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# The relation between the share of agricultural credits in a credit portfolio, the quality of the entire credit portfolio, and profitability of selected cooperative banks' assets

Abstract. The purpose of this study is to show how a chosen group of clients, i.e. farmers, formed their position in the credit portfolio structure and to estimate the influence of changes on the quality of the credit portfolio and banks' profitability, on the basis of selected cooperative banks operating in Poland. Results of the study confirm a decrease in the share of farmer credits in the entire credit portfolio in the years 2007-2014. The second hypothesis which assumes that there is an inverse correlation between the share of farmer credits and the quality of a bank's credit portfolio was also verified positively. A strong inverse correlation has been observed between the variables in the analyzed population of banks. Also, the third hypothesis was positively verified as well. It assumes that there is a positive correlation between the decrease in the agricultural credits share and the deterioration of the profitability of assets, as well as, that this correlation is weaker than in the case of the previous pairs of analyzed variables.

Keywords: share of agricultural credits, quality of credit portfolio, profitability of banks' assets

### Introduction

Credit is one of the most essential sources of companies' external financing including agricultural businesses. A discourse over the factors influencing the choice of a credit in financial decisions made by agricultural businesses has been hold for many years in the professional literature. The scope of research on financing this group of business entities encompasses the following areas:

- connecting agricultural enterprises with institutional environment,

- connecting financial decisions with investment decisions made by farmers,

- credit limits in agriculture, in particular, the discussed problem of information asymmetry concerning the market of agricultural credits,

- taking advantage of credit subsidies,
- the importance of cooperative banks in crediting farmers.<sup>1</sup>

The subject matter of the study covers the first as well as the last research area.

Crediting of agriculture is indispensable for its proper development, building of capital base or effective capital allocation. It performs a number of functions among which the most crucial ones include facilitating the intensification and development of agricultural production as well as the possibility of introducing technical, biological and social achievements in agriculture. The significance of this financing source started to increase when the agriculture sector had to adjust itself to some general processes which were observed in modern economies because the process of accumulating internal revenues was very frequently insufficient to conduct restructuring processes in agriculture.<sup>2</sup> It is worth remembering that bank credits may influence the multiplier effects, particularly, if they are related to financing investments. In recent years a growth in the share of credits and loans for investment in the structure of agricultural credits has been observed, which should be interpreted as a positive signal because these are investment expenses which generate production growth in the future. The support given to farmers thanks to preferential credits subsidized by the European Union and national resources is also responsible for the increase of investment credit values for farmers. In 2011 the total amount of investment credit debt of individual farmers in monetary financial institutions equaled about 14.4 billion PLN, whereas the sum of preferential credits given only in 2011 subsidized by Agency for Restructuring and Modernization of Agriculture (ARiMR) reached 3.8 billion PLN, 82% of which were investment credits.<sup>3</sup> The cost of credit subsidized by ARiMR is lower than the cost of commercial credit, therefore preferential credits predominate when it comes to the source of financing investments. The share of preferential credits in the total balance of credits for agriculture within the years 2003-2009 ran at the level of 76-88%.4

<sup>&</sup>lt;sup>1</sup> D. Zawadzka, Kredyt w decyzjach finansowych przedsiębiorstw rolniczych w Polsce (ze szczególnym uwzględnieniem podmiotów z regionu Pomorza Środkowego), "Zarządzanie i Finanse" 2013, No. 2(2), p. 620.

<sup>&</sup>lt;sup>2</sup> T Siudek, *Banki spółdzielcze jako instytucje kredytujące rozwój rolnictwa i obszarów wiejskich w Polsce*, "Zeszyty Naukowe Akademii Rolniczej we Wrocławiu" 2006, No. 540, p. 447.

<sup>&</sup>lt;sup>3</sup> M. Utzig, *Korzystanie z rynku depozytowo-kredytowego przez rolników w Polsce*, "Roczniki Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich" 2012, Vol. 99, No. 4, pp. 422-423.

<sup>&</sup>lt;sup>4</sup> A. Rosa, *Kredyty preferencyjne jako forma finansowania działalności rolniczej w Polsce*, "Zeszyty Naukowe SGGW w Warszawie. Ekonomika i Organizacja Gospodarki Żywnościowej" 2011, No. 91, pp. 99-100.

hasized that self-financing is the most com

On the other hand, it has been emphasized that self-financing is the most common element in the capital structure in agriculture worldwide.<sup>5</sup> Similar conclusions may be also drawn from the research carried out in Poland.<sup>6</sup>

From the financial system perspective, it is also extremely important to guarantee farmers free access to this source of financing their farms. It means such crediting conditions which do not discriminate farmers (in comparison to other groups of bank clients) and do not restrict groundlessly the possibility of taking advantage of this type of financing. The key role here has to be assigned to local banks, in particular, cooperative banks which by operating in the immediate surroundings of farms have become a natural farmers' financial partner. Hence, the role of cooperative banks is dominant.<sup>7</sup>

Poland's membership in the UE has guaranteed access to new sources of financing agricultural activities and, simultaneously, has limited credit protectionism especially in terms of operating credits. It has influenced the structure of financing sources and relatively decreased the role of bank credits in financing agriculture. Consequently, cooperative banks, which most often gave credits to farmers, are looking for new groups of clients where they can allocate their capital. Hence, the hypothesis (H1) has been put forward that the share of farmers in the structure of credits given by cooperative banks is decreasing.

Cooperative banking underwent huge structural transformations between 1996 and 2011. Then, cooperative banks changed their profile from the niche level, directed mainly to farmers and agribusiness, into the universal one with a more diversified product offer.<sup>8</sup>

Additionally, these banks, while financing other groups of clients rather than farmers, were entering completely new and unknown or less known markets. Quite often they were not prepared to these processes in terms of organization or staff preparation. This, in turn, could deteriorate the quality of a credit portfolio. Therefore, the second hypothesis (H2) was introduced stating that there exists an inverse relation between the share of credits given to farmers in the total balance of credits and the quality of a bank's credit portfolio measured by the share of bad debts in the total balance of a credit portfolio.

<sup>&</sup>lt;sup>5</sup> J. Kulawik, *Kredytowanie i finansowanie rolnictwa w przededniu integracji z Unią Europejską, cz. I*, "Bank i Kredyt" 2003, No. 6, pp. 29-42.

<sup>&</sup>lt;sup>6</sup> R. Kata, *Przesłanki oraz mikroekonomiczne determinant korzystania przez rolników z kredytów bankowych*, "Roczniki Ekonomiczne Kujawsko-Pomorskiej Szkoły Wyższej w Bydgoszczy" 2012, No. 5, p. 258.

<sup>&</sup>lt;sup>7</sup> R. Kata, *Znaczenie banków lokalnych w dostępie rolników do kredytów bankowych*, "Roczniki Nauk Rolniczych" 2010, Vol. 97, No. 4, series G, pp. 95-103.

<sup>&</sup>lt;sup>8</sup> S. Kozak, *Ewolucje strukturalne w sektorze banków spółdzielczych w latach 1996-2011*, "Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach" 2013, No. 96, pp. 126-127.

The search for this new group of clients started by cooperative banks was usually, and still is, connected with the preparation of a wider product offer, generating by the same token income other than the one derived from interests. The drop in the share of crediting farmers and sometimes preferences in credit interest rates decreases interest result. Additionally, it should be remembered that the deterioration of the credit portfolio is assumed, which by the system of reserves will also contribute to the decrease of the net result obtained by cooperative banks. This drop, while extending the offer, should be partially balanced out by other revenues. Nevertheless, it is hard to expect that this loss can be fully balanced. Therefore, the third hypothesis (H3) is introduced claiming that the decrease in the share of credits given to farmers in the total balance of credits in cooperative banks will result in decreased profitability measured by the ROA. Simultaneously, magnitude of this relation is expected to be lower than the magnitude of the relation between the change in agricultural credits share and the quality of a credit portfolio.

#### 1. Objective and methodology

The purpose of this study is to show how a chosen group of clients, i.e. farmers formed their position in the credit portfolio structure and to estimate the influence of potential changes on the quality of the credit portfolio and banks' profitability on the basis of selected cooperative banks operating in Poland.

The paper also examines the interrelations between variability of agricultural credits share in the volume of given credits in the total balance of credits and the quality of a bank's credit portfolio as well as the profitability of its assets. In this case, the primary data were used obtained from the cooperative banks which provided the opportunity to conduct an econometric analysis both for the entire group of banks and each bank separately due to significant differences in analyzed variables between particular banks.

In order to determine the magnitude, direction and shape of relations between selected pairs of variables, the analysis of variance was applied together with the calculation of basic descriptive statistic, regression analysis using the method of least squares as well as correlation analysis. The selected methods of analysis are complementary but not substitutive.<sup>9</sup>

The analysis encompasses cooperative banks operating in the Polish banking sector among which two banks – Bank A and B operate in district towns, whereas the remaining banks, i.e. Bank C, D, E and F<sup>10</sup> in urban and rural communes. The study used monthly data starting from December 2007 till June 2014.

<sup>&</sup>lt;sup>9</sup> A. Luszniewicz, T. Słaby, *Statystyka. Teoria i zastosowania*, C.H. Beck, Warszawa 2003, p. 196.

<sup>&</sup>lt;sup>10</sup> In Bank F the data cover the period of 2009-2014.

#### 2. Research results

The graph in Figure 1 presents the share of a client group, i.e. farmers as the entire credit portfolio in the analyzed banks.



Figure 1. The farmers' share in the credit portfolio of selected cooperative banks between December 2007 and June 2014 (in %)

Source: the author's own study on the basis of the data provided by the banks.

As of 2007 the farmers' share in the portfolio structure exceeded 50% in all the banks which were located in urban and rural communes, i.e. banks C, D, E and F, whereas in the case of the banks operating in district towns this share did not exceed 43%. The difference in the range of agricultural credits share in the banks due to their location results from the fact that higher population as well as a higher number of registered business entities are recorded in district cities and their nearest surroundings, which naturally influences the structure of clients in particular banks. After 2007 a decrease in farmers' share in the volume of given credits was noticed. The highest drop was recorded as of February 2012, which was probably connected with the deadline for the allocation of EU funds for the years 2007-2013. Since January 2014 stabilization has been observed as far as the share of this client group in the structure of a credit portfolio in cooperative banks is concerned.

The observations made in the area of agricultural credits share in the analyzed banks are concurrent with the relations observed in the entire cooperative banks sector in Poland, which illustrates Table 1. The share of receivables from farmers in the total balance of receivables in the banking sector from December 2007 to June 2014 systematically decreased, though from 2010 the tendency has been much slower.

Bank/period	2007	2008	2009	2010	2011	2012	2013	6/2014
Sector of cooperatives banks	43.2	40.0	37.0	32.6	31.5	30.6	29.6	28.7
Bank A	41.9	38.4	35.8	31.7	30.5	29.5	28.3	27.5
Bank B	43.2	39.8	36.8	32.5	31.5	30.6	29.6	28.7
Bank C	52.3	48.9	46.7	42.6	41.5	40.6	39.6	38.7
Bank D	54.5	49.8	46.2	41.1	38.0	35.7	34.0	33.5
Bank E	74.1	72.4	71.3	69.1	66.0	60.1	56.9	56.6
Bank F	b.d.	b.d.	b.d.	54.8	48.9	45.5	43.1	42.4
The average in analyzed banks	53.2	49.9	47.4	45.3	42.8	40.3	38.6	37.9

Table 1. The share of receivables from farmers in receivables of the non-financial sector in cooperative banks in Poland between 2007-2014 and in analyzed banks (in %)

b.d. - lack of data.

Source: own elaboration on the basis of the data provided by the banks; *Informacja o sytuacji banków spółdzielczych w latach 2007-2013 i I półroczu 2014 r.*, Urząd Komisji Nadzoru Finansowego, Warszawa 2008-2014.

In order to verify the magnitude and direction of the relation between the process of shaping the share of a client group, i.e. farmers in the structure of a credit portfolio and their influence on the quality of this credit portfolio as well as in the second stage of the bank profitability analysis, the econometric analysis was applied using the methods of correlation and regression analyses. Table 2 presents the data concerning the quality of a credit portfolio in the analyzed banks and in the entire sector of cooperative banks in Poland within the years 2007-2014,

Bank/period	2007	2008	2009	2010	2011	2012	2013	6/2014
Sector of cooperatives banks	3.0	2.8	3.4	5.3	5.8	6.3	6.4	6.6
Bank A	2.8	2.7	3.6	5.1	5.7	6.1	6.4	6.4
Bank B	4.2	4.1	4.9	6.6	6.8	7.2	7.0	7.2
Bank C	3.2	3.4	3.7	4.1	4.4	5.0	5.4	5.6
Bank D	3.1	3.3	4.8	5.7	6.1	6.4	6.7	6.8
Bank E	2.2	2.4	3.0	4.1	4.5	4.7	5.4	5.6
Bank F	b.d.	b.d.	b.d.	4.2	4.5	5.3	5.4	5.4
The average in analyzed banks	3.1	3.2	4.0	5.0	5.3	5.8	6.1	6.2

Table 2. The share of bad debts in the total balance of receivables in cooperative banks in Poland between 2007-2014 and in the analyzed banks (in %)

b.d. - lack of data.

Source: like in Table 1.

whereas Table 3 lists the data on the assets profitability of the analyzed banks and respectively the sector of cooperative banks also for the years 2007-2014.

The quality of the credit portfolio in the sector of cooperative banks in Poland decreased in 2010. Since then further deterioration of the quality has been observed, however, the pace of these changes was slower in the following years. Similar relations can be observed in the analyzed cooperative banks. It is worth emphasizing that the share of bad debts is slightly higher than in the banks operating in district towns.

Bank/period	2007	2008	2009	2010	2011	2012	2013	6/2014
Bank A	1.4	1.2	1.0	1.1	1.2	1.2	0.8	1.0
Bank B	1.6	1.5	1.2	1.1	1.0	1.3	1.4	1.4
Bank C	1.5	1.5	1.4	1.4	1.2	1.0	1.0	1.2
Bank D	1.4	1.2	1.0	1.1	1.2	1.1	0.8	1.0
Bank E	1.4	1.2	1.0	1.2	1.2	1.2	0.8	0.9
Bank F	b.d.	b.d.	b.d.	1.3	1.2	1.2	0.9	0.9

Table 3. The ROA in the analyzed banks in the years 2007-2014 (in %)

b.d. - lack of data.

Source: own elaboration on the basis of the data provided by the banks.

The profitability of assets owned by the analyzed cooperative banks decreased if we compare the results from the years 2013 and 2014 with the results from the first years of the analysis, i.e. 2007-2008. Slightly higher profitability was reached by the banks operating in district towns. The observations of the ROA changes in the analyzed population are also concurrent with the changes recorded in the entire sector of cooperative banks in Poland.

In the first phase of the analysis, the Kendall correlation coefficient was calculated between the variables of the farmers'share in the credit portfolio  $(X_1)$ , and the quality of this portfolio  $(Y_1)$ , and next against the variable – assets profitability ROA(Y<sub>2</sub>). Due to the fact that the level of bad debts in the portfolio may be under the influence of other variables not included in the analysis, in order to measure the relation between the variable  $Y_1$  and variable  $X_1$  the correlation coefficient was applied. This measure will allow to distinguish and determine the relation between the selected variables excluding, at the same time, the influence of the remaining variables.<sup>11</sup> Moreover the Kendall method is a nonparametric method, which allows for no assumptions referring to the arrangement of variables in the population. However, to guarantee a correct interpretation, the condition of normal distribution was kept. The value of the Kendall coefficient is included in the range

<sup>&</sup>lt;sup>11</sup> A. Zielaś, B. Pawełek, S. Wanat, *Metody statystyczne*, PWE, Warszawa 2002, s. 104.

[-1; 1]; if equal to 1, it means a linear relation between the analyzed variables, whereas if close to 0, it means no relations between variables.

The amount of calculated Kendall coefficients for the banks was presented in Table 4. The significant influence on the portfolio quality had the variable of the farmers' share in the volume of given credits. In all banks it exceeded 0.87. Moreover, the inverse relation was observed between the variables, which means that the increase of one of the variables results in the decrease of another.

The strongest relation between the variables was observed in bank A – the farmers' share in the credit portfolio in the total balance influenced the quality of this portfolio significantly. The value of the coefficient was respectively -0.9358, which means the inverse relation, namely the deterioration of the portfolio quality (the increased value of the bad debts share) takes place after the decrease in the share of the clients from the segment – farmers, and on the contrary, i.e. together with the increase in farmers' share, the portfolio quality improves (there is a decrease in the share of bad debts). The weakest, but still very strong, relation was observed in Bank B, and it does not matter if it comes to the magnitude of correlation between the variables or if the bank is located in a district town or not.

There is also observed a positive correlation between the share of agricultural credits in the total balance of the credit portfolio and the ROA, i.e. the growth of agricultural credits share is accompanied by the increase in the profitability of assets. Still, it has to be admitted that the magnitude of correlation is considerably weaker than in the case of the earlier discussed variables.

Banks C and F appeared to be interesting cases since they showed a huge influence of variable  $X_1$  on the ROA profitability. The values of the coefficients amounted to respectively 0.7773 in bank C and 0.7756 in bank F. It means that the bigger the farmers' share in the structure of clients is, the greater the profitability of these banks is. Such situation may be the result of the characteristics of cooperative banks operating in urban and rural areas, among which the prevailing both the target group and base group of clients are the people connected with agricultural activity. Obtained results allow to claim that the changes in the size of farmers' share in the volume of given credits influenced considerably the quality of a credit portfolio of these banks as well as they influenced assets profitability, but only in two cases (banks C and F) to a great extent. The positive correlation may result from the fact that farmers to a much greater extent than other client groups apply for preferential credits with higher interest rates (certainly, clients do not experience higher interest rates since their interests are subsidized).

To show how the variable changes, namely the portfolio quality  $(Y_1)$  and assets profitability  $(Y_2)$  depending on the changes in the variable of farmers' share in the structure of the credit portfolio  $(X_1)$ , the models of simple regression were applied for each bank. For the enumerated variables X and Y the regression function was defined as follows:  $E(Y|X = x_i) = f(x_i)$ , where  $E(Y|X = x_i)$  is the variable mean Y,

Variable	Bank A	Bank B	Bank C	Bank D	Bank E	Bank F
	$X_1$	$X_1$	$X_1$	$X_1$	$X_1$	$X_1$
$Y_1$	-0.9358*	-0.8758	-0.9727	-0.9806	-0.9723	-0.8911
$Y_2$	0.3694	0.2368	0.7773	0.3778	0.3894	0.7756

Table 4. The values of partial correlation coefficients by Kendall for the analyzed variables

\* marked coefficients are crucial for p < 0.05 (The value for p was calculated on the basis of a test statistic and compared with y, the level of statistical significance  $\alpha = 0.05$ : If  $p < a \Rightarrow$  rejects  $H_0$  adopting  $H_1$ ; If  $p > \alpha \Rightarrow$  does not have any grounds to be rejected  $H_0$ ).

Source: own elaboration.

which equal the value of variable  $x_i$ . Hence, the model of linear regression was adopted in the analysis as:  $Y = E(Y|X = x_i) = \beta_0 + \beta_1 x + \varepsilon$ , where  $E(Y|X = x_i)$  means the value of a chosen variable Y expected on the condition that the variable takes the value x, whereas  $\varepsilon$  means a random variable. In order to estimate the parameters of the simple regression model, the method of least squares was adopted.

Table 5 presents estimated values of the coefficients together with the assessment for all the banks. All banking institutions recorded a fall in farmers' share, which deteriorated the portfolio quality (the increase in the share of bad debts). Bank A reported a fall of its clients by 1 pp, which caused the greatest changes in the quality of the credit portfolio, i.e. by 0.31 pp on average. The fall of farmers in the structure of credit clients in bank F had the smallest influence on the portfolio quality, where the decrease in the share of the clients from this segment by1 pp resulted in the drop of the portfolio quality by about 0.11 pp with the mean error of 0.0047 pp. Simultaneously, obtained results were characterized by high quotients *t*, which mean by how much the evaluation of the parameter is higher than the estimation error, e.g. in bank D, the evaluation of the parameter with the variable – the share of farmers in the portfolio, is more than sixty times higher than the estimation error. Moreover, in no case there was a condition which would disqualify any of the models due to their higher value of the estimation error ( $S_{b1}$ ) than the quotient *t*.

The modification of variables  $X_1$  and  $Y_1$  in the models of simple linear regression made by the adjusted coefficient of determination ( $R^2$ ), which in banks A and B explains the change of the portfolio quality by means of the changes in the share of clients segment, i.e. farmers in about 95%, wheras in bank E – about 97%, in bank F – about 93%. In the case of banks C and E the coefficient  $R^2$  is slightly lower and amounts to respectively 85% and 89%. The standard error of the mean ( $S_e$ ) in the conducted estiamtions ran at the level of 0.24 pp. The biggest possible deviation in obtained results may be observed in the model for bank E – 0.37 pp, whereas the lowest in the model for bank F – 0.11 pp.

In the case of explaining the profitability of assets ROA (variable  $Y_2$ ) by means of changes in the farmers' share in the volume of given credits, the estimated

Bank	Bank A	Bank B	Bank C	Bank D	Bank E	Bank F			
Variable Y <sub>1</sub>									
$b_0$	15.23*	14.95	12.23	13.24	16.15	10.40			
$b_1$	-0.31	-0.26	-0.18	-0.19	-0.18	-0.11			
$S_{b1}^{1}$	0.0073	0.0065	0.0084	0.0031	0.0072	0.0047			
$t(77)^2$	-42.85	-40.58	-21.64	-60.20	-25.31	-24.55			
Corr. $R^2^3$	0.9592	0.9548	0.8570	0.9789	0.8914	0.9347			
$S_e^4$	0.2863	0.2511	0.2839	0.1835	0.3722	0.1118			
	Variable Y <sub>2</sub>								
$b_0$	0.63	0.52	0.45	0.71	0.1937	-0.41			
$b_1$	0.01	0.02	0.04	0.01	0.01	0.03			
$S_{bi}$	0.0026	0.0036	0.0026	0.0016	0.0022	0.0030			
<i>t</i> (77)	5.2015	6.0804	14.9759	5.3252	6.2325	10.5359			
Corr. R^2	0.2504	0.3156	0.7411	0.2596	0.3266	0.7236			
S <sub>e</sub>	0.1045	0.1427	0.0883	0.0982	0.1133	0.0730			

Table 5. The results of the simple linear regression model for the explanatory variable  $X_1$  and response variables  $Y_1$  and  $Y_2$ 

\* marked coefficients are crucial for p < 0.05 (The value for p was calculated on the basis of a test statistic and compared with y, the level of statistical significance  $\alpha = 0.05$ : If  $p < a \Rightarrow$  rejects H<sub>0</sub> adopting H<sub>1</sub>; If  $p > a \Rightarrow$  does not have any grounds to be rejected H<sub>0</sub>); <sup>1</sup> S<sub>bi</sub> - the average error of the estimation; <sup>2</sup>  $t = b/S_{bi}$ ; <sup>3</sup> Corr.  $R^2$  - adjusted coefficient of determination; <sup>4</sup> S<sub>e</sub> - standard terror of the mean.

Source: own elaboration.

models of simple linear regression were characterized by a significantly lower values than in the case of the previous analysis. Moreover, there was a positive correlation noticed, so the increase in the percentage share of farmers in the credit portfolio caused the increase in profitability of assets of these banks. The biggest increase in ROA due to the percentage fall of farmer clients took place in bank C – by about 0.04 pp with the estimation error of the mean at the level of 0.0026, as well as in bank F – by about 0.03 pp. Simultaneously, these models had the highest factor  $R^2$ , reflecting the explanation of the correlation between these variables amounting to respectively about 74% and 72%. In banks A, C and D the increase in farmers' share in the volume of given credits by 1 pp., cosequently, resulted in the increase in ROA by about 0.01 pp on average with the coefficient  $R^2$  run at the level of 25% in banks A and C and 32% in bank D. The standard error of the mean ( $S_e$ ) for the estiamted models equaled 0.10 pp, so possible deviations from obtained results may be twice as lower than in the case of the models concerning the first correlation.

In order to verify the correctness of conducted estiamtions, the significance of model parameters and all partial models as well as to hold the assumptions of the least square method, the analysis of variance was applied. Two hypothesis were put forward:  $H_0: \beta_i = 0$  and  $H_1: \beta_i \neq 0$ . For the majority of the parameters (except for the parameter  $b_0$  for the variable  $Y_2$  in Bank E) the results of regression analysis turned out to be crucial, hence  $H_0$  about lack of significance for  $H_1$  was rejected, which confirmed previous analyses and conducted discussion.

#### Conclusions

Summing up the conducted research discussed in the paper, every hypothesis put forward can be positively verified. The results of the analysis indicate a systematic fall in the share of farmer credits in the entire credit portfolio of cooperative banks in each of the analyzed banks as well as in the entire sector of cooperative banks in the years 2007-2014, which confirms the first hypothesis  $(H_1)$ . It is worth noticing that the pace of this fall clearly slowed down in the last period under analysis, nevertheless, in the entire analyzed period for the sector of cooperative banks the share of agricultural receivables decreased by 14.5 pp, i.e. by 33.6%, from 43.2% in December 2007 to 28.7% in June 2014.

From the banks' perspective, agricultural credits are characterized by certain traits influencing the risk related to them. Farmers often do not have any credit history and most often do not have farming accountancy, which makes it difficult for the banks to evaluate the risk factor connected with this credit category<sup>12</sup>, but still the quality of the credit portfolio of farmers in the banking sector in Poland is better than e.g. entrepreneurs.

The second hypothesis which assumes that there is an inverse correlation between the share of farmer credits in the total balance of credits and the quality of a bank's credit portfolio of was also verified positively. There has been observed a strong inverse correlation between the variables in the analyzed population of banks, which means that the decrease in agricultural credits share in the banks' credit portfolio deteriorates (the increase in share of bad debts) the quality of the entire credit portfolio of the banks.

Also, the third and last hypothesis was positively verified. It assumes that there exists a positive correlation between the decrease in the agricultural credits share and the deterioration of the profitability of assets as well as that this correlation is weaker than in the case of the previous pairs of analyzed variables. It is worth emphasizing that, indeed, the dependence is positive, but only in the case of the two out of six researched banks we can say that the relation is strong.

<sup>&</sup>lt;sup>12</sup> E. Stola, *Kredytowanie rolnictwa a poziom ryzyka bankowego*, "Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu" 2009, No. 2, p. 240.

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## Zależność między udziałem kredytów rolniczych w portfelu kredytowym a jakością całego portfela kredytowego i rentownością majątku wybranych banków spółdzielczych

Streszczenie. Celem opracowania było ukazanie udziału wybranej grupy klientów – rolników w strukturze portfela kredytowego oraz oszacowania wpływu zmian na jakość portfela kredytowego i rentowność banków na przykładzie wybranych banków spółdzielczych działających w Polsce. Wyniki analizy potwierdzają hipotezę, że udział rolników w strukturze kredytów banków spółdzielczych malał w latach 2007-2014. Drugą hipotezę, która zakłada, że istnieje odwrotna zależność między udziałem kredytów dla rolników w kredytach ogółem a jakością portfela kredytowego banku, również zweryfikowano pozytywnie. Między zmiennymi w badanej grupie banków zaobserwowano silną odwrotną zależność. Również trzecią z postawionych hipotez zweryfikowano pozytywnie. Zakładała ona, że istnieje dodatnia zależność między spadkiem udziału kredytów rolniczych a pogorszeniem rentowności aktywów banków oraz że zależność ta jest słabsza niż w przypadku wcześniej analizowanych zmiennych.

**Slowa kluczowe:** udział kredytów rolniczych, jakość portfela kredytowego, rentowność aktywów banków