

THE LEVEL OF INVESTMENT IN FARMS IN EUROPEAN UNION COUNTRIES

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ABSTRACT

The aim of the study presented in the paper was to assess the level of investment in farms in European Union countries. The assessment applied the reproduction rate, fixed-asset reproduction rate and the investment rate. Studies were performed for all farms and farms divided into classes according to economic size (KS6 classification). The study covered years 2007–2016. As significant changes were observed in individual years, the study period was divided into two equal sub-periods, for which average values of the ratios were determined. The studies showed that the level of investment in farms as taken jointly for all EU countries is not enough to reproduce their assets in both sub-periods. What needs to be positively assessed is the fact that the values of all indicators grow as the economic size of farms grows. The level of reproduction and multiplication of property in Polish farms is lower than the EU average for economically weaker farms, but it is usually higher for the stronger ones.

Key words: investments of farms, FADN, asset reproduction

JEL codes: Q14

INTRODUCTION

When assessing the situation of farms, what needs to be taken into account is not only the current situation, but also the future one. Development is a direct consequence of made investments, serving not only to restore the assets, but also to multiply it.

Investing by economic entities requires own or foreign financial means. The accession of Poland to the EU allowed farms to have access to EU funds. In years 2004–2016, as part of direct payments, over PLN 144 billion was paid out to Polish farmers¹. It had an effect not only on the level of life of farmers, but also

on the conditions of production and its development. The inflow of funds certainly makes farms take investment decisions, particularly so as there are additional payments for the investing activity.

Kulawik [2014] pays attention to the impact of subsidies on the investment decisions taken by EU agricultural producers. He notes that by allowing to considerably reduce the cost of capital, the subsidies can be an incentive to increase production capacities of farms through the use of newer technologies, modernisation of the machine park and expansion of farmland area. On the other hand, he claims that if subsidies do not result in shifting to

¹ The Agency for Restructuring and Modernisation of Agriculture (ARiMR) database. Retrieved from <http://www.arimr.gov.pl/pomoc-unijna/wdrazane-programy-i-dzialania-dane-liczbowe/zrealizowane-platnosci-obszarowe.html> [accessed 12.2018].

new technologies, they “weaken the motivation of farmers to improve competitiveness and take entrepreneurial actions and investments” [Kulawik 2014, p. 105]. Despite this, there is no doubt that subsidies have an effect on increase in the income of farmers and that their share in farming income is considerable. It might be suspected that if a market was opened to foreign farming products, a lot of weaker farms would not be able not only to invest, but even to pursue further activity.

Józwiak [2012] writes about the meaning of investment in farming. He points out that it is the investments that indicate the competitiveness of farms, apart from the obtained income. This is so as they indicate the willingness and the skill of the entity to adapt to the changing environment, which is a condition for maintaining competitiveness in the long run. Supporting investments with EU funds has a direct effect on the implementation of innovation in farms.

Gołębiowska [2010] provides the following as investing goals: introduction of new technologies, improvement in production quality, differentiation of agricultural activity or adaptation of agricultural production to the requirements of environment protection. She draws attention to the fact that the factors having an impact on investment decisions may be both internal and external. The conducted studies show that the entities with the highest participation in expenses for investment purposes were farms with stronger ties with the surroundings.

Investigations by Grzelak [2012] indicate a significant effect of general economic conditions on the reproduction processes. The scale of production is also an important factor. Economically strong farms usually showed extended reproduction, economically weaker ones – a narrowed one.

The aim of the studies presented in the paper is to compare the level of investment conducted by farms in EU countries, taking into account their economic size. The study covered years 2007–2016. The scope of study was limited to commercial farms. According to FADN methodology, they cover farms achieving

standard production of over EUR 2,000². In 2016, they were 52% of all farms, but they manufacture nearly 82% of farming production³. The other farms (often referred to as welfare farms), are 48% of all farms, but their share in agricultural production is only 18%. Due to the low value of production, their owners usually generate income from other sources [Sikorska 2003, Józwiak et al. 2018]. According to Kołoszko-Chomentowska and Siczko [2014, p. 104]: “farms without the capacity to commercial production and reproduction of potential are not farming components, but welfare entities”.

MATERIAL AND METHODS

The assessment of the level of investment in farms usually uses three indicators being a relation of investment to depreciation (*W1*), investment to fixed assets (*W2*) and investment to farming income (*W3*). The said indicators are named variously in the literature, they are also different in economic categories used to determine them.

The *W1* indicator is referred to as the reproduction indicator [Grzelak 2012, Grzelak 2014, Ryś-Jurek 2014, Grzelak 2015], fixed-asset reproduction rate [Józwiak 2012], investment rate [Kulawik 2014] or asset reproduction indicator [Wasilewska 2009]. The *W2* indicator is a relation of gross investment to fixed assets [Grzelak 2012], fixed-asset restoration indicator [Grzelak 2014, Ryś-Jurek 2014], fixed-asset reproduction rate [Wasilewska 2009, Józwiak 2012]. The *W3* indicator is referred to as the relation of investment to income [Grzelak 2012, Ryś-Jurek 2014] or investment rate [Grzelak 2014].

To determine the indicators, gross investments, gross investments without land or net investments are used. Some authors include all fixed assets in the *W2* indicator, others reduce it by the value of land. The indicators determined for various categories differ not only in values, but also in their interpretation.

In this paper, the indicators were determined in the following manner:

² The manner of determination of standard output (SO) is presented, among others, by Goraj et al. [2012].

³ These values were calculated according to Statistics Poland (GUS) and FADN values.

$$W1 = \frac{\text{gross investments}}{\text{depreciation}} \cdot 100\% \quad (1)$$

$$W2 = \frac{\text{net investments}}{\text{fixed assets}} \cdot 100\% \quad (2)$$

$$W3 = \frac{\text{gross investments}}{\text{agricultural income}} \cdot 100\% \quad (3)$$

The $W1$ indicator will be referred in this paper as the reproduction indicator. To determine it, gross investments not adjusted by the value of purchased land were used because land purchases were not defined in the FADN base – investments are entered jointly. It distorts the interpretation of this indicator to some extent as land is not depreciated. Studies by Grzelak [2015] indicate that land purchases prevailed in the farms with a low value of reproduction indicator (calculated for gross investments without land). The $W1$ indicator calculated according to formula (1) cannot be interpreted as a measurement of asset reproduction. Values higher than 100% do not guarantee the reproduction of fixed assets if land was a significant item in the investment. The $W1$ indicator can assume negative values if gross investments are negative. Such a situation will occur when the sold assets exceed the purchased and produced one (including the breeding livestock). It usually means the lack of vistas for the farms and inclination to their liquidation.

The $W2$ indicator (fixed-asset reproduction rate) is information about the degree of multiplication of assets (along with land). Positive values mean that farms increase the possessed assets. As the numerator of the $W2$ indicator include net investments (gross investments minus depreciation), the indicator will be negative in the cases where the $W1$ indicator is lower than 100. As a result, the interpretation of the sign of that indicator is analogous to the interpretation of the $W1$ indicator (whether it is higher or lower than 100%).

In the case when investments are pursued from own funds of farms, the $W3$ indicator (investment rate) shows what part of their income is allocated to development. If external financing sources are also

used, the $W3$ indicator shows proportions between investments and income. It must be added that in some instances the interpretation of the $W3$ indicator may be difficult. Such a situation will occur when gross investments or farming income are lower than 0. The $W3$ indicator is then lower than 0 and the interpretation depends on what category is negative. If both gross investments and farming income are lower than 0, the $W3$ indicator is positive and its value may be misleading.

The average values of the indicators were calculated for all farms from the FADN base and for classes determined according to the economic size according to the ES6 classification⁴. Individual classes were determined in the following manner:

- K1 – very small farms, economic size in thousand EUR $\in [2; 8)$;
- K2 – small farms, economic size in thousand EUR $\in [8; 25)$;
- K3 – medium-small farms, economic size in thousand EUR $\in [25; 50)$;
- K4 – medium-large farms, economic size in thousand EUR $\in [50; 100)$;
- K5 – large farms, economic size in thousand EUR $\in [100; 500)$;
- K6 – very large farms, economic size from EUR 500,000 upwards.

RESULTS AND DISCUSSION

The studies used data from 2007 and 2016, coming from commercial farms from EU-28 member states, included in the FADN base. The studies included the Great Britain despite the planned exit from the EU and Croatia, which until 2013 had not been a member of the EU.

The three indicators were calculated for all years and all farms and with division into classes. It turned out that there is quite a variability in them over years, which results in comparison between countries giving various assessments depending on the year of the analysis. As a result, the data were aggregated, determining average values of the $W1$ and $W2$ indicators

⁴ Standard values for 2015 obtained for farms participating in the Polish FADN [IERiGŻ-PIB 2016].

for two five-year sub-periods⁵: from 2007 to 2011 and from 2012 to 2016⁶. In the *W3* indicator, both the numerator and the denominator are data in the form of a time series of periods, which allows aggregation by way of determining the sum. Therefore, in both sub-periods gross investments and farming income were summed up and then their quotient was calculated.

When assessing the levels of the indicators in various countries and economic classes, it must be remembered that between the countries and classes there are huge differences as regards the level of equipping the farms with fixed assets or as regards their incomes. These factors surely have an effect on the inclination to undertake investment efforts. The indicators allow to assess the investment ability in farms from various perspectives, but they do not explain what their level results from.

Table 1 illustrates average reproduction values (*W1*) for both five-year sub-periods.

In the first sub-period, the values of the indicator lower than 100% were seen in almost all countries of Southern Europe (except for Bulgaria and Slovenia) and in Poland, France and Slovakia. The highest values (above 150%) were seen in nine countries – five highly developed countries of Western Europe (Sweden, Denmark, the Great Britain, Belgium and the Netherlands) and for post-communist ones (Lithuania, Bulgaria, Estonia and Latvia). The average values (from 113 to 149%) were seen in eight countries (three out of which are post-communist countries – the Czech Republic, Slovenia and Hungary).

In the second sub-period, the values of the indicator lower than 100% were seen in most countries of Southern Europe (except for Bulgaria, Malta, Portugal and Slovenia) and Poland and France. Very high (above 150%) values of the indicator were obtained in two highly developed countries of Western Europe (Ireland and Luxembourg) and three post-communist ones (Latvia, Estonia and Lithuania). Average values (from 110% to 150%) were obtained by three post-communist countries (Bulgaria, the Czech Republic

and Hungary), four highly developed ones (the Netherlands, Belgium, Sweden and Germany) and Malta. In the six other countries, the *W1* indicator's value was from 111 to 129% and 101% in Finland.

The average level of the *W1* indicator in the second sub-period increased in 14 countries and decreased in 13 compared to the first sub-period. The increases and decreases covered various countries, both highly developed and post-communist, and countries from Southern Europe – no principle can be formulated here.

For all EU countries, the average reproduction indicator for the second sub-period was slightly higher than the one determined for the first sub-period, but its low value (slightly higher than 100%) indicates markedly that EU farms are not developing in general. Of course, it does not mean that this conclusion applies to all farms in all countries. What is recommended is an analysis separate for the classes distinguished by economic size.

As mentioned, the average reproduction indicator for all EU farms has a low value both in the first and in the second period, but there is a pronounced upward trend as the economic size expands. In both sub-periods, the average value *W1* of below 100% is seen in farms from class K1 to class K4 and above 100% – in farms from class K5 and K6. Class K6 has the highest value, although what may be disconcerting is the decrease in the reproduction indicator over time (observed in class K5 as well).

Data from the individual countries indicate that classes K5 and K6 are definitely the leaders in the field of asset reproduction. In the first period, the highest *W1* indicator was seen in class K6 in 11 countries and in class K5 in nine countries (including Poland). What is interesting is the situation of very small farms (K1) in Estonia and small farms (K2) in Slovakia, where it is them that are the leaders of reproduction in these countries. The values of the *W1* indicator higher than 100% in all classes can be seen in farms in Bulgaria, Estonia, Lithuania and Latvia and in Austria (which in the FADN base has data about farms in K2–K5 class only).

⁵ An equal division of the research period was decided. The research covered a period of only 10 years. Investments should be considered in longer periods to eliminate fluctuations that are observed in individual years.

⁶ In the case of Croatia, 2016 was omitted in calculations for all farms because the values of the indicator indicated a data error. Year 2016 was included in the case of the indicators calculated separately for classes.

Table 1. Average reproduction rates in the EU countries – *W1* index

Country	First sub-period 2007–2011							Second sub-period 2012–2016						
	T. ^a	K1	K2	K3	K4	K5	K6	T.	K1	K2	K3	K4	K5	K6
	%													
Austria	141	–	134	141	148	142	–	128	–	150	106	128	118	–
Belgium	155	–	–	64	131	147	192	138	–	–	–	121	148	140
Bulgaria	193	127	126	241	213	238	196	149	99	111	80	211	135	157
Croatia	–	–	–	–	–	–	–	61	22	27	48	68	130	–
Cyprus	72	60	68	64	104	86	–	62	55	56	17	78	79	–
Czech Republic	122	–	69	105	101	116	135	146	–	83	104	128	154	148
Denmark	193	–	3	132	83	188	249	125	–	29	–63	60	117	148
Estonia	192	273	146	189	184	203	194	165	125	126	108	143	159	159
Finland	120	–	86	96	123	138	82	101	–	72	93	92	120	104
France	93	–	–	79	85	96	104	98	–	98	95	95	100	112
Greece	18	8	14	27	47	10	–	26	21	21	32	46	57	–
Spain	72	29	39	64	88	108	113	72	59	52	63	79	89	93
Netherlands	152	–	–	26	32	178	155	138	–	–	76	–21	168	141
Ireland	114	–48	94	82	94	197	–	167	–	115	118	140	247	–
Lithuania	218	125	242	288	299	249	171	155	190	150	136	151	148	116
Luxembourg	144	–	–	152	106	144	244	155	–	–	54	107	162	203
Latvia	170	107	117	147	160	181	236	190	111	117	128	161	173	241
Malta	57	48	99	163	196	402	–	136	182	–6	138	107	157	–
Germany	127	–	–	76	91	131	149	134	–	–	89	115	125	147
Poland	95	15	58	118	166	193	159	85	21	43	88	125	154	108
Portugal	93	53	78	87	95	142	108	121	85	115	78	125	125	178
Romania	55	20	60	92	89	152	141	44	–7	12	34	60	152	132
Slovakia	92	–	169	154	89	93	90	112	–	–	155	155	118	97
Slovenia	119	74	111	128	171	227	–	111	114	104	99	124	177	–
Sweden	194	–	71	154	183	224	199	136	–	89	52	117	161	132
Hungary	113	8	60	108	112	141	150	136	13	63	128	178	182	151
Great Britain	157	–	91	126	130	159	195	129	–	–20	71	105	124	152
Italy	37	14	28	30	21	59	83	68	43	71	72	62	73	90
Total	104	22	56	84	93	125	153	107	26	65	78	98	119	139

Notes: Empty items mean the lack of data in the FADN base. In the second sub-period, class K3 was omitted in Belgium because data about these farms were only from 2012.

^aFor all households.

In the second period, the highest reproduction indicator in class K6 had 11 countries and in class K5 – as many as 15 countries. The values of the indicator higher than 100% in all classes were seen only in three countries – Estonia, Lithuania and Latvia.

Table 2 illustrates average rates of reproduction of fixed assets ($W2$) for both five-year sub-periods. As mentioned earlier, the interpretation of the sign of the $W2$ indicator is the same as the interpretation of $W1$ going beyond 100%. Therefore, some conclusions resulting from the analysis of the $W1$ indicator still apply.

In the first sub-period, the pronounced leaders as regards the fixed-asset reproduction rate were four post-communist countries: Lithuania, Latvia, Estonia and Bulgaria ($W2$ value above 6.0%). However, taking into consideration low values of the assets of farms in these countries, it cannot be assumed that they will make up for the dissonance as regards highly developed countries. The reproduction rate from 1.1 to 3.7% can be seen in nine developed countries of Western Europe (Sweden, Belgium, Luxembourg, Austria, Denmark, Finland, the Netherlands, the Great Britain and Germany) and the Czech Republic. In other countries, the $W2$ indicator has low values (below 1%) and negative values.

In the second sub-period, the same four countries as in the first sub-period are the leaders in terms of the reproduction rate ($W2$ indicator from 4.4 to 7.8%). The $W2$ indicator from 1.0 to 3.1% is seen in the Czech Republic, Luxembourg, Belgium, Hungary, Slovakia, Germany, Austria, Sweden and the Netherlands. For the other countries, the reproduction rate is low (below 1%) or negative.

The average level of the $W2$ indicator in the second sub-period was higher than in the first one in 12 countries and lower in 15. Similarly to the $W1$ indicator, increases and decreases included various countries.

Let us assume that the value of the $W2$ indicator of above 10% means a very high level and from 5 to 10% – a high level. The very high level in the first sub-period was seen in Lithuania in classes K3, K4 and K5, in Latvia in classes K5 and K6, in Bulgaria in classes K5 and K6 and in Slovakia in classes K2 and K3. In the second sub-period, no country and no class showed such a high reproduction rate. A high

level of the $W2$ indicator in the first sub-period in various classes was obtained in 15 cases (11 out of which are post-communist countries) and in the second sub-period – in 11 cases (9 post-communist countries). In nearly all cases (except for two) of high and very high reproduction rates, they were reduced, which means a reduction in the propensity to invest and which might result from the achievement of sufficient equipment with fixed assets.

Table 3 illustrates the average investment rate ($W3$) determined for all farms from the EU countries, with division into classes according to economic size for both sub-periods.

In the first sub-period, the highest values of investment rate were seen in farms from Sweden, the Netherlands and Luxembourg. Moreover, values exceeding 100% were observed in Finland, the Czech Republic, Slovenia, Estonia, Lithuania and Germany. Therefore, five highly developed countries and four post-communist countries are the leaders. The lowest values, below 40%, are observed in farms from seven countries of Southern Europe (Portugal, Cyprus, Romania, Malta, Italy, Spain and Greece). For the other countries, the indicator's value is from 42 to 87%.

In the second sub-period, the highest $W3$ indicator (over 200%) was observed in Slovakia, Estonia and Sweden. $W3$ values exceeding 100% were observed in Luxembourg, Slovenia, Denmark, Finland, Latvia, the Czech Republic, the Netherlands and Germany.

Very low (below 40%) values of $W3$ were seen in the same countries of Southern Europe as in the case of the first sub-period. For the other countries, the indicator's value is from 43 to 98%.

The $W3$ indicator for Poland is lower than the EU average in both sub-periods.

The average level of the $W3$ indicator in the entire EU is 50% and has slightly grown in the second sub-period compared to the first one. The largest change in the value of the indicator (above 20 percentage points) was observed in the following four post-communist countries: Estonia (increase by as many as 137 percentage points), Slovenia, Latvia, Lithuania and Malta. The biggest decrease was observed in the Netherlands (by 67 percentage points). In the other countries, the changes fit within the scope of ± 20 percentage points: in most of them, these were slight increases.

Table 2. Average rates of fixed assets in the EU countries – *W2* index

Country	First sub-period 2007–2011							Second sub-period 2012–2016						
	T. ^a	K1	K2	K3	K4	K5	K6	T.	K1	K2	K3	K4	K5	K6
	%													
Austria	1.9	–	1.5	1.8	2.3	2.2	–	1.4	–	2.2	0.3	1.4	1.0	–
Belgia	3.0	–	–	–1.9	1.4	2.4	6.2	1.9	–	–	–	0.8	2.3	2.5
Bulgaria	6.1	0.9	1.6	7.9	6.8	15.8	11.6	4.4	0.1	0.7	–2.5	7.3	4.6	6.9
Croatia	–	–	–	–	–	–	–	–1.2	–2.1	–2.0	–1.9	–1.3	1.2	–
Cyprus	–0.7	–0.7	–0.8	–1.4	0.4	–0.4	–	–0.9	–0.8	–0.8	–2.1	–0.6	–0.5	–
Czech Republic	1.2	–	–2.4	0.3	0.1	1.1	1.7	3.1	–	–1.2	0.3	2.0	4.2	3.8
Denmark	1.8	–	–1.3	0.4	–0.3	1.5	3.6	0.5	–	–1.2	–2.7	–0.9	0.3	1.1
Estonia	6.4	2.7	1.8	6.4	7.0	9.0	7.2	5.3	0.6	1.4	0.5	3.9	5.3	4.6
Finland	1.5	–	–0.7	–0.3	1.7	3.3	–1.7	0.1	–	–1.5	–0.4	–0.5	1.5	0.3
France	–0.9	–	–	–1.9	–1.6	–0.6	0.6	–0.3	–	–0.3	–0.5	–0.5	0.0	1.7
Greece	–2.9	–3.2	–3.0	–2.7	–2.3	–3.7	–	–2.5	–2.3	–2.6	–2.4	–1.9	–1.5	–
Spain	–0.4	–1.0	–0.9	–0.5	–0.2	0.1	0.3	–0.6	–0.8	–1.1	–0.8	–0.4	–0.2	0.0
Netherlands	1.5	–	–	–1.8	–1.7	1.6	2.6	1.0	–	–	–0.5	–1.7	1.4	1.6
Ireland	0.1	–0.8	0.0	–0.2	–0.1	1.2	–	0.5	–	0.0	0.1	0.3	1.5	–
Lithuania	8.5	1.6	9.5	13.8	14.5	11.8	6.1	5.6	7.0	4.9	3.7	5.7	5.2	1.7
Luxembourg	2.5	–	–	2.3	0.3	2.6	8.7	3.1	–	–	–2.2	0.3	3.6	6.0
Latvia	6.8	–0.2	1.9	5.5	7.7	10.4	10.6	7.8	–0.5	1.3	2.9	7.1	8.3	9.8
Malta	–0.6	–0.6	0.0	0.8	1.2	3.7	–	0.6	1.1	–1.4	0.6	0.2	0.8	–
Germany	1.1	–	–	–0.6	–0.3	1.3	3.5	1.4	–	–	–0.3	0.4	1.0	2.7
Poland	–0.1	–3.2	–1.6	0.8	2.5	3.9	3.4	–0.5	–2.3	–1.8	–0.4	0.8	1.8	0.5
Portugal	–0.3	–1.7	–1.0	–0.7	–0.5	2.0	0.7	0.9	–0.4	0.6	–0.8	1.1	1.0	5.8
Romania	–1.9	–3.1	–1.5	0.7	–0.5	3.8	2.1	–2.6	–4.5	–3.4	–2.3	–2.5	3.6	2.3
Slovakia	–1.5	–	10.5	11.4	–3.3	–1.5	–1.6	1.7	–	–	4.9	7.9	2.8	–0.4
Slovenia	0.7	–0.9	0.3	1.1	3.1	5.4	–	0.5	0.5	0.2	0.0	1.1	3.8	–
Sweden	3.7	–	–0.7	1.7	2.3	5.7	5.5	1.3	–	–0.3	–1.2	0.4	2.5	1.6
Hungary	0.9	–5.2	–2.2	0.4	0.8	3.2	4.8	1.9	–2.2	–1.2	1.0	3.2	4.5	4.3
Great Britain	1.2	–	–0.1	0.4	0.5	1.3	2.9	0.6	–	–1.2	–0.3	0.1	0.5	1.2
Italy	–1.5	–2.6	–1.8	–1.7	–1.9	–0.9	–0.3	–0.6	–1.7	–0.4	–0.4	–0.7	–0.5	–0.2
Total	0.1	–2.3	–1.1	–0.4	–0.2	1.0	2.5	0.3	–2.6	–0.9	–0.6	–0.1	0.7	1.8

Notes: As for Table 1.

Table 3. Average investment rates in the EU countries – *W3* index

Country	First sub-period 2007–2011							Second sub-period 2012–2016						
	T. ^a	K1	K2	K3	K4	K5	K6	T.	K1	K2	K3	K4	K5	K6
	%													
Austria	77	–	100	79	73	66	–	91	–	244	83	79	63	–
Belgium	81	–	–	33	77	69	127	77	–	–	–	69	73	89
Bulgaria	87	32	47	112	117	128	112	91	34	23	19	79	169	154
Croatia	–	–	–	–	–	–	–	56	31	24	25	27	56	–
Cyprus	24	44	22	19	40	25	–	25	78	30	14	67	40	–
Czech Republic	129	–	54	58	60	72	252	115	–	55	53	66	74	148
Denmark	$d < 0$	–	66	972	173	$d < 0$	$d < 0$	166	–	405	$i < 0$	85	134	296
Estonia	114	43	52	84	87	128	211	250	55	85	132	137	235	8043
Finland	132	–	218	98	97	156	106	145	–	933	225	102	129	183
France	72	–	–	65	71	73	73	91	–	20	85	87	94	87
Greece	4	2	3	6	10	2	–	9	10	8	10	12	12	–
Spain	10	7	6	8	10	14	15	12	19	11	11	14	15	12
Netherlands	180	–	–	56	46	137	369	113	–	–	729	$i < 0$	131	122
Ireland	44	$i < 0$	45	32	31	67	–	47	–	37	34	33	53	–
Lithuania	72	55	69	71	80	78	89	97	158	98	69	85	93	107
Luxembourg	179	–	–	4169	132	160	416	187	–	–	107	116	174	263
Latvia	104	42	46	93	107	147	276	140	33	44	80	115	175	296
Malta	11	14	17	31	33	94	–	33	174	$i < 0$	23	14	42	–
Germany	101	–	–	90	65	85	200	100	–	–	83	79	82	158
Poland	42	10	30	45	55	64	93	44	17	30	45	53	54	76
Portugal	30	21	27	28	25	40	37	31	19	27	20	31	33	64
Romania	14	6	11	25	17	41	20	11	$i < 0$	2	4	7	30	33
Slovakia	$d < 0$	–	56	165	180	$d < 0$	$d < 0$	369	–	–	278	181	287	346
Slovenia	123	488	132	101	100	91	–	178	$d < 0$	195	117	133	121	–
Sweden	217	–	94	199	142	202	971	222	–	701	248	179	232	297
Hungary	53	7	22	37	40	67	100	43	5	12	25	34	50	98
Great Britain	78	–	58	93	70	74	92	98	–	$i < 0$	50	92	90	103
Italy	11	7	13	11	7	12	10	15	38	27	21	13	12	10
Total	50	9	21	34	41	62	104	54	13	25	34	43	63	88

Notes: As for Table 1.

$d < 0$ means negative agricultural income, $i < 0$ means negative gross investments.

What is a positive in the situation is the fact that the average investment rate in EU countries grows as the economic size of farms increases, in both sub-periods.

What attracts attention when analysing the level of investment rate in individual classes and countries is its very high values (above 500%) in several cases in class K6 and classes K2 and K3. This results from relatively low income, not exceptionally high investments.

The highest tendency to invest in relation to income in the first sub-period was observed in the farms from the highest class, K6 (in 12 countries), and from class K5 (in 5), but also in the other classes in several cases (from 2 to 3). In the second sub-period as well, the highest investment rates were observed in the largest number of countries in class K6 (in 12), but also in classes K5, K2 and K1 (in 5 countries per class) and in one country in class K3.

The investment rate indicates a propensity of the farm owner to make investment effort. To examine whether there is a linear link between the $W3$ indicator and income from the farm (from five years in total) in individual countries, correlation coefficients were calculated between these characteristics for the two sub-periods.

In the first sub-period, Denmark and Slovakia were excluded because the average income (or rather losses) generated in their farms pronouncedly deviated from the rest and changed to correlation coefficient very much. In the second sub-period, all EU countries were included. In the first sub-period, the correlation coefficient was 0.35; in the second – 0.13. These values show that even though in the first sub-period there was a weak linear link between the level of income and the investment rate, in the second sub-period there was no such link at all [Wasilewska 2009]. Perhaps it would be worthwhile to allocate some EU subsidies for operating activity to investment. In 2016, subsidies for investment activity were merely 2.7% of subsidies for operating activity, and their share in gross investments was only 3.3%⁷.

CONCLUSIONS

The most important conclusions to be drawn from the above are as follows:

1. The values of the reproduction indicator ($W1$) and reproduction rates ($W2$) indicate that farms in most countries of Southern Europe (and in Poland and France) do not reproduce the possessed assets. This conclusion applies both to the first (2007–2011) and the second (2012–2016) sub-period. An exception to this are two post-communist countries – Bulgaria and Slovenia (in both sub-periods) and Malta and Portugal (in the second sub-period). A very high and high level of reproduction is observed both in highly developed countries of Western Europe and in post-communist countries. The leaders in the fixed-asset reproduction rate are Lithuania, Latvia, Estonia and Bulgaria.
2. The investment rate ($W3$) in both sub-periods is the lowest in countries of Southern Europe (except for Slovenia and Bulgaria). High values were observed both in some post-communist countries and in highly developed countries. Studies showed that in the second sub-period there is virtually no link between the income generated in the farm and the tendency to invest, measured with the $W3$ indicator, at the level of countries. The link was weak in the first sub-period. As subsidies for investment activity were merely 2.7% of subsidies for operating activity and their share in gross investments was only 3.3% in 2016, perhaps it would be worth increasing the share of subsidies for investments.
3. The highest propensity to invest in both sub-periods was manifested by very large and large farms (usually the three indicators were the highest in these classes).
4. Overall, the investment level for the EU countries is not sufficient to reproduce their assets in both sub-periods under investigation (a slight increase in the value of the $W1$ and $W2$ indicators in the second sub-period does not give grounds for changing that assessment). What is encouraging is only the fact that

⁷ Calculated on the basis of 2016 FADN data for all countries on the basis of the value of subsidies for investments (SE406), subsidies for operating activity (SE605) and gross investments (SE516).

the situation is improving along with the growing economic size of farms. Large and very large farms pursue investments at levels allowing their development, which means that their role in the farming production will strengthen in the future.

- Polish farms invest little compared to other EU countries. It manifested the three considered indicators that were lower than the EU average in both sub-periods. What might be encouraging is only the fact that the economically strongest Polish farms (medium, large and very large) usually exhibited *W1* and *W2* indicators that were higher than the average (except for very large farms in the second sub-period). The assessment of investment in relation to income is slightly different. In the first sub-period, the investment rate (*W3*) of very large farms was lower than the EU average in that class; in the second sub-period, the same applied to large farms as well. In lower classes (small and medium farms), the *W3* indicators were higher than the EU average for these classes in both sub-periods. Despite the fact that these farms allocate considerable funds for investment as regards their income, they usually cannot reproduce the possessed assets (which is manifested by negative values of the *W2* indicator). In the first sub-period, medium farms managed to do this, and in the second – only medium-large farms. This results from too low income, which must cover the current needs of farming families.

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POZIOM INWESTYCJI W GOSPODARSTWACH ROLNICZYCH W KRAJACH UNII EUROPEJSKIEJ

STRESZCZENIE

Celem badań przedstawionych w artykule była ocena poziomu inwestycji w gospodarstwach rolniczych w krajach Unii Europejskiej. Do oceny wykorzystano wskaźnik reprodukcji, stopę reprodukcji majątku trwałego oraz stopę inwestowania. Badania prowadzono dla wszystkich gospodarstw oraz gospodarstw podzielonych na klasy według wielkości ekonomicznej (klasyfikacja KS6). Badaniem objęto lata 2007–2016. Zaobserwowano istotne zmiany w poszczególnych latach, z tego powodu okres badawczy podzielono na dwa równe podokresy, dla których wyznaczono średnie wartości wskaźników. Badania pokazały, że poziom inwestycji gospodarstw rolniczych w ocenie łącznej, dla wszystkich krajów UE, jest niewystarczający do odtworzenia ich majątku w obydwu podokresach. Pozytywnie należy ocenić to, że wartości wszystkich wskaźników rosną wraz ze wzrostem wielkości ekonomicznej gospodarstw. Poziom odtwarzania i pomnażania majątku w polskich gospodarstwach jest niższy niż średnia unijna dla gospodarstw słabszych ekonomicznie, natomiast zwykle wyższy w przypadku silniejszych.

Słowa kluczowe: inwestycje gospodarstw rolniczych, FADN, reprodukcja majątku