The Current View on Redistribution of Subsidies in the Agricultural Sector in Slovakia[1]

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Abstract

The essential way of realization of the Common Agricultural Policy in EU is through the financial support. One of the basic ways of financial support are subsidies. The huge segment affecting the agricultural sector is necessary to define, describe or classify so that we can might it to best analyse and understand. The aim of this paper is to evaluate the development of agricultural subsidies granted per hectare of agricultural land in Slovakia in terms of territory. The difference between the individual regions was evaluated using one-way analysis of variance. This analysis confirmed the existence of statistically significant differences between the amounts of subsidies per hectare of agricultural land provided to agricultural entities in terms of individual regions. This fact shows that firms in regions with worse natural and climatic conditions achieved a higher amount of financial support than companies in regions where agricultural production has better conditions and a long-term tradition.

Key words

Subsidies, agriculture, regions, Slovakia

JEL Classification: H20, Q18

Introduction

The Common Agricultural Policy of EU is in the multilateral and continuous development. Although the structure is relatively complex, for the vast majority of production is an essential way of its realization through the financial support. This is achieved by using tools such as the various types subsidies, intervention purchases, export restitution, the minimum import prices and import duties.

According to Matthews (2013), the subsidies can have positive as well as negative impact on the behaviour of agricultural entities. On the one hand, subsidies can positive influence on the agricultural behaviour through the wealth effect. Farmers are more willing to expand production through such activities, which would be considered too risky in case of absence of guaranteed income from direct payments.

On the other hand, the subsidies can negatively affect agricultural productivity because they distort the production structure of the recipient enterprises. The obvious examples are coupled subsidies that keep the position of farmers dealing with the loss-making business solely for the purpose of drawing of subsidies. The subsidies can lead

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to technological inefficiency, lack of effort to look for the methods to reduce the cost of farmers. The subsidies may also lead to slightly budgetary constraints, which means that farmers might be inclined to over-invest and thus ineffectively use the resources. More generally, the subsidies help to keep the existing resources and to channel funds for more productive use in response to new technologies and changing market conditions.

The term subsidy covers a wide range of economic interventions of the government and policies, which are implemented. The huge segment affecting the agricultural sector is necessary to define, describe or classify so that we can might it to best analyse and understand. At present, there is no uniform definition of subsidy. For the initial definition can be regarded as the definition used in OECD publications, which defines a subsidy as a "result of government activities that are beneficial to the consumer or the manufacturer in order to supplement their income or reduce costs" (OECD 2005). This definition thus includes activities such as direct payments from the state budget, tax breaks and rebates or subsidies arising from the legal preferences beneficial for certain market participants (e.g. the preferential access to the market, etc.).

The basic types of support in the agricultural sector include direct support and agri-environmental support. The list of current direct support in Slovakia is recorded by Agricultural Payment Agency. Slovak farmers can annually apply for this direct support, whose conditions for the provision are pursuant to the EU and SR legislation. It is the following support:

- from the European Agricultural Guarantee Fund (EAGF)
    - Single Area Payment Scheme (SAPS)
    - payment to dairy cow,
    - separate sugar payment,
    - separate fruits and vegetables payment;

- from the European Agricultural Fund for Rural Development (EAFRD)
    - support in less favoured areas (LFA),
    - agri-environmental payments,
    - support in territories of European importance for agricultural soil,
    - support for animals welfare,
    - payment for first afforestation of agricultural land,
    - forest environmental payment,
    - support in territories of European importance for forest land;

- from the state budget
    - transitional national payments
    - additional direct payments,
    - support for hops,
    - payment per big livestock unit (Agricultural Payment Agency 2015).

1   Methodology

The aim of this paper is to evaluate the development of agricultural subsidies granted per hectare of agricultural land in Slovakia in terms of territory. In this paper was tested the validity of hypotheses 1: *"It was assumed that there is a statistically*

significant difference between the amount of subsidies per hectare of agricultural land provided to entities working on agricultural land in the Slovak Republic for the period 2005 - 2014 in terms of territorial division."

The basis for the empirical part were secondary financial and additional data of agrarian enterprises provided by the Ministry of Agriculture and Rural Development of the Slovak Republic in the form of Information sheets that we received from the company Radela Ltd. In terms of time series analysis, the paper is focused on the period from 2005 to 2014. The following table 1 shows the representation of the agricultural enterprises in the research sample by the regions.

Table 1 Research sample of agricultural companies by regions, 2005-2014

Year/ Regions	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
BA	89	81	81	82	78	72	79	83	83	85
TT	240	225	242	220	232	225	243	247	237	253
TN	113	111	119	108	100	102	109	111	111	117
NT	263	256	261	257	261	239	249	260	279	283
ZA	127	127	130	125	125	118	120	133	124	127
BB	187	177	178	175	195	177	208	227	240	231
PO	214	216	189	192	202	199	203	224	205	196
KE	177	171	164	158	190	173	201	195	204	195
SR	**1410**	**1364**	**1364**	**1317**	**1383**	**1305**	**1412**	**1480**	**1483**	**1487**

Source: Own processing.
(Legends: BA – Bratislava region, TT – Trnava region, TN – Trenčín region, NT – Nitra region, ZA – Žilina region, BB – Banská Bystrica region, PO – Prešov region, KE – Košice region, SR – Slovak Republic total)

The analysis processing was realized in the computer programs STATISTICA and STATGRAPHICS. The difference between the individual regions was evaluated using one-way analysis of variance, which assumes the normal distribution of variables, independence of the selections as well as the homoscedasticity. First assumption of a normal distribution was verified by the Shapiro-Wilk test defined by the following formula:

$$W = \frac{(\sum u_i x_i)^2}{\sum u_i^2 \sum (x_i - \bar{x})^2} \tag{1}$$

where: u_i – constant,
              x_i – value of the *i-th* statistical unit,
              $\bar{x}$ – average value of the variable.

There was tested the hypothesis $H_0 : F(x) \in N(\mu; \sigma^2)$ opposite alternative $H_1 : non\ H_0$.

Further assumption of the homoscedasticity was verified by the Levene's test defined by the following formula:

$$W = \frac{(N-k)}{(k-1)} \frac{\sum_{i=1}^{k} N_i (Z_{i.} - Z_{..})^2}{\sum_{i=1}^{k} \sum_{j=1}^{N_i} (Z_{ij} - Z_{i.})^2} \tag{2}$$

where: k – number of values monitored categorical variable,

N – the number of observations or file range,

N_i – the number of observations in the i-th group,

Y_{ij} – measured value of j-th unit of the i-th group,

$\overline{Y}_i$ – average value of the i-th group,

$\widetilde{Y}_i$ – median of the i-th group,

$Z_{..}$ – average of the groups Z_{ij},

$Z_{i.}$ – average Z_{ij} for i-th group.

There was tested the hypothesis $H_0: \sigma_1^2 = \sigma_2^2 = \ldots = \sigma_1^2 = 0$ opposite alternative $H_1: non$ H_0.

In the case of confirmation of both assumptions was the difference between the regions for the whole period tested by ANOVA, the output of which is as follows:

Table 2 Scheme table ANOVA

Source of variability	Sum of the squared deviations	Number of degrees of freedom	Mean squared deviation	F-ratio
Factor A	SSA	k − 1	$MSA = \dfrac{SSA}{k-1}$	$F = \dfrac{MSA}{MSE}$
Random E	SSE	n − k	$MSE = \dfrac{SSE}{n-k}$	
Total	SST	n − 1		

Source: Pacáková et al., 2009

ANOVA divides the overall variability of the data (SST) on the variation within groups (SSE) and the variation between groups (SSA), which represents the F charac-teristics calculated as:

$$F = \frac{MSA}{MSE} = \frac{\frac{SSA}{k-1}}{\frac{SSE}{n-k}} = \frac{\frac{\sum_{i=1}^{k} (\overline{Y}_i - \overline{Y})^2 n_i}{k-1}}{\frac{\sum_{i=1}^{k} \sum_{j=1}^{n_i} (Y_{ij} - \overline{Y}_i)^2}{n-k}} \tag{3}$$

There was tested the hypothesis $H_0: \sigma_1^2 = \sigma_2^2 = \ldots = \sigma_1^2 = 0$ opposite alternative $H_1: non$ H_0.

2   Results and discussion

A closer look at the volume of subsidies per ha of agricultural land in terms of territorial division identifies in each region in Slovakia the trend, which copies develop-ment of the subsidies for the entire Slovak Republic. In 2010, all regions except the Žilina region reached the highest value of the volume of subsidies. Since 2010, there

was a gradual decline of financial support, mainly due to the depletion of funds from the Rural Development Programme 2007-2013 and slower initial use of the payments from new Rural Development Programme for 2014-2020 and the slight drop in support from the budget of Slovak Republic.

An important fact is that subsidies should be seen as a tool for meeting the objectives of agricultural policy and not as an objective of business behaviour of the agricultural producers. Due to the particularities of Slovak agriculture, the agricultural policy should respect the regional principle, which in our view the most corresponds to the level of individual regions. A uniform system of payments per hectare is aimed at reducing disparities in payments to farmers in different member states, and for farmers from different regions within the nation states. Therefore in our analysis, we looked at success of fulfilment of this objective in the Slovak agricultural sector as well as the increasing trend in subsidies in Slovak agriculture that has been maintained despite the fact that Europe-wide trend is reversed.

Looking at the figure 1 can be seen that the lowest amount of subsidies per ha of agricultural land was achieved by companies of Nitra, Bratislava and Trnava region. On the other hand, companies of Žilina, Prešov and Trenčín region achieved the most aid per hectare of agricultural land. This fact shows that firms in regions with worse natural and climatic conditions achieved a higher amount of financial support than companies in regions where agricultural production has better conditions and a long-term tradition.

Figure 1 Development of volume of subsidies per one hectare of agricultural land by regions (in euro), 2005-2014
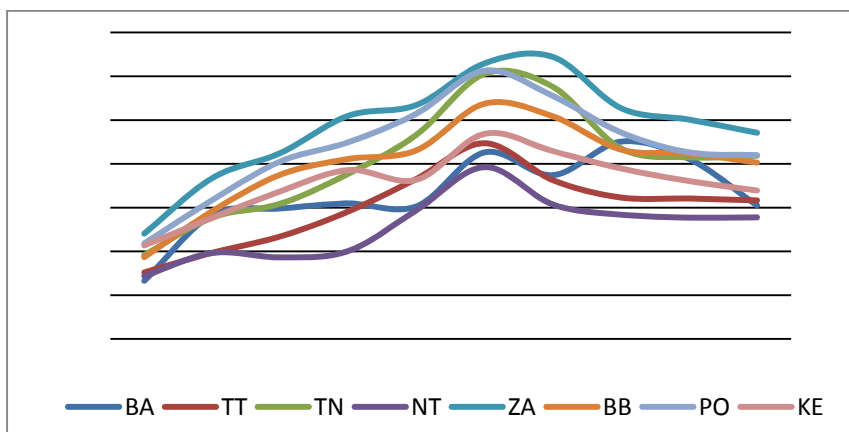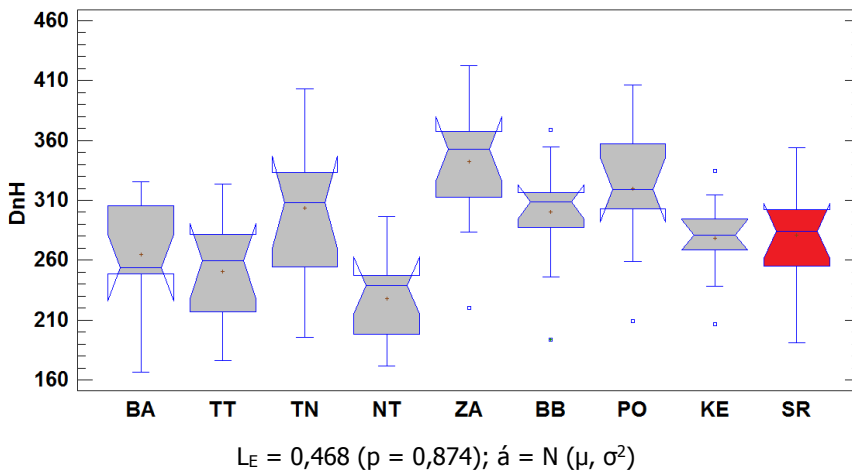

Source: Own processing.
(Legends: BA – Bratislava region, TT – Trnava region, TN – Trenčín region, NT – Nitra region, ZA – Žilina region, BB – Banská Bystrica region, PO – Prešov region, KE – Košice region)

The following figure 2 shows the distribution of the results of the subsidies per hectare (DnH) in terms of territorial division. The results are also compared with the average value for whole Slovak Republic. Through the Shapiro-Wilk test was confirmed a normal distribution of values and by Levene's test was confirmed their homoscedasticity. Based on the results of a one-way analysis of variance (Table 3) were confirmed differences between the values of subsidies per hectare of agricultural land at the level

of individual regions. When looking at the figure 2, we can assume the differences in the amount of subsidies granted per hectare between the Žilina region, Trenčín region and Prešov region.

Figure 2 Comparison of regions and Slovak Republic according to subsidies per one hectare, 2005 - 2014

$$L_E = 0,468 \ (p = 0,874); \ á = N \ (\mu, \sigma^2)$$

Source: Own processing.
(Legends: BA – Bratislava region, TT – Trnava region, TN – Trenčín region, NT – Nitra region, ZA – Žilina region, BB – Banská Bystrica region, PO – Prešov region, KE – Košice region, DnH – subsidies per one hectare)

Table 3 ANOVA - comparison of regions in the Slovak Republic according to subsidies per one hectare, 2005 - 2014

Results of ANOVA	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	99884,4	8	12485,6	**5,06**	**0,0000**
Within groups	199863,	81	2467,44		
Total (Corr.)	299747,	89			

Source: Own processing.

Conclusion

The Common Agricultural Policy (CAP) currently represents only tool of support and agricultural management for farmers. At present, the indispensable parts of this policy are just subsidies. The majority of subsidies are paid in the form of decoupled direct payments, called Single Payment Scheme (SPS), which are currently the most important payments. The payments are not dependent on the actual or future amount of the ag-

ricultural production, but on the contrary are attached on the agricultural land. Furthermore, we can find a higher public also as political interest in the field of individual effects of agricultural policy on the redistribution of incomes in the agricultural sector.

Based on results of the ANOVA was confirmed the hypothesis 1. This analysis confirmed the existence of statistically significant differences between the amounts of subsidies per hectare of agricultural land provided to entities working on agricultural land in the Slovak Republic for the period 2005 - 2014 in terms of territorial division. This fact shows that firms in regions with worse natural and climatic conditions achieved a higher amount of financial support than companies in regions where agricultural production has better conditions and a long-term tradition. The point is that the assumptions of the program of the Common Agricultural Policy in EU have the aim to compensate the opportunities for farmers with farms on poor soils in bad natural conditions. In this regard, it verifies the fulfilment of this vision in terms of Slovak agriculture. However, for the further research, it would be good to look in more details on impacts and dependencies of performance of agricultural entities from these subsidies.

The issue of subsidies in primary agricultural production is the disputed area for many decades. On the one hand, the subsidies are justified because the agricultural sector is very sensitive sector to changes in climatic factors compared to other sectors of the national economy. On the other hand, it is true that the subsidies distort the market efficiency. One thing is sure; this situation is certainly not an ideal solution. Subsidy policy has many problems and inconsistencies and agricultural enterprises should therefore seek opportunities for their growth in other fields rather than rely only on financial support in the form of the effect of subsidies.

References

Agricultural Payment Agency. (2015). *PPA/Priame a agro-environmentalne podpory*. Retrieved June 26, 2015, from http://www.apa.sk/index.php?navID=123

Matthews, A. (2013). *Impact of CAP subsidies on productivity*. Retrieved August 30, 2016, from http://capreform.eu/impact-of-cap-subsidies-on-productivity/

OECD. (2005). *Environmentally Harmful Subsidies, Challenges for reform*. Retrieved July 22, 2015 , from http://www.oecd.org/tad/fisheries/environmentallyharmful-subsidieschallengesforreform.htm

Pacáková, V. et al. (2009). *Štatistické metódy pre ekonómov*. Bratislava: Iura Edition.