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Investment in machinery, equipment and means of transport in Polish agriculture, 2009-2012: example of FADN region 785 (Pomorze i Mazury)

In the paper the scale of investment in agricultural equipment in Poland in the years 2009-2012 is investigated. The research concentrates on FADN region 785 as it has on average the largest farms in Poland. Thus its agriculture is the most advanced in terms of convergence with EU-15 agriculture and presents the highest potential to compete on the European Union (EU) market. Investment in machinery, equipment and means of transport is the most common kind of investment projects and the first that is undertaken by farmers who wish to develop their farms. The results show that although the average scale of investment is growing it is still insufficient given the average level of usage of fixed assets in Polish agriculture. The EU co-financed support for investment can be seen as an additional source of investment finance, with only about 12 per cent of farms making use of public support in their investment projects. The average value of such investment is several times higher than in the case of farms using other sources of financing their investments. Most investment projects are financed from own resources – retained profits.

Keywords: Polish agriculture, investment, public support

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Introduction

Since Poland's accession to the European Union (EU) the pace of change in Polish agriculture has significantly increased. This is for two main reasons, Common Agricultural Policy (CAP) support and membership of the EU common market, the latter providing both better marketing prospects and more competition. An increase in agricultural incomes has made agricultural production more profitable and thus raised the farmers' willingness to invest.

Farm investment is a subject of vast research related to numerous detailed issues and aspects of both investment behaviour and impact of investment projects on further business activity. Gallerani *et al.* (2008) review the research findings on factors affecting farm investment behaviour. Their findings show that a decision on undertaking an investment project depends on such variables as, *inter alia*: farm characteristics (i.e. location, specialisation debt/asset ratio), factor markets, product markets, public policy and household characteristics.

Investment as an increase in capital stock should be a positive factor leading to higher competitiveness. Yet, there are two main types of investment that are not equal in terms of their impact on a farm's situation in relation to other farms. Investment limited to the replacement rate of capital does not improve the farm's standing. However, with the competition among producers of different tangible and intangible goods it is hardly possible to expect a farmer to replace depreciated goods like-for-like and not with technologically more advanced ones. Thus, it seems that distinguishing between investments in more technologically advanced capital goods from those that simply substitute old capital goods with others of the same kind is in today's context pointless.

Investment is considered to be an important indicator of the situation in the economy and its branches. It does not only show the current perception of the future market situation but it also implies the future competitive potential of economic units. Moreover, "increasing the competitiveness of the agricultural sector requires an improvement of the productivity of physical capital" (EC, 2014, p.6). It is directly related to the fact that "modernisation of farms is crucial to improve their economic performance through better use of the production factors including the introduction of new technologies and innovation, farm diversification, etc." (EC, 2014, p.22).

The role of investment in increasing a farm's competitiveness is directly linked to technical progress that is an important factor of growth in modern agricultural growth models (Rembisz and Floriańczyk, 2014) and it drives productivity and efficiency in production and enhances firm profitability (O'Toole *et al*., 2011). The literature on investment in agriculture concentrates on two main issues, factors determining investment behaviour and sources of financing investment projects, although the second one is closely related to the first. Within the second branch of research there is a subsection related to analysing the impact of public support on the level of investment and characteristics of the investing farms. A large part of the research is also devoted to the impact of agricultural policy on investment decisions. Lefebvre (2014) reviews the impact of the CAP. Naturally there also other areas of research related to investment such as the analysis of investment risk or impact of investment on economic performance or competitiveness.

The aim of the paper is to assess the scale of investment in machinery and equipment in Polish agriculture in the period 2009-2012 and, using the example FADN region 785 Pomorze i Mazury, to answer the following questions: (a) do the farms co-financing their investment with public funds differ from those not using this source of financing; and (b) is there any correlation between the level of support and farm size and performance?

Methodology

Using Polish FADN data for individual farms between 2009 and 2012, the research is based on analysis of the changes in indicators over time and among farm types. The period analysed was determined by the availability of data as

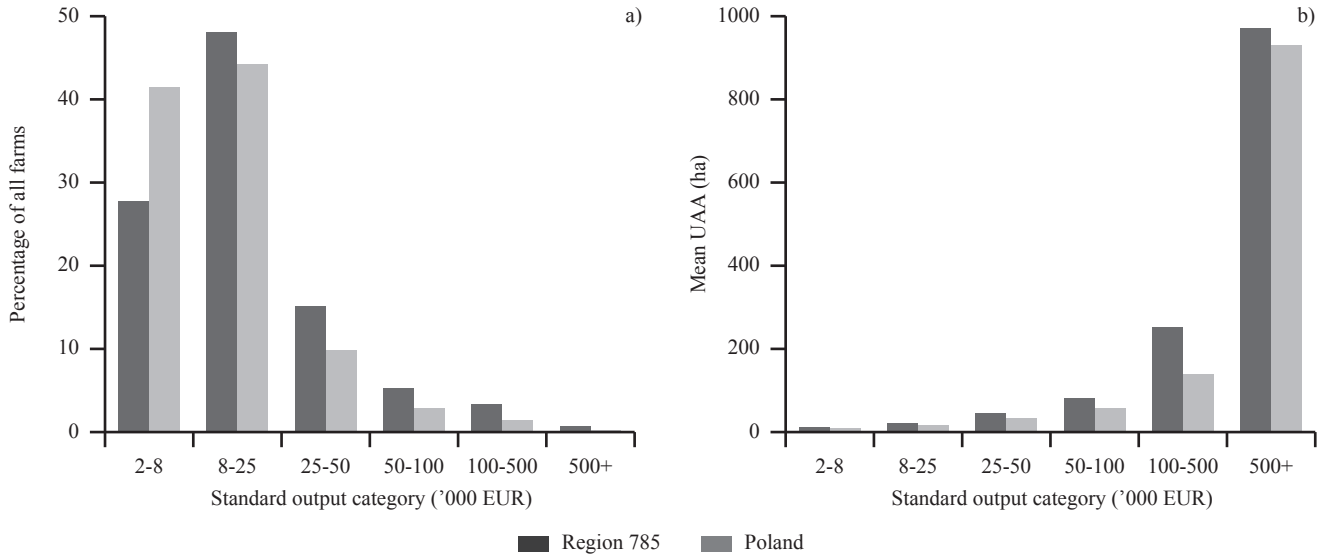

Figure 1: Structure of the FADN population by standard output category in region 785 and Poland in 2012 in terms of (a) percentage of farms and (b) mean utilised agricultural area.

Data source: Polish FADN data

it was not until 2009 that information on investment support was added to the data collected. FADN region 785 was chosen as it has the largest farms of all the Polish FADN regions. Therefore these farms are the most similar to the EU-15 average and are most able to compete with other farms in the EU. The agriculture in this region is also most advanced in terms of convergence with the most agriculturally advanced EU Member States[1].

For the analysis only investment in two categories was taken into account: (a) machinery and equipment, and (b) means of transport. These were chosen as only for these two types of investment projects are there sufficient numbers of farms receiving public support. Thus only in these cases can any analysis be made. Farms in region 785 show, on average, higher investment activity in machinery, equipment and means of transport than in Poland as a whole and are developing faster than their counterparts in other regions of Poland.

Results

Characteristics of the farms in FADN region 785

FADN region 785 Pomorze i Mazury (Hereafter referred to as 'region 785') is one of four Polish FADN regions. It consists of four Polish NUTS 2 regions or *voivodeships* situated in the northern and north-western parts of Poland (PL42 Zachodniopomorskie, PL43 Lubuskie, PL62 Warminsko-Mazurskie and PL63 Pomorskie). This is the region with the largest average size of farms in Poland, yet it includes only slightly over 10 per cent of farms represented by the Polish FADN sample. The average farm utilised agricultural area (UAA) in this region about is double the national average: in 2009 34.7 ha c.f. 17.8 ha and in 2012 39.6 ha c.f. 19.6 ha (FADN)[2]. The share of large farms is much higher in region 785 (4.0 c.f. 1.6 per cent) and that of the very smallest much lower (27.7 c.f. 41.4 per cent) than in the whole farm population (Figure 1).

The larger farm size is also the reason for a higher share of farms with a specialised type of farming. In 2012 the share of arable farms in the region was almost twice as big as in Poland as a whole, while the share of mixed farms was over 10 percentage points lower (Table 1).

Table 1: Type of production of the FADN population in region 785 and Poland in 2009 and 2012 (per cent).

Farm type	2009		2012	
	Region 785	Poland	Region 785	Poland
Arable	29.1	23.6	15.6	8.0
Horticulture	2.2	2.9	2.7	3.7
Permanent crops	0.7	3.4	0.6	2.6
Dairy	7.6	5.1	15.2	12.7
Other grazing livestock	9.1	6.6	7.3	4.2
Granivores	5.9	6.5	8.6	8.2
Mixed	45.4	51.9	49.8	60.6

Data source: Polish FADN data

Despite the size differences, in 2009 the farms in region 785 did not show higher cost efficiency than their counterparts in the whole Polish FADN population (Table 2). The relationship between total inputs (SE270)[3] and total output (SE131)[4] is similar in farms from region 785 and Poland specialising in a given type of production. In some cases (mixed farms and other grazing livestock farms in region 785) total inputs even exceed total output. This may be a result of a higher amount of total external factors (SE365) that include interest (SE380) paid on credits for purchase of land, machines and other inputs.

The situation was similar in 2012. In the case of most farm types the relationship of total inputs to total output was slightly higher for farms representing region 785 than for the

[1] The convergence process and comparisons with the EU-15 are common topics of research studies among researchers in the Eastern EU (e.g. Ziętara *et al*. 2013).

[2] These figures represent the FADN indicator SE025.

[3] Total inputs (SE270) are defined as a sum of: total specific costs, total farming overheads, depreciation and total external factors.

[4] Total output (SE131) is defined as a sum of: total output of crops and crop production, total output livestock and livestock products and other output.

Table 2: Total inputs (SE270) and output (SE131) in EUR in region 785 and Poland by farm type in 2009 and 2012.

Farm type	Region 785						Poland					
	2009			2012			2009			2012		
	SE270	SE131	SE270/ SE131 (%)	SE270	SE131	SE270/ SE131 (%)	SE270	SE131	SE270/ SE131 (%)	SE270	SE131	SE270/ SE131 (%)
Arable	40,266	40,273	100.0	85,794	104,157	82.4	21,580	22,301	96.8	47,450	60,573	78.3
Horticulture	22,132	27,730	79.8	33,225	42,134	78.9	32,743	43,635	75.0	30,736	39,771	77.3
Permanent crops*	35,449	39,944	88.7	-	-	-	17,639	19,980	88.3	-	-	-
Dairy	20,404	22,969	88.8	46,516	53,975	86.2	16,316	18,324	89.0	24,080	30,108	80.0
Other grazing livestock	20,262	19,286	105.1	13,633	13,727	99.3	21,130	21,621	97.7	12,834	13,343	96.2
Granivores	109,018	127,245	85.7	110,239	134,441	82.0	49,027	59,797	82.0	48,838	59,496	82.1
Mixed	25,958	24,640	105.4	26,055	29,173	89.3	16,262	16,383	99.3	19,206	21,872	87.8

* In 2012 there are no data for permanent crops as in region 785 the number of farms representing this type of farming is too low to be representative of the whole population.
Data source: Polish FADN data

Table 3: Farm net value added (SE415) and farm net value added/AWU (SE425) in EUR, and farm net value added per total utilised agricultural area (SE415/SE025) in region 785 and Poland (per cent) by farm type in 2009 and 2012.

Farm type	Region 785						Poland					
	2009			2012			2009			2012		
	SE415	SE425	SE415/ SE425 (%)	SE415	SE425	SE415/ SE425 (%)	SE415	SE425	SE415/ SE425 (%)	SE415	SE425	SE415/ SE425 (%)
Arable	17,389	9,394	185.1	54,897	25,146	218.3	9,473	5,425	174.6	32,810	16,930	193.8
Horticulture	8,746	4,417	198.0	15,402	5,783	266.3	15,856	6,368	249.0	14,146	5,964	237.2
Permanent crops*	16,555	6,024	274.8	-	-	-	7,506	3,762	199.5	-	-	-
Dairy	8,909	4,869	183.0	21,908	10,150	215.8	6,401	3,631	176.3	13,024	7,247	179.7
Other grazing livestock	7,502	4,182	179.4	7,228	4,533	159.4	7,530	4,284	175.8	5,705	3,675	155.2
Granivores	31,571	15,175	208.1	42,172	19,595	215.2	17,192	10,142	169.5	18,083	10,549	171.4
Mixed	8,125	4,543	178.9	12,503	7,085	176.5	5,337	3,328	160.3	8,589	5,119	167.8

* In 2012 there are no data for permanent crops as in region 785 the number of farms representing this type of farming is too low to be representative of the whole population.
Data source: Polish FADN data

whole Polish FADN population. Both total inputs and total output grew substantially in all farm types, but the highest increase was observed in arable farms. This was a result of their rapid growth in size: in 2012 they were about twice as big as in 2009. On average, the arable farms in region 785 operated on 94.5 ha UAA, while for Poland as a whole the figure was 50.7 ha UAA. These data include both own and leased land. In 2012 the average area of leased land per farm amounted to 39.4 ha UAA in region 785 (Mikołajczyk and Wituszyńska, 2014) and to 18.8 ha UAA in Poland as a whole (Floriańczyk *et al*., 2013). The average total UAA per farm in 2009 was: 51.3 ha in region 785 (including 20.1 ha of leased land) (Brzezik *et al*., 2011) and 23.7 ha (including 8.1 ha of leased land) in Poland as a whole (Goraj *et al*., 2010).

As the farms in region 785 are generally larger than their counterparts in the rest of Poland their farm net value added (SE415) is much higher. The value per annual work unit (AWU)[5] and UAA is also much higher, indicating higher efficiency and economies to scale.

In 2009 the horticulture farms were the only ones in region 785 that showed lower net value added as well as net value added per employee and per ha of UAA in comparison with the general population (Table 3). This was due to the fact that horticultural farms in region 785 were smaller than in other regions. Yet, the average size of the UAA was only slightly larger: 4.1 ha, while in region 785 it was 3.5 ha and the total labour input was very similar, so significant differences at the level of net value added can be explained only by differences in efficiency and the types of plants grown. In 2012 all the farm types analysed in region 785 had higher net value added and its indicators per employee and per ha of UAA. Only the figure of net value added per AWU was slightly lower in horticulture farms in region 785 than in the other regions. In this year horticulture farms in region 785 were on average larger than in the general population of these farms.

Scale of the investment in machinery, equipment and means of transport

In the analysed years the scale of investment was closely related to the farm size. This explains the differences in the level of investment expenditure among different farm types as well as between farms in region 785 and the whole Polish farm population. The highest gross investment was observed in arable farms in region 785 in both 2009 and 2012 (Table 4). Also in the case of farms specialising in granivores the difference between years in the average value of investment in region 785 is much higher than for the whole farming population in Poland. As for all the other types of farms the data do not show a clear pattern and change substantally with the year of analysis.

Data for gross investment (SE516) cannot be seen as a precise tool to assess the actual changes in the physical capital owned by a farm as they include depreciation. Therefore, it is necessary to analyse also the data on net investment,

[5] The formula to calculate farm net value added/AWU (SE425) is: farm net value added (SE415) divided by total labour input expressed in AWU (SE010), where total labour input is presented in the equivalent of full-time persons working on a farm.

Table 4: Average farm gross investment in region 785 and Poland in EUR by farm type in 2009 and 2012.

Farm type	2009		2012	
	Region 785	Poland	Region 785	Poland
Arable	10,676	4,243	19,328	14,216
Horticulture	817	4,627	5,493	4,569
Permanent crops	5,794	4,063	-	5,843
Dairy	3,324	3,080	11,075	6,371
Other grazing livestock	3,510	4,218	2,452	2,865
Granivores	11,509	5,460	8,327	5,021
Mixed	3,211	1,880	4,223	2,853

Data source: Polish FADN data

Table 5: Farm net investment in region 785 and Poland in EUR by farm type in 2009 and 2012.

Farm type	2009		2012	
	Region 785	Poland	Region 785	Poland
Arable	4,779	3,150	7,748	6,739
Horticulture	-2,996	-1,242	997	-505
Permanent crops	-6,944	-1,988	-	-1,231
Dairy	-1,237	-422	3,118	1,720
Other grazing livestock	-910	-526	-786	-179
Granivores	2,695	-228	-622	18
Mixed	-1.277	-982	45	-453

Data source: Polish FADN data

Table 6: Value of investment in equipment and means of transport in EUR on FADN farms in region 785 in the period 2009-2012.

Indicator	2009	2010	2011	2012
Median	6,620	6,263	6,288	7,938
Standard deviation	40,003	38,620	43,160	46,253
Mean	26,233	23,687	22,526	27,517
Minimum	119	151	114	124
Maximum	220,664	277,873	755,959	444,062

Data source: Polish FADN data

which is gross investment minus depreciation (SE521). The averages for the different farm types in region 785 and Poland as a whole indicate that the actual development is generally illusory as net investment is negative, thus in fact a process of disinvestment is taking place. In the analysed period only in the case of arable farms was there a steady increase in the value of physical capital as the net investment was positive (Table 5).

Data for the whole FADN population in region 785 show that the scale of investment in equipment and means of transport varies greatly. Therefore, it is worth assessing not only the mean value of investment, but also median and standard deviation. The median value of investment was about one quarter of the mean (Table 6). The value of standard deviation amounts to about 150 per cent of the mean, showing a great diversity in the scale of investment. The changes in these indicators are in line with the other data presented here on region 785, showing that a slight fall in the value of investment was observed in 2010 as a result of a worse market situation.

As the investment is related not only to business strategy and the farm's prospects but also to the availability of capital to undertake them, its scale and type depend on types and scale of external funding. Of special interest are the funds available within the public agricultural policy as it is important to assess their actual efficiency and effectiveness.

Characteristics of the farms investing with the public support in region 785

The first issue worth analysing is the structure of the beneficiaries as this can show whether the policy was implicitly or explicitly targeted to specific types of farms. The structure of farms whose investment projects related to purchase of machinery and equipment was co-financed with the public support does not reflect the structure of farms in region 785.

The profile by farm type of farms from region 785 whose investment in machinery, equipment and means of transport was co-financed by public funds differs greatly from that of all farms in this region (c.f. Tables 1 and 7). As the eligibility criteria for financial support within the Polish Rural Development Programme (RDP) for 2007-2013 did not exclude any type of production (MARD, 2007), the differences in structure of support beneficiaries cannot be explained by lack of access to the support measures. Also the criterion of minimum economic size generally did not apply to farms from this region as average farms of all types of farming activities were at least three times larger (12 European Size Units, ESU) than the RDP's threshold (4 ESU) for the most popular investment measure – modernisation of farms. Thus, the potential explanation of these differences can be the farms' willingness and capacity to invest. While this can be influenced by numerous factors, definitely one of the key issues are the projections of the future situation on a given agricultural market.

However, the average structure of the beneficiaries of public support and that of the whole farm population undertaking the analysed types of investments are very similar (Table 8). A difference of more than 1 percentage point between the two groups is observed only in the cases of dairy and mixed farms.

Yet, these small differences in the profile can be attributed to the size of the sample. Only several per cent of the

Table 7: Profile of the farms investing with public support funds in region 785 by farm type in the period 2009-2012 (per cent).

Farm type	2009	2010	2011	2012
Arable	44.7	29.5	25.8	15.9
Horticulture	0.8	0.0	0.0	0.0
Permanent crops	0.8	0.0	0.0	1.6
Dairy	5.7	16.7	36.4	57.1
Other grazing livestock	13.8	6.4	9.1	9.5
Granivores	11.4	11.5	10.6	3.2
Mixed	22.8	35.9	18.2	12.7

Data source: Polish FADN data

Table 8: Profiles of the farms investing with co-financing from public funds and of all investing farms in region 785 by farm type in the period 2009-2012 (per cent).

Farm type	Investment with public support	All investing farms
Field crops	31.8	32.1
Horticulture	0.3	0.9
Permanent crops	0.6	0.8
Dairy	24.2	19.0
Other grazing livestock	10.3	10.2
Granivores	9.7	9.8
Mixed	23.0	27.3

Data source: Polish FADN data

Table 9: Share of farms in region 785 undertaking investment in machinery, equipment and means of transport in the period 2009-2012 (per cent).

Year	Investment with public support	Investment irrespective of capital sources
2009	6.5	38.1
2010	4.5	36.9
2011	3.8	40.2
2012	3.7	38.8

Data source: Polish FADN data

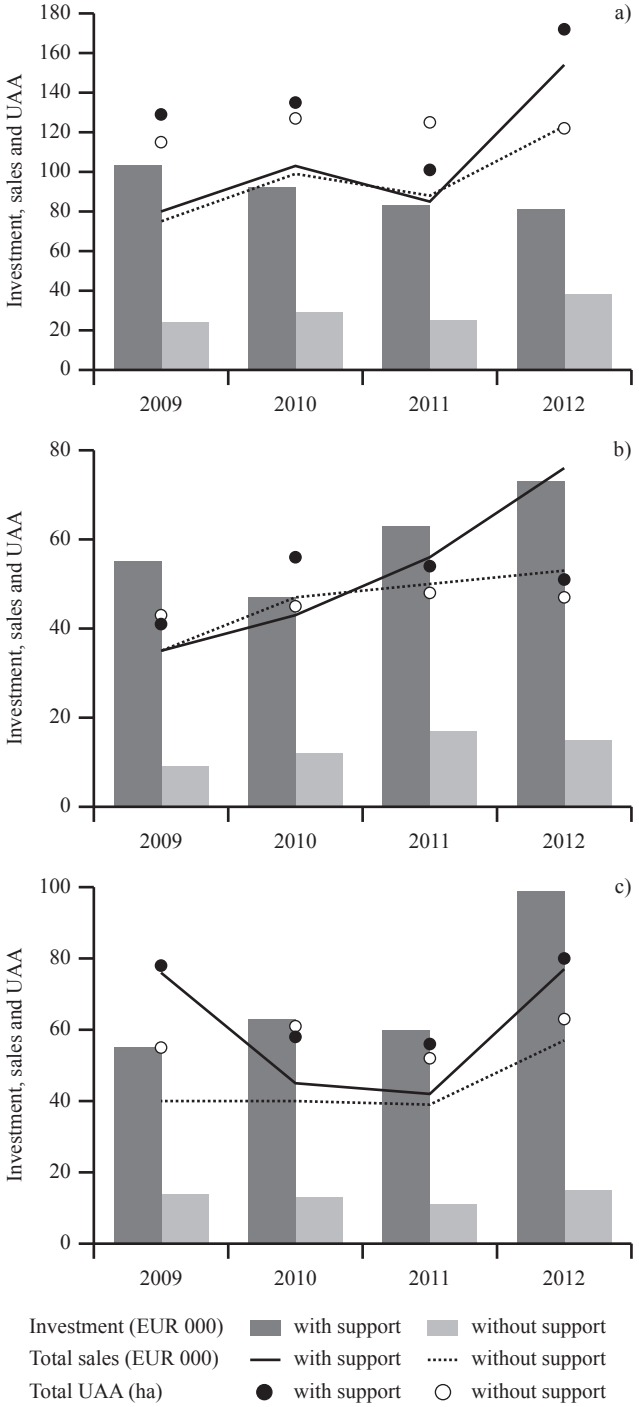

Figure 2: Values of investment, total sales and average utilised agricultural area per farm of (a) arable, (b) dairy and (c) mixed farms with and without public co-financing in region 785 in the period 2009-2012.

Data source: Polish FADN data

farms represented by FADN in region 785 undertook investment in equipment and means of transport co-financed with public funds in the period 2009-2012 (Table 9). This means that on average about 12 per cent of the investment in the assessed categories was conducted with the help of public funds. It is also clear that in a given year only about 40 per cent of farms had any investment in farm equipment.

As the share of farms using public support as a source of financing their investment is low, for further analysis of the difference between the group investing with public support and without it only three types of farms (arable, dairy and mixed) were chosen. The choice was based on their average share in the population of supported farms. However, although farm types with the largest share were chosen their number in specific case does not exceed 15.

In 2009 the values of investment by arable and mixed farms that were beneficiaries of public support were at least four times higher than in the group of non-beneficiaries (Figures 2a and 2c). In the case of dairy farms the difference was even larger and the amount of investments made with public support exceeded that of non-beneficiaries by over twelve times (Figure 2b). For arable farms the amount of total sales by support beneficiaries did not differ greatly from those for farms using other sources of capital for their investment. By contrast, for both dairy and mixed farms the amount of total sales of support beneficiaries showed figures about double those of non-beneficiaries. Similar relationships applied to the differences in the total (own and leased) UAA operated by them and (data not shown) total output. In 2010, for all three farm types the values of investment were around 4-5 times higher for the support beneficiaries than for the non-beneficiaries. Across all farm types, both groups of investing farms had similar levels of sales, UAA and (data not shown) total output.

In 2011 large differences in the values of investment remained in all farm types. Once again, in the case of arable farms, although the average UAA per farm of the beneficiaries of support was slightly smaller (101 ha c.f. 125 ha), the beneficiaries recorded very similar sales and output figures to the non-beneficiaries, Thus, these were already more effective farms. Among the dairy and mixed farms the non-beneficiaries had only slightly lower sales and output figures than their counterparts who received support. In 2012 very big differences in the scales of investment remained. For all three farm types, farms investing with public support had rather higher levels of sales than the ones investing without support, reflecting similar differences in UAA and (data not shown) total output.

The next issue to verify is the existence of any link between the scale of support and farm size and performance. To check whether smaller farms or farms with lower sales figures receive more investment support a correlation analysis was conducted. This analysis did not include farms specialising in horticulture and permanent crops as the numbers of support beneficiaries among these farms were low during the whole analysed period. Although in some instances there were quite strong correlations between the level of investment support and individual parameters for individual sectors (e.g. UAA in the dairy sector in 2010 and 2011), in general there is no clear relationship between the level of

Table 10: Correlation between the level of investment support and selected farm parameters.

Farm type	Parameter	2009	2010	2011	2012
Arable	UAA	0.57	0.39	-0.07	-0.31
	Total sales	0.27	0.32	-0.29	-0.16
	Total production	0.30	0.32	-0.20	-0.26
	Sales per ha UAA	-0.21	-0.16	-0.40	0.24
Dairy	UAA	0.23	0.75	0.74	0.03
	Total sales	0.17	0.59	0.61	0.21
	Total production	-0.49	0.66	0.60	0.17
	Sales per ha UAA	-0.36	-0.55	-0.16	0.24
Other grazing livestock	UAA	0.27	0.77	-0.22	0.81
	Total sales	0.10	0.38	0.46	0.65
	Total production	0.13	0.52	0.41	0.43
	Sales per ha UAA	-0.17	-0.46	0.65	0.14
Granivores	UAA	0.53	0.57	0.42	0.15
	Total sales	0.49	-0.23	0.50	0.44
	Total production	0.50	-0.04	0.49	0.47
	Sales per ha UAA	-0.24	-0.39	0.25	0.38
Mixed	UAA	0.67	0.26	0.14	0.48
	Total sales	0.13	-0.07	0.25	0.56
	Total production	0.17	0.01	0.23	0.50
	Sales per ha UAA	-0.08	-0.30	0.43	0.22

Source: own calculation based on Polish FADN data

support and farm size or performance (Table 10). Even for a given farm type the figures change year on year, showing neither a distinct direction of this relationship nor a stable strengthening of the correlation.

Discussion

Summing up the presented research it must be stated that the scale of investment in Polish agriculture is still insufficient. The data on net investment (Table 5) suggest that for many farm types in Poland the level of investment is lower than the rate of depreciation. This picture is made even worse when the usage level of the fixed assets in Polish agriculture is taken into account. Fogarasi *et al*. (2014), analysing the period 2000-2012, showed that despite the increase in investment and the inflow of CAP funds to the sector, the gross value of the fixed assets grew by over 20 per cent but the net value decreased during this period. During the same period the level of usage of these assets increased from around 10 to over 75 per cent. This is an observation specific not only to Poland but also to other countries struggling with modernisation of agriculture, such as Romania where "a rather limited volume of investment subsidies" is observed (Hubbard *et al*., 2014, p.104).

Comparing the figures for farm sales and UAA, especially for the period 2010-2012 (Figure 2), it is evident that the farms using public support generally have slightly lower levels of sales per ha UAA. Thus, they are less efficient than their counterparts investing without this support. In view of the small sample sizes used in this study, the results must be viewed with caution. However, Wigier *et al*. (2014) reported that the Polish farms undertaking investment projects financed from their own resources or credits perform better than their counterparts making use of public support for investment. In order to reach a more conclusive insight into the actual role played by public investment support in agricultural development the starting point of the investing farms must be taken into account. An in-depth case study would be needed to verify whether the farms without public support already had better equipment before making this investment and whether in the case of support beneficiaries the investment made enabled them to improve their efficiency significantly.

It is also difficult to access the increase in gross value added of the farms as the impact of external factors plays a crucial role in shaping this indicator. Trying to take into account the fluctuations in the market situation is even more complicated as it is not always the general market situation in a given agricultural market that counts, but in some case a specific set of conditions either on the local market or the ones related to any part of food chain that can affect prices and other market conditions. Thus, it seems that to achieve conclusive findings on the impact of investment support much longer time series and much more detailed data are required. Any further research could both tackle all four Polish FADN regions as well as apply more sophisticated research methods to verify the conclusions stemming from this analysis. Yet, the analysis of one region has the advantage of lower diversity among farms analysed given more homogenous environmental conditions and historically shaped farm sizes and farming traditions.

Furthermore, the results of a study on investment support in Slovenia also point out that "impacts of investment support on agricultural productivity growth … remain inconclusive" and the growth in labour productivity was in this country the main aim of the support (Travnikar and Juvančič, 2013, p.102). The results of the study on the investment support under rural development policy commissioned by the European Commission (EC, 2014) state that the availability of data is limited not only because the time series is short, but also because it is limited to a non-crisis period so the changes throughout the whole business cycle could not be observed. Therefore, it is not possible to come to substantial conclusions even by applying such methods of comparing beneficiaries and non-beneficiaries of investment support as propensity score matching or difference-in-difference. Moreover, different methods should be used for different types of impact assessment. For regional and national scale research the most suitable method is input-output analysis and for micro scale research more advisable is using propensity score matching.

Notwithstanding the general conclusions set out above, rapid changes are visible in many Polish farms, meaning that the process of constant growth in the scale of diversification of Polish agriculture is progressing.

References

Brzezik, R., Mikołajczyk, I. and Wituszyńska, A. (2011): Wyniki standardowe uzyskane przez gospodarstwa rolne uczestniczące w Polskim FADN w 2009 roku. Region FADN 785 – Pomorze i Mazury. Część I. Wyniki standardowe [Standard results of the farms participating in the Polish FADN in 2009. Part I]. Warszawa: IERiGŻ-PIB.

EC (2014): Investment Support under Rural Development Policy. Contract 30-CE-0609852/00-41. Final Report. Brussel: European Commission.

Floriańczyk, Z., Mańko, St., Osuch, D. and Płonka, R. (2013): Wyniki Standardowe 2012 uzyskane przez gospodarstwa rolne uczestniczące w Polskim FADN. Część I. Wyniki Standardowe [Standard results of the farms participating in the Polish FADN in 2012]. Warszawa: IERiGŻ-PIB.

Fogarasi, J., Wieliczko, B., Wigier, M. and Tóth, K. (2014): Financing of Agriculture and Investment Supports in Agriculture, in N. Potori, P. Chmieliński and A.F. Fieldsend (eds), Structural changes in Polish and Hungarian agriculture since EU accession: lessons learned and implications for the design of future agricultural policies. Budapest: AKI, 55-76.

Gallerani, V., Gomez y Paloma, S., Raggi, M. and Viaggi, D. (2008): Investment Behaviour in Conventional and Emerging Farming Systems under Different Policy Scenarios. Sevilla: Joint Research Centre, Institute for Prospective Technological Studies.

Goraj, L., Mańko, St., Osuch, D. and Płonka, R. (2010): Wyniki standardowe uzyskane przez gospodarstwa rolne uczestniczące w Polskim FADN w 2009 roku. Część I. Wyniki standardowe [Standard results of the farms participating in the Polish FADN in 2009. Part I]. Warszawa. IERiGŻ-PIB.

Hubbard, C., Luca, L., Luca, M. and Alexandri, C. (2014): Romanian farm support: has European Union membership made a difference? Studies in Agricultural Economics **116** (2), 100-106. http://dx.doi.org/10.7896/j.1415

Lefebvre, M., De Cuyper, K., Loix, E., Viaggi, D. and Gomez-y-Paloma, S. (2014): European farmers' intentions to invest in 2014-2020: survey results. JRC Science and Policy Reports. Sevilla: Joint Research Centre, Institute for Prospective Technological Studies.

MARD (2007): Rural Development Programme for 2007-2013. Warszawa, Ministry of Agriculture and Rural Development.

Mikołajczyk, I. and Wituszyńska, A. (2014): Wyniki standardowe uzyskane przez gospodarstwa rolne uczestniczące w Polskim FADN w 2012 roku. Region FADN 785 – Pomorze i Mazury. Część I. Wyniki standardowe [Standard results of the farms participating in the Polish FADN in 2012. FADN Region 785. Part I]. Warszawa: IERiGŻ-PIB.

O'Toole, C.M., Newman, C., Hennessy, Th. (2011): The role of financing frictions in agricultural investment decisions: an analysis pre and post financial crisis. Paper prepared for presentation at the EAAE 2011 Congress "Change and Uncertainty Challenges for Agriculture, Food and Natural Resources", 30 August to 2 September 2011 ETH Zurich, Zurich, Switzerland.

Rembisz, Wł. and Floriańczyk, Z. (2014): Modele wzrostu gospodarczego w rolnictwie. [Economic growth models in agriculture] Warszawa: IERiGŻ-PIB.

Travnikar, T. and Juvančič, L. (2013): Application of spatial econometric approach in the evaluation of rural development policy: the case of measure Modernisation of agricultural holdings. Studies in Agricultural Economics **115** (2), 98-103. http://dx.doi.org/10.7896/j.1307

Wigier, M., Wieliczko, B. and Fogarasi, J. (2014): Impact of Investment Support on Hungarian and Polish Agriculture. Paper prepared for presentation for the 142nd EAAE Seminar Growing Success? Agriculture and rural development in an enlarged EU. Corvinus University of Budapest, Budapest, Hungary. 29-30 May 2014.

Ziętara, W., Adamski, M. and Grodzki, H. (2013): Polish farms with cattle production in comparison to selected countries. Multiannual programme report no. 86.1. Warszawa: IERiGŻ-PIB.