

Economic Results of Legal Entity Agricultural Enterprises in the Decade 2009-2019

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Introduction

After the systemic transformations initiated in 1989, one of the significant challenges in Poland's economic policy pertained to the restructuring of state-owned agricultural farms. On one hand, these farms held substantial production potential, yet on the other hand, they were largely lacking microeconomic efficiency at that time.

Throughout the restructuring of state-owned agricultural farms, a plethora of asset management and agricultural production methods were introduced. Based on the resources of these farms, agricultural enterprises emerged, encompassing a variety of legal and organisational forms. These encompassed entities operating as sole proprietorships, commercial law partnerships, and single-person State Treasury-owned companies. The land retained under the purview of such enterprises could be leased or acquired by users. As a result of the diverse approaches taken towards asset utilisation and land management previously under the jurisdiction of state-owned agricultural farms, a considerable diversity in the forms of managing large-scale agricultural enterprises is observed today. Many agricultural enterprises take the legal form of commercial law partnerships, predominantly limited liability companies,

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which possess extensive tracts of arable land and significant assets. A common characteristic among them is their reliance on hired labour.

11.1. Large-Scale Agricultural Enterprises in Poland Following the Period of Systemic Transformation – Fundamental Issues

The assessment of the level of productivity of large-scale agricultural enterprises in Poland after the political transformation was conducted by numerous scholars. In the initial period of operation within farms based on the resources of former state farms (known as PGR), adaptive changes occurred, involving the modernization of equipment, rationalisation of land and labour utilisation. The majority of the utilised land was under lease agreements (Kraciński 2013). By 1996, the majority of lands within the Agricultural State Property owned by the State Treasury were already leased out (Kraciński 2011).

Lessees and owners initially had to make decisions regarding the ultimate direction of production, the level of intensity, and investments in a highly unstable economic and agricultural policy environment. Production intensification aligned with a specific production direction enabled higher productivity and income to be achieved at that time. Additionally, it served as a basis for further developmental decisions (Kasztelan 2008), including decisions concerning land acquisition.

It is worth noting that prior to the year 2000, large agricultural farms, those exceeding 1000 hectares, especially those operated as corporations, were considered persistently inefficient. Many of these farms exhibited negative equity and reported losses (Guzewicz 2000). The only solution appeared to be an influx of external investor capital. Only over the years, with decreasing inflation and increased trading stability, were these difficulties overcome (Świtlyk and Gołębiowski 1998). The enhancement of capital-labour relations constituted and continues to constitute one of the factors leading to higher labour productivity, as well as improved efficiency of other production factors (Filipiak and Wicki 2021). This correlation is distinctly evident in large-scale farms as well (Kasztelan 2009).

After 2010, changes in productivity occurred at a slower pace, yet growth was still observable. This was largely attributed to the enhancement of

technical efficiency rather than technological advancement (Adamski 2017; Helta 2017). It must be emphasised that without the utilisation of lands previously held by state farms, the doubling of the commodity value of agricultural production in Poland, observed between 1995 and 2015, would not have been feasible (Wicki 2016), and it would not be possible in the last three decades to achieve twice the high milk yield in per cow and an increase in crop yields by 50% (Wicki et al. 2023).

11.2. Efficiency of Farms of different size

One of the more significant aspects of evaluating large-scale agricultural enterprises, or rather, those of considerable size, pertains to their proficiency in the realms of production and economics. Considering production efficiency, numerous studies have revealed that larger farms typically yield significantly higher crop outputs and superior animal performance. In Polish conditions, these disparities can even be several-fold (Wicki 2019, Dymnicki and Gajos 2012). A markedly higher resource productivity, including labour, is also noteworthy within large farms (Grontkowska 2008).

A pivotal concern is the economic autonomy of agricultural farms and their capacity for survival. It is observed that farms with larger land areas can sustain operations even without subsidies received through mechanisms of the Common Agricultural Policy (CAP). In smaller farms, investments without subsidies are often unfeasible, and in the smallest ones, subsidies primarily serve to maintain ongoing consumption (Kusz and Misiak 2017; Hornowski et al. 2020; Bereznicka and Wicki 2021). This phenomenon is also observed beyond Europe and generally among developed countries, where supporting the scaling of production, for instance through subsidies, is deemed necessary for farm survival in agricultural policy (Obi and Ayodeji 2020). Strictly family farms encounter limits to their size-based development due to their operational philosophy (Swinnen 2009). Unfortunately, the consolidation within Polish agriculture is progressing slowly, as evidenced by the results of successive agricultural censuses (Filipiak and Wicki 2022).

Hence, a clear trend emerges that future primary agricultural production is poised to rely on large and extensive farms. Small farms fail to meet the demands of a concentrated economic environment (Nurmet and Omel 2020).

although there are voices highlighting the important non-production roles of such farms (Rasva and Jürgenson 2022).

From the perspective of environmental initiatives such as energy production in biogas plants, only large-scale agricultural farms can effectively implement such solutions by establishing their own biogas facilities, given their sufficient substrate quantities (Bencheva and Tepavicharova 2017; Wicki et al. 2022). Conversely, the increasing mechanisation of production leads to escalated energy consumption and augmented emissions in agricultural production (Wicki and Wicka 2022). However, potential threats stemming from excessive production concentration can also arise (Dell'Angelo et al. 2017).

A research gap is evident concerning the assessment of how the efficiency of management in large-scale farms in Poland has evolved over an extended period. An invaluable research sample is represented by agricultural enterprises operated as commercial companies, for which data are compiled in the FADN-PL database. These are classified among the economically largest farm groups.

This study aims to assess the economic-financial situation, taking into account productivity and factors of production efficiency, as well as investment possibilities. Additionally, it seeks to determine the directions and pace of changes within agricultural companies operating as companies. The analysis encompasses the years 2009-2019.

11.3. Source of Data and Research Methodology

The data utilised in the study were collected within the framework of the Farm Accountancy Data Network (FADN) and pertained to entities engaged in agriculture as legal entities over an eleven-year period spanning from 2009 to 2019. The sample comprised 2124 entities, with an average of 193 entities per year. However, the examined population did not constitute a balanced panel, as not all entities were present in successive years. Economic conditions were assessed through the utilisation of productivity indicators for production factors, represented by the ratios of total production (SE131) and, correspondingly, labour measured in Annual Work Units (AWU, SE010), land (SE025), and capital (SE436-SE446). Additionally, other indicators gauging firms' efficiency were employed, measured by the Gross Value Added (GVA,

SE410) concerning production factors. Gross Value Added was chosen over the profit category since there was no attempt to evaluate financial efficiency, yet it remains an objective measure of effectiveness (Góral, Rembisz, 2017). A stance also supported by Brčák (2008) and Bervidová (2002). An essential aspect of agricultural management evaluation involves costs. As such, an assessment of changes in the value of distinct cost groups, accounting for their composition, was conducted. To achieve this goal, the following variables were utilised: total costs (SE270), direct costs (SE281), general operational costs (SE336), depreciation costs, external factor costs (SE365), and wage costs (SE370). In terms of financial situation evaluation, the extent of external capital financing for enterprises was appraised using the general debt ratio, as well as the value of long-term debt (SE490) and equity value. Information concerning long-term sources of funding is crucial for assessing the growth potential of the examined entities.

The primarily employed method was descriptive and comparative analysis. To assess the average annual rate of changes over the examined period, an exponential trend function was utilised.

11.4. Characteristics of the Sample under Study

Numerical data depicting the resource endowment of the examined enterprises with essential agricultural production factors are presented in Table 11.1. The table provides an overview of the average levels of endowment with fundamental production factors for the surveyed firms over the period 2009-2019.

From the data presented in Table 11.1, it is evident that over the examined 11-year period, there was a reduction of 9 full-time equivalent AWU units per enterprise. This outcome likely resulted from the decrease in the average arable land (UR) area by approximately 300 ha during the study period. However, when considering employment per 100 ha of arable land, the number of employees remained around 2 AWU (2.4 in 2009 and 2.1 in 2019). This finding suggests that employment within the enterprises remained stable and at a low level, which should yield favourable economic outcomes, particularly in terms of labour productivity.

Table 11.1. Average Endowment with Fundamental Production Factors of the Surveyed Companies during the Period 2009-2019

Years	Labour [AWU]	Land [ha LSU]	Total assets [thousand PLN]	Capital excluding land* [thousand PLN]
2009	23.02	955.68	10 366.18	7 305.57
2010	23.24	774.01	8 620.94	6 602.40
2011	20.40	740.06	8 761.80	6 221.84
2012	18.56	703.87	9 874.45	6 792.84
2013	17.66	694.55	10 062.90	7 344.43
2014	16.74	663.97	10 016.47	6 928.85
2015	16.68	669.24	10 337.67	7 238.52
2016	15.49	654.93	10 195.95	7 103.93
2017	15.18	663.27	10 626.65	7 156.10
2018	14.04	654.95	10 777.00	7 135.83
2019	14.07	668.30	11 193.11	7 178.66
Annual rate of change [%]	-5.26	-2.70	1.77	0.65

* Value of total assets without the value of land.

Source: own calculation based on FADN.

Regarding land resources, the average land area decreased in successive years. Interestingly, in the initial analysed period, enterprises possessed the largest land area despite having the smallest numerical count. Subsequently, the land area stabilised at around 700 ha. Presumably, after the first year of analysis, smaller-sized companies might have joined the study, or land lease agreements for some entities might have expired. The average annual rate of land area change over the entire study period was just under 3%. It can be concluded that the changes in this area were not significant.

Conversely, concerning the value of assets, fluctuations occurred until 2013, after which the situation stabilised, and the asset value revolved around 10 million PLN. A minor increase in value was observed only in the final year under analysis. This change indicates a rise in land prices in 2019. The average asset value increased by 1.77% in 2019, despite a decreasing average area. The values of production, investments, and generated gross value added are presented in Table 11.2.

The average value of production fluctuated around 4 million PLN, with its highest value occurring in 2012. The value of plant production was twice that of animal production. Throughout the analysed period, there was a slight decline in the value of agricultural production in the surveyed enterprises, as indicated by the average annual rate of change at 0.28%.

Table 11.2. The value of production and costs, as well as gross value added in thousands of PLN during the period 2009-2019

Years	Total Production	Direct costs	General operational costs	Net investments	Gross Value Added
2009	4 265.50	2 093.18	1 219.36	341.0	1 793.14
2010	4 103.64	1 840.44	1 083.41	283.0	1 917.58
2011	4 221.96	2 003.25	1 109.10	214.0	1 898.66
2012	4 877.26	2 151.94	1 205.80	249.7	2 237.49
2013	4 524.35	2 191.58	1 179.30	65.4	1 885.50
2014	4 390.52	2 148.93	1 174.86	245.6	1 738.45
2015	4 209.26	2 094.83	1 084.41	178.5	1 472.15
2016	4 074.94	2 037.81	1 060.29	-43.3	1 523.75
2017	4 259.65	2 077.70	1 110.33	-59.4	1 653.23
2018	4 151.40	2 009.36	1 123.29	-149.9	1 621.48
2019	4 313.35	2 145.11	1 128.56	-5.4	1 636.45
Annual rate of change [%]	-0.28	0.39	-0.53	-12.20*	-2.33

* Due to the calculation method, the rate of change covered the period until 2015, as net investments turned negative from 2016 onwards.

Source: own calculations based on FADN.

The value of production results from incurred costs; as anticipated, direct costs held the highest value, constituting approximately half of the generated production value and amounting to around 2 million PLN. The year 2013 is noteworthy, as despite a drop in production value, the cost of production increased (the increase was marginal compared to the preceding year, but the production decline amounted to several hundred thousand PLN). The average annual rate of change in direct costs was positive at about 0.40%, which could be indicative of growing inflation. General operational costs exhibited significantly lower values. They represented around 25% of the production value and demonstrated a negative rate of change during the examined period.

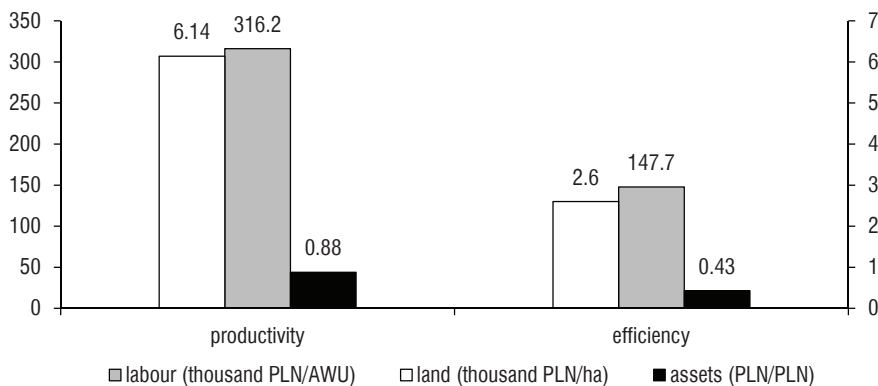
The issue of net investments was particularly intriguing. These figures incorporate the value of depreciation. From the data in Table 11.2, it can be deduced that positive capital reproduction occurred until 2015 (net investments greater than 0). However, from 2016 onwards, a phenomenon of capital divestment emerged. This described situation is concerning, especially as the value added of agricultural production also exhibited a negative rate of change (average annually -2.33%).

11.5. Economic and financial situation – assessment of changes and development possibilities

Nominal figures do not fully capture the achieved effects. Figure 11.1 presents information on the productivity and efficiency of engaged production factors.

The value of produced output per employee amounted to several hundred thousand PLN, with its nominal value increasing from 206 thousand PLN in 2009 to 370 thousand PLN in 2019. The nominal growth occurred at an average annual rate of about 4% (roughly in line with inflation). Conversely, when calculated per hectare of arable land, enterprises obtained around 6 thousand PLN starting from 2012. Here as well, the average annual rate of change approached 4%. Approximately 0.9 PLN of production was generated for every unit of capital, usually between 0.8-0.9 PLN. The growth rate was a mere 0.09% annually.

Figure 11.1. Productivity and Efficiency of Production Factors on Average in the Years 2009-2019



Source: own calculations based on FADN-PL data.

Efficiency of production factors, considering gross value added (excluding depreciation), was also analysed. Per unit of the labour force, over 100 000 PLN of gross value added production was generated. The obtained values ranged from over 123 000 PLN (weakest result in 2011) to 182 000 PLN (2012). In 2019, a value above 160 000 PLN was achieved, suggesting an improvement

in the situation. The situation within the companies remained relatively stable, and the attained positive growth rate of 1.71% annually is low, as it pertains to nominal values.

Assessing land efficiency leads to similar conclusions. About 2-3 thousand PLN of gross value added was obtained from each hectare of land. This was approximately 2.5 times less than the productivity of this factor. A negligible rate of change occurred during the examined period, only 1.33%. This is a result inferior to the changes in labour efficiency.

Even more concerning results pertain to capital efficiency, whose value hovered around 0.40 PLN of assets. As determined by Filipiak and Wicki (2021), while technical labour enhancement leads to labour productivity growth, there is almost always a decline in capital utilisation efficiency. The average annual rate of change was negative, indicating a weak utilisation of assets for generating value added. Deteriorating economic results could also stem from unfavourable cost changes (cf. Table 11.2).

Direct costs constituted the largest share of expenses. This ranged from 41-43% of total costs, depending on the year; the contribution of general operational costs and external factor costs remained consistent throughout the period, at approximately 25%. Notably, a significant part of the latter group is comprised of salaries, accounting for around 80% of the value of external factor costs. Assessment of the rate of change indicates a slight (0.13%) reduction in the share of direct costs in total costs. The observed changes are surprising, as the nominal value of these costs increased (cf. Table 11.2), albeit due to an overall increase in costs arising from the growth of external factor costs, partly due to an increase in the minimum wage. The share of general operational costs also experienced reduction during the examined period, though it was even smaller than the decrease in direct costs. It is worth adding that the sum of the values of these cost groups decreased by 0.12%. Hence, entrepreneurs sought solutions to enhance their economic results and curtail costs associated with agricultural activities. The most pronounced limitations in cost structure were related to depreciation (-0.73%), resulting from decreased investments. Only the share of external factor costs displayed an ascending trend, primarily due to the increase in the proportion of salaries (annual increase of 0.59 p.p.) and interest and rent costs. The latter are not insignificant for companies frequently managing leased land. Debt, including long-term debt, was also analysed. Table 11.3 presents data concerning financing sources in the surveyed enterprises.

Table 11.3. Selected Data Regarding Funding Sources in the Investigated Enterprises

Years	Capital equity [thousand PLN]	Total debt ratio[%]	Long-term debt[thousand PLN]
2009	7 221.33	52.6	2 317.14
2010	6 412.19	29.3	1 589.74
2011	6 120.82	32.2	1 652.05
2012	7 320.26	27.7	1 843.05
2013	7 676.30	25.5	1 725.80
2014	7 660.12	25.1	1 833.20
2015	8 032.50	25.4	1 798.60
2016	8 104.90	23.0	1 640.43
2017	8 538.67	21.4	1 510.73
2018	8 569.51	20.3	1 477.82
2019	8 933.33	19.0	1 603.53
Annual rate of change [%]	3.16	-7.42	-2.36

Source: own calculation based on FADN.

The predominant source of financing in the examined enterprises was equity capital, the value of which ranged from over 6 million PLN to nearly 9 million. In the first analysed year, this constituted approximately 48% of liabilities, while in the final year, it exceeded 80%. The nominal value of equity capital increased at a rate of 3.16%, indicating that companies generated profits and retained them within the corporations. External financing decreased on average per company from 2.3 million PLN to 1.6 million. A negative annual rate of change of -2.36% was observed in relation to the alteration of long-term indebtedness value.

Summary

Large-scale agricultural holdings are a pivotal component of agriculture. Over time, their significance has grown, both due to their contribution to the production of food raw materials and the implementation of high-yield and contemporary production techniques, including precision agriculture methods. They are also to a lesser extent reliant on subsidies for production and developmental funding. Besides their productive and income-generating function, these holdings also assume the role of pioneers in the adoption of advanced techniques and manufacturing technologies. They become exemplars to emulate for others, while also serving as experimental platforms.

Consequently, strong production and economic outcomes would attest, among other factors, to the efficacy of the employed methodologies.

Based on the conducted assessment of the economic and financial status of agricultural enterprises for the years 2009-2019, the following conclusions can be drawn:

1. The resources of the enterprises did not undergo significant changes. However, a distinct trend towards reducing employment size was evident, with a yearly decrease of 5.3%, while maintaining a relatively constant asset value and a reduction in land resources at a rate of 2.7% annually. The level of employment decreased from 2.4 to 2.1 AWU per 100 ha of UAA in the examined period.
2. In the structure of funding sources, the share of equity capital increased. Total indebtedness decreased at an annual rate of 7.42 percentage points, with long-term indebtedness decreasing at a rate of 2.36% per year. The indebtedness ratio was 52.6% in 2009, but decreased to only 19% in 2019. Considering the level of indebtedness, the situation of the examined enterprises can be evaluated as favourable.
3. The value of production and costs per enterprise did not significantly change during the examined period. Nevertheless, on average, a decrease of 0.28% in production value and an increase of 0.06% in costs were observed annually. As a result, gross value added decreased at a rate of 2.33% per year.
4. In the cost structure of the examined enterprises, a reduction in the share of direct costs, general economic costs, and depreciation was observed. The share of external factor costs and remunerations increased rapidly, at a rate of 0.5-0.6 percentage points annually. This situation serves as one of the premises for labour-capital substitution.
5. Regarding the productivity of engaged production factors, a positive upward trend was observed. Labour and land productivity increased at annual rates of 3.9% and 3.4%, respectively. The production value per employee increased by 100 000 PLN to 368 000 PLN in 2019. Land productivity in 2019 reached 6 700 PLN per hectare. Asset productivity did not significantly change.
6. A notable increase in labour and land efficiency measured by gross value added (GVA) was recorded. GVA per employee grew at a rate of 1.7% annually and reached a value of 161 000 PLN in 2019.

Similarly, GVA per hectare increased at a rate of 1.33% annually, reaching 2 700 PLN per hectare in 2019. Asset efficiency, however, decreased.

In summary of the assessment results of the examined enterprises, it can be concluded that their economic and financial situation improved during the examined period. Higher operational efficiency was achieved, measured both by resource productivity and gross value added. A trend of labour-capital substitution is observed, resulting in the lowest growth in productivity concerning assets, and their efficiency measured by gross value added decreased.

Considering both the level of achieved results and the observed trends, it can be affirmed that corporate agricultural enterprises exhibited a relatively sound economic and financial condition. It is of concern, however, that the growth dynamics were not exceedingly high and often did not surpass the level of general price inflation in the economy.

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