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AREA OR ECONOMIC SIZE? THE ROLE OF SPECIALIZATION IN PRODUCTIVITY CONVERGENCE OF SUBSISTENCE FARMS IN CENTRAL AND EASTERN EUROPE FROM 2005 TO 2016

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ABSTRACT

Aim: The aim is to provide an economic analysis of the extent to which the area size and economic size of small farms below 5 ha helped productivity development for survival in the EU-10 after joining the EU (period 2005–2016). **Methods:** Based on Eurostat data, a special database was established. The indices approach was used to analyze productivity development. Dynamics of capacity variables (number, utilized agricultural area, and standard output) and productivity indicators (average farm size, area productivity, and total productivity) were calculated. The distance of the EU-10 averages from the EU-15 was measured. Ten specialist farm types were observed in the following categories: below 2 ha, 2.0–4.9 ha, below 5 ha, below 2,000 EUR, below 2 ha and 2,000 EUR, and below 5 ha and below 2,000 EUR. **Results:** EU-10: a) The decline in the number of very small specialist farms was below the average; b) The dynamics of both area and total productivity of specialist farms exceeded EU-15 averages; c) In subsistence farms, the economic size was more supportive of increasing productivity, while in semi-subsistence farms, the area size was more supportive of increasing productivity; d) Small specialist semi-subsistence farms with an output below 2,000 EUR contributed more to convergence; e) The gap of specialist subsistence farms below 2,000 EUR between the EU-10 and EU-15, both in total and area productivity, increased. **Conclusions:** Farms below 5 ha in the EU-10 increased productivity, more so in specialist semi-subsistence farms, supporting convergence. Poland has achieved outstanding growth in convergence related to small specialist farms, both in terms of area and economic size. The dynamics of indicators for specialist semi-subsistence farms contributed to convergence in Poland, Hungary, and Romania.

Key words: agriculture, productivity, specialization, subsistence farm, semi-subsistence farm, SFs, SSFs, convergence

JEL codes: Q1

INTRODUCTION

Radical political changes that occurred in Central and Eastern European countries (CEECs/EU-10) during the last decade of the 20th century significantly transformed the farm structure in these countries. Based on the Soviet-type farm structure, with the exceptions of Poland and Slovenia, state farms and agricultural cooperatives accounted for the majority of production. Besides Poland and Slovenia, which have traditionally had small household farms integrated by cooperatives, these also played a significant role in providing one-third of Hungary's agricultural production.

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As a result of reprivatization, restitution, and land distribution, the number of very small farms under 5 ha (UAA) in CEECs increased dramatically. In 2005, out of 14.5 million registered agricultural holdings in the EU-27 (prior to Brexit, excluding Croatia), more than two-thirds had an area below 5 ha, and nearly 70% of them were in CEECs.

Although the number of subsistence farms (below 2 ha) and semi-subsistence farms (2.0–4.9 ha) further declined until 2016 in the EU-27 overall, it is worth providing insight into how these small farms in the EU-10 have been struggling to survive during the decade after EU eastward enlargement by using the advantages of specialization, economic scale, and territorial scale in order to increase productivity.

LITERATURE REVIEW

Radical changes in farm structure after 1989 strongly affected the agricultural output of these countries. Forgács [2004] pointed out that one decade was not enough for most of the EU-10 member states to reach the gross agricultural output (GAO) of the last year of the pre-reform period. An asymmetric farm structure emerged in the EU-10 between 1990 and 2005. In 2005, 80% of very small farms (below 5 ha) farmed 19.5% of the land area (UAA), while the other end of the spectrum saw only 2.8% of farms (20 ha and above) farming 56.6% of the UAA. The proportion of medium-sized farms (5.0–19.9 ha) in farmland in the CEECs was relatively low (14.4%), compared to the EU-15 average of 23.6%. The issue of the dual face of farm structure in the CEECs was discussed by Csáki and Forgács [2008]. However, subsistence farms (SFs) and semi-subsistence farms (SSFs) play a significant role in the food supply of the population, partly in farm households and partly on the market (SSFs), generating additional income for the family.

Regarding small farms, there is no universally accepted definition. Three main indicators define small farms: area, economic size, and labor used. Hubbard [2009] discussed the size issue of small farms. The link between semi-subsistence farming, farm income, and social capital was analyzed in Bulgaria by Wolz et al. [2010]. The distinction between small and family farms was clarified by Matthew [2000]. The issue of supporting small farms has been a constant focus on the EU agenda. Taking into account the importance of the topic, Gordon et al. [2014] released a special issue on SSFs in Europe. The volume included several studies discussing various aspects, such as the role, importance, development paths, strategies, and agricultural policies of semi-subsistence farms. Davidova [2014] analyzed the significance and development paths of small and semi-subsistence farms in the EU. The roles of small and semi-subsistence farms in the EU were explored by Davidova and Bailey [2014]. It also addressed how semi-subsistence farms can be integrated into supply chains [Gorton et al. 2014]. Future possibilities of small farms were analyzed by Forgács [2006]. Thomson [2014] provided an overview of the EU policy treatment of small and semi-subsistence farms. The viewpoint of new member states was explored by Erjavec et al. [2014], focusing on the structural changes of SSFs and related agricultural policy. Hubbard et al. [2014] discussed the aspects of the survival strategy of semi-subsistence farms in Romania and Bulgaria. The productivity of small and large farms was also a focus for researchers. Aragón et al. [2021] noted that the positive relationship between farm productivity and land size may become negative when yields are considered. Rabinowicz [2014] draws attention to the economic, social, and environmental advantages of small farms, explaining their importance and underlining that they are often owned by the poor and provide benefits in public goods. Concerning environmental issues, Stępień et al. [2021] emphasized that while contractual integration enhances the eco-efficiency of small-scale farms in Poland, dependence on state support has the opposite effect. Dwyer [2014] summarizes the CAP reform proposals that support small and semi-subsistence farms, highlighting how the Small Farms Scheme provides assistance to small farms in the EU. Forgács [2016] concludes that the analysis provides grounds to support the contention that small farms have found further specialization as a path of development, helping them to survive; however, the speed at which specialization has been

achieved varies according to country and farm type. On the policy side, the EU Committee on Agriculture and Rural Development discussed the future of small agricultural holdings in the 2013/2096(INI) EU report [Popescu 2014].

MATERIAL AND METHODS

Based on Eurostat data, a special database was created in an Excel file, comprising approximately 40,000 rows and 1,600 columns. The analysis focuses on the dynamics of capacity variables (number of farms, utilized agricultural area, and standard output) and productivity indicators (average farm size, area productivity, and total productivity). The average distances from the EU-10 to EU-15 were measured. Ten specialist farm types were observed in the following categories: below 2 ha, 2.0–4.9 ha, below 5 ha, below 2,000 EUR, below 2 ha and 2,000 EUR, and below 5 ha and below 2,000 EUR.

Aim

The aim is to provide an economic analysis of the extent to which the area size and economic size of small farms (below 5 ha, below 2,000 EUR) contributed to the productivity development of SFs and SSFs for survival in the EU-10 during the challenging transition period (2004–2016) after joining the EU. This analysis will examine how the farm structure's legacy from the communist regime differentiated the dynamics of convergence of very small farms in selected CEECs.

Research hypotheses

Subsistence farms use the entire volume of production to provide the family with food, and nothing is left for market sale. Higher productivity enables an increase in self-sufficiency. The primary economic goal of SFs is to reduce expenditure on food purchases in the markets.

Hypothesis 1: *The productivity growth of subsistence farms is primarily determined by the economic size of the farm.*

Semi-subsistence farms pursue two goals. The primary goal is to ensure the family's food supply. Second, due to their larger territorial size, they produce a surplus that enables them to obtain additional income from the market and improve their family's financial situation. The effectiveness of market sales depends on the level of farm productivity. SSFs are interested in further increasing productivity, and the territorial size of the farm is the determining factor in this.

Hypothesis 2: *The increase in productivity of semi-subsistence farms is primarily determined by the territorial size of the farm.*

The cases of SFs and SSFs have always been on the agenda of all EU member state governments, as well as in EU agricultural policy. Different aspects of SFs/SSFs are of great importance. Furthermore, the size of farms (in terms of area and economy), age, gender, educational background, role in rural development, and opportunities for off-farm jobs in the region are the most important factors. This paper examines the economic aspects of farm performance, focusing on productivity development and specialization. Other aspects require further research.

A detailed clarification of the abbreviations used, the indicators applied, as well as the classification of specialist farm types is presented in Table 1. This table provides a concise reference framework that supports the interpretation of the analysis results discussed in subsequent sections.

RESULTS

Radical political changes that occurred in Central and Eastern European member states (CEECs/EU-10) during the last decade of the 20th century significantly transformed the farm structure in these countries. The agricultural crisis reached its lowest point in 1992–1993. Slovenia needed five years to recover, while Poland was close to reaching the basic level after one decade. For other EU-10 member states, one decade was not even enough to close the basic gap, and even Romania experienced a downward trend just after 2000.

Table 1. Explanation of abbreviations, indicators, and specialist farm types

	Abbreviations
1	EU-27: Prior to Brexit, excluding Croatia.
2	EU-15: Old member states (excluding Cyprus and Malta).
3	EU-10: Central and Eastern European Countries (former socialist countries, new member states).
4	CEE: Central and Eastern Europe (Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, Slovakia).
5	CEECs: Central and Eastern European Countries.
6	SFs: Subsistence farms: those farms producing food to meet the needs of a farmer's family or a small group, with little or no surplus for sale.
7	SSFs: Semi-subsistence farms are those agricultural holdings that primarily produce food for the farmer's own household consumption but also sell a portion of their output on the market.
8	GAO: Gross agricultural output: It is the total value of all crops, livestock, and other products produced by the agricultural sector in a given period.
9	UAA: Utilized agricultural area.
10	SO: Standard output: It is the average monetary value of the agricultural output at farm-gate price, in EUR per hectare or per head of livestock. There is a regional SO coefficient for each product, representing the average value over a 5-year reference period.
	Indicators
1	UAA/farm: Average farm area/territorial size: per farm below 2 ha, 2–4–9 ha, below 5 ha/EU-10 countries/10 farm types/ /EU-27/EU-10/EU-15.
2	SO/farm: Total farm productivity, average farm economic size: per farm below 2 ha, 2–4–9 ha, below 5 ha/EU-10 countries/farm type/EU-27/EU-10/EU-15.
3	SO/UAA: Farms' area productivity: per farm below 2 ha, 2–4–9 ha, below 5 ha/EU-10 countries/farm type/EU-27/EU-10/EU-15.
	Specialist farm types observed
1	Specialist cereals, oilseed, and protein crops (calculated with SO)
2	Specialist horticulture indoor (calculated with SO)
3	Specialist horticulture outdoor (calculated with SO)
4	Specialist vineyards (calculated with SO)
5	Specialist fruit and citrus fruit (calculated with SO)
6	Specialist olives (calculated with SO)
7	Specialist dairying (calculated with SO)
8	Specialist cattle-rearing and fattening (calculated with SO)
9	Specialist pigs (calculated with SO)
10	Specialist poultry (calculated with SO)

Source: own work.

Specialization as the main driver of convergence of SFs/SSFs in EU-10 agriculture – An area size approach

In addition to the values of the indicators, relative changes and dynamics are considered, highlighting which indicators contributed most to the convergence of the EU-10. The study focuses on small farms with less than 5 ha and SO of less than 2,000 EUR. In 2005, approximately 60% of the 14.5 million agricultural holdings in the EU-27 were located in the EU-10, decreasing to 56.4% by 2016; meanwhile, the share in land area (UAA) accounted for around 27%, essentially unchanged. Regarding the share of SO in the EU-10, it increased slightly from 14.7% to 16.5%, reaching one-fifth of the EU-15 average.

The number of farms below 5 ha (UAA) declined drastically in the EU in general. In the case of SO of these very small farms, the decline was only 16.4%, while its value per farm even increased by 30%. The average territorial size of small farms in the EU-10 (1.4 ha) was only 71.5% of the EU-15 average in 2016. From a convergence point of view, the difference in size indicates a very significant lag of EU-10 agriculture, where the productivity ratio of small farms compared to the EU-15 average increased from 22% in 2005 to only 23.3% in 2016.

In the case of specialist farms under 5 ha, the situation is similar to the mainstream of convergence, with the difference that the degree of productivity lagging behind the EU-15 has been narrowed. In 2016, the largest distance in the EU-10 compared to the EU-15 average can be observed in total and area productivity (convergence values of 15.1% and 21.7%, respectively). The lag is partly explained by the lower territorial size; the other part can be attributed to the low level of capitalization of farms, the use of outdated technology, and poor operational management (Tables 2 and 3).

Convergence of SFs and SSFs of EU-10 – An economic size approach

Out of the EU-27 (14.5 million farms), 6.4 million (44%) had the SO below 2,000 EUR in 2005. 80% of them came from the EU-10, both in 2005 and 2016. This farm category lost the most farms (39.1%) during the transition between 2005 and 2016, with no significant difference between the EU-10 and EU-15. The share of total land use (UAA) in the EU-27 decreased from 4.8% in 2005 to 2.9% in 2016. The average farm size amounts to 1.3 ha (approximately 1.1 ha in the EU-10 and 2.3 ha

Table 2. Dynamics of capacity variables by farm area/economic size, below 2,000 EUR, in the EU-27, EU-10, and EU-15, and selected EU-10 countries (for the period 2016/2005)

Variable	EU-27	EU-10	EU-15	Poland	Hungary	Romania
	Number of farms [%]					
Farms total	71.4	67.9	76.4	57.0	60.2	80.4
Spec farms total	82.7	83.4	82.1	83.5	67.8	89.0
Farms below 5 ha total	65.2	64.2	67.3	43.7	0.0	81.9
Spec farms below 5 ha total	88.4	75.8	74.3	103.6	52.9	74.3
Spec farms below 2,000 EUR, below 2 ha	67.8	69.6	62.8	26.5	60.8	90.9
	UAA of farms [%]					
Farms total	99.8	101.8	99.1	97.6	109.5	89.9
Spec farms total	114.8	140.7	107.5	136.2	135.0	128.4
Farms below 5 ha total	70.3	68.5	73.1	73.6	62.7	70.3
Spec farms below 5 ha total	88.4	97.5	75.3	114.4	83.6	75.3
Spec farms below 2,000 EUR, below 2 ha	73.4	72.9	74.2	55.6	57.5	85.3
	SO of farms [%]					
Farms total	126.2	141.8	123.6	155.5	132.7	115.4
Spec farms total	136.5	184.3	131.3	205.0	163.3	183.6
Farms below 5 ha total	84.1	83.6	84.3	98.0	64.7	88.0
Spec farms below 5 ha total	88.8	113.6	76.3	127.8	75.0	76.3
Spec farms below 2,000 EUR, below 2 ha	64.7	61.3	68.8	58.4	35.4	75.6

Source: own work based on Eurostat data.

Table 3. Dynamics of indicators by area size, below 2,000 EUR, in the EU-27, EU-10, and EU-15, and selected EU-10 countries (for the period 2016/2005)

Indicator	EU-27	EU-10	EU-15	Poland	Hungary	Romania
			UAA/farms [%]			
Farms, total	139.8	149.9	129.7	171.4	182.0	111.8
Spec farms, total	138.9	168.8	130.9	124.5	199.0	121.0
Farms below 5 ha, total	107.8	106.8	108.6	168.4	129.5	85.8
Spec farms below 5 ha, total	117.7	128.7	110.9	187.2	158.0	78.3
			SO/farms [%]			
Farms, total	176.8	208.8	161.8	272.9	220.6	143.5
Spec farms, total	165.1	221.0	159.9	163.0	240.7	144.2
Farms below 5 ha, total	129.0	130.3	125.2	224.0	133.6	85.8
Spec farms below 5 ha, total	118.2	149.9	115.1	209.2	141.6	78.3
			SO/UAA [%]			
Farms, total	126.4	139.3	124.7	159.2	121.2	128.4
Spec farms, total	118.9	131.0	122.2	150.5	121.0	143.0
Farms below 5 ha, total	119.7	122.0	115.3	133.0	103.2	125.2
Spec farms below 5 ha, total	100.4	116.5	103.8	111.7	89.7	81.3

Source: own work based on Eurostat data.

in the EU-15), representing a relatively small change between 2005 and 2016. The decline of capacity factors (number of farms, UAA) affects small specialist farms less in the EU-27. It is the same for both the EU-10 and EU-15, with one exception: total production (SO) in the EU-10.

The average farm size of specialist SSFs declined by 9.5% in the EU-10 but increased by 4.6% in specialist SFs. Small farms in the EU-15 followed a different development path, where the average farm size also increased in SFs more than in the EU-10; however, total productivity did not decline but rather increased by 9.5%. In the case of SSFs, the average farm size and total productivity (SO/farms) practically remained unchanged in the EU-15. In the EU-10, farm size decreased by 10%, but total productivity increased by 21% at the same time (Tables 4 and 5).

Selected cases of the EU-10 – Poland, Hungary, and Romania

Besides the EU-27, EU-10, and EU-15 average figures for the number of farms, UAA, and SO were also calculated for Poland, Hungary, and Romania, which have different backgrounds concerning their heritage from the socialist farm structure system. In each of the three cases, dynamic figures for: a) farm total; b) spec farms total; c) farms below 5 ha total; d) spec farms below 5 ha total; e) farms below 2,000 EUR total; f) spec farms below 2,000 EUR; g) small spec farms below 2,000 EUR and below 2 ha; h) small spec farms below 2,000 EUR and 2.0–4.9 ha; and i) small spec farms below 2,000 EUR and below 5 ha were calculated. It can be concluded that, in the convergence of EU-10 agriculture to EU-15, specialization was the driving force for all three CEE countries, particularly in terms of g rowth speed, although it was less pronounced in SFs and more pronounced in SSFs.

A higher share of specialist farms could survive in each country; their total UAA increased by 28.4–36.2%, and the growth of SO was outstanding, at 63.3–105%. However, small farms with an area of less than 2 ha and an annual revenue of less than 2,000 EUR lost the most in these countries, except in Poland. The dynamics of farm size (apart from SSFs), total productivity, and area productivity of very small specialist farms (below 5 ha, and within that below 2,000 EUR) were

Table 4. Dynamics of variables by farm economic size, below 2,000 EUR, in the EU-27, EU-10, and EU-15, and selected EU-10 countries (for the period 2016/2005)

Variable	EU-27	EU-10	EU-15	Poland	Hungary	Romania
			Number of farms [%]			
Farms below 2,000 EUR, total	60.7	60.9	59.2	29.3	52.1	82.5
Spec farms below 2,000 EUR, total	66.5	67.7	63.5	36.0	60.3	83.8
Small spec farms below 2,000 EUR, below 5 ha	67.2	68.4	63.8	37.2	60.3	84.5
			UAA of farms [%]			
Farms below 2,000 EUR, total	58.9	58.1	60.6	43.9	59.6	67.5
Spec farms below 2,000 EUR, total	63.3	59.8	69.2	54.6	53.9	59.2
Small spec farms below 2,000 EUR, below 5 ha	67.0	64.3	72.2	67.0	54.3	63.3
			SO of farms [%]			
Farms below 2,000 EUR, total	66.0	67.4	61.8	52.1	57.2	84.4
Spec farms below 2,000 EUR, total	65.0	62.8	67.8	73.5	37.4	67.9
Small spec farms below 2,000 EUR, below 5 ha	66.5	64.7	68.8	81.0	37.3	69.2

Source: own work based on Eurostat data.

Table 5. Dynamics of indicators by farm economic size below 2,000 EUR, in the EU-27, EU-10, and EU-15, and selected EU-10 countries (for the period 2016/2005)

Variable	EU-27	EU-10	EU-15	Poland	Hungary	Romania
			UAA/farms [%]			
Farms below 2,000 EUR, total	97.1	95.3	102.5	149.6	114.3	81.8
Spec farms below 2,000 EUR, total	95.1	88.4	108.9	151.5	89.4	70.6
Small spec farms below 2,000 EUR, below 5 ha	99.7	93.9	113.0	179.9	90.0	74.9
			SO/farms [%]			
Farms below 2,000 EUR, total	108.8	110.6	104.5	177.7	109.7	102.3
Spec farms below 2,000 EUR, total	97.6	92.9	106.7	204.1	62.0	81.1
Small spec farms below 2,000 EUR, below 5 ha	99.0	94.6	107.8	217.5	61.8	81.9
			SO/UAA [%]			
Farms below 2,000 EUR, total	112.0	116.0	102.0	118.8	96.0	125.0
Spec farms below 2,000 EUR, total	102.7	105.0	98.0	134.7	115.7	114.8
Small spec farms below 2,000 EUR, below 5 ha	99.3	100.7	95.4	120.9	121.4	109.3

Source: own work based on Eurostat data.

convincingly high in Poland. In Hungary and Romania, the advantage of specialization contributed to increased growth in area productivity in general but resulted in a decrease in farm size (UAA/farm) and total productivity (SO/farm) in SFs (Table 6).

Similar to the main trend, in the three countries, a higher proportion of specialized farms were able to survive the 2004–2016 period. In Poland, specialized small farms with an average UAA of less than 2 ha and a total area value of less than 2,000 EUR more

Table 6. Selected EU-10/EU-15 countries average ratio of indicators in 2005 and 2016

Indicator	Poland		Hungary		Romania	
	Share in EU-15 average [%]					
	2005	2016	2005	2016	2005	2016
	Farms, total					
UAA/farm	27.8	36.8	27.9	39.1	15.3	13.2
SO/farm	15.6	26.3	16.5	22.5	5.9	5.2
SO/UAA	55.9	71.4	59.2	57.5	38.7	39.8
	Specialist farms, total					
UAA/farm	38.3	47.7	33.7	51.2	17.4	19.2
SO/farm	20.9	32.0	15.8	23.8	4.7	6.1
SO/UAA	54.5	67.2	46.8	46.4	27.0	31.6
	Small farms below 5 ha, total					
UAA/farm	81.7	126.7	33.4	39.9	74.9	59.2
SO/farm	16.8	30.0	15.2	16.2	14.9	12.8
SO/UAA	20.5	23.7	45.4	40.7	19.9	21.7
	Small spec farms below 5 ha, total					
UAA/farm	81.8	138.2	28.6	40.7	56.5	51.3
SO/farm	19.2	35.0	11.4	14.0	6.6	8.5
SO/UAA	23.5	25.3	39.9	34.5	11.6	16.5
	Small spec farms below 2,000 EUR, total					
UAA/farm	98.2	136.7	17.2	54.7	68.7	44.6
SO/farm	56.2	107.5	68.2	104.2	55.6	42.3
SO/UAA	57.2	78.7	397.1	190.4	81.0	94.9
	Small spec farms below 2 ha, below 2,000 EUR, total					
UAA/farm	95.5	169.3	46.0	36.8	70.3	55.8
SO/farm	47.1	94.8	69.8	37.1	45.9	34.9
SO/UAA	49.4	56.0	151.9	100.8	65.3	62.5
	Small spec farms 2.0–4.9 ha and below 2,000 EUR, total					
UAA/farms	102.6	90.9	93.6	85.5	98.8	87.1
SO/farm	78.5	119.1	102.3	120.3	104.0	122.7
SO/UAA	76.5	131.1	109.3	140.6	105.3	141.0
	Small spec farms below 5 ha and below 2,000 EUR, total					
UAA/farms	101.4	161.4	40.9	32.6	79.9	53.0
SO/farm	53.6	108.1	69.9	40.1	55.8	42.4
SO/UAA	52.8	67.0	170.8	122.9	69.8	79.9

Source: own work based on Eurostat data.

than doubled their average area size, achieving a 120% increase in total productivity.

In the case of Hungary, these figures indicate a decrease in the average size of the holdings by almost 5%, and in terms of total productivity, the decline exceeded 40%.

Within the farms with a value below 2,000 EUR, the figures for specialized farms with an area of 2.0–4.9 ha are as follows: In Hungary, the average area size shows a decrease of 8.4%, while the total productivity indicator increased by 17%. In Poland, there was a 12% decrease in the average area size, accompanied by an outstanding improvement in total productivity, which reached 51%. In Romania, the average area size, similar to Poland, decreased by 12%, but the total productivity indicator increased by 17%.

The average farm size below 5 ha in the EU-15 member states in 2005 was almost four times bigger than that of the EU-10; the distance gap (relative share) from the EU-15 average narrowed from 74.4% in 2005 to 70.5% in 2016. In terms of area productivity, the EU-10 is significantly behind the EU-15 average; in 2016, it accounted for only slightly more than half (51.6%) of it. The growth indices of the EU-10 indicators, with the exception of area productivity (SO/UAA), are all more favorable in specialized farms, indicating that specialization plays a decisive role in convergence. In the EU-10, the average farm size of specialist farms (below 5 ha) grew faster, but even in 2016, it did not reach half of the EU-15 average (45.7%).

Examining the number of capacity variables by specialist SFs and SSFs separately, the figures reveal significant differences. The decline in both the number of farms and UAA in SFs was lower in specialist farms below 2,000 EUR compared to specialist farms below 2 ha (UAA), but it was the opposite in SSFs. Standard output dropped more in specialist SSFs compared to the average of total specialist farms, and to a lesser extent in the case of SFs.

Despite the fact that the average farm size in the EU-10 is lower compared to the EU-15 average, the area productivity (SO/UAA) of these farms exceeds the EU-15 average both in 2005 and 2016 (by 47.3% and 67.5% respectively), indicating that farms below 2,000 EUR run more intensive land use in the EU-10 than in the EU-15. The advantage of specialization

in the EU-10 can also be observed in the case of small farms with an area below 2,000 EUR.

The total area of UAA of specialized farms under 5 ha increased by almost 15% in Poland, and the advantage of specialized farms in terms of total output was 27.8%. The increase in average farm area in Hungary and Poland was significantly higher (58% and 87%) than the average growth in the EU-15 (28.7%). Their total productivity index, compared to the increase of almost 50% in the EU-15, was almost 110% in Poland and 33.3% in Hungary.

Poland achieved outstanding growth in convergence related to small farms, both in terms of area and economic size. Concerning the dynamics of specialist SFs/SSFs, both area and economic size approaches are showing evidence of convergence in all three CEE countries, more so in semi-subsistence farms and less so in subsistence farms.

DISCUSSION

Between 2005 and 2016, approximately 3.5 million small farms with a UAA of less than 5 ha disappeared in the EU-27; however, 6.6 million farms are still operational, with more than two-thirds located in the EU-10 countries. The survival rate of subsistence and semi-subsistence farms in these countries, as well as in the EU-15, was higher in specialized farms. The latter, by increasing labor use, increased total productivity compared to non-specialized small farms. In 2016, 6.3 million ha (13%) of land were still cultivated by very small farms in CEECs (3.3% in the EU-15), playing an important role in food supply, protecting the environment, producing public goods, contributing to sustainable agricultural production, and providing jobs for millions of people living mostly in rural areas, most of whom are very poor.

Between 2005 and 2016, concerning convergence in productivity among the EU-10, specialization was the driving force behind narrowing the gap between the EU-10 and EU-15 averages, as well as in subsistence and semi-subsistence farms. In the EU-10 area size was more supportive of convergence than economic size. However, in the case of small farms with a value below 2,000 EUR, specialist SSFs in the EU-10 made a greater step forward in convergence to the EU-15 average compared to that of SFs. Regarding the growth of area productivity, the very small farms, by economic size, are lagging behind in total productivity growth. It can be expected that in the future, specialization will play a significant role in the convergence of the EU-10 to the EU-15 in general, and in the case of SSF farms as well.

EU agricultural policy needs to focus on providing more support to small farms, slowing the rate of their decline in the years ahead. Research results indicate that in the case of subsistence farms, subsidies should focus more on income support, while for semi-subsistence farms, tools to increase farm area size appear to be a helpful aid.

CONCLUSIONS

In the EU-10, the territorial size of farms below 5 ha, especially in SSFs, helped increase productivity more than the economic size below 2,000 EUR did. The area and total productivity of SSFs declined slightly in the EU-15 but increased in the EU-10. However, a significant improvement in the convergence of productivity growth of SFs/SSFs categories in the EU-10 requires a longer period. Poland, traditionally characterized by a stronger small farm structure, has achieved outstanding growth in productivity convergence related to small farms, both in terms of area and economic size. Concerning the total and area productivity development of farms with a total value below 2,000 EUR, the dynamics of productivity in SSFs were significantly high (21% in total and 33% in area productivity), while a decline (12% and 16%, respectively) was observed in SFs in the EU-10.

ORIGINALITY AND FUTURE RESEARCH DIRECTION

This study provides the first comprehensive assessment of the production and productivity trajectories of subsistence and semi-subsistence farms in the EU-10 (Central and Eastern European) countries, conducted through both area-based and economic-size approaches, and benchmarked against the averages observed in the EU-15. The results indicate that the growth of productivity in subsistence farms is predominantly

shaped by their economic size (Hypothesis 1: justified), whereas the improvement in semi-subsistence farm productivity is largely associated with their territorial scale (Hypothesis 2: justified). Further investigation should therefore focus on the performance and productivity dynamics of farms belonging to higher area and economic size categories, to obtain a more comprehensive and nuanced understanding of the mechanisms underpinning productivity convergence within European agriculture.

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POWIERZCHNIA CZY WIELKOŚĆ EKONOMICZNA? ROLA SPECJALIZACJI W KONWERGENCJI PRODUKTYWNOŚCI GOSPODARSTW SAMOWYSTARCZALNYCH W EUROPIE ŚRODKOWO-WSCHODNIEJ W LATACH 2005–2016

STRESZCZENIE

Cel: Celem artykułu jest analiza ekonomiczna zakresu, w jakim wielkość obszarowa oraz wielkość ekonomiczna małych gospodarstw o powierzchni poniżej 5 ha przyczyniły się do rozwoju produktywności umożliwiającej przetrwanie w państwach UE-10 po akcesji do Unii Europejskiej (w latach 2005–2016). **Metody:** Na podstawie danych Eurostatu utworzono specjalną bazę danych. Do analizy rozwoju produktywności zastosowano podejście wskaźnikowe. Obliczono dynamikę zmiennych dotyczących potencjału (liczba gospodarstw, użytkowana powierzchnia użytków rolnych oraz standardowa produkcja) oraz wskaźników produktywności (przeciętna wielkość gospodarstwa, produktywność ziemi oraz produktywność ogółem). Zmierzono również dystans średnich wartości dla UE-10 względem UE-15. Obserwacji poddano 10 typów gospodarstw wyspecjalizowanych w następujących kategoriach: poniżej 2 ha, 2,0–4,9 ha, poniżej 5 ha, poniżej 2000 EUR, poniżej 2 ha i 2000 EUR, poniżej 5 ha i poniżej 2000 EUR. **Wyniki:** W krajach UE-10: a) Spadek liczby bardzo małych gospodarstw wyspecjalizowanych był mniejszy od średniej. b) Dynamika produktywności ziemi i produktywności ogółem w gospodarstwach wyspecjalizowanych przekroczyła średnie wartości dla UE-15. c) W gospodarstwach samowystarczalnych większe znaczenie dla wzrostu produktywności miała wielkość ekonomiczna, natomiast w gospodarstwach częściowo samowystarczalnych większą rolę odgrywała wielkość obszarowa. d) Małe gospodarstwa częściowo samowystarczalne o produkcji poniżej 2000 EUR silniej wspierały proces konwergencji. e) Luka między UE-10 a UE-15 w zakresie produktywności ogółem i produktywności ziemi wśród gospodarstw wyspecjalizowanych poniżej 2000 EUR się powiększyła. **Wnioski:** Gospodarstwa poniżej 5 ha w UE-10 zwiększyły swoją produktywność, przy czym efekt ten był silniejszy wśród wyspecjalizowanych gospodarstw częściowo samowystarczalnych, co sprzyjało konwergencji. Polska odnotowała szczególnie duży wzrost konwergencji w odniesieniu do małych gospodarstw wyspecjalizowanych, pod względem wielkości obszarowej i ekonomicznej. Dynamika wskaźników dla wyspecjalizowanych gospodarstw częściowo samowystarczalnych przyczyniła się do konwergencji zwłaszcza w Polsce, na Węgrzech i w Rumunii.

Słowa kluczowe: rolnictwo, produktywność, specjalizacja, gospodarstwa samowystarczalne, gospodarstwa częściowo samowystarczalne, konwergencja