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JAROSŁAW MIKOŁAJCZYK[*], TOMASZ WOJEWODZIC[**], WOJCIECH SROKA[**]

[*]State Higher Vocational School in Tarnow, [**]University of Agriculture in Krakow, Poland

THE SCALE OF INVESTMENT ACTIVITY OF COMMERCIAL FARMS IN METROPOLITAN AREAS[1]

Key words: investments, metropolitan areas, commercial farms

ABSTRACT. The aim of the research was to identify the scale of investment activity in commercial farms located within different distances of large urban centres. The research covered six voivodships: Lower Silesia, the Lubelskie Voivodship, Lesser Poland, Masovia, Pomerania and Greater Poland. The source of data used in the analyses was the database of the Polish FADN system. Out of the 3,508 farms participating in the system, over an uninterrupted period between 2004 and 2016, entities operating within the study area were selected and classified into three groups: the inner zone of the metropolitan area, the outer zone of the metropolitan area and others (outside metropolitan areas). Out of the population of 1,668 commercial farms that were selected, 46 operated in the inner zone of metropolitan areas, while 143 – in the outer zone. The averaged values for the distinguished groups were subjected to a comparative analysis. The research showed that farms in metropolitan areas have more factors of production (especially land) and demonstrate faster growth compared to farms located outside the zones of a city's economic impact. They also spend higher amounts on investment and show a higher investment rate. The scale of investment activity of farms located in metropolitan zones gives such entities a real chance of gaining a competitive advantage (both in resources and production) over farms located outside metropolitan areas.

INTRODUCTION

Investments are a factor determining the competitiveness and development potential of economic entities and the economy as a whole. They involve resigning from some benefits in the present in order to obtain uncertain benefits in the future [Flak 2000]. Thus, they require a good income, access to development measures and an optimistic view of changes occurring in the environment.

The social and economic changes that took place in Poland at the turn of the 21st century, in particular the return of a market economy and integration with EU structures, had a significant impact on the situation of agriculture. The deregulation of prices of agricultural products and the means of production forced farmers to continue their activity under totally new economic conditions or abandon production completely. At the same time, one of the goals of agricultural policy, both at a country and EU institutional level,

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was to improve agricultural structures. Changes observed in the whole economy, and especially those taking place in agriculture, can be, to a large extent, attributed to access to investment funds [Poczta et al. 2009]. Economic growth leads to social transformations and increased prosperity, which, in turn, contributes to the expansion of residential zones. In the last decades of the 20th century, agricultural land, which is the basic component of the rural landscape, increasingly started to change its uses, especially in peri-urban zones, from production and agricultural ones to residential, commercial, production and investment as well as communication uses. This led to a build-up of agricultural land between urbanisation belts, causing food supplying zones to move away from the city centre [Majewska 2011, Musiał-Malago 2016].

Areas of socio-economic influence of cities (especially large ones) are now referred to as metropolitan zones (metropolitan area – MA). There are no clear definitions of metropolitan zones. For the purpose of this paper, the definition presented in the National Spatial Management Concept 2030 [MRD 2011] was adopted, according to which a metropolitan area is an area of a large city (over 300 thousand residents) and its immediate environment that has functional links with it as established in the national spatial management concept.

The aim of the research was to identify the scale of investment activity in commercial farms located within different distances of large urban centres. For the purpose of the analyses, three groups were distinguished: the inner zone of metropolitan areas (counties in immediate proximity of voivodship capitals), the outer zone (other counties with at least part of their areas located in a metropolitan area) and counties entirely located outside metropolitan areas.

Given the decline in the agricultural character of metropolitan zones and the threats to their future development, as perceived by farm owners, the following hypothesis was formulated: farms in metropolitan areas show less willingness to invest compared to farms located outside zones of a large city's influence.

MATERIAL AND METHODS

The research concerns investments in commercial farms located in the metropolitan areas (MA) of Warsaw, Cracow, Wrocław, Poznań, the Tricity and Lublin. Investment processes in farms based in the voivodeships where the analysed metropolitan areas are located constituted background and comparative material.

The selection of metropolitan areas was in line with the assumptions adopted in the research project [Sroka et al. 2018]. The areas selected were metropolitan areas located in different parts of the country (huge variation in environmental and economic conditions) and metropolitan areas differing in size, and thus having an impact on the agricultural sector. [Sroka et al. 2018].

The source material was data obtained from the database of the Polish FADN system. Of 3,508 farms participating in the system over an uninterrupted period between 2004 and 2016, entities operating within the study area were selected. Out of a population of 1,668 entities fulfilling the above criterion, 46 operated in the inner zone of metropolitan areas, while 143 – in the outer zone. 1,479 farms were located outside the analysed metropolitan areas. The averaged values for the distinguished groups were subjected to a comparative analysis.

In order to achieve the aim of the research, it was necessary to determine the gross investment expenditure (actual amounts disbursed), net investment expenditure (gross investments less depreciation) and investment rates for entities in the analysed zones. Investment values (gross and net) were calculated per hectare of land used in the farms analysed and per annual working unit (AWU). The investment rate was calculated as a ratio of the value of gross investment to the sum of farm income and depreciation, and was expressed in percentages [Woś 2000]. The values of gross and net investment, as the total amount for the study period, per 1 ha of agricultural area and per 1 AWU, were presented in nominal and real prices in 2016. Conversion into real values was based on annual inflation rates as adopted by Statistics Poland [www.stat.gov.pl].

RESEARCH FINDINGS

The farms analysed were located within different distances of urban centres (the inner zone of metropolitan areas, the outer zone of metropolitan areas, the outside of metropolitan areas). At the same time, they varied significantly in terms of land and capital resources, while showing similarities in terms of labour resources. Irrespective of their location relative to voivodship capitals, the 2004-2016 period saw a clear increase in the size of agricultural areas of farms (Table 1). The farms analysed are commercial entities, mostly growth-oriented, and therefore seeking to increase their area, which is a manifestation of strategic thinking on their part. One of the factors inhibiting changes in the area structure of farms is availability of land. The supply of land usually comes from small-size farms that resign from agricultural production [Wojewodzic 2017]. The scale of area growth of the farms analysed indicates a higher supply of agricultural land in metropolitan areas compared to non-metropolitan areas (a 31.0% increase in the area of farms in metropolitan areas in the study period compared to a 21.9% increase outside metropolitan areas). At the same time, this confirms a larger scale of resignation from agricultural activity among farms in metropolitan areas compared to those located outside metropolitan areas. Moreover, the size of farms in the zones of a city's influence (in particular those located in the inner zone) indicate their greater economic strength. The impact of a metropolis, as a result of the opportunities to use land for non-agricultural purposes and an increase in land prices, caused the weakest entities to abandon agriculture. Entities operating on the outskirts of metropolitan zones are much more willing to resign from continuing agricultural activity. Owners of small and inefficient farms are more likely to make their land available to entities with greater development potential, because they struggle with combining agricultural and non-agricultural activity, and have lower expectations as to obtaining potential economic rent in the future as a result of the change in the use of land. Therefore, the size of commercial farms usually increases faster in the outer zone of metropolitan areas than in the inner zone [Wojewodzic, Sroka 2018]. Within the area of a city's influence, it was usually economically strong and relatively big-sized entities that carried on production. The larger average area of entities located within the range of city's influence indirectly indicates that such farms developed faster than entities located outside metropolitan areas. Outside metropolitan areas, the pressure of the urban environment and demand for land for non-agricultural use was smaller, and lower prices were

Table 1. Selected characteristics of the factors of production of the commercial farms analysed (average per farm)

Specification		Metropolitan areas (MA)			Outside MA
		zones		in total	
		inner	outer		
Agricultural area in total [ha]	2004	38.4	29.8	31.9	27.0
	2016	41.7	41.8	41.8	32.9
Rented agricultural area [ha]	2004	15.2	8.8	10.4	6.7
	2016	16.1	13.0	13.7	8.4
Own agricultural area [ha]	2004	23.2	21.0	21.5	20.3
	2016	25.6	28.8	28.1	24.5
Labour input [AWU]	2004	2.316	2.006	2.082	2.036
	2016	2.145	1.969	2.012	2.048
Own labour input [FWU]	2004	1.870	1.774	1.798	1.718
	2016	1.741	1.743	1.742	1.697
Average capital value [PLN]	2004	477,831	399,945	418,901	379,257
	2016	700,923	653,842	665,301	587,316

Source: own study based on FADN data

not a sufficiently strong enough incentive to get rid of land. This thesis is also confirmed by a variation in farm resources across metropolitan areas. In inner zones, in addition to the average area, labour resources and capital commitment were higher compared to the outskirts of metropolitan areas. What is also noticeable is a high share of rented agricultural area in the agricultural area of the analysed farms. It should be noted, however, that this share does not differ significantly from the share reported by all the entities participating in the Polish FADN (in 2016 the share of farm lease in total agricultural area was 26.5%, on average, in the analysed farms, whereas in the entire population of the Polish FADN it accounted for 27.7%). However, the share of farm lease is significantly higher within metropolitan areas (32.8% in 2016) than outside them (25.5%). Moreover, in metropolitan areas, there is a significantly higher share of farm lease in the inner zone (38.6%) than the outer zone (31.1%). This indicates that farms located in metropolitan areas (in particular the inner zone) tend to take advantage of any opportunities to expand their area.

There are also differences between entities operating in metropolitan areas and those outside them in terms of capital resources. Farms operating in proximity of capitals voivodship capitals were characterised by a higher value of capital employed compared to other farms. However, it should be noted that a higher capital value does not necessarily mean larger capital resources in physical terms (e.g. surface area of buildings), as the location of farms may have (and probably has) an impact on the valuation of individual assets.

As far as labour resources are concerned, they were at a similar level in the farms located in metropolitan zones and those outside them. The structure of own and external labour resources was also similar.

Table 2. Value of production and income in the commercial farms analysed (average per farm)

Specification		Metropolitan areas (MA)			Outside MA
		zones		in total	
		inner	outer		
Production in total [PLN]	2004	182,963	151,955	159,502	153,192
	2016	258,727	291,244	283,330	255,354
Farm income [PLN]	2004	49,250	42,792	44,364	40,640
	2016	99,647	120,104	115,125	104,460

Source: own study based on FADN data

The differences in resources led to the differences in production performance among the farms analysed. The farms located in metropolitan zones, bigger in size, achieved higher values of production and income (Table 2), thus giving them real possibilities of higher investment expenditure.

In the study period, the farms located in metropolitan areas incurred higher investment expenditure compared to farms located outside such zones (Table 3). The average value of gross investment made by farms within the influence zone of voivodship capitals was 30.6% higher compared to farms located outside such zones. However, within metropolitan areas, investment expenditure throughout the entire study period varied slightly and, calculated per farm, were on average 0.7% higher than in the outer zone.

Net investments, which take the value of depreciation into account, represent a measure of a farm's actual growth. Their amounts, for the analysed groups of farms, show that the value of net investments among farms located in metropolitan zones are 60.5% higher in nominal terms compared to farms located outside such zones (the difference in constant prices is 62.0%).

The variation in the average amounts earmarked for investment per one hectare of land is relatively small. Nominal expenditure per one hectare among the farms located in metropolitan zones in total was only 4.5% higher compared to other farms. In real terms, this difference was close to the difference in current prices and was 4.6%. Variation was also seen across areas subject to the influence of voivodship capitals. Investments per 1 ha of agricultural area made by farms located on the outskirts of metropolitan areas were on average 10.2% and 11.1% higher in nominal and real terms respectively compared to those made by farms located in the inner zone.

As far as the value of investment expenditure per AWU is concerned, the differences between the zones analysed are much bigger. In the 2004-2016 period, investment expenditure per 1 AWU among the farms in metropolitan areas was on average 28.9% and 28.6% higher in nominal and real terms respectively compared to other farms. For the farms operating in outer zones, the figure was on average 10.9% higher compared to the farms in inner zones.

In each of the years analysed, the share of farms securing investment grants was much bigger in metropolitan zones than in the areas beyond a city's influence. The biggest share

Table 3. Investment expenditure in commercial farms throughout the period 2004-2016 in current and constant 2006 prices

Specification		Metropolitan areas (MA)			Outside MA
		zones		in total	
		inner	outer		
Gross investment (current prices [PLN])	in total per farm	613,722	609,606	610,605	467,378
	per 1 ha of agricultural area	14,874	16,561	16,090	15,400
	per 1 AWU	272,973	301,681	293,840	228,126
Gross investment (constant prices [PLN])	in total per farm	658,918	656,944	657,422	503,414
	per 1 ha of agricultural area	16,005	18,001	17,443	16,670
	per 1 AWU	292,580	324,652	315,931	245,648
Net investments (current prices [PLN])	in total per farm	136,063	232,847	209,294	130,387
	per 1 ha of agricultural area	3,286	6,503	5,633	4,314
	per 1 AWU	59,738	114,035	99,451	63,423
Net investments (constant prices [PLN])	in total per farm	145,923	254,425	228,020	140,795
	per 1 ha of agricultural area	3,525	7,156	6,170	4,678
	per 1 AWU	64,026	124,479	108,278	68,475

Source: own study based on FADN data

of farms securing grants was recorded in 2013 (both in metropolitan areas and outside them), and the figure for farms located in metropolitan zones was higher by 7.3 p.p. In that year, as many as 40.7% of the analysed farms located in metropolitan zones received investment grants, whereas the share of farms securing grants located outside metropolitan zones was 33.4%. Within metropolitan areas, farms located in the outer zone clearly dominated in this respect (only at the end of the study period, farms located in inner and outer zones were similarly active in securing investment grants).

The value of the investment rate (Figure 1) also indicates more investment among farms located in metropolitan zones. The investment rate calculated for the whole study period, i.e. 2004-2016, was higher by 4.2 p.p. for farms operating in metropolitan areas compared to farms located outside them. Thus, farms located in metropolitan areas show more willingness to invest, spending a greater share of income on development compared to farms located outside metropolitan zones. As with overall investment expenditure and investment expenditure calculated per units of factors of production, farms located in outer metropolitan zones showed higher investment rate values than those located in inner zones.

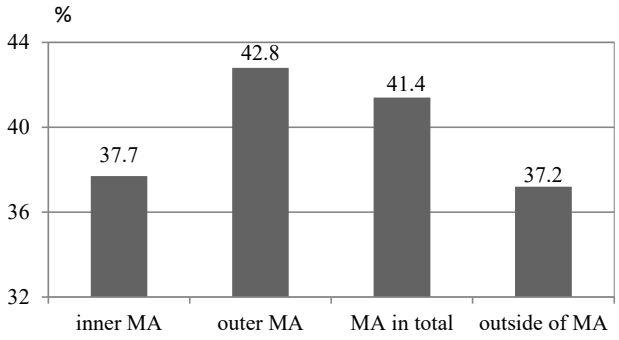

Figure 1. Investment rate in the commercial farms analysed in the 2004-2016 period
Source: own study based on FADN data

CONCLUSIONS

1. Commercial farms located in metropolitan zones have more factors of production - land and capital. This indicates a faster rate of growth among growth-oriented commercial farms located in the proximity of large urban centres, which results from access to resources (mainly land), which, in turn, stems from a weaker farm resigning from agricultural production.
2. In the study period, higher investment expenditure, and thereby faster growth, were recorded among farms located within metropolitan zones. This indicates that the research hypotheses formulated in the paper should be rejected. At the same time, within the zones subject to a city's influence, it was in the outer zone of metropolitan areas that investment expenditure was higher and the growth of farms faster. This may mean that the availability of relatively cheap resources within a zone of a city's influence is only temporal and decreases as cities absorb more and more areas. This should encourage growth-oriented farms in the outer zones of metropolitan areas to take advantage of chances and obtain resources (especially land).
3. The conclusions presented above prompt the rejection of the hypothesis formulated at the beginning of the research saying that commercial farms located in metropolitan zones are less willing to invest. Commercial farms currently operating in such zones grew at a faster rate in the study period. Moreover, the fact that in the starting year of the analysis their average area was greater than that of farms located outside the city's zones of influence suggests that metropolitan zone farms developed faster in the previous period as well. Greater development possibilities are most likely attributable to i.a., more dynamic changes in the agricultural structure in metropolitan areas compared to those observed outside metropolitan areas. However, the reasons why some farms resign from production while others grow require further in-depth research.

BIBLIOGRAPHY

Flak Włodzimierz (ed.). 2000. *Inwestor. Inwestycje rzeczowe: przygotowanie, realizacja, ewidencja inwestycji. Seria Drogi do biznesu* (Investor. Material investments: preparation, implementation, investment records. Series Roads to business). Warszawa: C.H. Beck.

Majewska Anna. 2011. *Suburbanizacja w strefie metropolitalnej Warszawy, jako zagrożenie zrównoważonego rozwoju* (Suburbanization in Warsaw's metropolitan zone as a threat for sustainable development). *Studia KPZK*. 308-320.

MRR (Ministerstwo Rozwoju Regionalnego – Ministry of Regional Development – MRD). 2011. *Koncepcja Przestrzennego Zagospodarowania Kraju 2030* (National Spatial Development Concept 2030). Monitor Polski, 252, 27.04.2012.

Musiał-Malago Monika. 2014. *Procesy suburbanizacji obszarów podmiejskich Krakowa* (Suburbanisation Processes of Cracow's Suburban Areas). *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie* 12 (936): 63-77.

Poczta Walenty, Wawrzyniec Czubak, Karolina Pawlak. 2009. Zmiany w woluminie produkcji i dochodach rolniczych w warunkach akcesji Polski do UE (Changes in the volume of production and agricultural income in the conditions of Poland's accession to the EU). *Zagadnienia Ekonomiki Rolnej* (4): 40-52.

Sroka Wojciech, Jarosław Mikołajczyk, Tomasz Wojewodzic, Bogusława Kwoczyńska. 2018. Agricultural land vs. urbanisation in chosen Polish metropolitan areas: a spatial analysis based on regression trees. *Sustainability* 10 (3): 837. DOI: n10.3390/su10030837.

Wojewodzic Tomasz, Wojciech Sroka. 2018. Commercial Farms in Polish Metropolitan Areas: Changes in Production Factors. *Wieś i Rolnictwo* 4 (181): 91-109.

Wojewodzic Tomasz. 2017. Procesy dywestycji i dezagraryzacji w rolnictwie na obszarach o rozdrobnionej strukturze agrarnej (Divestment and disagrarization processes in agriculture systems with distributed agrarian structure). *Zeszyty Naukowe Uniwersytetu Rolniczego im. H. Kołłątaja w Krakowie* 535 (412): 1-128.

Woś Augustyn. 2000. *Inwestycje i akumulacja w rolnictwie polskim* (Investments and accumulation in Polish agriculture). Warszawa: IERiGŻ.

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SKALA DZIAŁALNOŚCI INWESTYCYJNEJ TOWAROWYCH GOSPODARSTW ROLNYCH OBSZARÓW METROPOLITALNYCH

Słowa kluczowe: inwestycje, obszary metropolitalne, towarowe gospodarstwa rolne

ABSTRAKT

Celem badań była identyfikacja skali działalności inwestycyjnej prowadzonej przez towarowe gospodarstwa rolne zlokalizowane w różnej odległości od dużych ośrodków miejskich. Badaniami objęto sześć województw: dolnośląskie, lubelskie, małopolskie, mazowieckie, pomorskie oraz wielkopolskie. Źródłem danych do analiz była baza polskiego FADN. Spośród 3508 gospodarstw, które uczestniczyły w systemie nieprzerwanie w latach 2004-2016 wyodrębniono podmioty prowadzące swoją działalność na obszarze badań w podziale na strefę wewnętrzną obszaru metropolitalnego, strefę zewnętrzną obszaru metropolitalnego oraz pozostałe (poza obszarami metropolitalnymi). Z populacji 1668 wyodrębnionych na tej podstawie gospodarstw towarowych 46 funkcjonowało w strefie wewnętrznej obszarów metropolitalnych, a 143 w strefie zewnętrznej. Wartości uśrednione dla wyodrębnionych grup poddano analizie porównawczej. Badania wykazały, że gospodarstwa stref metropolitalnych są podmiotami lepiej wyposażonymi w czynniki produkcji (zwłaszcza ziemię) i wykazują się szybszym rozwojem niż gospodarstwa leżące poza strefami wpływów ekonomicznych miast. Są również podmiotami inwestującymi większe kwoty i charakteryzującymi się wyższą stopą inwestycji. Skala działalności inwestycyjnej gospodarstw stref metropolitalnych daje tym podmiotom realną szansę na uzyskiwanie przewagi konkurencyjnej (zarówno w zasobach, jak i w produkcji) nad gospodarstwami spoza obszarów metropolitalnych.

AUTHORS

JAROSŁAW MIKOŁAJCZYK, PHD
ORCID: 0000-0001-6165-2529
State Higher Vocational School in Tarnow
Institute of Administration and Economics
8 Mickiewicza St., 33-100 Tarnów, Poland

TOMASZ WOJEWODZIC, DR HAB.
ORCID: 0000-0002-0817-4190
University of Agriculture in Krakow
Institute of Economics and Social Sciences
21 Mickiewicza Av., 31-120 Kraków, Poland

WOJCIECH SROKA, PHD
ORCID: 0000-0002-4255-3741
University of Agriculture in Krakow
Institute of Economics and Social Sciences
21 Mickiewicza Av., 31-120 Kraków, Poland