

University doctoral (PhD) dissertation abstract

**THE ECONOMIC AND SOCIAL IMPACTS OF THE
AGRICULTURAL AND RURAL DEVELOPMENT EUROPEAN
UNION PAYMENTS IN REGIONAL AND DISTRICT DIMENSIONS**

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1. THE BACKGROUND OF THE RESEARCH

More than ten years have passed since Hungary joined the European Union on 1st May, 2004 and this is a sufficient period to assess the economic-social impact of the accession. Through the accession our country has received funds from several support sources where the agricultural and rural development funds which support agriculture and the countryside played a decisive role. These subsidies were available in the beginning from the European Agricultural Guidance and Guarantee Fund (EAGGF) and then from 2007 from the European Agricultural Guarantee Fund (EAGF) and the European Agricultural and Rural Development Funds (EARDF).

Several evaluations have been made about the utilisation of the European Union subsidies both nationally and internationally. LEHMANN – NYERS (2009) analysed the economic impact of the First Development Plan. They found that the use of EU subsidies was full, the main aims were achieved though in achieving certain targets the plan was not successful. The two authors highlighted in their study that the regional differences decreased somewhat, the innovation ability of the small and medium businesses improved, the modernisation of agriculture accelerated and significant sources were spent on human research development. They have made an important conclusion that the impact of EU subsidies on increasing GDP is smaller in the short term than what could be expected on the basis of the position in investments.

BÉKÉS (2014) examined the developmental trends of the most developed and the least developed regions (Central and Northern Hungarian Region) and pointed out that since the EU accession the economic and regional developmental difference did not decrease but on the contrary it increased. Still from the EU subsidies – defined by the per capita GDP – the poorest region received one and a half times more per capita than the richest one. The author emphasizes that „... *despite the growing differences it is possible that the subsidies have decreased the inequality. It can happen that the incoming EU money compensated for other impacts of the EU accession which raised the inequality between the areas.*”

The different examinations often show different results in terms of the regional impact of the different subsidies. This opinion is shown in the works of BORKÓ – OSZLAY (2007),

as well as TRÓN (2008) who pointed out that the different impact study practices attribute different impact to the European Union subsidies. Certain simulation models which assume optimum subsidies utilization show a bigger development output impact than the econometric models based on data facts. The latter ones display the imperfection of the realisation and thus many times show slight increase impact.

Considering the former ones researching and classifying the regional role of the agricultural and rural development funds is an unavoidable task. The literature primarily deal with the combined impact of the European Union subsidies and certain specific subsidies on the given area. The impact study of the wider environment of the agricultural and rural development funds, its scientific study analysis still cannot be considered settled (FERTŐ, 2013).

The theoretical importance of the topic has become important because the concept of multifunctional agriculture, a multifunctional approach of agriculture is widely spread since the social will is growing to preserve the cultural life of the countryside and we need to follow a way of farming which secures healthy food and does not damage the environment. From this aspect the relationship of agriculture and rural areas must be handled in a complex way. This approach is present in the Common Agricultural Policy of the European Union by making rural development its organic part. As a result of this in the European Union – as well as in several other countries in the world – we talk about the system of agricultural and rural development funds.

2. THE AIMS OF THE RESEARCH AND THE INTRODUCTION OF THE RESEARCH HYPOTHESES

A national objective was realised when Hungary joined the European Union based on the preliminary result of the referendum. Naturally, there were pros and cons about the accession and there were those who refused the European integration. Still the emotion was stronger that came from the future EU membership and the hope in terms of the agriculture that with the opportunities offered by the EU both the Hungarian agriculture and countryside would follow a development course. Because of the accession a lot of support forms as well as the EU institutions became available but considering the impacts there were no clear positions. Obviously, today we know what kind of objective, positive changes were brought by the accession for example in terms of infrastructural and machine supply, broadened market possibilities and income growth. Still we also experience the objective disadvantages such as the stronger competition and the mass expansion of multinational food-processing and trading companies. The scientific measurement and judgement of the developmental changes which are difficult to measure is still a subject of debate.

Despite the above mentioned we can state that the European regional policy which aims at a balanced regional policy with the accession established the opportunity that the development of disadvantageous regions begin. The scientific assessment of the results of the development is the primary aim of the thesis. The research of the topic is especially important in the most disadvantageous subregions of our country. These subregions show heightened sensitivity both from an economic and social point of view which is specified in the 311/2007 Government Decree. From these regions the Sarkad District and its settlements are examined at a deeper level, in the meantime the realistic evaluation of the results cannot ignore the regional level outlook. In the case of the Sarkad District – regarding its rural aspect – the agricultural and rural development sources can mean substantive drive in the development. The overall aim of the thesis is to explore the economic and social impacts of the agricultural and rural development funds in a disadvantageous subregion.

This can be achieved through the following subgoals:

1. Evaluation the available literature;

2. The regional and district level examination of payments and their correlations;
3. The examination of the impacts of the payments on the balance sheet structure of agribusinesses and on their property, financial and profitability status;
4. The assessment of agricultural and rural development payments based on the farmers' opinion;
5. Drawing up conclusions and suggestions from the results.

The drawn-up aims generate the hypotheses below:

First hypothesis (H₁): The concentration of funds-dispersion show an equalisation both in the Southern Great Plain Region and in the Sarkad District since joining the EU.

Second hypothesis (H₂): The development position of the Southern Great Plain Region settlements and the Sarkad District settlements have improved after the accession.

Third hypothesis (H₃): A significant cause and effect relationship can be proven between the temporal changes of the Complex Development Indicators carrying settlement peculiarities and certain types of payments.

Fourth hypothesis (H₄): In the changes of the CDI¹ values before and after the EU membership we can detect the impact of funds after the accession.

Fifth hypothesis (H₅): There have been positive changes in the balance sheet of the agribusinesses examined in the Southern Great Plain Region and the Sarkad District as well as, in their property, financial and profitability situation since the accession. The combination of certain balance and result items of agribusinesses and the agricultural and rural development funds are in linear correlation with profitability.

Sixth hypothesis (H₆): There is a significant connection between the awarded funds and certain socio-demographic qualities of farmers in the Sarkad District. The Sarkad District settlements and the farmers can be segmented according to income on the basis of statements connected to certain funds types.

¹ CDI: Complex Development Index describing the development of settlements

3. THE DESCRIPTION OF DATABASE AND THE APPLIED METHODS

When processing the literature the gathering of secondary data was aimed at introducing the national and international literature of the topic. Both traditional and online sources have been used. I had significant help in gathering the literary sources from the website of Electronic Information Service (EIS) and the relevant bibliographies found in the library of the University of Debrecen. The area of primary research is primarily the Sarkad District however, for the sake of reliable statistical analysis in certain cases it was necessary to consider Southern Great Plain regional data, as well. I have collected statistical data from several sources: Information database of the Central Statistics Office, settlement data of the National Regional Development and Spatial Planning Information System, statistical information of the National Employment Service, the funds data of the Agricultural and Rural development Office (ARO), as well as the data of FAO (FAOSTAT) and the United States Department of Agriculture (USDA). The company information was acquired from the company information and electronic company procedures services of the Ministry of Justice website (e-report). For the data analysis I used SPSS (Statistical Package for Social Science), STATA statistical and Microsoft Excel programs. For the spatial visualization with the help of MAPINFO program I used ArcHungary 6.3 raster map files provided for me by GeoX Ltd.

3.1. The regional and district level methodology of the impact studies of the agricultural and rural development funds

For the examination of funds distribution I used the support data of the Agricultural and Rural Development Office between 2004-2013. The data files available for me made it possible to group them in different ways in relevance to the funds. The funds are grouped as the following: *Total funds, EU sources, national sources, European Agricultural Guarantee Fund, European Agricultural Fund for Rural Development, Income support, Investment and rural development funds.*

For the measurement of the regional and district concentration of funds I used different concentration measurement methods. The Lorenz curve was originally used to measure the income distribution where the concentration is shown in a unit-sided square where it

displays the cumulated relative value amounts in relations to the cumulated relative frequency (KOVÁCS, 2011; ELTE, 2005).

The concentration proportion or in other words the concentration rate (CR) is one of the most easily produced concentration metrics both in calculation and in data need. The CR concentration proportion shows that the largest unit of plurality is that it receives share from the total value amount. Another definitive metrics of concentration is the Hirschman-Herfindahl index. When calculating the index, it correlates to the main diagonal of the Lorenz curve which means that it complies as the sum of squares of the share of the value amount of the certain units (HUNYADI – VITA, 2008a; KERÉKGYÁRTÓNÉ et al., 2001).

To define the complex development of the settlements I calculated Complex Development Index (CDI) which were based on factor analysis. The received factors constituted the basis to calculate the Complex Development Index. There are several possibilities presented in literature to calculate the complex index, in my thesis I used the method applied by BÍRÓ – MOLNÁR (2004) as well. With the linear combination of explanation value - weighed factor values present in the particular main components I received the Complex Development Index with respect to the given year and settlement. Based on MALHOTRA (2009) where the i^{th} factor's factor value is estimated by the following equation:

$$F_i = W_{i1}X_1 + W_{i2}X_2 + W_{i3}X_3 + \dots + W_{ik}X_k$$

where

F_i : is the estimate of the i^{th} factor;

W_i : the coefficient of the weight or factor values;

k : the number of variables.

For the statistical analysis of the Complex Development Index I used different descriptive statistical methods (average, median, extent, minimum, maximum, obliquity). For the further examination of the distribution of data I used the Shapiro-Wilk test. The test is in close correlation with obliquity since in the case of normal distribution the index value is zero (MADDALA, 2004).

I examined the improving or undermining probability of the development position of the settlements with the help of the Markov probability matrix. To explore the connection between the Complex Development Index and the funds I used the Pearson correlation and partial correlation.

After exploring the connection between the CDI values and the funds it was essential to prove the cause and effect connections for which I used a fitting test. During the examination of the fitting test an independent metrical variables is examined for a dependent metrical variables. The received coefficient of determination (r^2) displays the strength of the connection, the value of which can fluctuate between 0 and 1 while the significance of the F-test proves the existence of the connection that aims at testing the significance of the coefficient of determination (SAJTOS – MITEV, 2007).

The received CDI was further analysed by the difference in differences method. As KÉZDI (2011) commented it „*the regressive difference in differences method technically is a regression model in which among the explanatory variables the past values of outcome variables are present.*” In my case panel data are analysed to which I applied from the two impact models the permanent impact model. Applying the permanent impact model there is a presumption that the unique features of particular entities effect the outcome variables thus these features need to be controlled. The model removes the time-independent properties in the case of estimated variables. Another important presumption of the model is that in the case of particular entities the time-independent properties do not correlate with each other (MOLNÁR, 2011).

KÉZDI (2011) describes that the Difference in Differences method (DiD) can be suitable to filter the effect of the preceding status of a program. The essence of the method according to KÉZDI (2004) is that the change of outcome variables (in my case the change of CDI values) is compared between the supported (treatment) and not supported (control group) (Figure 1).

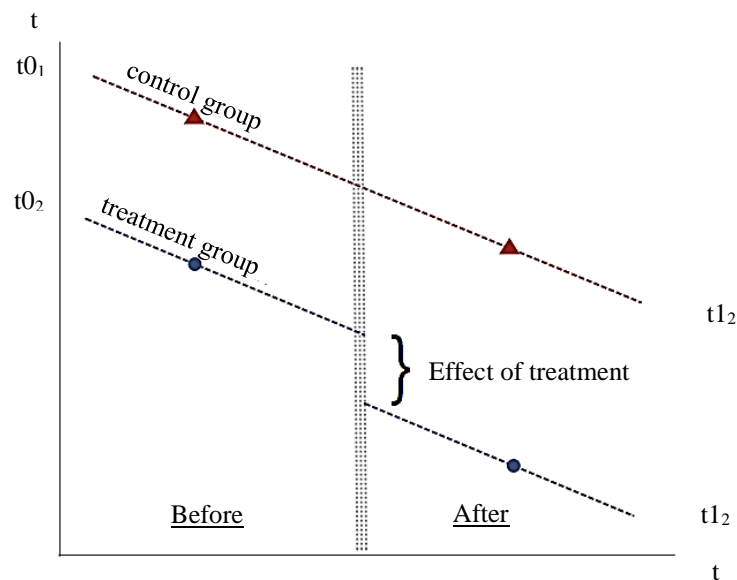


Figure 1: A possible impact of a programme in terms of a treatment group

Source: own figure

3.2. The impact study of the agricultural and rural development funds in regards to agribusinesses

Between 2004 and 2013 51 agribusinesses used some kind of European Union support forms in the Sarkad District. The use of the subsidies showed a heterogeneous form in this period, certain businesses received some kind of funds every year while others received EU sum in particular years. However, several businesses became subject to liquidation, elimination, forced cancellation and termination by the end of the period according to the database of the business register. Due to these reasons my sample got considerably reduced which made the statistical examinations uncertain. For the sake of acceptable statistical examinations it was necessary to think of regional dimensions in terms of the agribusinesses so that the sample includes the agribusinesses of the Sarkad District.

On a regional level I had a bigger pool to select from since between 2004 and 2013 almost 637 Ltds., 120 agricultural cooperatives, 141 limited partnerships, 59 Plcs and 5 general partnerships received some forms of EU support. Since I received a quite heterogeneous sample here as well I decided to find a common denominator for certain aspects of the winning enterprises:

1. I considered those enterprises which received funds every year between 2005 and 2012 (the year 2004 does not constitute a full year because of the May accession thus

- I left it out from the criteria, the final year being 2012 was chosen because the balance sheet and the profit and loss data of the enterprises were available until that year;
2. I considered only enterprises which were founded before 2003 since I want to compare the status before the accession to three states after the accession (2007, 2011, 2012);
 3. I considered those companies which were still operating in 2012 and were not under elimination and liquidation, were not terminated and were not under forced cancellation and their data were available from the public company register;
 4. The received database was put into categories of micro-, small- and medium-businesses;
 5. The large enterprises were left out of the sample because I was focusing on the micro/small/medium business sector in my thesis;
 6. I required even in the case of micro-businesses that it would consist of at least one average statistical staff;
 7. Finally I considered those businesses which received on average at least 60 million HUF funds between 2005-2012.

As a result of this filter and data collection the number of businesses was reduced to 279 out of which 16 were in the Sarkad District.

The first step of the examination was the comparative analysis of the balance sheet composition of the businesses in the Southern Great Plain Region and the Sarkad District. For establishing the ratios I considered the total assets as a base of comparison. The analysis for the 279 businesses was made aggregately and these data were compared to the aggregated data of the 16 examined agribusinesses of the Sarkad District.

Following the balance sheet analysis I examined the property and financial situations of the agribusinesses. For the analysis of the property state I used vertical (calculated from data appear on the liability) and horizontal (expressing the ratio of certain items of liability and asset) capital structure indicators (Table 1).

Table 1: The scope of indicators used for the analysis of the property and financial situation

Vertical indicators of property situation			
Capital strength $= \frac{\text{Shareholders' equity}}{\text{Total liabilities}}$	The share of liabilities $= \frac{\text{Liabilities}}{\text{Total liabilities}}$	Profit attributable to equity balance $= \frac{\text{Profit or loss for the year}}{\text{Shareholders' equity}}$	Capital voltage $= \frac{\text{Liabilities}}{\text{Shareholders' equity}}$
Horizontal indicators of property situation			
Coverage Fixed assets (A) = $\frac{\text{Shareholders' equity}}{\text{Fixed assets}}$		Coverage Fixed assets(B) $= \frac{\text{Shareholders' equity} + \text{Long - term liabilities}}{\text{Fixed assets}}$	
Indicators of financial situation			
Debt ratio $= \frac{\text{Long - term liabilities}}{\text{Long - term liabilities} + \text{Shareholders' equity}}$	Equity ratio $= \frac{\text{Shareholders' equity}}{\text{Shareholders' equity} + \text{Long - term liabilities}}$		Debt coverage ratio $= \frac{\text{Shareholders' equity}}{\text{Long - term liabilities}}$
Net working capital = (CA + ADA - P) - (CL + ADL)		EVA = Profit after taxes - Cost of capital	

Key: CA=current assets; ADA=accrued and deferred assets; P=provisions; CL=current liabilities; ADL=accrued and deferred liabilities

Source: own table based on ÓNODI, 2005; BÍRÓ et al., 2001; COHEN, 1997

The examination of the profitability of the agribusinesses was done by using the profit and loss statement of the businesses by calculating profitability indicators. The profit and loss statements available on the e-report for me had two content types, one was the statement of a total cost method the other one was the statement of cost of sales method. From the available data I calculated three types of profitability indicators:

1. ROE (Return on equities) – $ROE = \frac{\text{Net Income}}{\text{Shareholder Equity}}$
2. ROA (Return on assets) – $ROA = \frac{\text{Net Income}}{\text{Average Total Assets}}$
3. ROS (Return on sales) – $ROS = \frac{\text{Operating income}}{\text{Revenue}}$

To explore the connection between the profitability indicators of the examined businesses and the funds I used the Pearson correlation and partial correlation and then to show the cause and effect connections I applied a fittings test. During the further examination of the profitability indicators I used descriptive statistical methods and for the study of the improving and undermining probability of the profitability positions I used the Markov probability matrix.

To model the effect of the funds, the balance sheet items and profit items of the examined regional enterprises on their net turnover profitability I performed multivariate regression calculations. For the model building I used 18 balance sheet and profit data:

Balance sheet: invested assets, fixed assets, current assets, own capital, capital reserve, accumulated profit reserve, net profit of the year, liabilities, long-term liabilities, short-term liabilities.

Result influencing data: other income, material-type costs, payments to personnel, operating result, income of financial operations, costs of financial operations, result of financial operations, profit on ordinary activities.

The 19th variable of the regression calculation was the funds paid to the businesses until the examined year by the Agricultural and Rural development Office.

3.3. The examination of the farmers' opinions given about the agricultural and rural development funds

The questionnaire interview of those farmers who received agricultural and rural development funds in the Sarkad District was based on the 2013 support data of the Agricultural and Rural Development Office. The year 2013 was chosen because the farmers had fresh experiences concerning the funds. On the basis of the database available for me on the 11 settlements 1080 families were given some kind of funds. The word family is emphasized because in the database under the same address more names appeared and there were names which were repeated several times (using different types of funds) in it. By filtering the repetition of names and addresses the survey was conducted. During the data collection I used random (probability) sampling technique and within this the simple random sampling. From the population 293 heads were sampled, which is 27% of the 1080 sample population based on which we can state that the error of sampling is way below 5% with 95% confidence interval. The form of the survey was PPI (Paper and Pencil Interview) personal conduct, the advantage of it is that the highest response rate can be achieved (TAMUSNÉ, 2010). The questionnaire structurally is divided into four parts, includes open and closed questions as well. The titles of the particular issues are the following:

1. Information on the leader of the business, the funded;
2. Information on the business;
3. Information on the social status of the family;
4. Information on the funds.

The correlation-test of the data measured on the nominal and ordinal scales was done with the help of cross tabulation. The contingency table (cross tabulation) examines the connection between two variables where the lines of the table belong to the values of one variable while the columns belong to the values of another variable. One element of the table means the combined incidence of the right line and column variable (KETSKEMÉTY – IZSÓ, 2005).

To demonstrate the connection between more variables I used Multiple Correspondency Analysis (MCA). The multiple correspondency analysis is a Multidimensional Scales Method (MDS) which can be applied for scaling qualitative data (MALHOTRA, 2009). Its essence was defined in his work by MOLNÁR (2008) based on HAJDU (2003) that it is an explorative multivariable technique which converts the data of the three or multivariable convergency table into graphic illustration for the sake of visual analysis of the association connection.

The value judgement of the famers related to the funds was surveyed through statements connected to the funds. The responders had to grade the statements from one to five on a Likert scales. The segmentation of the farmers was made on the basis of the database which was done by cluster analysis. The report of the correlation connection between the non-metrical variables was done with rank correlation process. The Spearman's rank collection coefficient is used to assess how well the relationship between two variables can be described (HUNYADI – VITA, 2008b).

4. THE MAIN FINDINGS OF THE THESIS

The significance of the agricultural and rural development funds and the examination of its impact is unavoidable in terms of the disadvantageous, rural-like districts. It is especially true nowadays since the transformation of the public administration system the district level has become more important. It does not only mean a transparent territorial unit but the people living here are connected by the common identity, history and the common interest stem from similar problems. Agriculture still plays a significant role in the majority of districts even nowadays since this is the main shaper of rural areas. The development of agriculture and rural areas are in close connection. This connection is concentrated in the concept of multifunctional agriculture which is an already established concept in several countries of the world and is an essential part of the agricultural and rural development policy. The problems of agriculture and rural areas are often compensated through support systems. In the USA primarily the ecological sustainability is present besides the support of the traditional agricultural activities. In the developing countries the problems of rural areas are tried to be solved by increasing agricultural efficiency and giving input funds. In the European Union, and thus in Hungary as well, rural development became the second pillar of the Common Agricultural Policy where the support and protection of the economic, social and ecological function of the rural areas play an important role. In terms of the Southern Great Plain Region and the Sarkad District the support level has been increasing since 2004, the size of support per capita changed almost similarly both on a regional and district level, it shows the rural aspect of the district, though it exceeds the Southern Great Plain-value. When it comes to the support types the data clearly show the dominance of income supports pushing into the background the investment and rural development funds.

4.1. The regional and district level examination of the impact of the agricultural and rural development funds

4.1.1. The regional and district analysis of the funds distribution

The concentration analysis was made for two budget periods, 2004-2006 and 2007-2013. The regional concentration is more balanced from year to year than the district one between 2004-2006 (Figures 2-5).

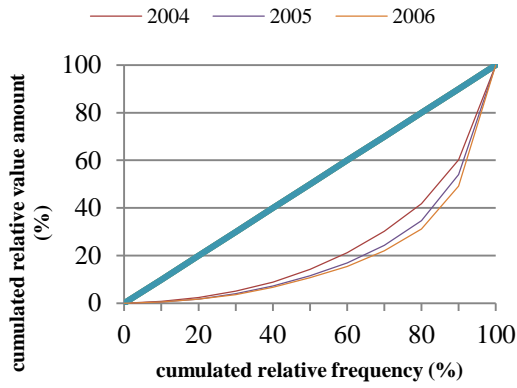


Figure 2: Subsidy concentration in the Southern Great Plain Region between 2004-2006

Source: Personal research based on the publically available data from ARO

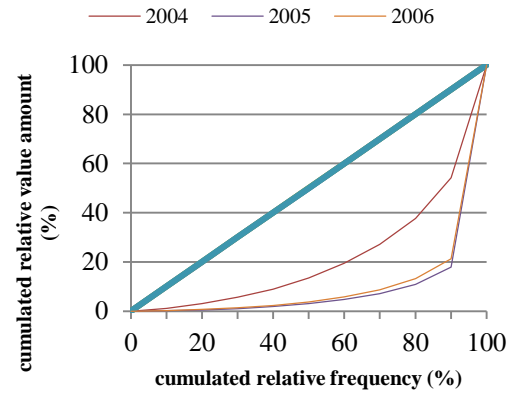


Figure 3: Subsidy concentration in the Sarkad District between 2004-2006

Source: Personal research based on the publically available data from ARO

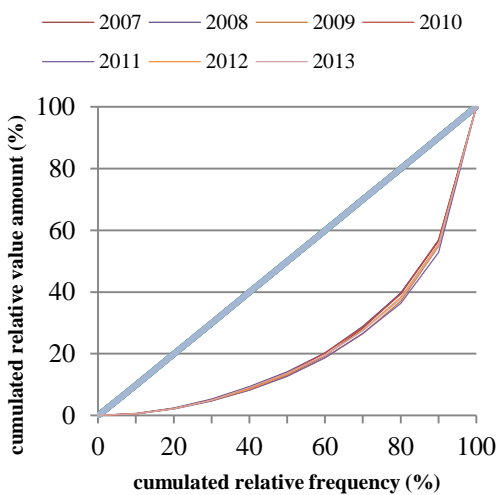


Figure 4: Subsidy concentration in the Southern Great Plain Region between 2007-2011

Source: Personal research based on the publically available data from ARO

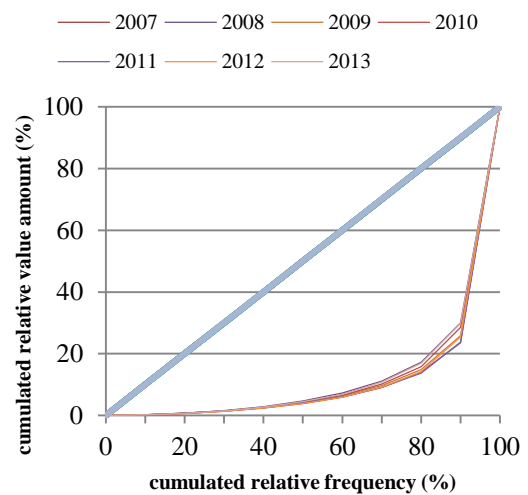


Figure 5: Subsidy concentration in the Sarkad District between 2007-2011

Source: Personal research based on the publically available data from ARO

On the district level it is already perceptible in this period that few farmers receive higher volume funds. There are no sharp differences in terms of concentration neither in the region nor in the district between 2007-2013. The Lorenz curve shows classic concentration distribution in the Southern Great Plain Region every year while in the Sarkad District a typically high concentration is experienced every year.

The course of Lorenz curves is confirmed by the value of the concentration ratio i.e. the share of the total funds among the three individuals who received the biggest funds since the average value index moves around the 10% average value since 2006 while in the district the values can be found within a 36% and 17% interval.

4.1.2. The complex development of the Sarkad District settlements in a regional dimension

The calculated Complex Development Index was examined by different methods. On the basis of the Pearson correlation coefficient values the settlements preserved their development position between 2004 and 2011 but this method does not make a distinction between the particular settlements. Based on the Markov matrix of the CDI for the periods of 1998-2003 and 2004-2011 we can state that after the accession the probability of position-keeping of the settlements improved. It confirms the correlation results meanwhile the possibilities for deteriorating (22.4%) and improving (17.8%) positions decreased (Tables 2-3).

Table 2: Markov matrix of Southern Plain Region’s settlements based on the CDI values between 1998-2003

	CDI<0	CDI>0
CDI<0	0.7778	0.2222
CDI>0	0.2694	0.7306

Source: own calculation

Table 3: Markov matrix of Southern Plain Region’s settlements based on the CDI values between 2004-2011

	CDI<0	CDI>0
CDI<0	0.8222	0.1778
CDI>0	0.2242	0.7758

Source: own calculation

If we make differences between the settlements and examine the development changes of the settlements by displaying it on maps we can experience that in terms of particular development quartiles item numbers there is no significant difference between the different years. But if we examine the settlement particularities we can see that on the basis of the CDI data the Sarkad District settlements belong to the third and fourth, better position

settlements quartile in 2011 while in 1998 there were seven settlements in the first and second, worse position settlements quartile (Figure 6).

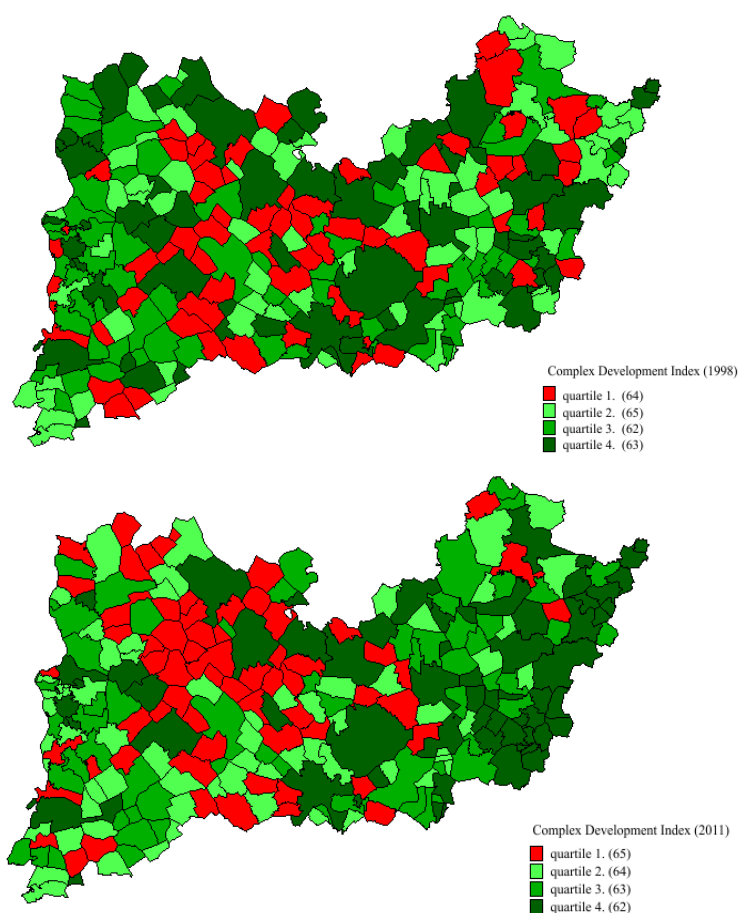


Figure 6: Complex Development Index of settlements of Southern Plain Region and Sarkad District in years 1998 and 2011

Source: own calculation

4.1.3. The connection between settlement-development and agricultural and rural development funds

On the basis of the applied Pearson correlation and partial correlation and the linear fittings-examination we can state that all the funds, the EU sources and the income support are in a significant cause and effect relationship with the CDI values in every year between 2004-2011. The determination coefficient explain the total spread between a 4-15% intervals. In the case of the investment and rural development funds and the national sources we can only detect impact on the development in 2006 (Table 4).

Table 4: Effects of subsidies to the Complex Development Index

		Total funds		EU sources		Income support		Investment and rural development funds		National sources					
		F-test	R ²	F-test	R ²	F-test	R ²	F-test	R ²	F-test	R ²				
CDI2004	F	38.4484	0.1324	38.3865	0.1320	38.3865	0.1320								
	Sig.	0.0000		0.0000		0.0000									
CDI2005	F	30.9018	0.1092	31.1464	0.1100	30.3630	0.1075								
	Sig.	0.0000		0.0000		0.0000									
CDI2006	F	45.2245	0.1522	41.9206	0.1426	39.0874	0.1343					40.7592	0.1392	38.9792	0.1340
	Sig.	0.0000		0.0000		0.0000						0.0000		0.0000	
CDI2007	F	11.0397	0.0420	11.6794	0.0443	12.0856	0.0458								
	Sig.	0.0010		0.0007		0.0006									
CDI2008	F	27.1009	0.0971	28.3418	0.1011	27.4213	0.0981								
	Sig.	0.0000		0.0000		0.0000									
CDI2009	F	35.3281	0.1230	38.9979	0.1340	39.7058	0.1361								
	Sig.	0.0000		0.0000		0.0000									
CDI2010	F	26.2867	0.0945	29.5322	0.1049	31.3099	0.1105								
	Sig.	0.0000		0.0000		0.0000									
CDI2011	F	24.4031	0.0883	26.8659	0.0963	29.0933	0.1035								
	Sig.	0.0000		0.0000		0.0000									

Source: own calculation

Since complete data of the settlements were available until 2011 and the most topical connection between the CDI and the funds on the basis of the available data can be examined in relevance to that year I measured the impact of EU accession between the development factors and support-variables of 2011.

The first main component contains eight variables where density of population weighs the most and it contains high values in terms of variables connected to enterprises and variables connected to infrastructure so I gave the title *economic-infrastructure development factor* to this main component.

The second main component contains five variables where the variable of people receiving regular social benefits has the most factor weight also the registered unemployed and the different supports given to self-governments were put in here. Since this main component distinctively contains social type indicators I named it *social development factor*.

The third main component includes three variables which characteristically are in connection with population retention so here I used the *settlement population retention-ability factor* title.

The fourth main component includes the demographic processes so the title here is *demographic development factor*.

In the final two cases the main components are made up by variables connected to agriculture which made it well-founded to call it *agricultural development factor*.

In terms of the year 2011 a cause and effect relationship can be pointed out between the economic-infrastructure development factor and all the funds types, which is explained by the 19-42% spread and in the case of settlement population retention-ability factor the relationship is justified by all the funds. Furthermore we can state a cause and effect relationship between the relevant factor variables that make up the developmental factors and the funds.

4.1.4. The analysis of the connection between the settlement development and the funds with the Difference in Differences method

In terms of the allocations of the agricultural and rural development funds we cannot mention one single settlement in the Southern Great Plain Region which did not use some kind of support after Hungary joining the European Union. That is the reason for the counterfactual statement i.e. controlling on those settlements which did not receive any funds is impossible in my situation. Using the study of MICHAŁEK – ZARNEKOW (2012) and FERTŐ (2013) I defined the „settlements not receiving funds” by putting those settlements in the group which has a lower than two-thirds value of the median of the support amount.

In the model I applied four steps:

1. I controlled on which year we are talking about to filter the factors coming from the economic fluctuation;
2. I controlled on which settlement we are talking about to filter the impact which comes from the fact that the non-observable things of the settlements differ from each other (or even observable);
3. Thirdly I applied the Difference in Differences method which is an index, which is one if the particular settlement received funds (handled) and zero when it did not receive (not handled). Before 2004 it is zero for all settlements since I want to explore the effect of the European Union accession and from 2004 it is one for the settlement I declared handled;

4. Fourthly I used a population-weighted regression.

In the case of choosing on the basis of per capita support of the handled and control group I experienced that the estimated **diffindiff** coefficient loses -0.0194 value which shows that the development of settlements did not improve (Table 5).

Table 5: Results of DiD method

	Coefficient	Standard error	t	P>t	[95% confidence interval]	Prob > F
Based on the total subsidy						
diffindiff	0.0188	0.0152	1.24	0.217	-0.0110 0.0485	0.0000
<i>F test that all u_i=0: F (253.3288) = 105.73 Prob > F = 0.0000</i>						
Based on per capita subsidy						
diffindiff	-0.0194	0.0089	-2.19	0.029	-0.0367 -0.0020	0.0000
<i>F test that all u_i=0: F (253.3288) = 89.25 Prob > F = 0.0000</i>						
Based on per hectare subsidy						
diffindiff	0.0134	0.0183	0.73	0.464	-0.0225 0.0494	0.0000
<i>F test that all u_i=0: F (253.3288) = 107.36 Prob > F = 0.0000</i>						

Source: own calculation

As I did not receive a reassuring result I made further examinations. I studied how my **diffindiff** coefficients turn out when I make comparison between two and two years and I do not consider 2004 as the year of European Union accession but do pseudo examinations from 2005 for its preceding and following two years yearly. In the case of examining shorter periods the positive impact of the accession can be significantly detected in the years 2004 and 2005 both in terms of total, per capita and per hectare funds. While in terms of the other years we can notice a bigger fluctuation in regards to the positive and negative impacts.

4.2. The impact of agricultural and rural development funds on the agribusinesses

In the balance sheet of the examined businesses of the Southern Great Plain Region and the Sarkad District there were no significant changes in the assets neither in terms of the fixed asset nor in the current assets rates. In the case of the former the rate was 50% while in the latter it was 45%. Within these main categories in regards to certain items we can demonstrate an improvement on a district level primarily in the field of financial assets, stocks, securities and credit balances. On a regional level no such changes were detected. When examining the liability of the balance sheet we can state that there has been constant growth in terms of equity on a regional level and with small fluctuations on a district level.

Simultaneously the liabilities decreased. We can establish that the long term indebtedness of the regional and district businesses continuously decreased then again there was an increase in forming provisions for liabilities (Table 6-7).

Table 6: The changes of the asset items of the enterprises of Southern Great Plain Region and Sarkad District

	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District
	2003		2007		2011		2012	
A. Fixed assets	54.29%	54.70%	51.74%	50.12%	52.53%	53.51%	51.85%	51.61%
I. Intangible assets	0.38%	0.03%	0.28%	0.03%	0.19%	0.56%	0.16%	0.48%
II. Tangible assets	51.16%	54.01%	48.98%	46.84%	49.62%	51.83%	49.20%	50.10%
III. Financial investments	2.74%	0.65%	2.47%	3.25%	2.73%	1.12%	2.49%	1.03%
B. Current assets	44.83%	42.75%	45.87%	46.82%	45.22%	43.78%	46.17%	47.40%
I. Inventories	24.58%	18.11%	24.21%	21.27%	20.81%	17.24%	21.23%	15.79%
II. Liabilities	12.30%	16.33%	14.45%	20.42%	14.91%	25.13%	14.66%	26.84%
III. Securities	1.79%	0.11%	1.09%	0.60%	1.16%	0.28%	1.46%	0.63%
IV. Liquid assets	6.16%	8.19%	6.12%	4.52%	8.35%	1.12%	8.82%	4.14%
C. Accrued and deferred assets	0.88%	2.56%	2.39%	3.06%	2.24%	2.71%	1.99%	0.99%
Total assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: own calculation

Table 7: The changes of the liability items of the enterprises of Southern Great Plain Region and Sarkad District

	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District
	2003		2007		2011		2012	
D. Shareholders' equity	58.05%	38.12%	59.60%	41.64%	67.26%	30.89%	70.13%	42.89%
I. Subscribed capital	22.77%	3.51%	13.43%	2.78%	10.37%	3.78%	9.70%	3.46%
II. Subscribed capital unpaid (-)	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.12%
III. Capital reserve	12.94%	7.89%	11.26%	11.02%	11.65%	5.91%	11.50%	11.25%
IV. Accumulated profit reserve	14.16%	12.26%	15.14%	15.15%	20.18%	5.56%	24.47%	6.99%
V. Tied-up reserve	5.90%	7.97%	9.59%	7.06%	14.10%	12.27%	13.99%	12.97%
VI. Revaluation reserve	3.89%	0.00%	3.92%	0.00%	3.07%	0.00%	3.61%	0.00%
VII. Profit or loss for the year	-1.63%	6.48%	6.25%	5.63%	7.89%	3.38%	6.90%	8.09%
E. Provisions	0.02%	0.00%	0.06%	0.12%	0.33%	0.78%	0.27%	0.09%
F. Liabilities	40.52%	61.22%	38.57%	57.71%	31.17%	67.51%	28.44%	56.42%
I. Subordinated liabilities	0.65%	1.86%	1.15%	0.92%	0.63%	0.24%	0.45%	0.19%
II. Long-term liabilities	18.91%	22.38%	10.50%	11.54%	7.96%	8.33%	6.49%	5.68%
III. Current liabilities	20.96%	36.98%	26.91%	45.25%	22.57%	58.94%	21.50%	50.55%
G. Accrued and deferred liabilities	1.41%	0.66%	1.78%	0.53%	1.24%	0.82%	1.16%	0.60%
Total liabilities	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: own calculation

In terms of the vertical and horizontal indicators showing the property and financial situation and the indicators concerning debt and liquidity the change of parameters were hectic in the

years examined. I experienced improvement in some of the years examined while deteriorating values in others both on a regional and district level (Tables 8-9).

Table 8: The indicators describing the property situation of the enterprises of the Southern Great Plain Region and the Sarkad District

	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District
	2003		2007		2011		2012	
Capital strength	51.15%	48.65%	56.57%	44.37%	62.40%	32.97%	65.54%	42.20%
The share of liabilities	47.66%	50.89%	41.83%	54.99%	35.92%	65.82%	33.10%	56.89%
Profit attributable to equity balance	3.11%	11.75%	10.37%	10.82%	9.42%	-36.23%	-8.86%	11.20%
Capital voltage	205.31%	324.62%	211.34%	147.87%	190.17%	219.76%	188.59%	32.70%
Coverage Fixed assets (A)	215.61%	257.60%	224.02%	93.92%	142.87%	-198.20%	215.66%	-255.11%
Coverage Fixed assets (B)	379.68%	286.33%	254.13%	130.72%	161.22%	-179.14%	230.66%	-241.70%

Source: own calculation

Table 9: The indicators describing the financial situation of the enterprises of the Southern Great Plain Region and the Sarkad District

	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District	Southern Great Plain Region	Sarkad District
	2003		2007		2011		2012	
Debt ratio	36.75%	28.07%	22.72%	52.83%	98.55%	25.55%	17.82%	16.21%
Equity ratio	63.25%	71.93%	77.28%	47.17%	1.45%	74.45%	82.18%	83.79%
Debt coverage ratio	843.26%	528.89%	1874.04%	452.78%	2632.47%	473.07%	3755.36%	874.77%
Net working capital	90447.78	8575.88	107184.54	6443.00	175331.57	-41460.38	174275.49	-9174.69
Economic Value Added (EVA)	-4022950.87		5878872.36		12557732.04		10270638.06	

Source: own calculation

The average change of the value amount of the net working capital in the region can be considered positive, though since its proportions almost doubled from 2003 to 2012 and also the value of the coverage indicator of the floating capital shows that the enterprises moved from the *aggressive* financing strategy to a *solid* financing strategy. Considering the change of EVA indicator we can point out a clearly positive tendency in the Southern Great Plain Region which means that the enterprises after the initial negative value realise higher added value year by year.

In my work I calculated the profitability indicators on the basis of the profit and loss account of 279 enterprises. The received results justified it to exclude certain enterprises from the analysis. In terms of eight enterprises there were years when no sales return was posted in their profit and loss account so in regards to the ROS indicator I got a zero value furthermore in regards to an agricultural cooperative the ROE indicator showed an extremely high value so I decided to exclude that from further examination to avoid a significant distortion of the results.

By examining the profitability indicators it stands out that the enterprises of the region have gone through significant capital gain since the EU accession while in the Sarkad District such positive change can be observed only in the year 2012. The tendency is similar in regards to return on assets, as well, the return on sales values show that a distinctive part of the sales return stays with the enterprises after the accession. The increasing median values of the profitability indicators show that after the accession the situation of half of the agribusinesses improved, at the same the chance to improve their position also increased since in the case of all indicators the value of indicators is between a 83-85% interval (Table 10).

Table 10: The Markov matrix of profitability indicators

	ROE<0	ROE>0		ROA<0	ROA>0		ROS<0	ROS>0
ROE<0	0.1368	0.8632	ROA<0	0.1462	0.8538	ROS<0	0.1462	0.8538
ROE>0	0.0577	0.9423	ROA>0	0.0559	0.9441	ROS>0	0.0559	0.9441

Source: own calculation

The change of profitability indicators was examined on the basis of plant size category. The extent of the spread of ROE, ROA, ROS was divided into four quartiles and I checked how the element numbers of each quartile change according to plant size in the years examined. The enterprises with the worst profitability indicators made up the first quartile while the ones with the best profitability quartile were put in the fourth quartile. On the basis of the plant size in terms of ROE the winners of the accession in the region were the medium-sized businesses while on a district level the number of businesses in a better position is lower than before the accession similarly in the case of ROA and ROS values (Figures 7-9).

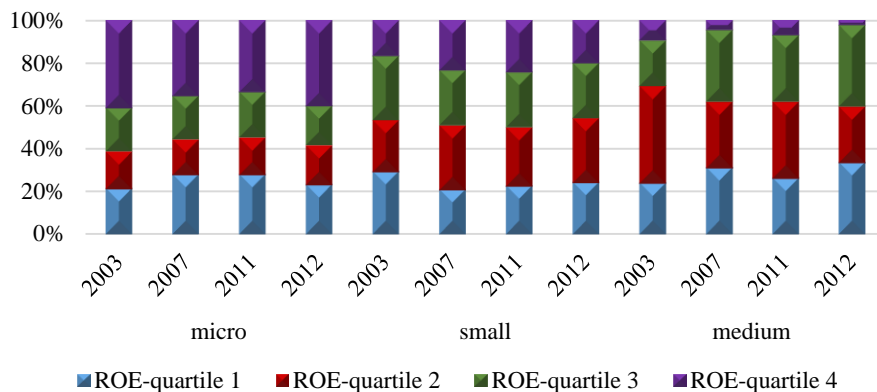


Figure 7: The spread of ROE values according to plant size

Source: own figure

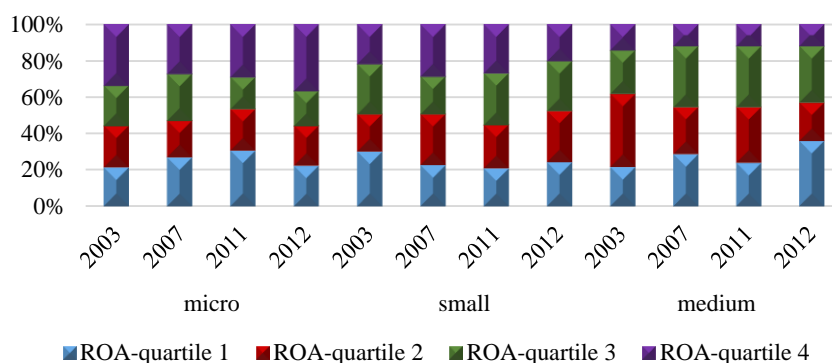


Figure 8: The spread of ROA values according to plant size

Source: own figure

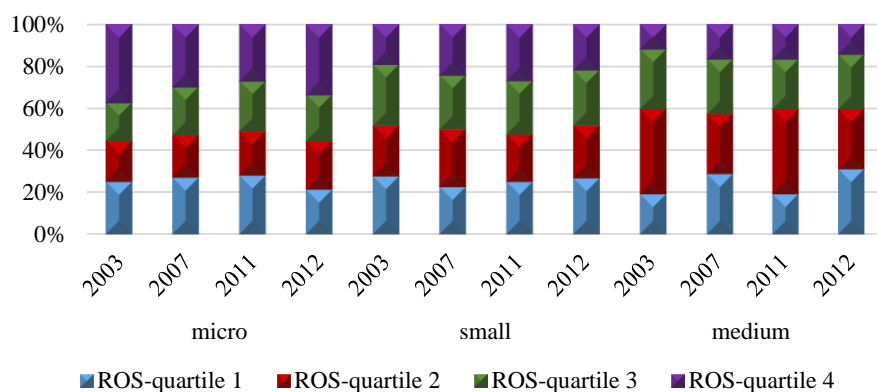


Figure 9: The spread of ROS values according to plant size

Source: own figure

While proving the connection between the profitability indicators and the funds I can detect a significant medium positive connection in the case of return on sales. The cause and effect correlation was confirmed by the linear fittings examination since the spread of the

determination coefficients changed between a 4 to 11% interval. On the basis of the multivariate linear regression model I find that both in 2011 and 2012 the ROS value was positively influenced by accumulated profit reserve and the subsidy and it was negatively influenced by the combined value of inventories and liquid assets since they increase the sales return more than the results which means less profitability (Tables 11-12).

Table 11: The estimated regression coefficients in 2011

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% confidence interval	
	B	Standard Error	Beta				
(Constant)	0.095192191	0.02595167		3.67	0.0003	0.04409537	0.146289011
Accumulated profit reserve	4.28711E-07	8.6131E-08	0.36692251	4.98	0.0000	2.59127E-07	5.98296E-07
Subsidy	3.21942E-10	1.1125E-10	0.23139746	2.89	0.0041	1.02894E-10	5.4099E-10
Inventories + Liquid assets	-3.06892E-07	1.0731E-07	-0.2610086	-2.86	0.0046	-5.18181E-07	-9.56031E-08

Source: own calculation

Table 12: The estimated regression coefficients in 2012

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% confidence interval	
	B	Standard Error	Beta				
(Constant)	0.1744259	0.0934849		1.87	0.0632	-0.0096386	0.3584903
Accumulated profit reserve	0.2816438	0.0792580	0.2816438	3.55	0.0004	0.1255910	0.4376967
Subsidy	0.2287565	0.0895154	0.2287565	2.56	0.0112	0.0525077	0.4050054
Inventories + Liquid assets	-6.91671E-07	2.89342E-07	-0.2390841	-2.39	0.0175	-1.26136E-06	-1.22E-07

Source: own calculation

4.3. The assessment of the agricultural and rural development funds based on the farmers' opinion

I used a questionnaire form in the Sarkad District to explore the social and economic correlations and the opinions connected to the agricultural and rural development funds. Since I do not possess a panel database in regards to the income of the winning farmers and to keep the questionnaire anonym I could not connect support data to the responders. So the examination of the impact of the funds on the farmers is based on their own opinions. It is apparent from the results that on the district level the single area payments (SAPS) is the most significantly represented while the investment and development aimed funds are not dominant. 98% of the people questioned (287 people) used single area payments while in the case of livestock units funds 5.5% (16 people) received funds for keeping ewes, 3.4%

(10 people) received for keeping suckler cows and 92.5% (271 people) did not receive any funds. In regards to the milk quota register and the historical base payment we recognised that for 95% of the people questioned this form of support is not typical. The support of fattened bulls 3.8% (11 people) and the support of milk production 1.7% (5 people) is better represented.

The most typical support form in the Sarkad District is the single area payments the impact of which on farming is considered positive by 94% of the farmers. There is a proven significant connection between the gender of the farmers and the judgement of the single area payments. The male consider a bigger impact to the single area payments than the female (Figure 10).

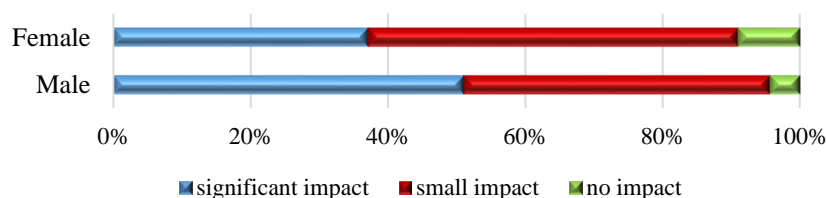


Figure 10: The relationship between gender and the Single Area Payment Scheme

Source: own figure

On the basis of the multiple correspondency analysis we can state that the settlements of the Sarkad District can be separated in connection to the judgement of the single area payments (Figure 11).

On the basis of the map there is a unanimous agreement on the statements in the village of Geszt while the other extremity is in the settlement of Körösnagyharsány where there is a total refusal. The farmers are close to agreement in Biharugra, Méhkerék and Mezőgyán while the uncertainty and agreement have equal support in Okány and Újszalonta. In the settlements of Kötegyán, Sarkad and Zsadány rate of uncertainty is high about the statements and a milder form of refusal is experienced in the settlement of Sarkadkeresztúr.

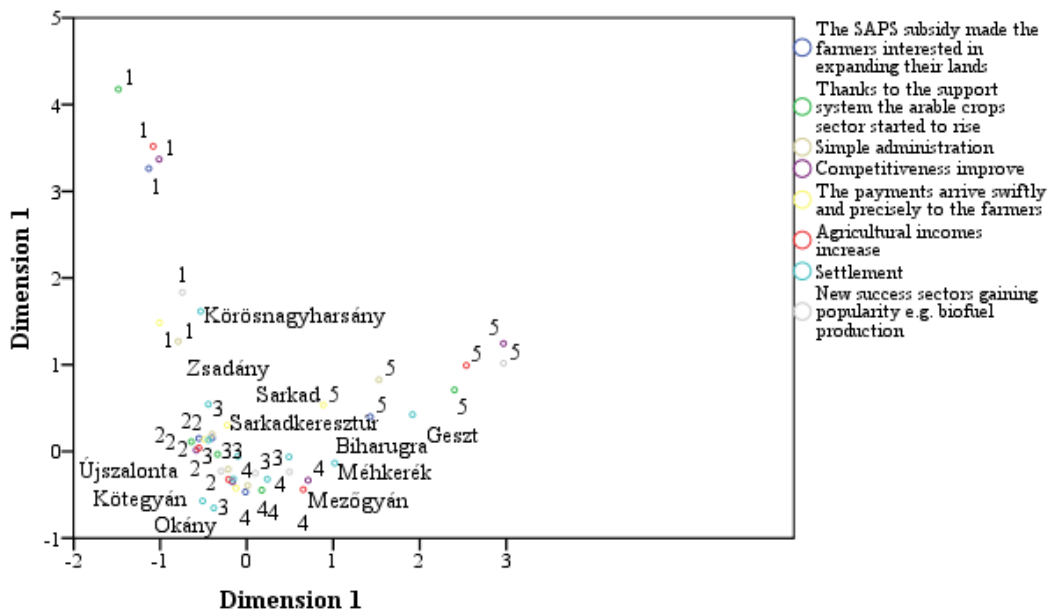


Figure 11: The correlation between the settlements and the opinions about the Single Area Payment Scheme

Key: 1-totally disagree; 2-disagree; 3-agree and disagree; 4-agree; 5-fully agree

Source: own figure

On the basis of the research about the connection between the per capita net income and the formed opinions we can state which categories attract and which categories repel each other on the perceptual map (Figure 12). There is a marked characteristics of those whose per capita net income is less than 30,000 HUF since in the representation they are far from the origo. They mainly attract category one and two so we can say that they do not agree with either the increasing income, the improvement of the crop production sector or the interest in increasing the land. Among those people whose per capita net income is more than 150,000 HUF there is uncertainty concerning the higher income but concerning the other statements there is an agreement. The transition into different income categories is well-perceived in the opinions as well since the people whose income is between 30 and 70 thousand HUF attract category three in all statements while among people earning between 70 and 150 thousand HUF, because of the increasing incomes the attraction of the fourth category is starting to dominate.

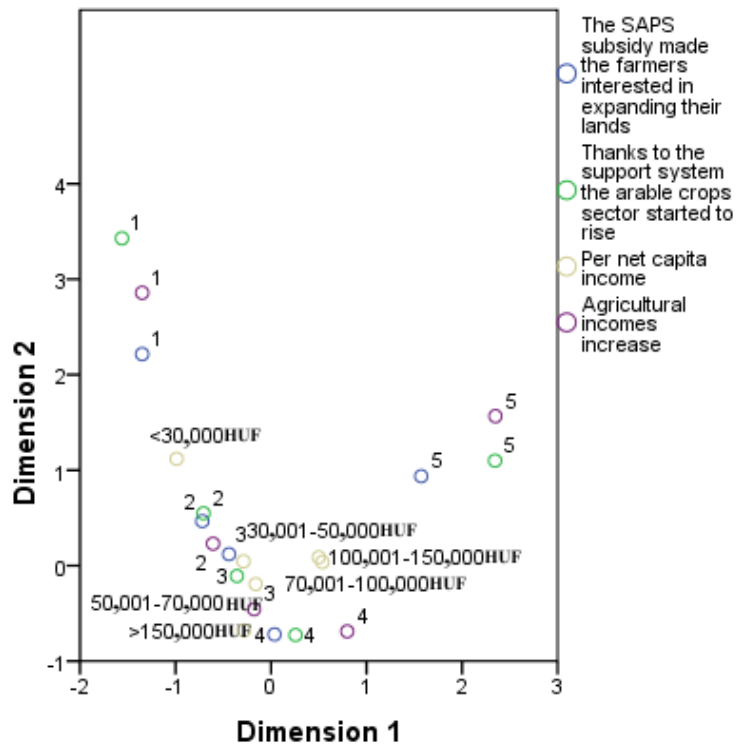


Figure 12: The correlations between the per net capita income and opinions about the Single Area Payment Scheme

Key: 1-totally disagree; 2-disagree; 3-agree and disagree; 4-agree; 5-fully agree

Source: own figure

In the case of cluster analysis which was done in connection with the judgement of the investment and development funds there is a significant correlation between the settlement and the cluster classification on which the Sarkad District settlements can be categorised. The ones in the first category both agree and disagree with the impact of investment funds on the quality of life, settlement attraction, identity, population retention ability and public security. It is those who can come up with pros and cons for both opinions so I decided to call it the argumentative cluster. The ones belonging to the second cluster totally refuse the impacts on the settlements which is displayed in their value judgement so I decided to call them pessimists. Those belonging to the third group mostly gave agreeing answers concerning the impacts on the settlements they are the ones who are optimistic about the future so I decided to call this group the hopeful.

- argumentatives: Kötegyán, Okány, Sarkad, Zsadány
- pessimists: Körösnagyharsány, Mezőgyán, Sarkadkeresztúr
- hopefuls: Biharugra, Geszt, Méhkerék, Újszalonta

5. THE THEORETICAL/PRACTICAL USABILITY OF THE RESULTS

In my thesis I undertook the study impact of the agricultural and rural development funds and within this I analysed the data of both the Southern Great Plain Region and the Sarkad District. In the secondary research I summarised and assessed the multifunctional agriculture, the main international and national literature of the agricultural and rural developments support system which can form the basis for further research. I expanded the palette of existing definitions by redefining the notions of multifunctional agriculture, subregion and district which can help other researchers' work. The comparison and concentration measurement of the support data of the Southern Great Plain Region and the Sarkad District between 2004-2013, and exploring the tendencies serve as a lesson for the next budget period. At the same time the statement on the intense support concentration experienced in the Sarkad District and the suggestions on how to reduce that can cause favourable changes which, because of the agricultural nature of the area can create the chance of catching up. By calculating the settlement development, measuring and modelling the impact of accession I showed further approach concerning the impact of accession which can help decision-makers and can serve as a basis and give methodological example for further examinations. The examination of the situation and the evaluation of the position of the relevant small and medium businesses as well as the modelling of the factors on the return on sales can help elaborate the long-term support and development conception of the enterprises. Knowing the settlement and farming characteristics, with the help of targeted programmes the attitudes concerning the funds can be improved which can primarily help the farmers' attitude towards the tenders of investment and development sources. It is essential to hold a common forum between the farmers and settlements in the best group and the ones in the weaker group to exchange views and experiences. To sum up, the methods applied in the thesis are suitable to measure the impact not just those of the agricultural and rural development funds but the impact of European Union funds on a national level both in terms of the development of the settlements as well as on the level of enterprises and farmers.

6. THE MAIN FINDINGS OF THE THESIS AND ITS NEW AND NOVEL RESULTS

The comprehensive aim of the thesis was drawn up as to explore economic and social impact of the agricultural and rural development funds in a disadvantageous subregion. The main target was realised through several subgoals from which I draw up the following new and novel findings:

1. I explored the conceptual system of multifunctional agriculture and resynthesized its most important elements.
2. By assessing the support data of the Southern Great Plain Region and the Sarkad District I found that the concentration levelled off in both areas and at the same time I explored the intense support concentration present on the district level.
3. On the basis of the analysis of the CDI indicators of the settlements it can be stated that the settlements retained their development positions, after the EU accession the probability of keeping the position of the settlements improved while the probability of improving or worsening the position decreased. The agricultural and rural development funds affect the CDI indicators significantly.
4. Concerning those CDI indicators which were analysed by the difference in differences method it can be said that if the election of the control group is chosen on the basis of the per capita support then the CDI indicators of the settlements did not improve since the accession compared to the CDI indicators measured between 1998-2003, on the other hand if we look into it in a two-year comparison the short term positive impact of the accession can be justified.
5. In terms of agribusinesses after the accession we can sense a positive change in the liabilities of the enterprises. In terms of profitability the capital supply and capital assets of the enterprises improved and a significant part of the sales returns stayed at the companies. The funds and the return on sales are in significant cause and effect relationship.
6. With the help of the multivariate linear regression model I pointed out that the agricultural and rural development funds and the accumulated profit reserve have positive impacts while the combined value of inventories and liquid assets have a negative influence on the returns on sales in regards to the examined enterprises.

7. I have proved that between certain socio-demographic characteristics of the farmers receiving subsidies in the Sarkad District and awarding the subsidies there is a significant connection moreover the settlements and the farmers who are put into different income categories can be segmented in terms of how they judge the statements concerning the subsidies.

7. LIST OF OWN PUBLICATIONS



UNIVERSITY OF DEBRECEN
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PUBLICATIONS



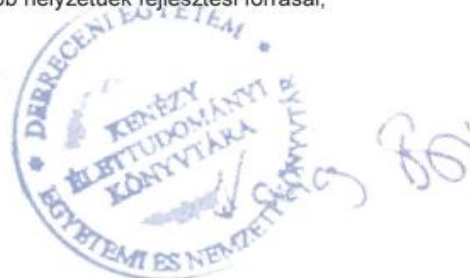
Register number: DEENKÉTK/405/2014.
Item number:
Subject: Ph.D. List of Publications

Candidate: Péter Horváth
Neptun ID: K9HHMH
Doctoral School: Ihrig Károly Doctoral School of Management and Business Administration
Mtm ID: 10025161

List of publications related to the dissertation

Hungarian scientific article(s) in Hungarian journal(s) (5)

1. **Horváth P.:** A határon átnyúló együttműködések új lehetőségei és szerepük a hátrányos helyzetű kistérségek felzárkóztatásában.
Közép-Európai közl. 6 (1-2), 317-324, 2013. ISSN: 1789-6339.
2. **Horváth P., Nagy G.:** A multifunkcionális mezőgazdaság és a fenntartható vidékfejlesztés egyes összefüggései.
Agrártud. Közl. 45, 29-38, 2012. ISSN: 1587-1282.
3. **Horváth P.:** A multifunkcionális mezőgazdaság szerepének értelmezése regionális dimenziókban.
Agrártud. közl. 49, 177-181, 2012. ISSN: 1587-1282.
4. **Horváth P.:** A kistérségi együttműködés új kihívásai a magyar-román határ menti perifériákon
=New challenges of the sub-regions' cooperation at the peripheries of the Hungarian-Romanian cross-border.
Virtuális Intéz. Közép-Eur. Kut. közl. 2 (2-3), 268-276, 2010. ISSN: 2062-1396.
5. **Horváth P.:** Kistérségek mai megítélése, a leghátrányosabb helyzetűek fejlesztési forrásai, kihasználásuk tapasztalatai a Sarkadi kistérségben.
Agrártud. közl. 42, 105-110, 2010. ISSN: 1587-1282.





Foreign language scientific article(s) in Hungarian journal(s) (1)

6. **Horváth, P.**: Issues in the economic development and utilization of EU funds in a disadvantaged sub-region of the Southern Great Plain Region.
Apstract. 6 (5), 43-46, 2012. ISSN: 1789-221X.

List of other publications

Hungarian book chapter(s) (5)

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