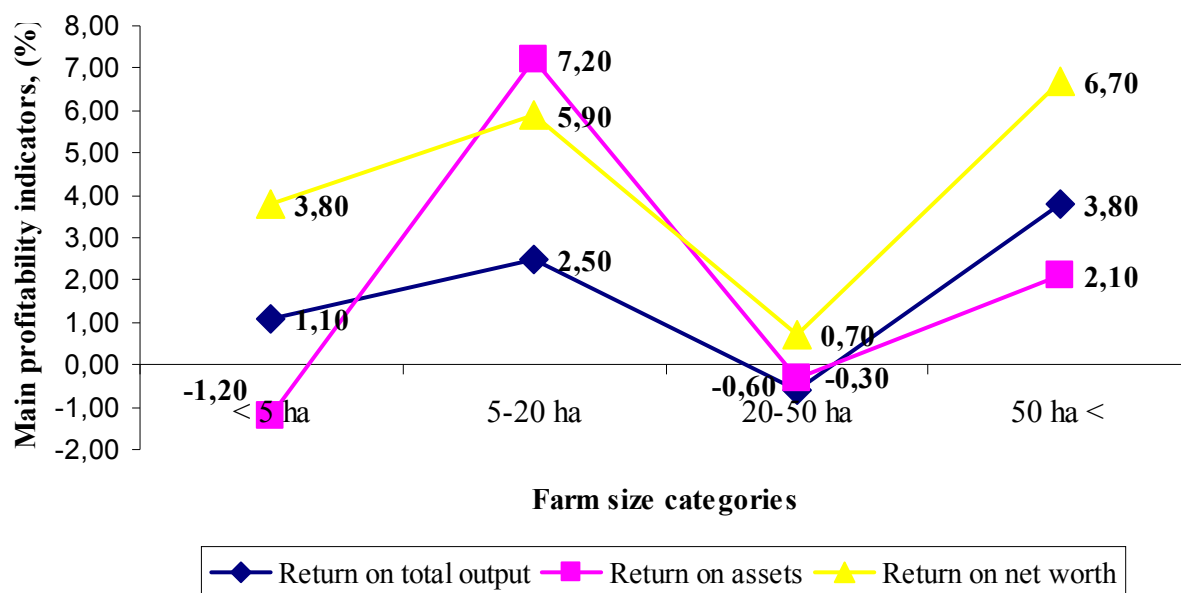

Source: Hungarian FADN data base (panel data), 2012.

The correlation analysis has showed a medium-strong connection between the farm size categories and the return on total output in the individual farms, the correlation coefficient amounted to + 0.58. The correlation coefficient was + 0.30 by the return on assets, and the coefficient was a little bigger, + 0.44, by the return on net worth.

In the corporate farms, the correlation coefficient has presented a more confused picture. The correlation coefficient was + 0.47 by the return on total output, meaning, that it is also a medium-strong relationship as we have seen in the private farms. The coefficient was negative, - 0.03 by the return on assets in 2010 and by the return on net worth the indicator was + 0.29. Based on these results it can be presumed that the farm size significantly affects the profitability of farming and for this reason the competitiveness too, but this statement requires more thorough research and needs more time. This study does not include a sectoral examination but presumably there is a significant scattering between the sectoral results.

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Figure 3. The main profitability indicators based on farm size categories in the corporate farms in Hungary in 2010.

Discussion

Hungarian agriculture was a prosperous sector of the national economy before the transition. The political, economic and social transition (1989-1990) resulted in a rapid and radical workforce loss in the whole economy: 1.7 million workplaces were lost in the early 1990s, mainly in the productive sectors. Agriculture discharged the largest number of employees (650 thousand people) and between 1990-2010 the sector's annual share in employment has fell by three quarters, from 17.5% to 4.5%. The rearrangement of the farm and property structure, the reduction in the technical and technological standards, the privatisation of land and the loss of its important markets made it vulnerable.

More than twenty years have elapsed since the radical political, economic and social transition in Hungary but it is still a current question as to what is the role of agriculture in contributing to an increase in the GDP, solving the problems of employment especially in the rural areas, and ensuring a secure livelihood for the farmers. There is also an important question regarding what kind of economic groups could meet the criteria of viability, subsistence and competitiveness and the multifunctional role of agriculture.

In Hungary, we tend to look at the small farms which are not significant from the point of view of the agricultural performance but this is not true. The small farms contribute to a secure livelihood and a modest income for many families. On the basis of the profitability indicators it is not clearly evident that the smaller farms perform much worse and the bigger agricultural holdings perform much better. The small family farms are as important as the corporate farms which cultivate more than hundreds of hectares. In the future, the Common Agricultural Policy should establish a farm structure in Hungary in which there is a healthy balance between agricultural holdings and activities of different sizes and types.

In the last two decades neither the government nor the agricultural policy has resulted in the organic development of agricultural production. Presently it is not decided which form of farms will be supported more in the future: the smaller private farms or the bigger corporate farms? This question will be answered as soon as possible.

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