

EFFECTIVENESS OF FIXED ASSETS IN AGRICULTURE OF SELECTED NEW MEMBER STATES IN EUROPEAN UNION

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Abstract. The paper presents the asset turnover ratio of farms in Estonia, Lithuania, Latvia and Poland. The time frame of analysis covers the years 2008 and 2013. The efficiency of fixed and current assets was evaluated on the basis of their productivity and profitability. Evaluations of fixed asset reproduction were conducted based on the rate of fixed asset reproduction. Favorable changes were also observed in the fixed assets to total asset ratios of farms; however, they still did not have the capability of expanded reproduction. Farms in all countries enriched themselves with modern machinery and equipment and modernized farm buildings. Growth of the capital saturation of land and labor is the effect of an increase of production potential. The productivity of fixed assets was variable in the studied period, and the profitability of assets was lower in 2013 than in 2008 in all countries despite much support of income with subsidies from the EU budget. Farms in all studied countries were not capable of expanded reproduction.

Keywords: agriculture, effectiveness, fixed assets, family farm.

Introduction

In agriculture, fixed assets are a basic component of agricultural holdings' technical equipment. The pool of these resources at the disposal of individual holdings, conditions, the method by which production is organized as well as achieved production and economic results. The fixed assets to total assets ratio is the primary factor differentiating agricultural holdings, besides human labour resources. Fixed assets constitute the material and technical foundation of production capacity. The volume of production and economic results largely depend on utilization of this capacity [1; 2].

The fixed assets to total assets ratio is directly proportional to the land productivity index and inversely proportional to the land technical development. The pursuit of better technical equipment for holdings is a natural tendency. Over time, an increase of technical equipment reduces the efficiency of production assets, because the rate of growth of production assets is greater than the rate of growth of the land productivity index [3]. This is unfavorable phenomenon, because growing outlays result in increasingly lesser effects.

Stimulation of modernization of agricultural holdings is one of the directions of support for Polish agriculture intended to improve its competitiveness. Investment activity serves, above all, to substitute human labour with capital. Labour-saving, but also capital-consuming, techniques and technologies are a consequence of this process. Implementation of technical progress is linked to investment in modern equipment that also enables the fulfilment of sustainable development requirements [4]. Progressing specialization, which is linked to a greater scale of uniform production, creates favorable conditions for modernization of holdings. The potential of fixed assets is also an element of the competitiveness of agricultural holdings. In recent years, significant improvement of the equipment of agricultural holdings with fixed assets has taken place in agriculture. The Common Agricultural Policy creates favorable conditions for this by directing funds to develop investment. Thanks to investments supported by subsidies in all new EU member states, the modernization of holdings improved and agricultural income grew [5].

The problem of modernization of agricultural holdings is undertaken in scientific literature. Most analyses are focused on changes in the level of fixed assets, which is the result of investments supported by EU funds, and these changes are the most noticeable. Fixed assets are mainly considered in the context of rational farm management [6]. Fixed assets are also accounted for in the context of farms' debt and are treated as collateral against long-term liabilities [7]. However, much less attention is paid to the efficiency of utilization of this capital and capabilities of its reproduction. In the authors' opinion, such analysis is indispensable because supporting holdings with public funds is only intended to contribute to permanent improvement of the economic condition and reproduction of production assets, not to cover immediate needs. Moreover, studies indicate that growth effects did not occur in all holdings, despite support with public funds [1; 8]. The question thus arises: in which holdings are assets effectively utilized and whether there are any effects of growth? In this context assessment of

the efficiency of utilization of fixed assets in agricultural holdings in selected new member states of the European Union in the years 2008-2013 was accepted as the research objective. The Baltic States: Estonia, Lithuania, Latvia and Poland were chosen for studies. These are neighboring countries that joined the EU in 2004 and utilize the same instruments to support modernization of agriculture in order to adapt it to the requirements of the common market.

Materials and methods

The research problem was addressed on the basis of the data found in the FADN system. Data from farms are publicly available [9]. The scope of analysis covers two time periods: the years 2008 and 2013. Changes in the value of assets and their turnover ratio take place over a long period of time, which is why the adoption of two time periods seems justified and allows for achievement of the accepted objective of the study. Analysis accounted for the value and structure of assets as well as changes over time. The efficiency (turnover ratio) of fixed and current assets was evaluated based on the productivity and profitability of individual groups of assets. Selected methods of financial analysis were also applied [10]. One method of evaluating fixed asset reproduction and development of farms is the fixed asset reproduction rate. This index indicates the type of reproduction occurring on the farm (simple, expanded, narrowed). It was calculated according to the formula: $(\text{net investments}/\text{fixed assets}) \times 100 \%$, which, according to FADN, takes on the form: $(\text{SE521}/\text{SE441}) \times 100 \%$. The value of land was omitted from the value of fixed assets for the purposes of calculating this index. This approach is the result of the fact that land is not subject to depreciation according to the principles applicable to other fixed assets.

The dependence between the net value of investment and family farm income were investigated using a coefficient of determination. The level of foreign capital was characterized by the debt ratio ($DR = \text{SE485} \times 100 \% / \text{SE436}$).

Results and discussion

In 2008-2013, the degree to which farms were equipped with factors of production changed (Table 1). Land concentration processes that improve the agrarian structure are observed.

Table 1

**Production potential of agricultural holdings in
Estonia, Lithuania, Latvia and Poland**

Specification	Estonia	Lithuania	Latvia	Poland
2008				
Utilised agricultural area (ha)	112.88	43.51	67.73	19.62
Total labour input (AWU ¹)	2.25	1.85	2.34	1.79
Unpaid labour input (FWU ²)	1.15	1.48	1.42	1.53
Fixed assets (EUR·ha ⁻¹)	1382	1465	1089	4378
Current assets (EUR·ha ⁻¹)	344	755	82	919
Equity (EUR·ha ⁻¹)	1198	1886	1083	4708
2013				
Utilised agricultural area (ha)	128.27	50.31	69.16	19.11
Total labour input (AWU)	1.99	1.83	2.05	1.72
Unpaid labour input (FWU)	0.87	1.46	1.35	1.50
Fixed assets (EUR·ha ⁻¹)	1507	1567	1422	7622
Current assets (EUR·ha ⁻¹)	273	848	709	1057
Equity (EUR·ha ⁻¹)	1401	2064	1489	8178

1 – Annual Work Unit, 2 – Family Work Unit

Source: own calculations

Growth of average farmland area occurred for farms in Estonia (by 15.39 ha), Lithuania (by 6.8 ha) and Latvia (by 1.43 ha). Only in Poland the average farmland area was reduced by 0.52 ha over the course of several years. This is probably more the result of the methods used to select farms for studies rather than actual changes in this scope. Growth of capital saturation of land can also be observed, as shown by the **increase** of the value of fixed assets per 1 ha of farmland. Growth in

Estonian and Lithuanian farms did not exceed 9 %, while Latvian farms reached up to 30 % growth. Particularly high growth of the value of fixed assets occurred for Polish farms, by as much as 74 %. Polish farms stand out in terms of the level of fixed assets. As early as in 2008, the level of fixed assets was significantly higher than in other countries. One may presume that this is a result of lower average farmland areas of farms. An increasing value of fixed assets indicates improvement of the degree to which farms are equipped with technical factors of production. Saturation of land with own equity, which occurred in all countries, is a consequence of this.

The value of current assets varied. Growth of the current asset values occurred in Lithuanian, Latvian and Polish farms, while these values were reduced in Estonian farms. The variability of these inputs is the result of production activity, which is why there may be significant differences in the level of their consumption.

Agriculture in the studied countries is characterized by decreasing employment, which applies to the majority of new EU member states [11]. Own work is predominant, and hired work is only a supplement to it. This situation is typical for family-owned farms.

There are differences between both the fixed assets to total assets ratio of farms and the structure of fixed assets. Technical fixed assets, which include buildings, machinery and equipment (Table 2), are dominant in the fixed assets structure in all countries. In 2008, they made up from 62.5 % (Latvia) to 72.3 % (Poland) of the value of fixed assets. In 2013, in Estonia, the value of technical fixed assets increased, and their share increased to 70.4 %, while the value of all components of assets increased. In the case of Poland, Lithuania, and Latvia changes went in the opposite direction. The value of all types of assets increased, but the value of land increased the most. In this situation, the share of technical fixed assets in 2013 was slightly lower than in 2008 despite the increase in their value. The largest changes took place in farms in Poland. The increase of the value of total fixed assets was nearly 70 %, and the increase in the value of land was four-fold (from 1035 EUR·ha⁻¹ in 2008 to 4272 EUR·ha⁻¹ in 2013), and the share of land in the structure of fixed assets changed from 23.7 % to 55.7 %. The phenomenon of growth of land prices has been observed since Poland's entry into the EU. Demand for agricultural land grew rapidly while supply was much less, and now some are talking about "land hunger" in Poland.

Growth of land productivity, understood as the value of production per 1 ha of farmland, occurred in all of the studied countries. The productivity of fixed assets also grew in Estonia and Lithuania. However, in Poland and Latvia, in 2013, productivity was lower than in 2008. In the case of these two countries, growth of the value of fixed assets was greater than growth of the value of production, thus the productivity of assets was lower.

The pursuit of better technical machinery and equipment for farms is a natural tendency. An increase of technical equipment reduces the efficiency of production assets, because the rate of growth of production assets is greater than the rate of growth of the land productivity index. The productivity of current assets decreased in all farms.

It is difficult to unambiguously evaluate this phenomenon in the studied farms, because there was high variability of the asset turnover ratio over time and between individual countries.

The profitability of fixed assets and land was also variable (Table 3). Only in Poland the profitability of land was higher in 2013 than in 2008. In other countries, the efficiency of land, measured as the income per unit of area, decreased. The profitability of fixed assets decreased in all countries. It is probable that the growth rate of the value of income from a family-owned farm was less than the growth rate of the value of fixed assets.

In 2013, there was an increase in the profitability of own labor in Estonian and Polish farms, while this index dropped in the case of Lithuanian and Latvian farms. In all countries, the level of income from a family-owned farm was under the strong influence of budget transfers. In the case of Estonia and Latvia, the value of subsidies was significantly higher than the income achieved. If not for subsidies, farms would operate at a loss. In Poland, the share of subsidies in income from a family-owned farm amounted to 58 % on average, in Lithuania, from 48 % in 2008 to 68 % in 2013. This shows that profitability of labor is not always the result of rational use of factors of production but often the result of effective absorption of budgetary subsidies. This situation is typical for many EU member states and has persisted for years [11; 12].

Table 2

Value of assets of agricultural holdings

Specification	Estonia	Lithuania	Latvia	Poland
2008				
Total fixed assets, EUR	156 012	63 742	74 417	85 890
including, %				
-land	25.5	28.5	31.4	23.7
-farm buildings	32.8	18.7	24.2	44.7
-machinery	36.0	48.4	38.3	27.6
-breeding livestock	5.7	4.4	6.1	4.0
Value of technical equipment, EUR·ha ⁻¹	952	983	686	3 167
Total current assets, EUR·ha ⁻¹	344	755	82	919
Total assets, EUR·ha ⁻¹	1 382	2 220	1 707	5 296
Total assets, EUR·AWU ⁻¹	86 628	52 217	49 399	59 057
2013				
Total fixed assets, EUR	193 372	78 835	98 350	145 669
including, %				
-land	25.0	31.7	35.7	55.7
-farm buildings	32.4	16.3	26.4	24.1
-machinery	38.0	46.4	32.7	17.4
-breeding livestock	4.6	5.6	5.2	2.8
Value of technical equipment, EUR·ha ⁻¹	1 016	959	818	13 165
Total current assets, EUR·ha ⁻¹	273	848	709	1 057
Total assets, EUR·ha ⁻¹	1 127	2 415	2 131	8 679
Total assets, EUR·AWU ⁻¹	69 465	139 304	71 897	96 431

Source: own calculations

Property status and capabilities of its reproduction are very varied. The net value of investment (corrected by depreciation) provides information on fixed asset reproduction processes. Farms in all studied countries were not capable of expanded reproduction. Although the fixed asset reproduction rate in Estonian, Lithuanian and Latvian farms was positive in both studied periods, it was less than 1 and exhibited a decreasing tendency. Polish farms were in the most difficult situation. The net value of investment and asset reproduction rate were negative in both periods, which indicates systematic decapitalization of fixed assets. Such phenomena are indicative of a relatively poor level of technical equipment of farms in previous years. Moreover, this was equipment that was already exploited but is still used in production processes [13]. Despite the significant improvement of the degree to which farms are equipped with machinery and equipment in recent years, fixed asset reproduction processes did not yet occur.

The statistical dependence between the value of income from a family farm and the net value of investment was also relatively high: $R^2 = 0.609$ (Fig. 1). However, this dependence is not always obvious. It is difficult to interpret this phenomenon unambiguously, because investment activity is the resultant of many factors. Investments serve, above all, to substitute labor inputs with capital, thus the demand for capital-consuming technologies increases. However, in the case where the workforce does not leave agriculture, the inclination to make investments and apply capital-consuming technologies is weak. Finally, the decision to conduct investment activity belongs solely to the farmer and their family, according to their situation.

Own equity and debt are the sources for financing investments. In general, farms that undertake investments are more eager to take advantage of foreign capital and have a greater debt ratio. Estonian and Latvian farms were the most in debt. In 2008 and 2013, the total debt ratio amounted to from 0.30 to 0.36. Polish farms were more circumspect in taking investment risk and their level of indebtedness was much lower (0.11 and 0.06). Certain sources state that this ratio should oscillate within the range of 0.57-0.67 [10].

Table 3

Productivity and profitability of assets and value of investment

Specification	Estonia	Lithuania	Latvia	Poland
2008				
Productivity of land, EUR ¹	655	763	745	1501
Productivity of fixed assets, EUR ²	0.47	0.52	0.68	0.34
Productivity of current assets, EUR ³	1.90	1.01	2.10	1.63
Profitability of land, EUR ⁴	151	355	179	418
Profitability of fixed assets, EUR ⁵	0.11	0.24	0.16	0.09
Profitability of work, EUR·AWU ^{-1 6}	7 599	8 356	5 187	4 579
Gross investment, EUR	30 530	11 691	18 405	4 171
Net investment, EUR	19 872	7 453	11 014	-472
Total debt ratio	0.31	0.15	0.36	0.11
Rate of fixed assets reinvestment	0.13	0.12	0.15	-0.05
2013				
Productivity of land, EUR	868	846	820	1643
Productivity of fixed assets, EUR	0.57	0.54	0.58	0.21
Productivity of current assets, EUR	1.53	0.99	1.16	1.55
Profitability of land, EUR	130	280	143	515
Profitability of fixed assets, EUR	0.09	0.18	0.10	0.07
Profitability of work, EUR·AWU ⁻¹	8 400	7 694	4 810	5 718
Gross investment, EUR	37 300	12 015	18 182	4 073
Net investment, EUR	21 145	4 188	9 277	-653
Total debt ratio	0.32	0.15	0.30	0.06
Rate of fixed assets reinvestment	0.15	0.08	0.15	-0.01

1 – production value per 1 ha UAA, 2 – production value per 1 EUR of fixed assets, 3 – production value per 1 EUR of current assets, 4 – family farm income per 1 ha UAA, 5 – family farm income per 1 EUR of fixed assets, 6 – family farm income per 1 AWU

Source: own calculations

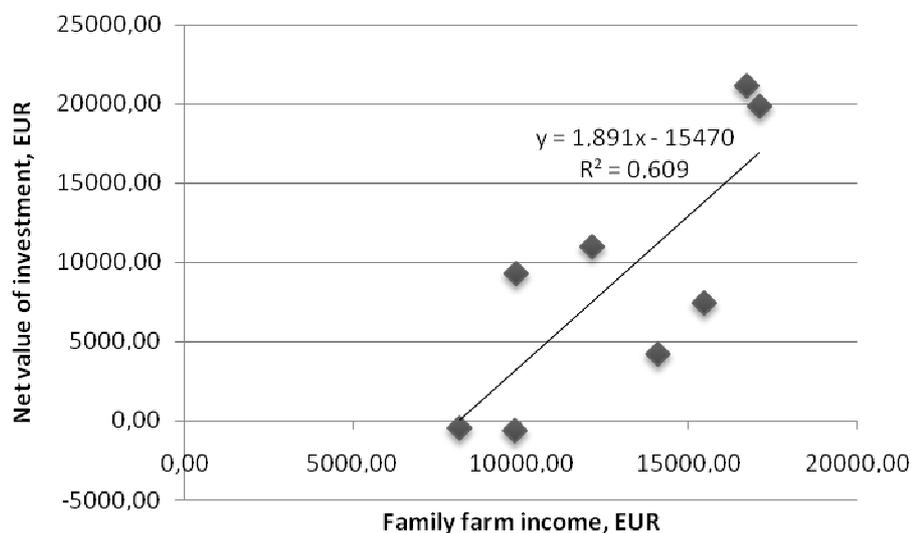


Fig. 1. Dependence between family farm income and value of investment

Conclusions

Fixed assets are an important component of farms' production potential and condition of the use of other factors of production. In consequence, this leads to improvement of production and economic results. Changes of the conditions under which farms function after integration with the EU had an impact on improving their financial situation on the one hand and modernizing them on the other. Favorable changes were observed in the fixed assets to total assets ratio of farms. Farms in all

countries enriched themselves with modern machinery and equipment and modernized farm buildings. Growth of the capital saturation of land and labor is the effect of an increase of production potential. This indicates adaptive processes in farms of new member states.

The productivity of fixed assets was variable in the studied period, and the profitability of assets was lower in 2013 than in 2008 in all countries despite much support of income with subsidies from the EU budget. Farms' fixed assets to total assets ratios have not, as of now, translated to improvement of the efficiency of utilization of fixed assets. There is also a low dependence between the income of a farm and labor efficiency. The economic crisis and general situation on global markets after 2008 probably had an impact on farms' results.

Farms in all studied countries were not capable of expanded reproduction. Undertaken investment processes were insufficient to compensate for the loss of the value of assets resulting from their exploitation. However, it should be noted that certain symptoms of improvement in fixed asset reproduction have manifested in Estonia, Lithuania and Latvia, because the asset reproduction rate was positive. In the case of Poland, this index was negative in both studied periods, which indicates decapitalization of assets.

The level of dependence of farms in all studied countries on foreign capital is low. On the one hand, this is evidence that risks related to debt payment have been reduced, but on the other, it limits possibilities of growth.

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