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## **Agricultural investment in Poland in the years 2007-2013**

**BARBARA WIELICZKO**  
Institute of Agricultural and Food Economics  
– National Research Institute  
Warsaw, Poland  
e-mail: [Barbara.Wieliczko@ierigz.waw.pl](mailto:Barbara.Wieliczko@ierigz.waw.pl)



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## **Abstract**

The Polish agriculture has been undergoing rapid changes since the EU accession. The pace of these changes varies between regions and farm types. The participation in the EU single market gave a significant boost to the development of the Polish food industry and agriculture.

Yet, the investment process is a complex issue influenced not only by economic factors related to market conditions and farms' economic performance but also to farmers' investment attitudes or the stage in the farmer's family life cycle. However, the availability of capital for investment is the key factor in influencing the final decision on undertaking investment and determining its scale.

The aim of the paper is to analyse the scale and types of investment made by Polish farms in the period 2007-2013 as well as differences in investment activity between regions and production types. The analysis is based on the Polish FADN database.

The results show that these are larger farms in the agriculturally more developed Polish FADN regions where the investment is conducted. The structure of capital sources of these investment projects shows that still most of the project is invest from own resources. Thanks to receiving direct payments farms have more financial resources to invest and this is visible in the scale of investment and the structure of investing farms. The investment co-financed by public funds amounts to app. 12% of all the investment in machines and means of transport conducted in a given year.

Key words: agriculture, investment, regional diversity, structural changes.

## **Introduction**

In order to become competitive or to keep the already gained competitiveness it is necessary to invest in increasing productivity, efficiency or quality of production. Therefore, the analysis of investment processes in a given country or sector enables the assessment of potential future competitiveness. The analysis of the structure of investment processes and of characteristics of investing entities can show the undergoing structural changes.

Ever since the start of the EU accession negotiations between Poland and the EU the Polish agriculture and agri-food industry has been undergoing serious structural changes accompanied by investment. Although the scale of investment is much bigger than in the decade prior to the beginning of the 21<sup>st</sup> century, the investment is still limited given the needs of the whole sector. Thus, it is unquestionable that investment activity is characteristic only of some groups of farms. Moreover, it can be expected that the conclusions of the COMPETE projects are valid also for other types of agricultural production than cereals, milk and pork. As the research conducted within the COMPETE project revealed: "Structural change seems to occur in a way that the most successful producers strengthen their positions. Producers with poor performance will not be able to catch up with the developments of the sector leaders, and therefore are supposed to fall more and more behind" (Čechura et al., 2014).

In Poland this diversity in development paths followed by different groups of farms is also visible. As shown by Józwiak (2014), the number of farms in Poland is slowly decreasing, but at the same time the number of the ones that are competitive or can soon become competitive is growing (Figure 1).

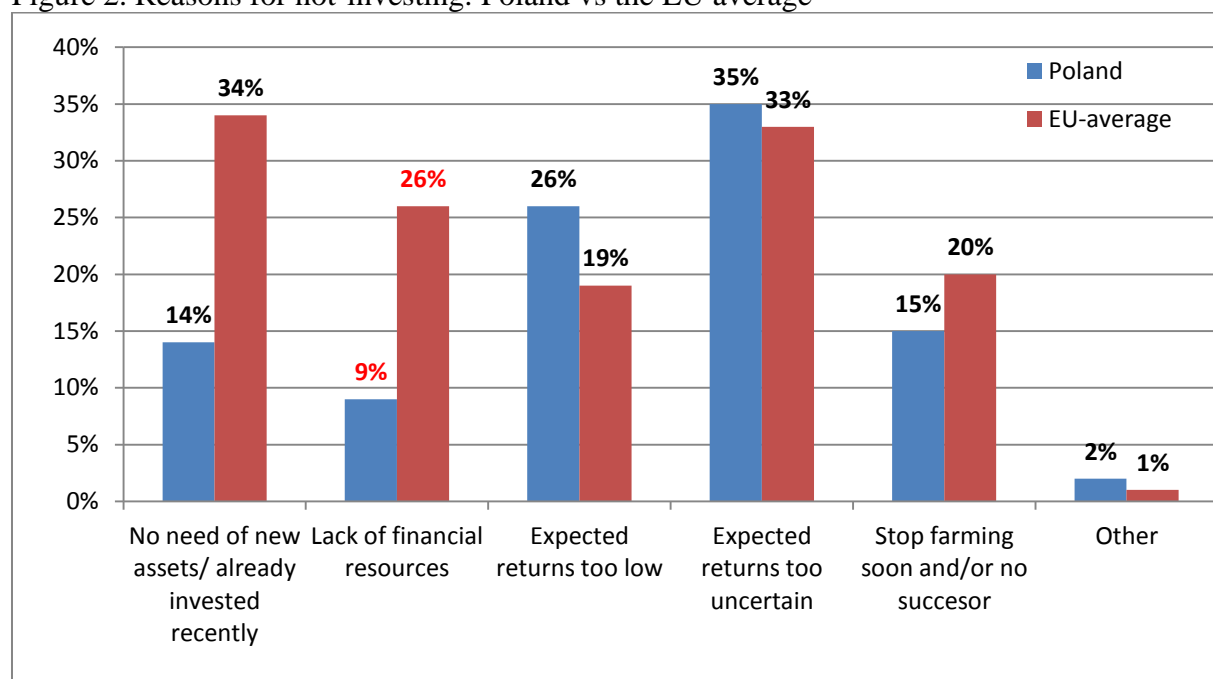
Figure 1. Changes in the number of farms with agricultural production and the surface above 1 ha of UAA in the years 1996-2010 in Poland (in '000)

Types of farms	Year		
	1996	2002	2010
Farms with the competitive ability and the ones that may soon achieve it	106 <sup>a</sup>	174 <sup>b</sup>	209 <sup>c</sup>
Remaining farms selling all or most of their final production	866	739	767
Farms producing mainly or exclusively for the needs of the farm holder's family	941	705	503

a. The number estimated on the basis of information in 1999.  
 b. Total estimated on the basis of information from 2005-2007.  
 c. Total estimated based on information from 2010-2012.  
 Source: W. Jozwiak (2014).

Compared to the EU average the Polish farmers have other reasons for not undertaking investment. In the research study conducted by M. Lefebvre et al. (2014) concerning the investment plans for the period 2014-2020 the Polish respondents were much less inclined to state that lack of financial resources could be a reason for not-investing and they were also less willing to state that there was no need of new assets (Figure 2).

Figure 2. Reasons for not-investing: Poland vs the EU average

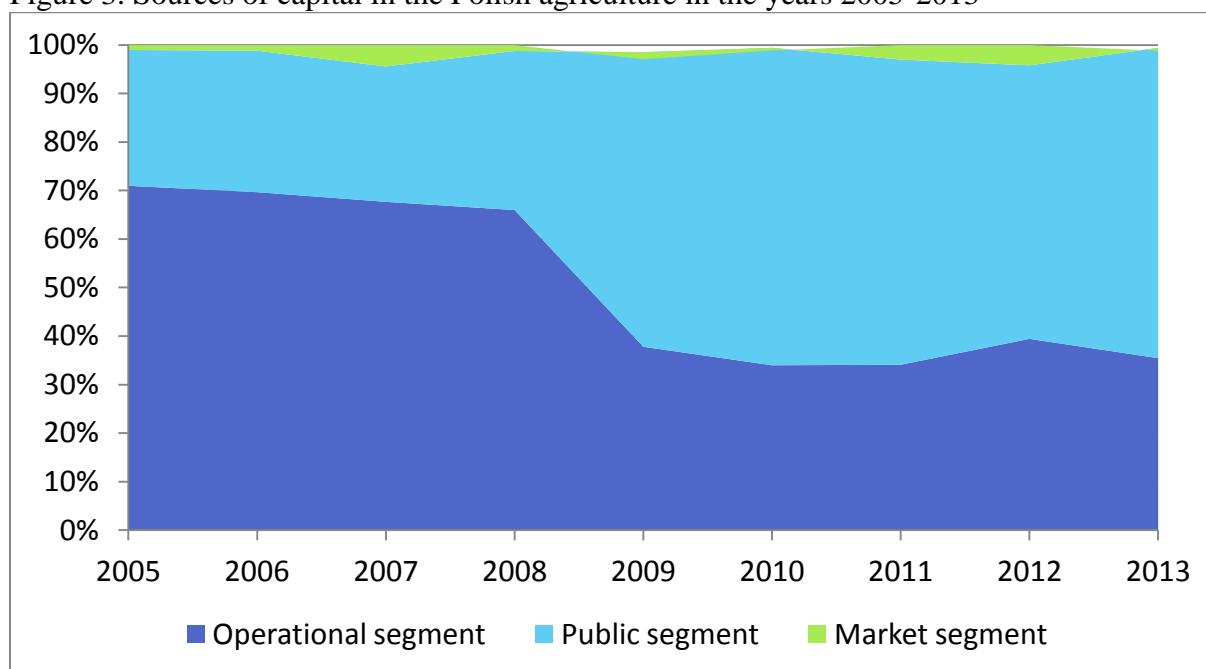


Source: Own elaboration based on M. Lefebvre et al., 2014, Fig. 14.

This low percentage of Polish farmers who suffer from lack of financial resources can be explained by the fact that with the Polish EU accession the farm incomes rapidly grew. Much of this growth was related to a gradual phasing-in of direct payments. This led to doubling of the share of public funds in the sources of capital present in the Polish agriculture (Figure 3). It is also worth drawing attention to the tiny share of the market segment in the total capital of the Polish agriculture. This suggests that the investment project undertaken are

financed from farmers' own resources stemming either from their agricultural activity or from the CAP funds.

Figure 3. Sources of capital in the Polish agriculture in the years 2005-2013



Source: J. Kulawik et al., 2015.

In order to analyse the investment process in the Polish agriculture following research questions were answered:

- What was the scale and type of investment made in the analysed period?
- What were the sources of capital for investment?
- Were there any regional differences in investment?
- Was the type and/or scale of investment related to the type of production conducted by a farm?

All the answers to these questions are presented in the results section of this paper. Final remarks and the general summary of the analysis conducted are presented in the conclusions.

## Methodology

The analysis of the investment in the Polish agriculture in the period 2007-2013 was conducted on the basis of the Polish FADN's data. Given the fact that the analysis is based on the FADN data the share of farms investing is undoubtedly much higher than in the whole population of the Polish farms. This conclusion can be drawn from the research based on a survey encompassing all farms in villages representative of the whole Poland conducted by the Institute of Agricultural and Food Economic – National Research Institute presented by M. Dudek (2015). The results presented by this researcher show that an increase in the farm size of 1 ha of UAA lead to an increase in the probability of undertaking agricultural investment project of 3%.

The statistical analysis encompasses descriptive and inferential statistics. As the aim of the paper is to present a general picture of the investment processes in the Polish agriculture and its diversity means for the analysed period are presented. There is statistical analysis of diversity of investment among the Polish four FADN regions for all the production types represented in Poland within the FADN's TF8 division of farm types. Thus, there is no type 3 – vineyards.

As farms undertaking investment treated were only the ones whose total investment expenditure in a given year of the analysed period exceeded PLN 2,000 (app. EUR 500).

## Results

Poland is divided into four FADN regions based on the specific characteristics of the agriculture in these areas (Figure 4). The differences among these regions are also visible in the investment process, although when analysing a given production type they are much lower than among production types.

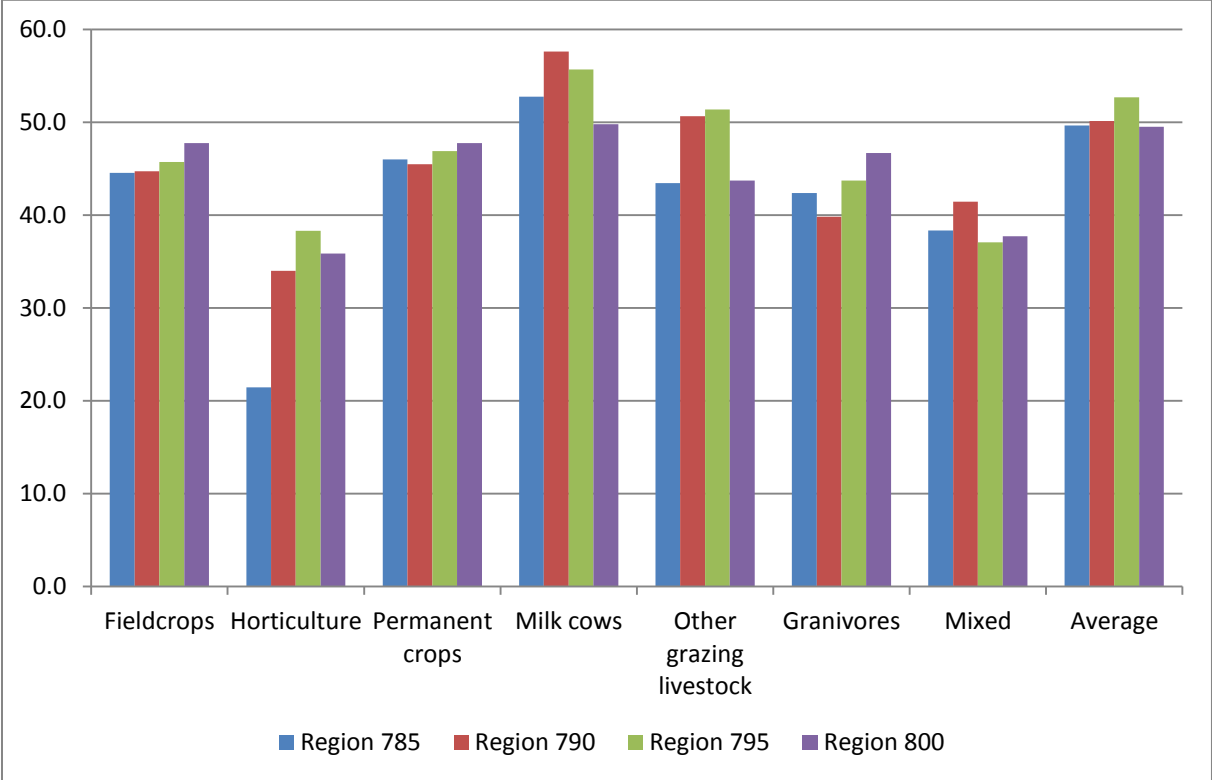
Figure 4. Polish FADN regions



Source: L. Goraj et al., 2010.

The average share of farms undertaking investment in the analysed period was app. 50% in all the regions (Figure 5). However, there are significant differences among farm types. The lowest share of farms undertaking investment projects was observed in the case of farms specialising in horticulture. In the case of these farms also regional differences were the highest. The reason for the low average share of investment is the fact that farms of this type receive the lowest support from the CAP as the share of their income. Moreover, in the years prior to the analysed period investment in this group was higher than in the general population of the Polish farms. The highest share of investing farms was noted in the case of farms specialising in milk cows. Only in the Region 800, characterised by the smallest farms, the share of investing milk cows farms did not exceed 50%.

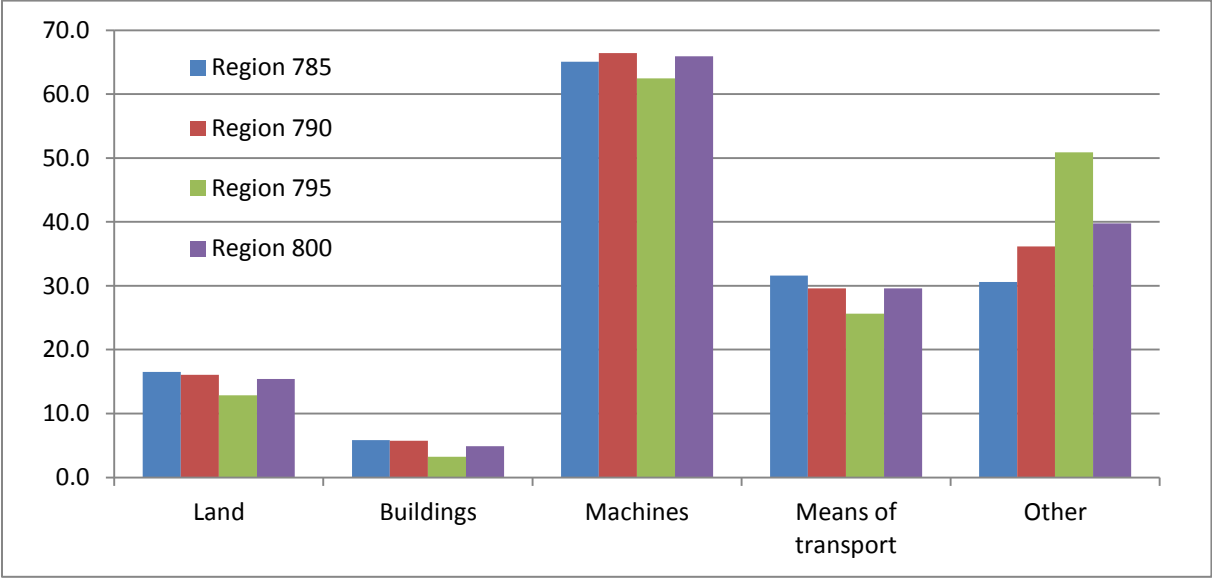
Figure 5. The average share of farms undertaking investment in the period 2007-2013



Source: Own elaboration based on the Polish FADN’s data.

The most popular type of investment was purchase of machines and equipment (Figure 6). Over 60% of investing farms bought new machines. The least popular was investment in buildings with only a couple of per cent of farms undertaking this type of investment.

Figure 6. Share of farms investing in given categories of investment in the analysed period

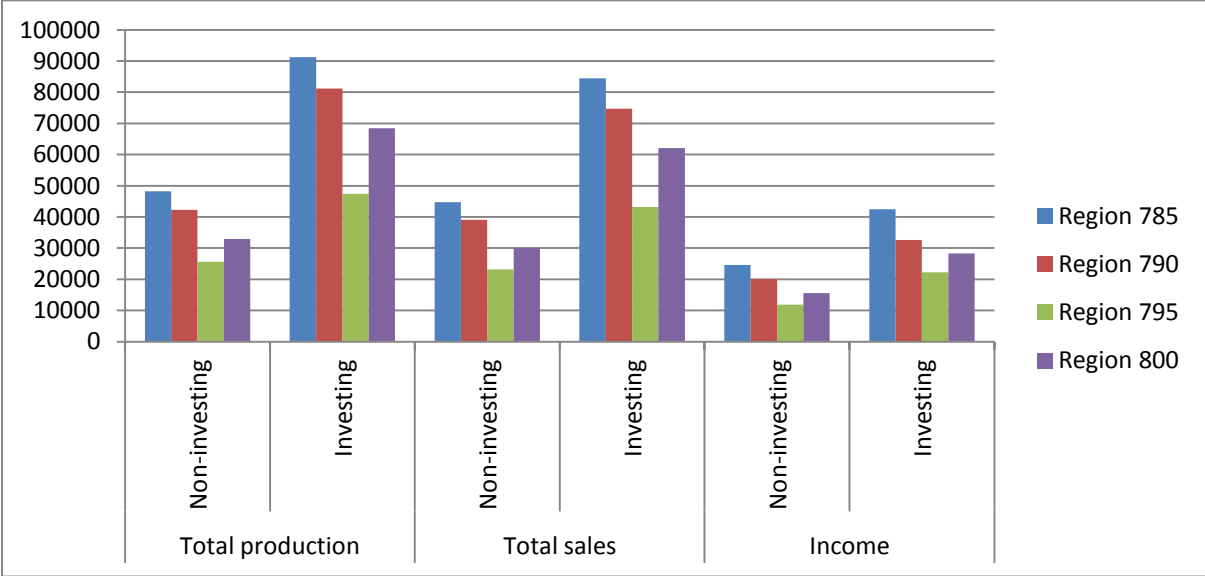


Note: The individual shares do not sum up to 100% as farms could undertake investment projects encompassing more than one investment category.

Source: Own elaboration based on the Polish FADN’s data.

The comparison of investing and non-investing farms shows significant differences between them. In the case of farms specialising in field crops the most pronounced differences in the figures for total production, total sales and income were observed in Region 785. This is due to the fact that the average difference in the size of UAA between investing and non-investing farms is the largest in this region. It amounts to 40.2 ha with the average field crop farms operating on – 71.3 ha in the case of non-investing farms and 111.2 ha for investing ones.

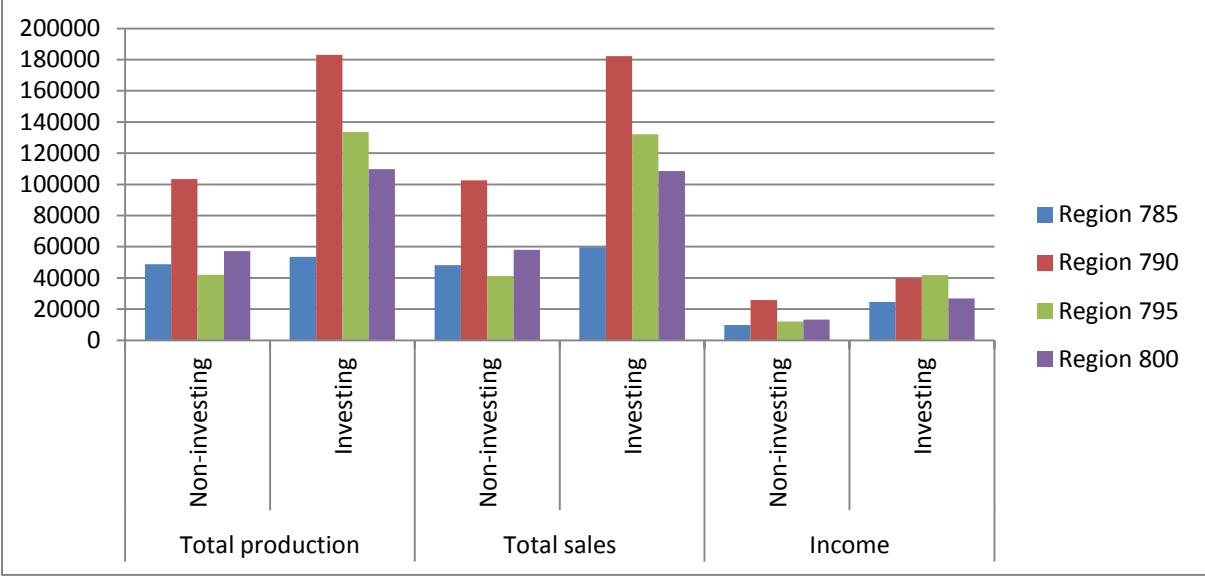
Figure 7. Investing vs. non-investing farms specialised in field crops (in EUR)



Source: Own elaboration based on the Polish FADN’s data.

In the case of farms specialising in horticulture this is the Region 785 were the lowest differences between investing and non-investing farms were observed (Figure 8). This is due to the fact that this type of farm is not typical of this region and there is only a small number of them. The largest farms of this type are in the Region 790. The differences between investing and non-investing are also the highest in this region.

Figure 8. Investing vs. non-investing farms specialised in horticulture (in EUR)

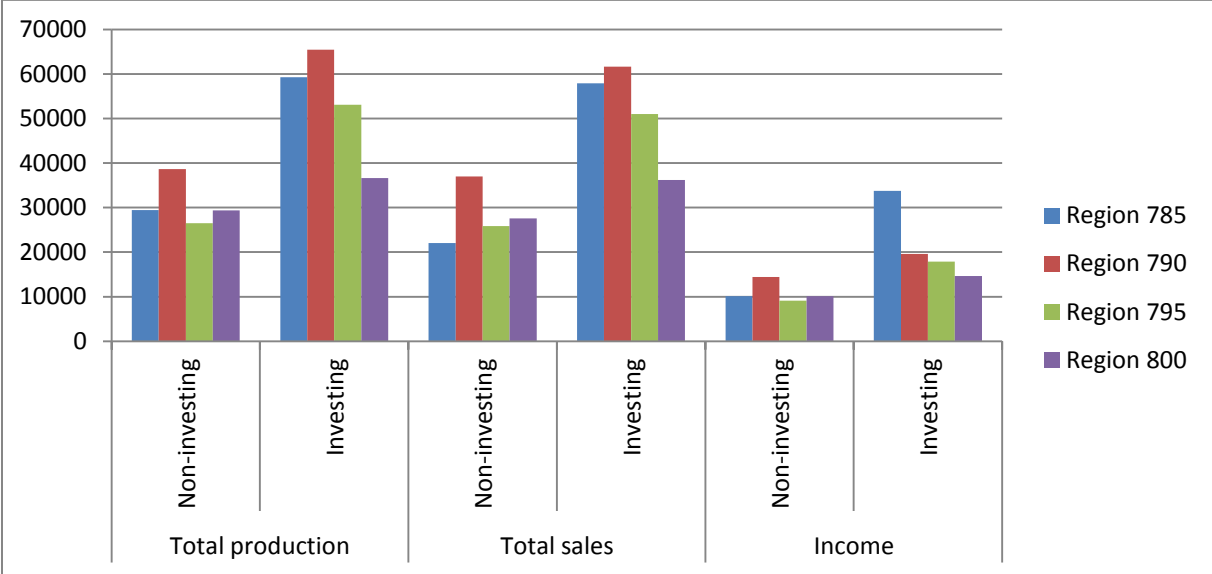


Source: Own elaboration based on the Polish FADN’s data.



The largest differences in the size of UAA between investing and non-investing in the case of farms specialising in permanent crops were observed in Region 785. Therefore, also the differences in economic performance are the largest (Figure 9). The smallest difference was noted in the case of Region 800.

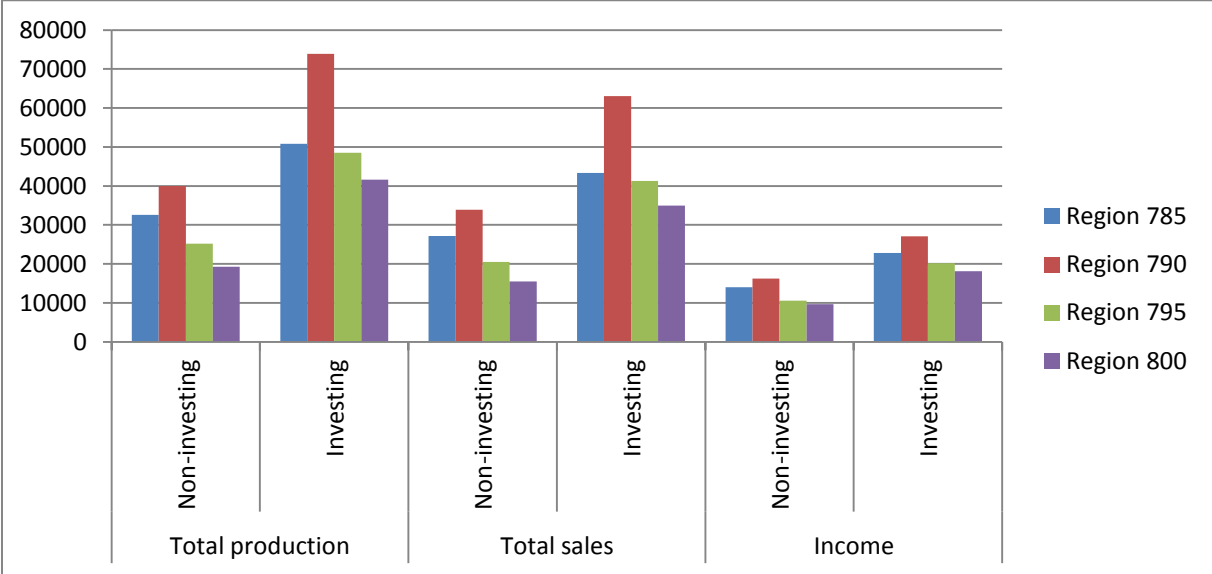
Figure 9. Investing vs. non-investing farms specialised in permanent crops



Source: Own elaboration based on the Polish FADN’s data.

The region 790 was characterised by the largest investing farms specialised in milk cows and the largest difference in area size and economic performance between investing and non-investing farms (Figure 11). The smallest difference between investing and non-investing farms was observed in the Region 800. This was also the region with the smallest farms of this production type.

Figure 10. Investing vs. non-investing farms specialised in milk cows

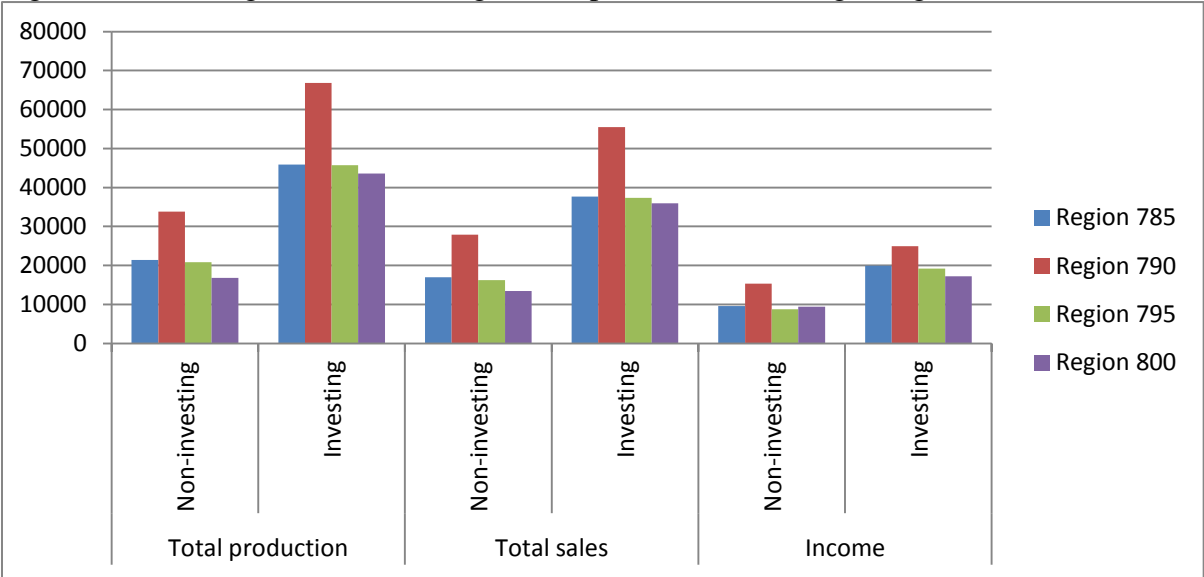


Source: Own elaboration based on the Polish FADN’s data.

In the case of farms specialising in other grazing livestock huge differences in total production were observed in all the regions – investing farms had twice higher production

value than non-investing ones (Figure 11). However, the differences between these two groups in the area of UAA operated by them were not as big and they varied among regions. In the Region 800 it was only 2 ha of UAA, while in the Region 785 it was 18.8 ha.

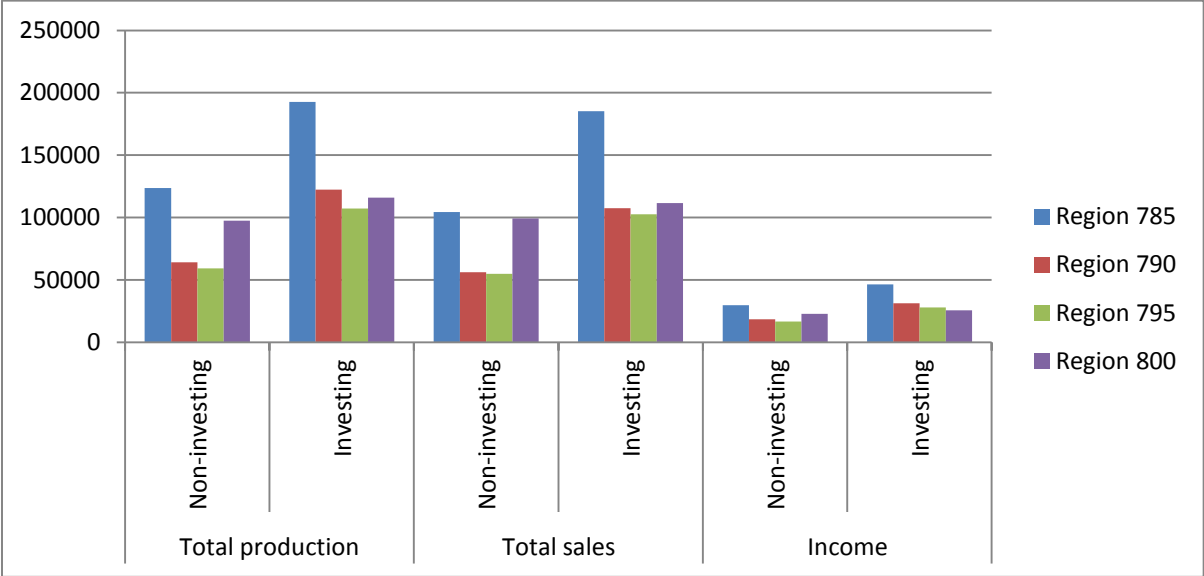
Figure 11. Investing vs. non-investing farms specialised in other grazing livestock



Source: Own elaboration based on the Polish FADN’s data.

In the case of farms specialising in granivores the largest differences between investing and non-investing farms were noted in the Region 785 (Figure 12). The smallest difference between these two groups was observed in the Region 800 where these farms were also the smallest in comparison with other regions.

Figure 12. Investing vs. non-investing farms specialised in granivores

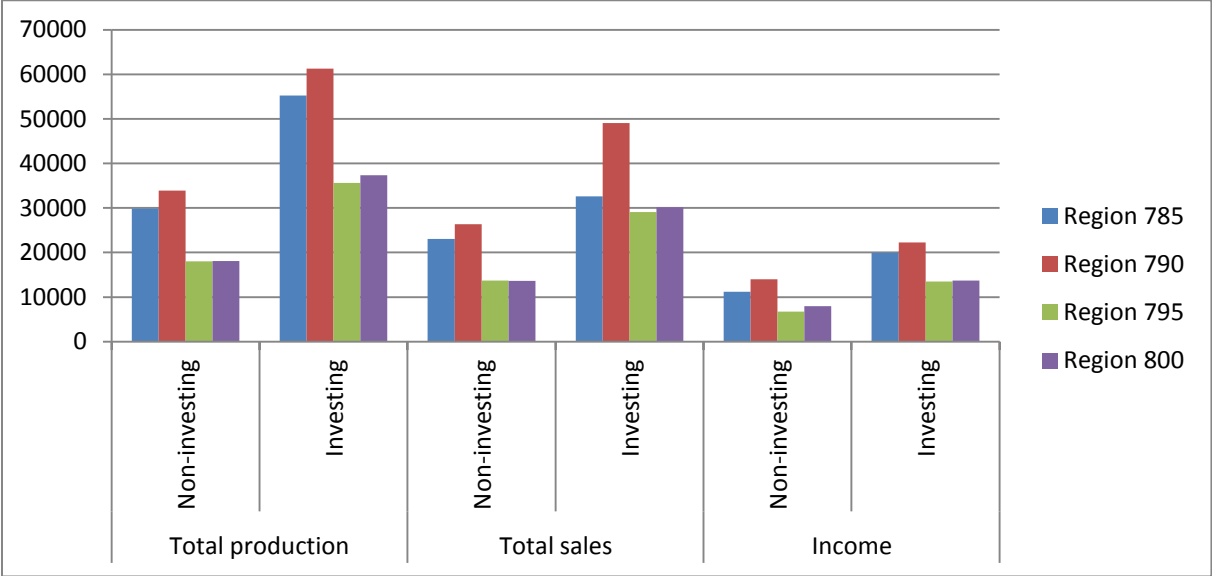


Source: Own elaboration based on the Polish FADN’s data.

In the case of farms with mixed production the largest differences between investing and non-investing farms were observed in two regions: 785 and 790 (Figure 13). As in the case of farms specialising in granivores, the smallest difference between these two groups was

observed in the Region 800 where these farms were also the smallest in comparison with other regions.

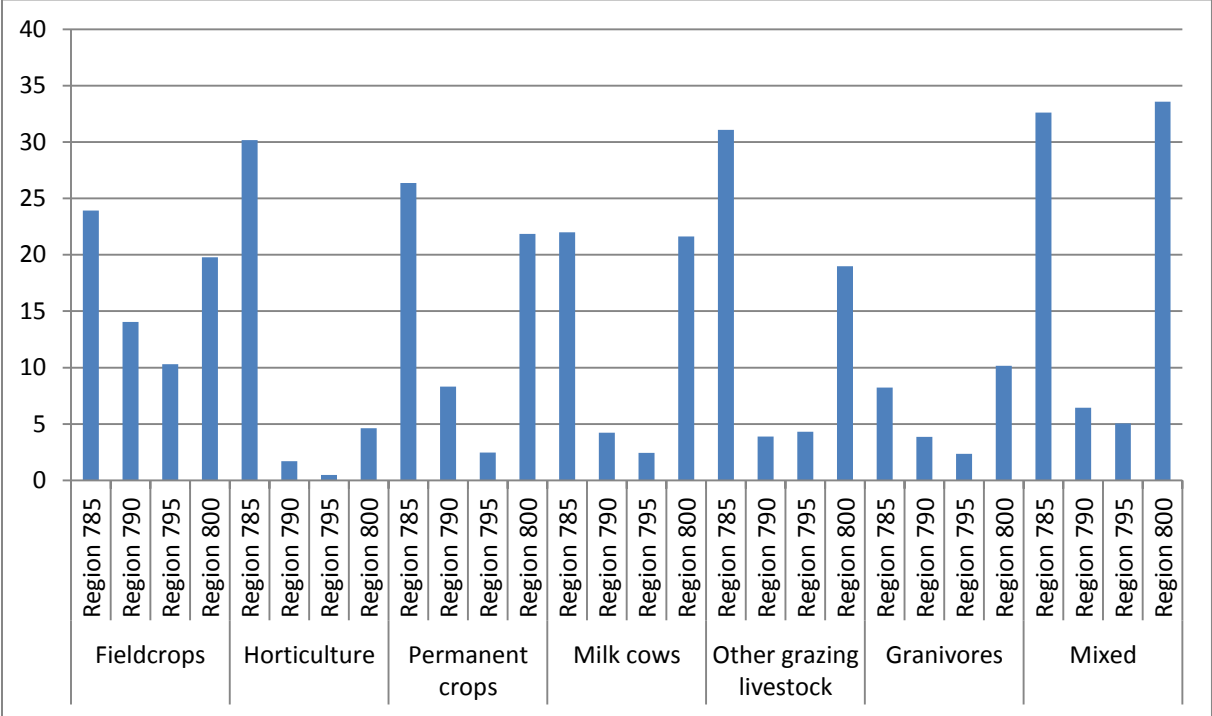
Figure 13. Investing vs. non-investing mixed farms



Source: Own elaboration based on the Polish FADN’s data.

The differences in the amount of money spent on investment in land in relation to the average total production varies significantly between regions and farm types (Figure 14). Most striking is the fact the highest relation between land investment and total production was observed in two regions: the Region 785 characterised by the largest average area of farms in the whole Poland and in the Region 800 where the average farm is the smallest in Poland. This suggests that both the smallest and the largest farms try to increase their area.

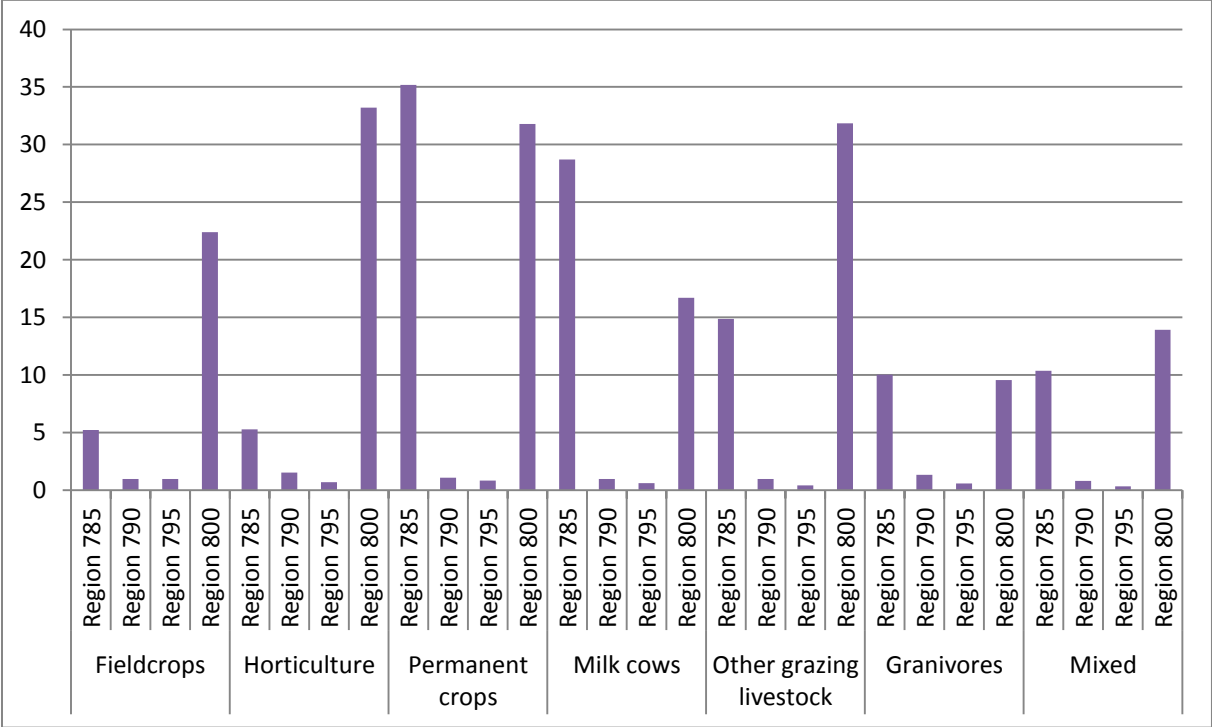
Figure 14. Average value of investment in land in relation to total production (in per cent)



Source: Own elaboration based on the Polish FADN’s data.

The investment in building was the least popular and also its average value was low (Figure 15). However, there were some exceptions ones again in the case of farms located in the regions 785 and 800.

Figure 15. Average value of investment in buildings in relation to total production (in per cent)



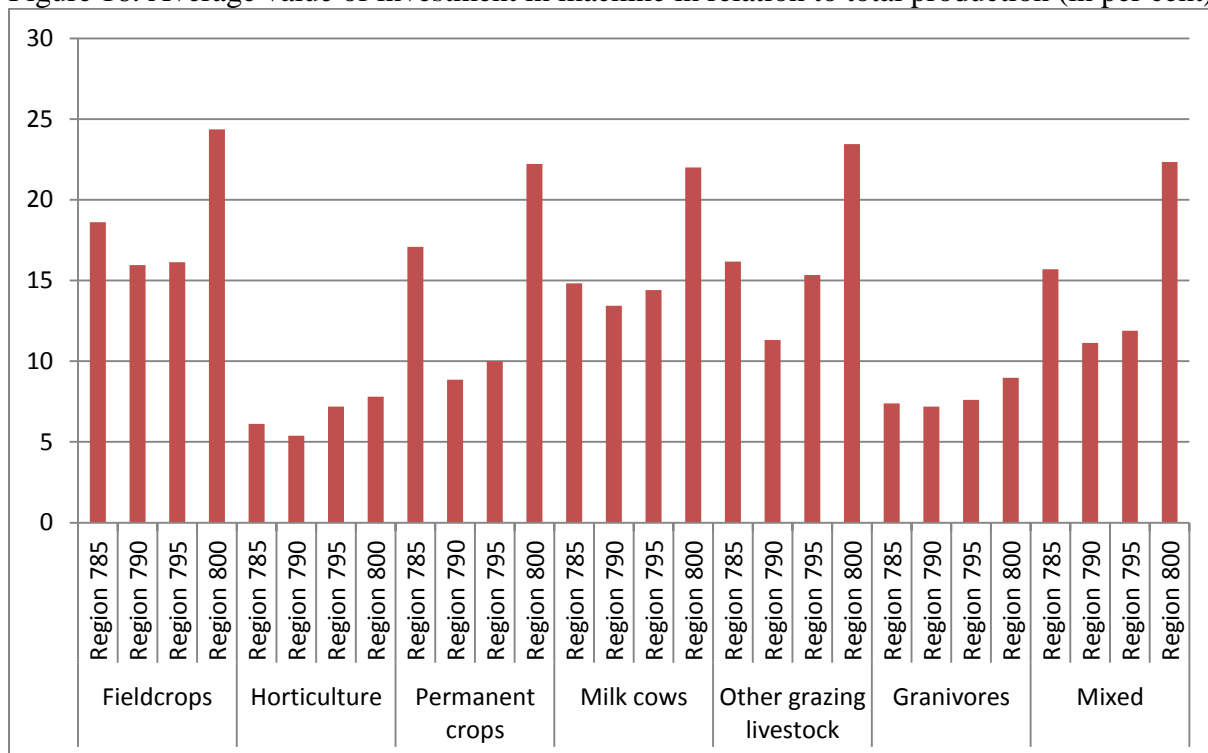
Source: Own elaboration based on the Polish FADN’s data.

The average value of investment in machines and equipment was less diverse and the highest figures much lower than it the case of investment in land or buildings (Figure 16). The lowest value of this type of investment was observed in the case of farms specialising in horticulture and granivores. However, it must be said that the low relation between amount invested and the total production in the case of granivores was caused by a high value of total production (on average app. EUR 150,000).

In the case of investment in means of transport the lowest figures were also noted for farms specialising in horticulture and granivores (Figure 17). When analysing regional differences it is clearly visible that in the case of all farm types these were the farms in the Region 800 whose investment in relation to the total production was the highest. In real values it was also much higher than in other regions. For example in the case of mixed farms it was over EUR 17,800 in the Region 800 and only over EUR 4,400 in the Region 795.

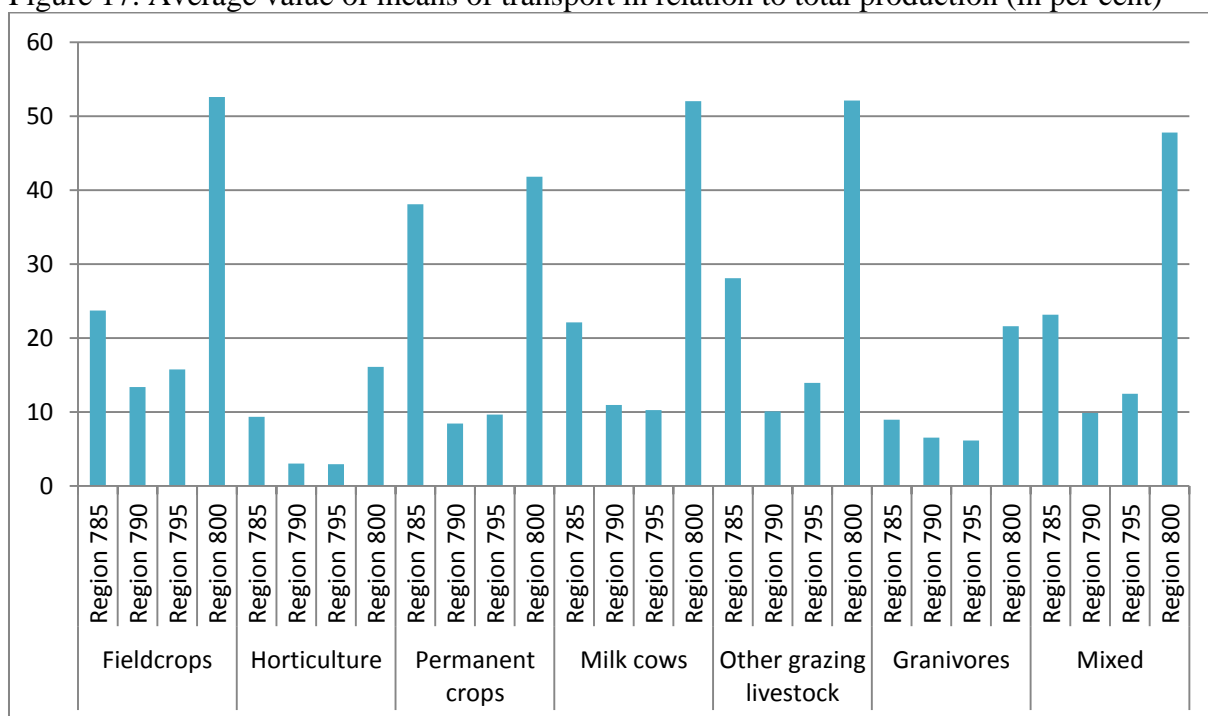
The figures for the average total amount of investment to the total production shows similar patterns as the above described two investment categories (Figure 18). Once again the lowest values applied to farms specialising in granivores. The second place was occupied by farms specialising in horticultures. Yet, here as in the case of farms specialising in permanent crops there was a difference between the figures for the Region 785 and the other ones of more than 20 p.p. This probably owes to the fact that these types of farms have a small representation in the FADN sample of this region as compared with the other regions of the Polish FADN. On average the highest and least diverse were the figures for farms specialising in field crops.

Figure 16. Average value of investment in machine in relation to total production (in per cent)



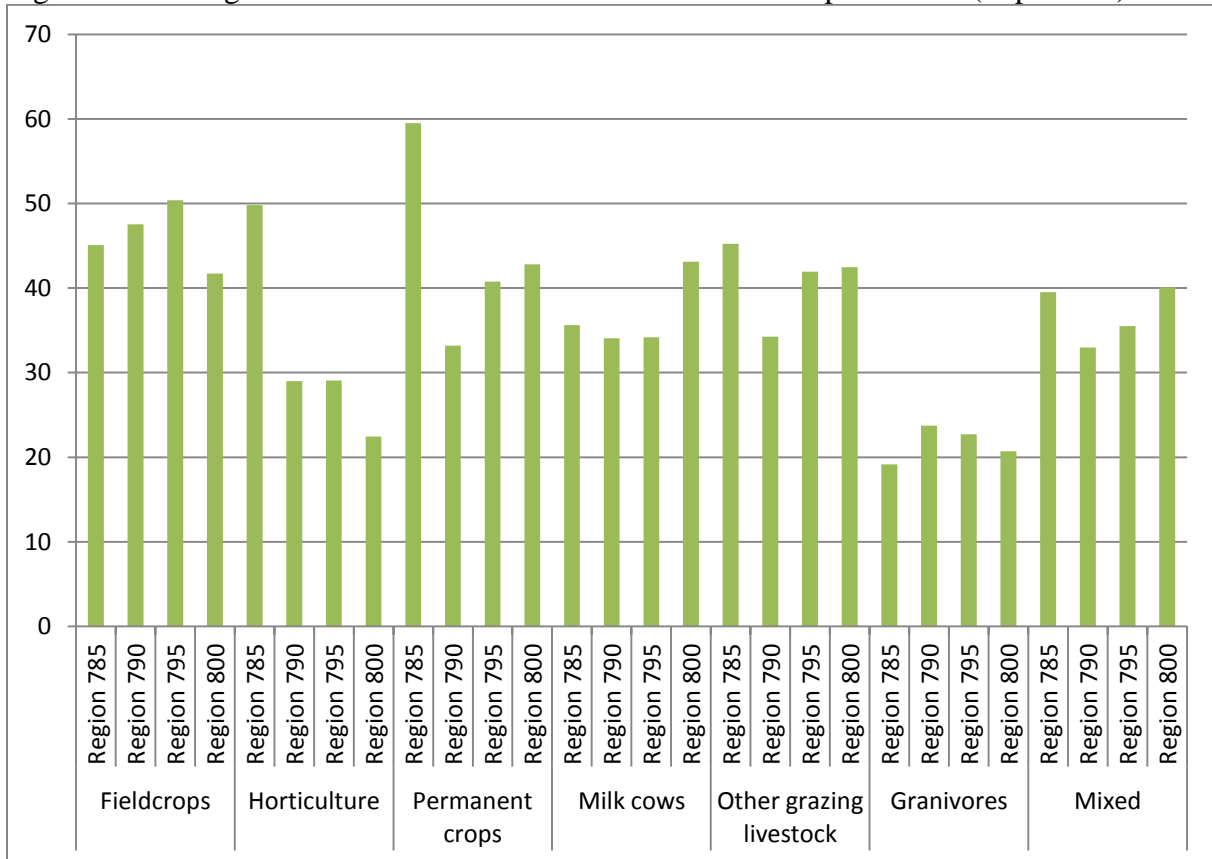
Source: Own elaboration based on the Polish FADN's data.

Figure 17. Average value of means of transport in relation to total production (in per cent)



Source: Own elaboration based on the Polish FADN's data.

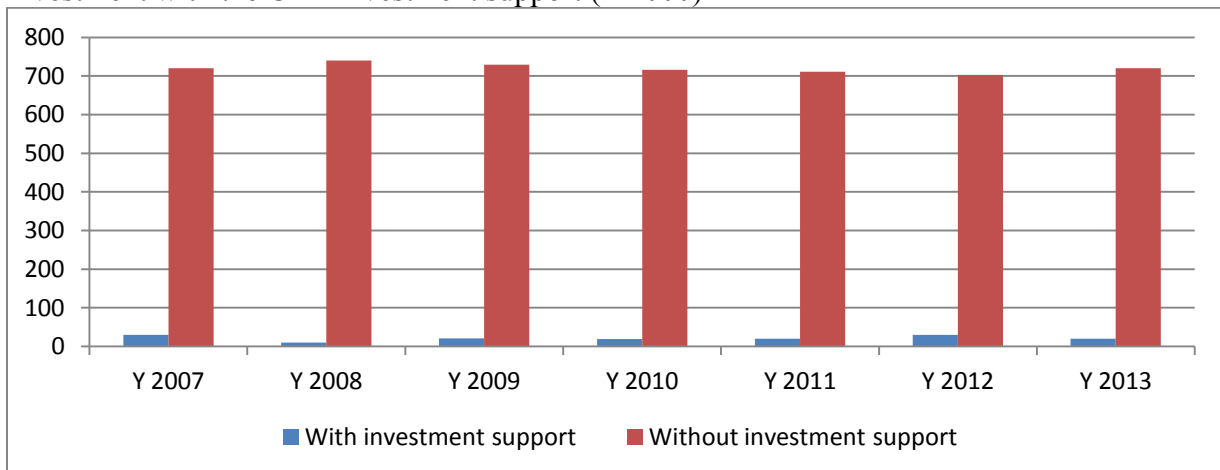
Figure 18. Average total value of investment in relation to total production (in per cent)



Source: Own elaboration based on the Polish FADN's data.

The CAP direct payments strongly contribute to the farms' financial capability of undertaking investment projects. The same cannot be said about the CAP measures implemented within the rural development policy. This is due to the fact that the investment funds within the subsequent rural development programmes can support only a small number of farms in comparison to the whole population. Therefore, only about 3% of the farms represented within the Polish FADN undertook investment with the use of CAP investment support (Figure 19).

Figure 19. Share of farms of the Polish farms represented by the Polish FADN undertaking investment with the CAP investment support (in '000)



Source: Own elaboration based on the Polish FADN's data.

As for the sources of financing of the investment projects the data presented in the Figure 3 has already shown the sources of financial resources used to undertake investment. Thus, it is in most case the income composed of both the income from farming and direct support. Although there is a number of farms indebted, most of the debt stems from long-term preferential credits that were granted to farms before the change of rules on these credits introduced in 2007 (Figure 20). Other sources of external capital are almost non-existent.

Figure 20. Share of farms using external financing (in per cent)

Commercial long-term bank credits	6.5
Commercial long-term credits from other institutions	0.3
Private long-term loans	0.3
Preferential long-term bank credits	62.4
Commercial short-term bank credits	6.2
Commercial short-term credits from other institutions	0.3
Private short-term loans	0.7
Preferential short-term bank credits	20.9
Preferential short-term credits from other institutions	1.3

Source: Own elaboration based on the Polish FADN's data.

The analysis of the correlation between the farm size and the scale of investment shows that there is no strong correlation between the amount invested and the size of a farm or none of the years analysed and none of the farm types. There is also no clear pattern in the level of correlation coefficient for correlation between amount invested and farm's UAA as well as amount invested and farm income. For example in 2007 the correlation coefficient between amount invested and farm size in the Region 795 for mixed farms was 0.34.

## Conclusions

The analysis of the scale and types of agricultural investment undertaken in Poland in the years 2007-2013 based on the Polish FADN data shows that there are significant differences in the scale of investment among FADN regions and farm types. There is no clear relation between the value of investment and the type of farm.

It is also clearly visible that investment is undertaken by larger farms in a given type of farming. This will undoubtedly lead to growing differences in the efficiency and productivity of the Polish farms. Yet, the actual scale of investment is not correlated with farm size or its income level. It depends on the farmer's development strategy, changes in technology and only then the availability of resources is examined.

Most of the investment projects are conducted based on the own financial resources stemming either from farmers' agricultural activity or CAP direct payments. The role played by the CAP investment support is insignificant. Only a small percentage of farms used this source of financing – app. 3%. The CAP investment support is most popular in the case of investment in machines and equipment with app. 12% of farms using it as one of the sources of financing this type of investment. Market sources of external capital are almost non-existent. Only the preferential credits (that is credits with part of the interest paid from the Polish state budget) are in the case of some farms part of their way of financing investment but their popularity is decreasing.

The presented analysis is just an initial step of the research related to the structural changes undergoing in the Polish agriculture. Further steps to be undertaken include, among others, the analysis of:

- impact of technological change on productivity and efficiency of farms;

- impact of the investment on environmental sustainability of agriculture;
- existence of the catching-up process in the Polish agriculture as compared to the more agriculturally developed EU member states.

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