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THE ROLE OF PRO-INVESTMENT MECHANISMS OF THE COMMON AGRICULTURAL POLICY IN ASSET REPRODUCTION OF FARMS IN CENTRAL AND EASTERN EUROPE

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ABSTRACT

The aim of this paper is to identify the role and importance of pro-investment mechanisms within the Common Agricultural Policy in the reproduction of farm assets in countries of Central and Eastern Europe. The experimental material comprised unpublished microdata of farms originating from the FADN database of the European Commission (data source: EU-FADN – DG AGRI). The time frame covered the years 2004–2015. Among all the farms selected for analyses only those ensuring data continuity throughout the entire investigated period were used in the study. In each of the studied countries farms were divided into two groups: the group of beneficiaries of CAP pro-investment funds and the control group. For each farm the value of fixed assets was determined (excluding the value of land) and next the mean value for each group was calculated in an individual country. The study showed that in most investigated countries both farms being and those not being beneficiaries of CAP pro-investment mechanisms are capable of reproducing their fixed assets; nevertheless, it is the farms receiving financial support for their investments that show a capacity to increase the value of their fixed assets.

Key words: Common Agricultural Policy, Central and Eastern Europe, pro-investment mechanisms
JEL codes: Q12, Q14, Q18

INTRODUCTION

In order to successfully compete on the market farms have to undertake investments, particularly aiming at modernisation of their assets. These outlays are incurred to guarantee development of a given economic entity, as well as improve productivity and economic outcomes (Czubak and Sadowski, 2014). Current assets may be reproduced only thanks to purchase or self-supply of inputs, whereas fixed assets are reproduced by investment outlays (Grabowski, 1991). Fixed assets of farms determine their upper limit of production capacities, but they also serve several other functions, e.g. being securities against long-term liabilities (Matemilola and Rubi, 2015). In the case of farms investments are most frequently related with tangible components of fixed assets, which

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directly results in an increased value and changed structure of assets, in turn leading to an increase in the production capacity. In agriculture unit costs may only be reduced thanks to the application of biological progress, organisational improvements and technical change, which requires investments (Czubak, 2012). These investments focus on several basic effects, such as quantitative or qualitative increase in production, reduction of production costs, changes in production structure or rationalised use of inputs. All these effects should lead to an improvement in the economic situation of farms (Babuchowska and Marks-Bielska, 2012). Investment measures should also aim at the substitution of human labour with capital, which results from changes in prices of input costs, among which the greatest dynamics is observed for labour costs (Ziętara, 2008). Investment costs may aim at the introduction of new technologies, improvement of production quality, diversification of agricultural activity, e.g. towards non-agricultural activity, or adaptation of agricultural production to requirements related with environmental protection (Woś, 2000). Investments in the production sphere determine the development potential of farms. They indicate that farmers increase their fixed assets or improve their quality, which is to contribute to an enhanced potential of farms in the future. Improvement of technical instruments of labour, as well as introduction of modern machines and equipment in agricultural production lead to increased productivity both in the case of plant and animal production (Józwiak and Kagan, 2008).

In agriculture of Central and Eastern Europe (CEE) an increase in investments has been observed following the accession of individual countries to the European Union. Considerable improvement of the production potential was made possible by the support of EU funds (Czubak and Sadowski, 2014). The importance of CAP pro-investment mechanisms in the development of farms in analysed countries has also been stressed by Babuchowska and Marks-Bielska (2011), and Kisiel, Dołęgowska and Marozas (2012). For example, in Poland after the country's accession to the EU investment outlays in agriculture have doubled, which has contributed to improved provision of fixed assets in farms (Czubak, 2015). However, in individual countries we may observe differences in the implementation of CAP pro-investment measures (Pawłowski and Czubak, 2018), which in turn may affect the potential to reproduce fixed assets.

In view of the above, the aim of this paper is to identify the role and importance of pro-investment mechanisms within the Common Agricultural Policy in the reproduction of assets in farms of the CEE countries.

MATERIALS AND METHODS

The source material used in the paper comprised unpublished FADN microdata originating from the EU Directorate-General for Agriculture and Rural Development (DG AGRI) database. The unique character of investigations presented in this paper consists in the execution of research tasks based on unpublished microdata of selected farms. Moreover, the microeconomic character of the data facilitates analyses using the dynamic approach (Grzelak, 2014). Formal guidelines related with analyses of particularly sensitive data are closely regulated by firm restrictions, thus this paper may also present results aggregated for a minimum of 15 farms. The analyses were conducted on selected CEE countries, i.e. Bulgaria, the Czech Republic, Estonia, Lithuania, Latvia, Poland, Romania, Slovakia, Slovenia and Hungary. The countries were selected for the study not only because of their geographical location, but primarily the same (or similar – in the case of Bulgaria and Romania) year of accession to the EU. Cyprus and Malta were excluded from the group of 12 countries, which accessed the EU in 2014 and 2017, because – as it is indicated by the authors' previous investigations and a review of literature on the subject – agriculture in those countries is markedly different and may not be considered comparable here. The time frame covered the years of 2004–2015. The starting year for the analyses marks the first enlargement of the EU to include CEE countries, while the last year of this period results from the availability of the most recent data in the FADN database. Farm accountancy data are subjected to several stages of verification at the farm, national and European Commission levels and for this reason they are made available with some delay, thus 2015 was the last analysed year.

An identical research path was followed for each country in this study, as presented below. Among all the farms only those were selected for the investigations, which were permanently present in the FADN database in all the analysed years. Thus it was possible to determine the effect of CAP pro-investment measures on the reproduction of fixed assets in the same farms in each individual year. Thus selected farms within each country were divided into two groups according to formula (1):

$$PIM = \begin{cases} 0, \text{ if } \sum_{t=2004^*}^{2015} SIV_t = 0 \\ 1, \text{ if } \sum_{t=2004}^{2015} SIV_t \geq 5{,}000 \end{cases} \quad (1)$$

*Since 2007 for Bulgaria and Romania.

where:
PIM – pro-investments measures;
SIV – subsidies on investments value (SE406 in FADN database).

The first group (*PIM* = 0) in each analysed country comprises farms, which in the analysed period received no pro-investment subsidies. The other group (*PIM* = 1) consists of farms, for which the total amount of subsidies to investments in the years 2004–2015 was minimum 5,000 EUR. In this way farms, which received support for investments from sources other than CAP funds, were excluded from this study. The above-mentioned threshold was adopted based on the analysis of the national Rural Development Programmes, which assume that pro-investment measures (particularly Young Farmers' Start-up Aid and Farm Modernisation), target relatively high investments, most frequently exceeding 10,000 EUR.

The next step was to calculate the value of fixed assets for each of the farms, which was determined formula (2):

$$FAV_t = TFAV_t - LV_t; \quad \forall t \in < 2004, 2005, ..., 2015 > \quad (2)$$

where:
FAV – fixed assets value;
TFAV – total fixed assets value (SE441 in FADN database);
LV – land value (SE446 in FADN database).

In order to determine the role of CAP pro-investment measures in the reproduction of fixed assets of farms it was necessary to deduct land value (*LV*) from the total fixed assets value (*TFAV*). In this way the value of fixed assets was obtained in accordance with the theory of inputs (labour, land and capital). Thus understood fixed assets determine the production potential of farms and this is the objective of CAP pro-investment measures, while land is a separate input, affected indirectly by pro-investment measures. Next for each country the average fixed assets value (*AFAV*) was determined in individual groups in the analysed years according to formula (3):

$$AFAV = \begin{cases} \frac{\sum_{i=1}^{n} FAV}{n}, \text{ for } PIM = 0 \\ \frac{\sum_{i=1}^{m} FAV}{m}, \text{ for } PIM = 1 \end{cases} \quad (3)$$

where:
AFAV – average fixed assets value in each group;
n – number of farms in group *PIM* = 0;
m – number of farms in group *PIM* = 1.

In order to present the phenomenon more comprehensively, changes in the value of fixed assets in individual countries in the analysed period are given in a graphic form in the next part of this paper.

RESULTS AND DISCUSSION

The number of farms in the FADN database in the individual countries varies greatly (Table 1). This is first of all connected with the method applied to calculate the representative sample of farms in each of these countries.

Definitely the largest number of farms in the FADN database is recorded in Poland (approx. 12,000), while the number is lowest in Estonia, Slovakia, Slovenia and Lithuania (in all these countries the number of farms in each of the years was below 1,000). Apart from the number of farms, its stability over the analysed years is also of great importance. Most of the investigated countries have a comparable number of farms in the database in individual years.

Table 1. The number of farms in the FADN database in individual years

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BGR	–	–	–	1 871	1 950	1 900	2 291	2 245	2 180	2 228	2 228	2 271
CZE	1 317	1 303	1 325	1 323	1 340	1 417	1 429	1 417	1 369	1 401	1 363	1 365
EST	498	498	500	499	498	498	659	657	655	660	658	658
HUN	1 915	1 933	1 944	1 953	1 936	1 932	1 918	1 918	1 978	1 974	1 982	1 962
LTU	1 023	1 049	1124	1 145	1099	1090	1056	1098	1109	1064	1153	1117
LVA	787	914	980	994	997	991	993	996	999	998	998	998
POL	11 831	11 785	11866	12 043	12 273	12 426	11 194	11 076	11 114	12 321	12 315	12 311
ROU	–	–	–	1 008	1 869	3 346	5 616	5 729	5 687	5 885	4 031	4 681
SVK	570	585	581	506	513	506	520	531	529	558	562	562
SVN	524	697	752	755	826	856	959	929	1142	944	904	895

Source: EU-FADN – DG AGRI.

Romania is an exception in this respect, as in the years 2007–2010 the number of farms in the FADN database increased over fourfold.

In the case of data from individual farms the research potential is much greater than for aggregate data. While conclusions drawn from the analyses of microdata were accurate, the precondition of data continuity needs to be met, as it is absolutely essential for panel data. This means that only those entities should be analysed, for which observations are found over the entire time frame. To a certain degree this limits the study population by disqualifying some entities; however, it has a definite advantageous effect on the precision of generated results. In the case of FADN microdata considerable differences are found in the proportions between the number of farms maintaining continuous observations and the mean number of farms from the entire period. In Estonia and Hungary the share of farms with continuous accountancy data exceeds 40%, while it is approx. 30% in Poland, Latvia and Slovakia and 20% in Bulgaria and the Czech Republic (Fig. 1). The percentage of farms maintaining continuous data in the total number of farms was lowest in Lithuania (2.1%) and Romania (0.5%), where out of the mean annual number of 4,206 farms only 23 are recorded in all the years.

Due to the small number of farms maintaining continuous data in Lithuania and Romania the data concerning entities from those countries may not be published according to the DG AGRI regulations, as

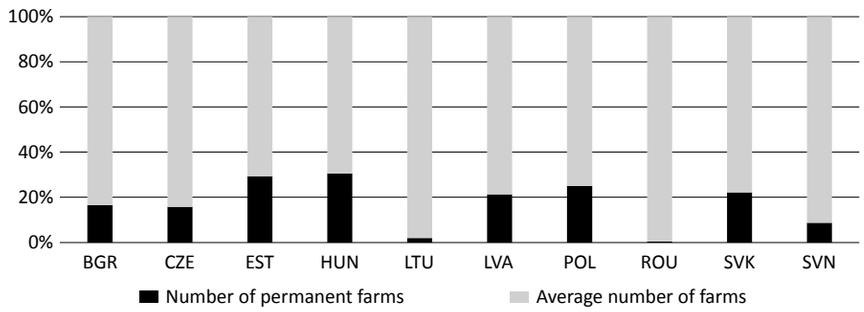

Figure 1. The share of farms found in the FADN database in all the years in the mean number of farms from the years 2004–2015

Source: EU-FADN – DG AGRI.

they concern an aggregate of fewer than 15 farms. In the case of the other countries the number of farms in each of the groups is sufficient to consider conclusions from this study to be presented (Table 2).

The analysis showed that in a vast majority of countries the *AFAV* in group *PIM* = 1 is markedly higher than in group *PIM* = 0. It obviously needs to be stressed that these differences were found already in the early years of analysis, which may indicate that it is farms better equipped in fixed assets that utilise the CAP pro-investment measures. This may be connected with the requirements binding at the implementation of individual instruments. However, it is of greatest importance that farms not receiving subsidies for investments are capable only to reproduce their assets, while farms receiving such subsidies increase their assets from year to year (Figs. 2–9).

Table 2. The number of farms according to groups

Country	PIM = 0 (n)	PIM = 1 (m)
BGR	108	316
CZE	135	113
EST	183	43
HUN	327	489
LTU	19	4
LVA	196	47
POL	1 376	2 152
ROU	10	9
SVK	92	61
SVN	46	21

Source: EU-FADN – DG AGRI.

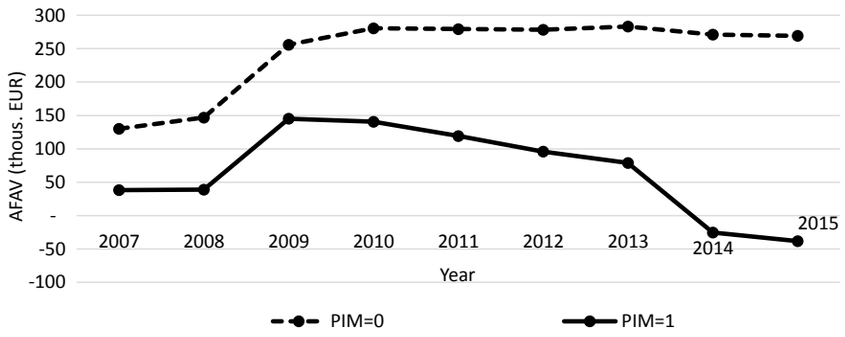

Figure 2. Average value of fixed assets in farms in Bulgaria in the years 2004–2015

Source: EU-FADN – DG AGRI.

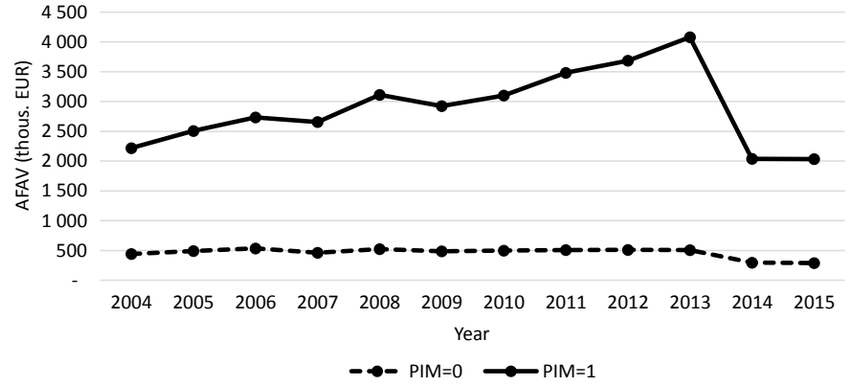

Figure 3. Average value of fixed assets in farms in Czech Republic in the years 2004–2015

Source: EU-FADN – DG AGRI.

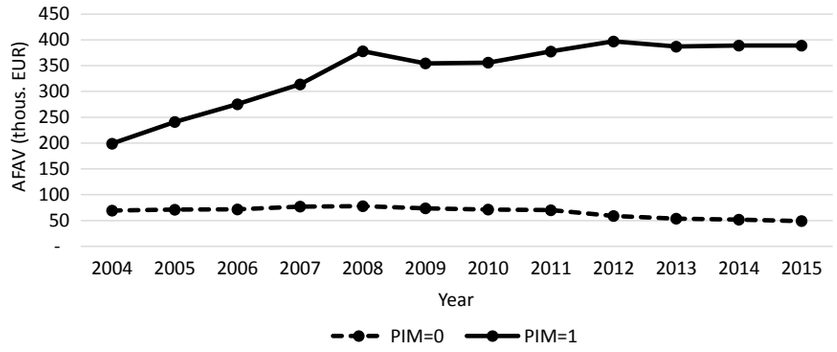

Figure 4. Average value of fixed assets in farms in Estonia in the years 2004–2015
Source: EU-FADN – DG AGRI.

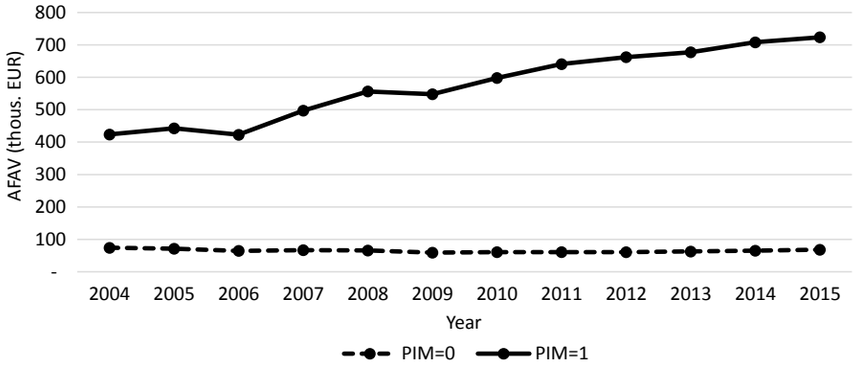

Figure 5. Average value of fixed assets in farms in Hungary in the years 2004–2015
Source: EU-FADN – DG AGRI.

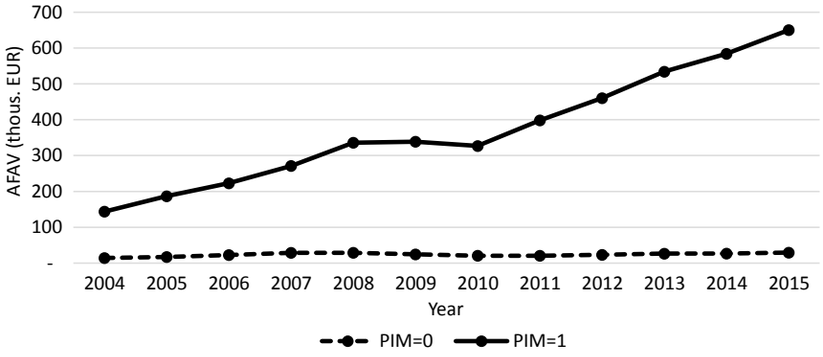

Figure 6. Average value of fixed assets in farms in Latvia in the years 2004–2015
Source: EU-FADN – DG AGRI.

Studies conducted by other authors (Grzelak, 2013; Kołoszko-Chomentowska, 2013; Hornowski, 2015) indicate that not all farms receiving pro-investment support showed a positive effect manifested in a greater value of their fixed assets. These results are confirmed based on the example of Bulgaria, where farms receiving no CAP subsidies for investments are characterised on average by a greater value of

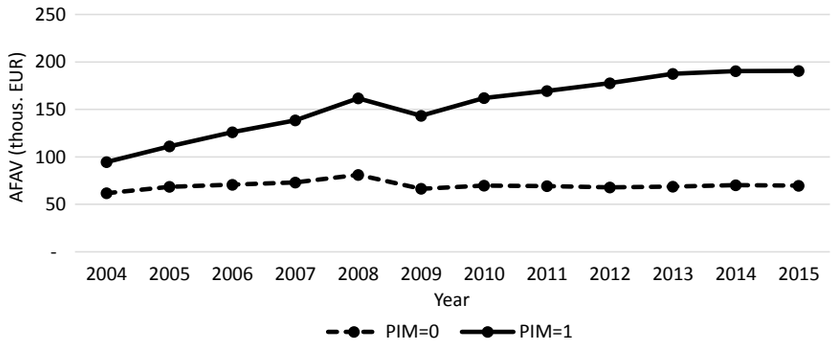

Figure 7. Average value of fixed assets in farms in Poland in the years 2004–2015

Source: EU-FADN – DG AGRI.

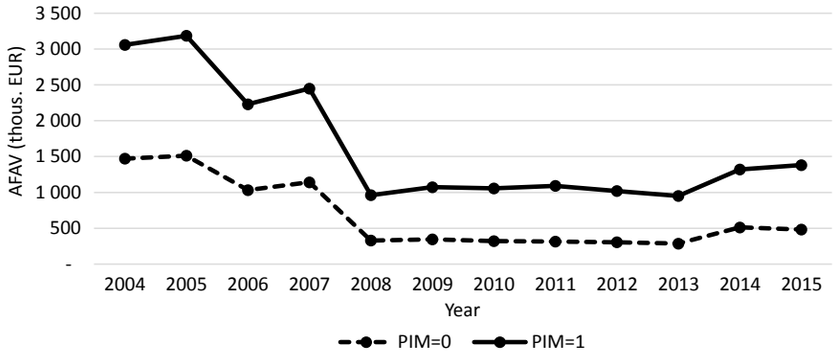

Figure 8. Average value of fixed assets in farms in Slovakia in the years 2004–2015

Source: EU-FADN – DG AGRI.

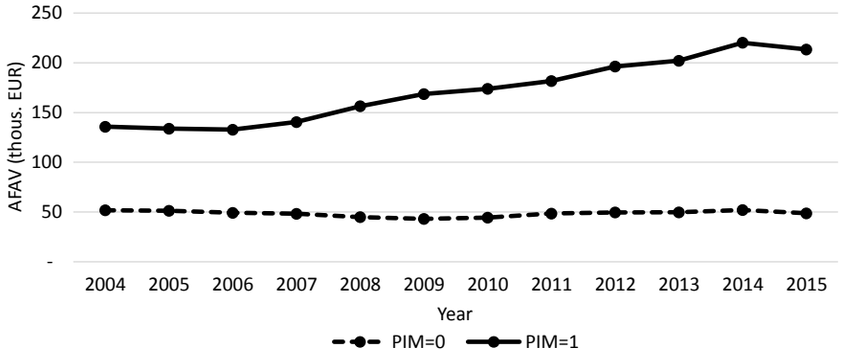

Figure 9. Average value of fixed assets in farms in Slovenia in the years 2004–2015

Source: EU-FADN – DG AGRI.

fixed assets. This may be related with the fact that this group comprises bigger and better developed farms, which are not eligible to apply for subsidies for investments from the second pillar of the CAP. Also in Slovakia the trend was not consistent: in the years 2004–2008 the difference in the mean value of assets between groups $PIM = 1$ and $PIM = 0$ decreased and next it remained at a similar level.

Nevertheless, in contrast to Bulgaria over the entire period the average value of fixed assets in farms using subsidies to investments was greater than in farms from the control group. In turn, in the Czech Republic in 2014 a considerable reduction was recorded in the value of fixed assets, which seems to be connected with a change in their appraisal method. It also needs to be stressed that the Czech Republic and Slovakia are the only countries, in which the average value of fixed assets of farms is the highest, considerably exceeding the corresponding values in the other countries.

Summing up, the stimulating role of CAP pro-investment mechanisms is evident in most CEE countries. However, there are some exceptions to the observed dependence. For this reason in order to draw comprehensive and more specific conclusions, the interaction group ($PIM = 1$) and the control ($PIM = 0$) need to be selected more precisely, which is planned in the further stage of this study. This will provide an answer to the question whether it is caused by the lack of precision in the method proposed in this study or whether it is connected with an ineffectiveness of the implemented CAP pro-investment mechanisms in terms of the intended increase in the value of fixed assets in farms.

CONCLUDING REMARKS

It was attempted in this paper to specify the role of pro-investment mechanisms within the Common Agricultural Policy in the reproduction of assets in farms in the CEE countries. Analyses showed that in most analysed countries both the farms being and those not being beneficiaries of CAP pro-investment mechanisms are capable of reproducing their fixed assets, but only farms receiving subsidies to investments are capable of increasing the value of fixed assets. However, significant differences are only found in the capacity to reproduce fixed assets in individual countries. These investigations show that it is highly advisable to conduct analyses of the effect of CAP pro-investment measures on the value of assets of farms based on more detailed and precise research methods, thus the authors of this paper intend to continue this line of research.

REFERENCES

1. Babuchowska, K., Marks-Bielska, R. (2011). Implementation of the RDP 2007-2013 activity 'Modernisation of farms' in the Lubelskie Voivodeship. Zeszyty Naukowe SGGW. Problemy Rolnictwa Światowego, 11 (26), 14, pp. 7-16.
2. Babuchowska, K., Marks-Bielska, R. (2012). Modernization of Farms from the Warmińsko-Mazurski Region under the RDP 2007-2013. Zeszyty Naukowe SGGW. Polityki Europejskie, Finanse i Marketing, 8 (57), pp. 36-46.
3. Czubak, W. (2012). Use of European agricultural fund supporting investments in agricultural holdings in Poland. Journal of Agribusiness and Rural Development, 3 (25), pp. 57-67.
4. Czubak, W. (2015). Nakłady inwestycyjne w rolnictwie polskim w kontekście wdrażania Wspólnej Polityki Rolnej Unii Europejskiej [Investment expenditures in Polish agriculture in the context of the implementation of the Common Agricultural Policy of the European Union]. In: A. Czyżewski, B. Klepacki (eds.) Problemy rozwoju rolnictwa i gospodarki żywnościowej w pierwszej dekadzie członkostwa Polski w Unii Europejskiej. Polskie Towarzystwo Ekonomiczne, Warszawa, pp. 199-206.
5. Czubak, W., Sadowski, A. (2014). Impact of the EU Funds Supporting Farm Modernisation on the Changes of the Assets in Polish Farms. Journal of Agribusiness and Rural Development, 2 (32), pp. 45-57.
6. Grabowski, S. (1991). Procesy reprodukcji w gospodarstwach indywidualnych [Reproduction processes in individual farms]. PWRiL, Warszawa.
7. Grzelak, A. (2013). Evaluation of investment processes in agriculture in Poland in 2000-2011. Journal of Agribusiness and Rural Development, 2 (28), pp. 111-120.
8. Grzelak, A. (2014). Evaluation of the Reproduction Processes of the Fixed Assets of Farms Engaged in Agricultural Accountancy (FADN). Zagadnienia Ekonomiki Rolnej, 3, pp. 45-64.
9. Hornowski, A. (2015). Investment Activities of Polish Farms Profiting from Structural UE Funds in 2004--2013. Zeszyty Naukowe SGGW. Ekonomika i Organizacja Gospodarki Żywnościowej, 109, pp. 55-70.
10. Józwiak, W., Kagan, A. (2008). Commercial Farms and Large Commercial Farms. Roczniki Nauk Rolniczych, Seria G, 95 (1), pp. 22-30.
11. Kisiel, R., Dołęgowska, D., Marozas, J. (2012). Kierunki wykorzystania płatności bezpośrednich w woj. podkarpackim [Directions of Use of the Direct Subsidies

in Podkarpackie Voivodeship]. Nierówności Społeczne a Wzrost Gospodarczy, 27, pp. 252-267.
12. Kołoszko-Chomentowska, Z. (2013). Przyrodnicze i organizacyjno-ekonomiczne uwarunkowania rozwoju rodzinnych gospodarstw rolnych w województwie podlaskim [Natural, organizational and economic conditions for the development of family farms in the Podlasie Voivodship]. Monografie i Rozprawy Naukowe IUNG-PIB, 41.
13. Matemilola, B.T., Rubi, A. (2015). Debt financing and importance of fixed assets and goodwill assets as collateral: dynamic panel evidence. Journal of Business Economic and Management, 16 (2), pp. 407-421.
14. Pawłowski, K.P., Czubak, W. (2018). Identification of ways of implementing the 2nd pillar of the CAP in Central and Eastern Europe countries. Zeszyty Naukowe SGGW. Ekonomika i Organizacja Gospodarki Żywnościowej, 124, pp. 109-123.
15. Woś, A. (2000). Inwestycje i akumulacja w rolnictwie chłopskim w latach 1988–1998 [Investments and accumulation in peasant farming in the years 1988-1998]. Komunikaty, Raporty, Ekspertyzy, 466, IERiGŻ, Warszawa.
16. Ziętara, W. (2008). From Farm to Enterprise. Roczniki Naukowe SERiA, 10 (3), pp. 597-604.