Bulgarian Journal of Agricultural Science, 24 (No 2) 2018, 171–179
Agricultural Academy

THE PROBABILITY OF FARM'S DIVERSIFICATION – ON THE EXAMPLE OF CENTRAL POMERANIA IN POLAND

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Abstract

Kurdyś-Kujawska, A., D. Zawadzka and A. Sompolska-Rzechuła, 2018. The probability of farm's diversification – on the example of Central Pomerania in Poland. *Bulg. J. Agric. Sci.*, 24 (2): 171–179

Against the backdrop of rural decline, many farms have to find more sustainable ways of surviving. For many of them, the way to stabilize and increase income is to diversify the farm. The decision to diversify depends largely on the characteristics of the farm and the farmers themselves. The purpose of this article is to determine the factors influencing the probability of diversification of agricultural holdings. Data were collected in the Central Pomerania region using a questionnaire survey. Identification of factors influencing the probability of diversification of farms was made using the logistic regression model. The analysis covers the diversification of production and the diversification of income sources. The conducted study shows that the decision to use diversification in farms depends on the demographic characteristics of farm owners and on their stocks. The likelihood of diversification of production increases with the number of fixed assets. It decreases, however, with the rising level of education. In turn, the likelihood of diversification of income sources increases with the reduction of the area of the farm.

Key words: diversification of production; income; source diversification; logit model

Introduction

Against the backdrop of rural decline, many farms have to find more sustainable ways of surviving. Undoubtedly, diversification is one of them. It offers a more stable source of income for farms and their families and increases the efficiency and the usage of existing production factors. It also strengthens entrepreneurship in rural areas and contributes to rural wellbeing. In the agricultural context, the simplest interpretation of farm diversification as an objective is that farmers seek to generate a portfolio of income from activities with different degrees of risk, expected returns, liquidity and seasonality, and adjust their output mix accordingly. Therefore farm diversification would be the allocation of resources (factors of production) of the farm such as land, labor and capital assets among different income generating activities (Delgada and Siamwalla, 1997). In previous studies on farm diversification, important steps have been taken to explain why it is increasingly perceived as a necessity not only for achieving individual farmers' goals, but also for meeting rural development policy objectives in many countries around the world. As it has been shown in the literature, diversification, from the point of view of individual farms, contributes to the sustainability and growth of household incomes of farmers (Minot et al., 2006; Abimbola and Oluwakemi, 2013; European Parliament, 2016), thus improving living conditions in rural areas (FAO, 2004). Diversification also provides active risk management in the face of a failure of insurance market (OECD, 2009; Barrett et al., 2001; Zawadzka and Kurdyś-Kujawska, 2015). It can limit the fluctuations of income in the face of the volatility

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of agricultural prices and climate risk (Combary, 2015; Mishra et al., 2004). It creates an external source of income, which can finance farms' internal development. This might be particularly important in the context of rural market credit failure (Kilic et al., 2009; Babatunde, 2015; Combary, 2015) and is also an adequate strategy to utilize excess capacity of farms' production factors and to utilize more effectively the product factors of farming business (Shucsmith and Winter, 1990; Hron et al., 2007; Hron, 2008). It offers a clear-cut competitive advantage (Hron et al., 2009). From the point of view of macroeconomic objectives, diversification is the driving force behind sustainable rural development (Renting et al., 2008; Cukur, 2014). It increases the environmental balance, provides employment and creates new jobs in rural areas and beyond (Van den Broeck and Maertens, 2017; Culas and Mahendrarajah, 2005; Buchtaand and Federicova, 2010). It contributes to the preservation of landscapes and protection of biodiversity (OECD 2009). It also contributes to reducing poverty (Oyinbo and Olaleye, 2016) and increasing food security (Cula Sand Mahendrarajah, 2005; Makate et al., 2016; Asante et al., 2017). There is no doubt that diversification plays a key role in the survival of farms and contributes to the achievement of economic, social and environmental goals. Farmers around the world use diversification, while macroeconomic actions, not only at a national level, seek active support for rural development by promoting diversification in specific directions. Farm diversification can be described twofold, firstly as the shift from a one crop production to multi-crop production, or secondly, as the economic development of non-agricultural activities (Start, 2001; Swant and Achuthan, 1995). The first category of diversification involves the practice of cultivating more than one variety of crops belonging to the same or different species in a given area in the form of rotation and intercropping (Makate et al., 2016). It also refers to a combination involving a shift of resources from one crop (or livestock) to a large mix of crops (or livestock) or a mix of crops and livestock (Vyas, 2006). The other includes increasing the number of income sources. This can be done via: a) self-employment, in an enterprise running within the farm limits or using farm components as a basis; b) from work outside of the farm – income from private business activities carried out on one's own account (off-farm company) or paid employment (full-time or casual employment in agriculture or farming outside the farm, in manufacturing and service companies, private and state enterprises and in public institutions); and c) from active or passive participation in the informal economy, from legal or illegal emigration (Polska Wieś, 2004). An effective process of diversifying farms requires complex macroeconomic measures, including stimulation measures and the creation of diversification programs. In terms of microeconomics, farmers should not only be familiar with the market and new production solutions, but they also need to be encouraged to adapt farms (structures and resources) to the changing environment. The identification of factors affecting the probability of diversification of farms may help to identify the main causes for differentiation of agricultural activity and income. The discussion in the literature deals mostly with two aspects. One focuses on the decision-making process of diversification in the context of increased income. The second is clearly about reducing the risk of agricultural activity. In addition, Barbieri and Mahoney (2009) point out that the diversification of a farm is due, among other things, to individual aspirations and the pursuit of one's own interests / hobbies. IIbery (1991) emphasizes that diversification can be seen as a result of many external and internal factors in agricultural holdings. External factors are often associated with the location of the farm. These include, among others, distance from city centers and landscape features (Dries et al., 2012; Zasada, 2011; Dube and Guveya, 2016), as well as cultural, employment and political issues (Maye et al., 2009). A number of internal factors play a key role in the process of deciding on diversification. Firstly, it has been empirically proven, that demographic characteristics of farmers, including gender, has an impact on farm diversification (Dube et al., 2016; Dube and Guveya, 2016; Rehima et al., 2013), age, education (Amanor-Boadu, 2013; Akaakohol and Aye, 2014; Rehima et al., 2013; Ibrahim et al., 2009; Huang et al., 2014; Amine and Fatima, 2016; Rahman, 2010; Khatun and Roy, 2012; Ashfag et al., 2008; Aheibam et al., 2017), agricultural experience (Amine and Fatima, 2016; Rahman, 2010; Ashfag et al., 2008; Dube and Guveya, 2016; Aheibam et al., 2017), family size (Bowler et al., 1996; Abimbola and Oluwakemi, 2013; Dube and Guveya, 2016) and personal characteristics, such as the attitude towards risk (Barrett et al., 2001). Secondly, farm characteristics also play a role, including the area of the farm (Demurger et al., 2010; Rehima et al., 2013; Sichoongwe, 2014; Huang et al., 2014; Mussema et al., 2015; Amine and Fatima, 2016; Ashfag et al., 2008; Garcia-Arias et al., 2015), type of farm (Dries et al., 2012; Weltin et al., 2017), number of plots (Rehima et al., 2013; Mussema et al., 2015), ownership structure of the land (Mussema et al., 2015; Rahman, 2010; Rehima et al., 2013), soil quality (Mussema et al., 2015; Mishra et al., 2004; Rehima et al., 2013), legal form (Mishra et al., 2004), equipment in agricultural machinery (Amine and Fatima, 2016; Ashfag et al., 2008). Another group consists of socio-economic and climate factors including access to markets (Sichoongweet et al., 2014; Ibrahim et al., 2009; Dube and Guveya, 2016; Aheibam et al., 2017), access to market information (Amine and Fatima, 2016), level of infrastructure development (Mussema et al., 2015), access to agricultural services (Ibrahim et al., 2009;

Mussema et al., 2015; Rehima et al., 2013), access to the insurance market (Mishra et al., 2004), access to subsidies (Mishra et al., 2004) and the credit market (Akaakohol and Aye, 2014; Demurger et al., 2010; Khatun and Roy, 2012); and exposure to extreme weather events (Huang et al., 2014). The issue of diversification of agricultural holdings in Poland was repeatedly undertaken in scientific studies. Over the years, it has been discussed whether the impact of diversification on the well-being of farms is positive or negative, and what is its scope and what it depends on. However, the significance of diversification determinants' influence on the decisions has not been thoroughly verified. Little emphasis has been placed on identifying factors that increase the likelihood of farm diversification, and the differences between the determinants of product diversification and the diversification of income sources in particular. In addition, the need to engage in research on specifying the determinants of diversification results from the growing debate about its importance in the process of adapting to the changing environment in agriculture. Against this backdrop, this paper aims at identifying the factors that influence the likelihood of diversification of agricultural holdings. The results obtained allow us to draw several implications for policy makers, farmers and others take holders. This article is a part of the discussion on better understanding of factors determining the diversification of farms and its premises, by presenting empirical research from the Central Pomerania region in Poland. This, in turn, has a measurable impact on the design and implementation of measures to promote and facilitate the diversification of agricultural holdings. The structure of the study is as follows: the first section presents the concept and the scope of diversification of agricultural holdings. A number of advantages of its use have been identified. Literature review has been done on the factors that influence the differentiation of production and income in agricultural holdings. The second part presents data sources and research methods. The third part presents results and discussion. This part begins with the characteristics of the studied population. The results of the analysis are then described. The conclusions drawn from the study are summarized in the last section.

Materials and Methods

The study was conducted in the northern part of Poland in the Central Pomerania region. This is a typical agricultural region. Soils of the rye complex prevail, of the very good, good and weak status. The percentage of very good wheat soils is small. The climate is mild and humid, and the vegetation period is very long. It is one of the regions is most prone to drought in Poland. It is characterized by a high share of commodity-based agriculture based on livestock, and traditional, self-catering one. The analyzed units were the owners or managers of agricultural holdings. The time frame for the study was 2012 and, for selected questions, 2004-2011. The study was conducted using a questionnaire, which included 34 questions. Most questions were formulated in the form of closed questions, and Likert's scale was used in part to make it possible to determine the significance of the researched phenomenon to the respondent. 450 interviews were conducted with farmers. The answers were obtained based on the acceptance of participation in the study. A total of 256 questionnaires were included in the study. A logit regression model was used to estimate the likelihood of farm diversification. The logistic regression model enables investigating the influence exerted by many independent variables X_1, ..., X_k on the dichotomous dependent variable Y. The values of the dependent variable are coded as follows:1 – distinguished value, 0 – lack of distinguished value. In the logit regression, the logistic function is used, having values from the range (0; 1) and a curve resembling the stretched S letter, whose analytical form is as follows (Stanisz, 2007):

$$f(z) = \frac{e^z}{1+e^z} = \frac{1}{1+e^{-z}}, z \in \mathrm{R} \quad (1)$$

The logistic regression model for the dichotomous variable Y specifies the conditional probability of taking by this variable the distinguished value and it is expressed by the following dependence (Maddala, 2001; Stanisz, 2007):

$$P(Y = 1/X_1,..., X_k) = \frac{e^{\alpha_0+\alpha_1X_1+...+\alpha_kX_k}}{1+e^{\alpha_0+\alpha_1X_1+...+\alpha_kX_k}}, \quad (2)$$

where α_0, α_1, ..., α_k are parameters of the model, X_1, ..., X_k independent variables, that may have both the qualitative and the quantitative character. Due to the model (2) nonlinearity in relation to the independent variables and parameters, by finding the logarithm the logistic model is transformed into the linear model. For this purpose the Odds Ratio concept is introduced, which is the ratio of the probability of a given event occurrence to the probability that the said event shall not occur, that is:

$$\frac{P(Y = 1/X_1,..., X_k)}{1 - P(Y = 1/X_1,..., X_k)} =$$

$$= \frac{e^{\alpha_0+\alpha_1X_1+...+\alpha_kX_k}}{1+e^{\alpha_0+\alpha_1X_1+...+\alpha_kX_k}} : \frac{1}{1+e^{\alpha_0+\alpha_1X_1+...+\alpha_kX_k}} = e^{\alpha_0+\alpha_1X_1+...+\alpha_kX_k} \quad (3)$$

So the Odds Ratio expresses how many times the probability that a given event shall take place increases or decreases, if there occurs a change of independent variable (at established values of independent variables).

Natural logarithm of the Odds Ratio is linear in relation to independent variables, and considering the model parameters facilitates estimation to a high degree. It is called the logit or the logit form of the logistic model, therefore (Stanisz, 2007; Cramer, 2003; Kleinbaum and Klein, 2002):

$$\text{logit}P = \ln\frac{P(Y=1/X_1,...,X_k)}{1-P(Y=1/X_1,...,X_k)} = \alpha_0 + \sum_{i=1}^{k}\alpha_i X_i \quad (4)$$

After estimating the parameters of the logistic regression model, it is possible to determine the theoretical values of the variable Y according to the standard principle of prediction:

$$\hat{y}_i = \begin{cases} 1, \text{ gdy } 0.5 < \hat{p}_i \leq 1 \\ 0, \text{ gdy } 0 < \hat{p}_i \leq 0.5 \end{cases} \quad (5)$$

where $\hat{p}_i$-theoretical probabilities obtained from the logistic regression model estimated on the basis of the random sample. Then the evaluation of the correctness of the estimated model can be carried out, counting correctly and mistakenly classified cases (Table 1).

Table 1
Correctness of classification of cases

Expected sizes	Observed sizes		Sum
	$y_i = 1$	$y_i = 0$	
$\hat{y}_i = 1$	n_{11}	n_{12}	$n_{1\bullet}$
$\hat{y}_i = 0$	n_{21}	n_{22}	$n_{2\bullet}$
Sum	$n_{\bullet 1}$	$n_{\bullet 2}$	n

Source: the authors' own elaboration on the basis of (Dobosz 2004)

For evaluation of the degree of the logistic regression model fitting the empirical data, one can use the measure called count-R^2, which takes values from the range $\langle 0,1 \rangle$ (Maddala, 2001). The quality of the built logistic regression model can also be evaluated using other measures e.g.:

Pseudo R^2 – is the measure of the model's fit(the equivalent of the coefficient of multiple determination R^2 determined for the linear multiple regression), test Hosmer-Lemeshow (Hosmer et al., 1989; Homer et al., 2008), AUC (Area Under the Curve) – field under the ROC curve (Receiver Operating Characteristic Curves) – the ROC curve is formed by connecting the points in the cartesian coordinate system having the coordinates (sensitivity, 1-specificity). Sensitivity describes the ability to detect units having the distinguished characteristic. Specificity describes the ability to detect units not having the distinguished characteristic. Two separate regression models were identified in their explicit forms as follows: model 1 – diversification of production, model 2 – diversification of sources of income. Based on empirical studies and the available database, variables were selected that could influence farmers' decisions on diversification. These variables include the demographic characteristics of farmers and the structure of agricultural holdings, as well as socio-economic factors. Table 2 presents a set of potential variables used to determine the probability of farm diversification.

Table 2
Variables used to determine the probability of diversification of farms

Component	
production diversification	income source diversification
– the age of the farm manager (years), – the period of managing the farm (years), – farm size (ha), – the number of people permanently employed on the farm, – the number of people temporarily employed on the farm, – farm status (1 – non-commodity household, 0 – commodity farm), – farm manager level of education (primary – 1, vocational– 2, secondary – 3, higher – 4), – voluntary property insurance of the agricultural farm (no – 0, yes – 1), – the dominant soil class (1-4 – 1st class – 4th class, 0 – other soil classes), – cropproduction (1 – yes, 0 – no), – livestock production (1 – yes, 0 – no), – mixed production (1 – yes, 0 – no), – the number of fixed assets in the agricultural farm, – number of natural disaster , – insurance against natural disasters (1 – yes, 0 – no).	– the age of the farm manager (years), – the period of managing the farm (years), – farm size (ha), – the number of people permanently employed on the farm, – the number of people temporarily employed on the farm, – farm status (1 – non-commodity household, 0 – commodity farm), – farm manager level of education (primary – 1, vocational– 2, secondary – 3, higher – 4), – voluntary property insurance of the agricultural farm (no – 0, yes – 1), – the dominant soil class (1-4 – 1st class – 4th class, 0 – other soil classes), – crop production (1 – yes, 0 – no), – livestock production (1 – yes, 0 – no), – mixed production (1 – yes, 0 – no), – the level of susceptibility of climate risk occurrence(expressed as a median of rank assigned to certain types of risk), – insurance price (1 – too high, 0 – low), – having disaster insurance (1 – yes, 0 – no).

Source: own study

Results and Discussion

This section consists of two parts. The first contains the characteristics of the examined farms in the Central Pomerania region. The second shows the results of the logistic regression analysis. The study was dominated by people aged 40-50 years (35%). The youngest person managing the farm was 21 years old and the oldest was 75 years old. The average age of the farmer was 46 years. Among the managers of the farm, there were vast differences in the time period of farm management. The shortest time was 1 year, and the longest time was 45 years. The majority of farmers (68%) had up to 20 years of experience in managing a farm. Most of the farm managers had vocational education or secondary education (80%) only 9% had higher education. Farm size is very diverse and is characterized by strong right asymmetry. Farms of up to 50 ha make up 90% of the population. The median size of farms is 15 hectares, the smallest farm has an area of 0.5 hectares and the largest one 272 hectares. In 42% of the farms have very good and medium quality soils (class 1-4). Half of the farms are crop production based, only 3% – livestock production and 46% mixed. In 90% of households employees are employed permanently (usually one or two people). More than half (54%) of the farms surveyed are farms where production is mostly not meant for the market. There are usually 3 or 4 fixed assets used in agricultural production (30% of farms). In 12.5% of households there were 6 fixed assets. The frequency of occurrence of negative atmospheric phenomena in the examined farms was varied. The maximum number of natural disasters was 36. Occurrence of over five natural disasters was observed in 50% of farms. Voluntary property insurance was used by 57% of farmers (most of them were property insurance) and 21% had insurance against the risk of natural disasters, of which 5% were from state-subsidized insurance. The low percentage of farmers with insurance coverage in the event of natural disasters, according to the majority of respondents (72%), is due to the high cost of taking out the insurance policy. In order to find the best combination of variables significantly affecting the diversification of production (model 1) and income sources (model 2) of the farm, a formal selection of variables was performed using reverse step regression. The obtained results indicate that the diversification of production (model 1) was influenced by two factors, i.e. the level of education of the farm manager and the number of fixed assets on the farm. On the other hand, the diversification of income sources (model 2) was influenced, among the fifteen variables taken into account, only by one variable, i.e. the size of the farm. The variables obtained are poorly correlated with each other and strongly correlated with the remaining variables eliminated from the initial set of variables. Evaluation of parameters for logistic model 1, including the final set of variables, is presented in Table 3. For model 2, evaluation of parameters is presented in Table 4.

Model 1 results show that the positive, statistically significant impact on the dependent variable is the number of fixed assets on the farm. The negative, statistically significant influence is the farm manager's level of education. Farm stocks, including the number of fixed assets, increase the probability of diversification of production. The greater is the number of fixed assets on the farm, the greater is the probability of diversification of production. This is due to the pursuit of effective use of assets. This is consistent with the results of Martin and Lorenzen (2016), who suggest that an increase in farm assets could facilitate a wider variety of farming activities. In turn, Hitayezu et al. (2016) indicate that crop diversification is possible in those farms which are not constrained by technological factors. Using the odds ratio, it was determined that if the number of fixed assets increased by one (assuming the remaining variables included in the model remain unchanged), the chances of diversifica-

Table 3
Evaluation of the parameters of logistic model 1

Variable's name	Parameter's estimation	*p*-value	Odds Ratio
Constant	2.982436	0.000054	–
The number of fixed assets in the agricultural farm	0.254841	0.000291	1.290256
Farm manger's level of education	-0.923766	0.000118	0.397021

Source: own study

Table 4
Evaluation of the parameters of logistic model 2

Variable's name	Parameter's estimation	p-value	Odds Ratio
Constant	0.564845	0.000863	–
Size of the agricultural farm (ha)	-0.01553	0.003005	0.98459

Source: own study

tion would increase by almost 30%. Among the demographic characteristics, the level of education of the farm manager was a significant influence on the diversification of production. The analysis showed that the increased education of the person managing the farm was accompanied by less likelihood of diversification of production. Interpretation of the odds ratio indicates that the chance of product diversification drops by 60% if farm managers raise their education by one category (assuming the remaining variables included in the model remain unchanged). Research suggests that people with higher education are more likely to specialize or simplify production. Educated farmers are more knowledgeable and more capable of understanding and responding to predicted changes, better able to predict the future and generally have greater access to information, which may encourage them to pursue other adaptation strategies to climate or market change (Uddin et al., 2014). According to Huang et al. (2014) farmers with lower education appear to be more reluctant to risk and more often use crop diversification as a risk mitigation tool. They tend to stick to traditional crops for which the hazards are known, even if the expected yields associated with crop differentiation are lower. It should be noted that crop diversification is used around the world as a way to improve farm incomes. Farmers with a lower level of education may find it difficult to obtain work outside agriculture. Without proper qualifications, training or skills, they are unable to undertake additional paid work. This explains why diversification of crops is carried out on farms run by less educated farmers. By interpreting the odds ratios for the independent variable in model 2, the following information is obtained: if the farm size increases by one hectare, the opportunity for diversification of farm income sources will be reduced by 1.54%. In the model, the independent variable has a negative, statistically significant effect on the dependent variable. According to Mishra et al. (2004) small and medium-sized farms are more likely to use a combination of more profitable activities, as they are often unable to adopt new technologies, new management practices and intensive farming. In turn, Amanor-Boadu (2013) points out that for small farms the justification for diversification is to maintain the owner's economic and social identities). Assessment of estimated values of models was done by counting the accuracy of the classification of farms (Table 5[1]). The correctness of classification was estimated by means of coefficient 2, count R Hosmer-Lemeshow test and area under ROC curve. The results are presented in Table 6.

Both models are characterized by very high sensitivity, i.e. the ability to correctly identify farms where there is a diversification of production or diversification of income sources. The specificity in the analyzed models is low, i.e. the model is poorly recognizing farms without diversified production or income sources. Model 1 is a very good match for empirical data (= 85.55%). Model 2 is the weaker match for empirical data. However, in both cases, is greater than 50%, so it can be said that the classification based on models is better than random. The Hosmer-Lemen show test results show that there are no significant differences between the empirical and theoretical numbers in both models resulting from the estimated regression models. The area under the ROC curve is statistically greater than 0.5 (Figure 1). It is

Table 5
Correctness of the classification of the logistic models

Classification of farms based on the logistic model	Farm's actual class		Correctness of classification
	$y_i = 1$	$y_i = 0$	
$\hat{y}_i = 1$	213 132	33 85	
$\hat{y}_i = 0$	4 9	6 30	85.55% 63.30%
Sensitivity, specificity	98.16% 93.62%	15.38% 26.09%	

Source: own calculations

Table 6
The degree of the logistic regression models fitting the empirical data

Models	Classification accuracy coefficient	Hosmer-Lemenshow test		Area under ROC curve		Reliability coefficient test	
	R^{2count}	χ^2	p	AUC	p	χ^2	p
Model 1	85.55%	8.83	0.357	0.772	0.00000	34.40	0.00000
Model 2	63.30%	13.20	0.105	0.621	0.00085	12.67	0.00037

Source: own calculations

[1]In Table 5, row 1, values from model 1 are presented, and in row 2 values from model 2

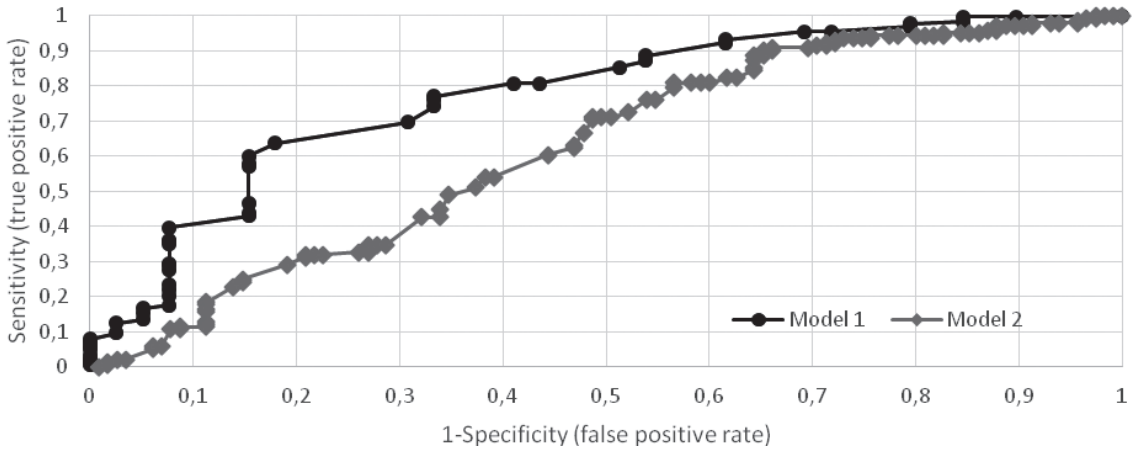

Fig. 1. The ROC curve for model 1 and model 2
Source: the authors' own elaboration

therefore possible to classify agricultural holdings on the basis of the models built. Both models are statistically significant, as evidenced by the values of the reliability test.

Conclusion

This paper presents the logistic regression models that determine the factors influencing the probability of diversification of farms, including the diversification of production and the diversification of income sources. The econometric results indicate that both models are well matched and statistically significant. The analysis included 15 endogenous variables. Although the decision to diversify production and sources of income is largely made under the influence of similar determinants, differences have been demonstrated which are visibly influencing the decision process It was found that two variables significantly influenced the probability of diversification of production: the number of fixed assets on the farm and the level of education of its owner. The model results indicated that the number of fixed assets on a farm positively and significantly influences the farmers' decisions to diversify their production, while the level of education has a significant negative impact on the diversification of production. The presented results suggest that the probability of diversification of production increases with the number of fixed assets and decreases as the level of education of farmers increases. The probability of diversification of income sources in farms was significantly influenced by only one variable, i.e. the size of the farm. This variable had a significant negative impact on the likelihood of diversification of income sources. This means that the likelihood of diversification of income sources increases with the reduction of the area of the farm. The obtained results allow to put forward the implications for public actions that can promote the use of diversification and thus improve the financial sustainability of agricultural holdings. It is important to emphasize that new macroeconomic measures to support diversification should take into account the extent of diversification of agricultural holdings. For measures to support the diversification of production, policy makers should focus on increasing farmers' access to external funding sources. This will enable the upgrade or purchase of fixed assets needed to expand production. It is also necessary to increase the activity of advisory bodies. Their aim should be to educate farmers how to introduce new types of production or modern technologies that improve work and increase the efficiency of production. As indicated by the research results, the diversification of income sources is mainly applied in smaller farms. Support for small-scale farms in diversifying their income should be provided by stimulating socio-economic activation. This is possible by promoting non-agricultural employment, providing access to preferential loans, conducting training and education courses in non-agricultural activities, and improving technical infrastructure in rural areas.

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Received December, 4, 2017; accepted for printing March, 7, 2018