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**Productivity and profitability developments in Ukraine:
agroholdings versus independent enterprises**

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1. Introduction

The emergence of holding companies in Ukrainian agriculture led to a consolidation of large amount of land over the past decade. The land bank of agroholdings in Ukraine increased 3.6 times since 2007 and reached 6.04 million hectares in 2013. One of the main questions of this development is connected with efficiency and productivity of such companies, compared to independent agricultural enterprises¹. In this abstract we will indicate key findings of an efficiency and productivity analysis of Ukrainian agroholding farms and independent farms based on farm level data for crop and dairy production for the period 2008-2013 based on data envelopment analysis and total factor productivity measurement.

2. Data and Methods

The data for the analysis is based on accounting data and interviews of agricultural enterprises for the years 2008 to 2013. 3425 enterprises were queried for these six years, 926 enterprises (27%) were excluded from further calculations after the cleaning procedures that are based on calculation of ratio indicators and elimination of thresholds by histogram analysis and three standard deviations procedure. In the end, 2499 observations remained in the unbalanced and 1260 in the balanced panel.

Technical efficiency is estimated using a standard Data Envelopment Analysis (DEA) that represents a non-parametric, linear programming-based approach. The model is specified as a multiple output - multiple input problem and assumes output-oriented optimization with constant returns to scale. The DEA model includes three outputs (crop production, milk and other animal production) and three input variables (amount of land, number of employees and capital costs).

3. Results

Main attention is paid to the differences between the agroholding and independent farming enterprises. Agroholding farms represent 23 % of all observations. A comparison of output and input variables between independent and agroholding farms reveals that agroholding farms in the sample are on average more than seven times larger than independent farms. This can be explained by the fact that several agroholdings organized agricultural production in very large units. Furthermore, agroholding farms are more specialized in crop production than independent farms. These two types of farms also significantly differ in their input structure. Agroholding farms have a lower share of depreciations in total costs than independent farms. This is rather surprising because most agroholdings operate with modern western technology. In addition, agroholding farms are found to use services from external parties more extensively than independent farms. This may explain the rather low depreciations. Also material inputs are used by the agroholdings on a much higher intensity level. As a result, agroholding farms achieve substantially higher yields and revenues per ha (cf. Balmann et al. 2013).

Despite of the higher absolute productivity of agroholding farms, Figures 1 and 2 show that independent farms had on average a higher profit rate and profit per hectare in 2008-2013. While the average profit per hectare in independent enterprises was at the level of 588 UAH, agroholding enterprises earned 60% less. Partly, this may be explained by the fact that high intensities only pay off if sales prices are high. The lower profitability of agroholding farms can also be explained by higher administrative costs and costs related to fast growth. Particularly the administrative costs is higher due such factors: necessity to have more administrative personal to manage business, highly skilled TOP-managers requires corresponding salaries. Moreover, accumulation of land resources is based on rather high acquisitions and adjustment costs. For instance, agroholding farms pay substantially higher land rental prices (cf. Figure 3). These higher land costs resulted particularly from the fast growth in the land bank, either through additional land rentals or through the acquisition of farming enterprises. Producing with higher intensities than previous land users causes moreover adjustment costs and investments in soil improvement – particularly if the previous farmers were not able to invest in basal dressing. While labor costs differ much less between the two farm types (cf. Figure 4), growth in the land bank is often related to changes in the production systems. This requires on the one hand substantial investments in

¹ By “independent” we mean enterprises that have no affiliation with agroholdings.

human capital and on the other hand, it often means that others lose their jobs. Last but not least, fast growth is connected to substantial learning costs.

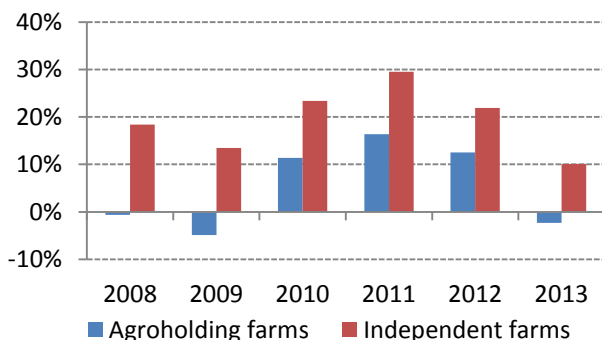


Figure 1. Profit rate, %.

Source: Own compilation and calculations.

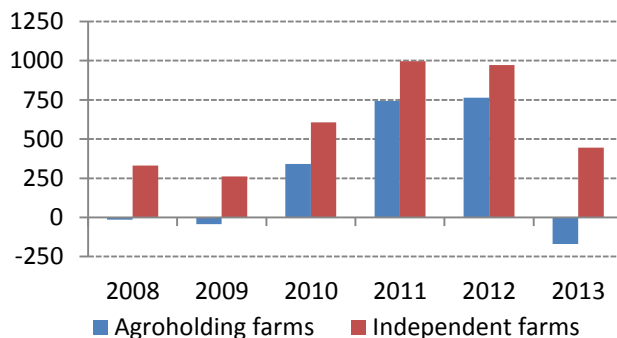


Figure 2. Profit per ha, UAH.

Source: Own compilation and calculations.

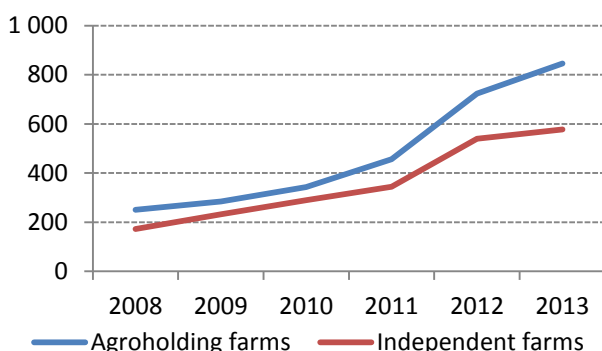


Figure 3. Land rental costs, UAH/ha.

Source: Own compilation and calculations.

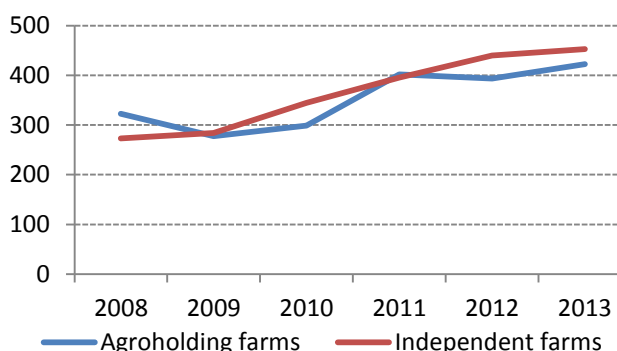


Figure 4. Labor costs per ha, UAH/ha.

Source: Own compilation and calculations.

The applied Data Envelopment Analysis shows that the average technical efficiency of agroholding farms was in most years lower than that of individual enterprises. While technical efficiency increased substantially between 2008 and 2010/11 for both types of enterprises, technical efficiency declined in the following years. Partly, this may have been caused by increasing intensities which led not immediately to proportionally higher yields. The agroholdings increased their land bank particularly in the years 2010, 2011 and 2012. Thus the decline in technical efficiency may be partly driven by adjustment costs.

As it can be seen from figure 5, average total factor productivity (TFP) has weak upward trend and in 2013 it increased due to simultaneous increase of technical efficiency and technological change. After a drop in 2012 both agroholding and independent farms had almost renewed their TFP to the level of 2011. In total, Figure 5 does not exhibit a superior development of either type of enterprise. This dynamics represents mainly crop production, because 90 % of the total production value in the sample is generated by crop production, thus whole sample and crop production curves are pretty similar. Partly, this is driven by impacts of annual weather conditions and sales prices. Weather conditions were particularly favorable in 2011 and 2013, while prices were high in 2008 and 2012/2013.

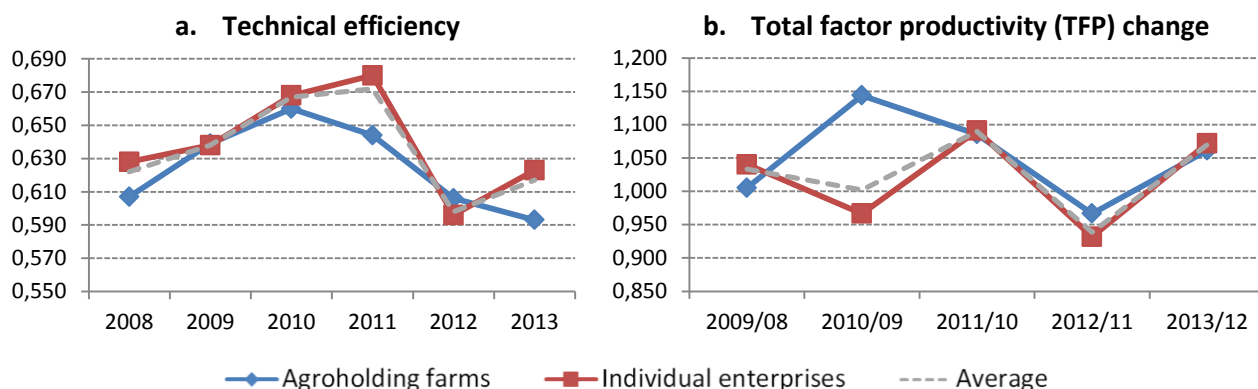


Figure 5. Technical efficiency and total factor productivity (TFP) change by type of enterprises, 2008-2013.

Source: Own compilation and calculations.

4. Conclusions

Ukrainian enterprises are strongly depended on prices on commodities, macroeconomic and political conditions. Nevertheless, they have a huge potential to improve the efficiency. Particularly in years with low prices like 2013, at least on average agroholding enterprises suffered from losses while independent enterprises were still profitable. Accordingly, agroholdings need to focus much more on cost efficiency and their solvency. A further key challenge for agroholdings is to successfully cope with adjustment costs caused by fast growth. As these adjustment costs seem to be substantial while at the same time financial basis of agroholdings is often rather weak compared to their size, agroholdings may rather focus on their internal consolidation and optimization than on additional fast growth.

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