potravinárstvo®
Slovak Journal of Food Sciences

Potravinarstvo Slovak Journal of Food Sciences
vol. 12, 2018, no. 1, p. 716-722
doi: https://doi.org/10.5219/941
Received: 1 June 2018. Accepted: 20 October 2018.
Available online: 29 October 2018 at www.potravinarstvo.com

ISSN 1337-0960 (online)

IS CURRENT SYSTEM OF DIRECT PAYMENTS SUITABLE FOR FARMERS IN SLOVAKIA?

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ABSTRACT
Current system of direct payments in Slovakia can be described as per hectare payment. It is based on the logical assumption that the more land farmers cultivates, the more support they need. However, it seems like this principle works differently among EU member states. Historically, Slovakia is a country with the largest farms in EU 28. This extreme big physical farm size is here connected with the lowest output among EU 28 and simultaneously Slovak farms display also lowest efficiency. Paper examine generally accepted assumption that the more hectares farms utilize, the more subsidies they should receive, to help achieve more output. Research is based on the mutual pair combined correlation analysis, which examined relationship between utilized agricultural area, total output and total subsidies. Surprisingly just the relationship between total subsidies and total output was proved to be positive and in a moderate manner. Relation of total subsidies and utilised agricultural area, respectively total output and utilised agricultural area show the inverse relationship. In spite of the development in most European countries, Slovak outcomes indicates that the more subsidies farmers receive, the less output they achieve. This paradox can be caused by the actual Common Agricultural Policy system of subsidies remuneration which is not necessary suitable for whole EU 28 on the same level.

Keywords: utilized agricultural area; total output; subsidies; Slovakia; farm efficiency

INTRODUCTION
Farmers' support in the European Union (EU) is currently implemented through various instruments, including financial ones, which are applied through direct payments. According to **Jankacká and Lincényi (2013)**, the context of direct payments has created a space for farmers to focus more on demand and therefore on the consumer. In addition, one of the functions of support is also to regulate the volume of production of certain commodities linked to production quota, price or even non-production on land **(EC, 2014)**. Direct payments are therefore an effective tool of the European Commission (EC) to regulate the agri-food sector in the EU. From 2015, the principle of decoupling of payments from production is applied also in Slovakia, and direct payments are paid per hectare of the agricultural area in order to ensure a direct positive impact on the actual performance of farms **(Duricová, 2016)**. As summarised by **Gordon and Davodora (2004)**, the question of farms' productivity and efficiency in post-socialist countries is crucial to understand whether the countries could compete within the enlarged EU after their accession and how farm structures in these countries would evolve.

Agriculture and food production in Slovakia are one of the main pillars of the national economy. The sustainability of these industries is crucial for further economic development as well as for ensuring the country's food security and satisfying domestic demand. According to **Matoškova and Gálik (2013)** this can be achieved mainly by ensuring a sufficient supply of competitive, high-quality and affordable home-grown food, while making use of the benefits of international trade and all instruments of the Common Agricultural Policy for trade in agricultural and food products. Subsidies affects the total input, so it is very important to monitor the link between input and total output. The relationship between output and input may be asociated to farm efficiency. **Bakhshood and Thomson (2001)** define efficiency in terms of production as output maximization for a given set of inputs or outputs at a given output level using a minimum input level, or a mixture of both. Agricultural subsidies help to increase the performance and reduce world prices but on the other hand also disrupt international markets and reduce economic efficiency. According to **Adamišin et al. (2015)**, the direct impact on the performance and efficiency may have also effect on the management of the agricultural entity. This can create better conditions, which can contribute higher performance and can be also positive inspiration to other companies in the neighbourhood.

In 2003, European Council reformed Common Agricultural Policy (CAP) system which caused dramatic

changes in direct payment scheme through decoupling of the direct support. After this payments were no longer connected to the production and farmers received direct payments (single farm payments) conditional on certain cross-compliance requirements which based on the keeping the land in good agricultural and environmental condition, soil protection, preventing deterioration of habitats, and protection of water resources **(Blomquist and Nordin, 2017)**. New system was fully implemented in 2005 and Slovakia as one of EU new entrants was allowed to adopt (temporarily until 2010) simplified system of direct payments (SAPS – single area payment scheme) which is payed yearly on the hectare basis. SAPS is connect only to agriculture area and has no link with the amount of production **(MARD SR, 2018)**.

The level of agricultural production in Slovakia is close to two billion EUR per year, with the largest share of total production in the region of Western Slovakia, where an annual production exceed 1.3 billion EUR. Plant production amounted to 1.149 billion EUR and livestock production 861 million EUR. Of the total agricultural production, measured at current prices, up to 94% was agricultural production, and the remaining 6% on average represented the production of agricultural services **(SO SR, 2016)**.

Scientific hypothesis

Based on the previous research these indicators suggests that there is a link between total subsidies (TS) utilized agricultural area (UAA) and total output (TO). Therefore the assumptions were set and examined by the correlation analysis:

Assumption 1: There is a statistical relationship between total subsidies (TS) and total output (TO) on farm level.

Assumption 2: There is a statistical relationship between total subsidies (TS) and utilized agridultural area (UAA) on farm level.

Assumption 3: There is a statistical relationship between total output (TO) and utilized agricultural area (UAA) on farm level.

MATERIAL AND METHODOLOGY

Article is based on the Farm Accountancy Data Network (FADN) data from twelve year time period from 2004 to 2015. FADN database includes data of agricultural holdings surveyed by the Farm Structure Survey (FSS), carried out by the EU countries and managed by Eurostat. This set of farms consists of all agricultural holdings in the European Union of at least 1 hectare and those of less than 1 hectare provided the latter market a certain proportion of their output or produce more than a specified amount of output **(FADN, 2017)**. Analysis includes 28 EU member states: (BEL) Belgium, (BGR) Bulgaria, (CYP) Cyprus, (CZE) Czech Republic, (DAN) Denmark, (DEU) Germany, (ELL) Greece, (ESP) Spain, (EST) Estonia, (FRA) France, (HRV) Croatia, (HUN) Hungary, (IRE) Ireland, (ITA) Italy, (LTU) Lithuania, (LUX) Luxembourg, (LVA) Latvia, (MLT) Malta, (NED) Netherlands, (OST) Austria, (POL) Poland, (POR) Portugal, (ROU) Romania, (SUO) Finland, (SVE) Sweden, (SVK) Slovakia, (SVN) Slovenia, (UKI) United Kingdom. Considering the fact, that different member states entered EU in different time, BGR and ROU data starts in 2007 and HRV in 2013. In chosen period these indicators were examined: average utilised agricultural area (UAA) in ha.farm^{-1} in EU 28 (2004 – 2015), total subsidies – excluding on investments (EUR.farm^{-1}) in EU 28 (2004-2015), average total output (EUR.farm-1) and total input (EUR.farm^{-1}) in EU 28 (2004 – 2015), total output (EUR.farm^{-1}) and total input (EUR.farm^{-1}) ratio in EU 28 (2004 – 2015).

All displayed calculations, graphical views and statistical analyzes were implemented on software Microsoft Excel as a part of product Microsoft Office 2013 Professonal Plus.

Statisic analysis

From the methodological point the statistical methods for measurement of the dependence, resp. associations of observed variables were used. We assessed the statistical significance of relations **(Orsághová, et al., 2016)**. If there is a reversible dependency between variables, which means that the dependence of the variable X from the Y variable has also meaning, then we found correlation dependency **(Obtulovič, 2001)**. To interpret correlation coefficient which can arise from -1 to +1, certain ranges were used: almost perfect correlation (0.9 – 1), very large correlation (0.7 – 0.9), strong correlation (0.5 – 0.7), moderate correlation (0.3 – 0.5), small correlation (0.1 – 0.3) and trivial correlation rate (0.0 – 0.01) **(Munk, 2011).** These ranges can gain both positive and negative linear relationship.

RESULTS AND DISCUSSION

Utilised agricultural area (UAA) is the EU standardized unit which describes the area used for farming in hectares per farm. It includes **(Eurostat, 2018)** the following land categories: arable land, permanent grassland, permanent crops, other agricultural land such as kitchen gardens (even if they only represent small areas of total utilised agricultural area). The term does not include unused agricultural land, woodland and land occupied by buildings, farmyards, tracks, ponds, etc. This area varies in member states. The smallest farms in EU 28 are in Malta (2.84 ha.farm^{-1}), the most of other members has farms with utilised between 10 and 100 hectares. Farms with more than 100 hectares are in: Estonia (119.85 ha.farm^{-1}), United Kingdom (154.70 ha.farm^{-1}) and Czech Republic (218.41 ha.farm^{-1}). Unlike these usual values, Slovakia has the absolutely biggest farms in EU 28 with the UAA value of 556.15 ha.farm^{-1} (Figure 1). This extreme can be described by historical farm size in Slovakia after process of collectivization after World War II, when huge collective ownership was established **(Lančarič, et al., 2013)**. The UAA of farms remained mostly unchanged also after privatization and transition to private ownership.

According to the size of UAA, subsidies are remunerated on the basis of hectare area, which is projected into the change of total subsidies. This system was set by the Common Agricultural Policy (CAP) for the all EU members. This system should mean advantage for Slovak farmers who utilise huge acreage of land. In examining time period this means that single Slovak farm received averagely 136 775 EUR.farm^{-1} per year. This was more than double amount of EUR than the second CZE where farmers received averagely 69,827.92 EUR.farm^{-1} per year (Figure 2). However, there were 12 countries where farmers got less

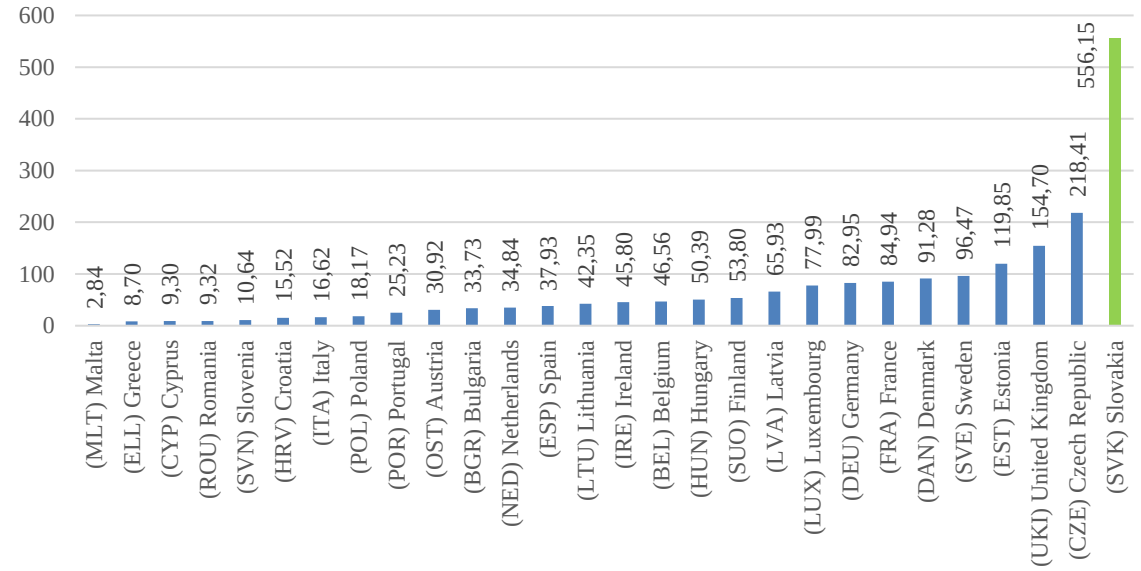

Figure 1 Average utilised agricultural area (ha.farm^{-1}) in EU 28 (2004 – 2015).
Source: own calculations based on FADN (2018) data.

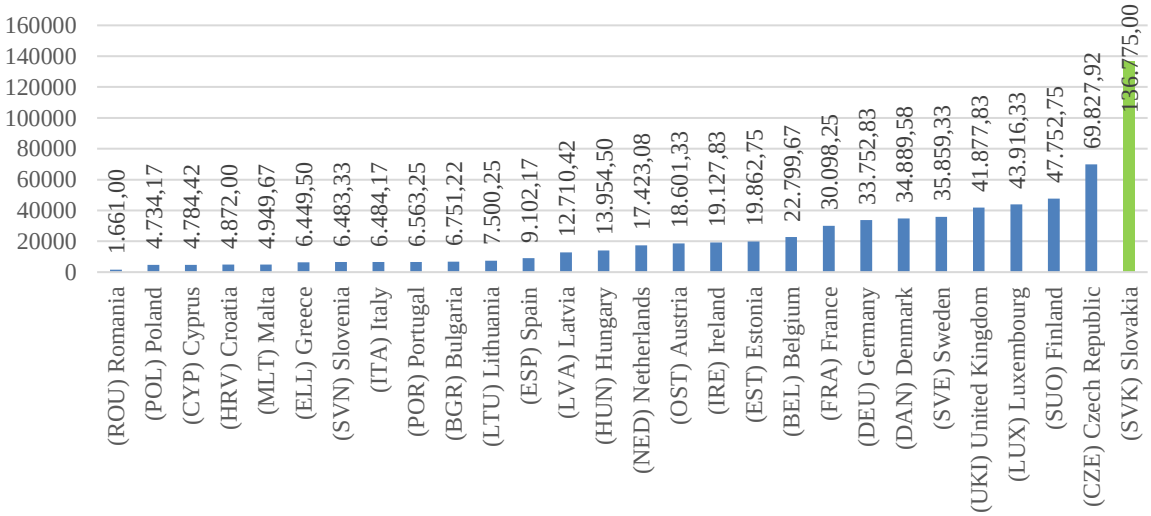

Figure 2 Total subsidies – excluding on investments (EUR.farm^{-1}) in EU 28 (2004 – 2015).
Source: own calculations based on FADN (2018) data.

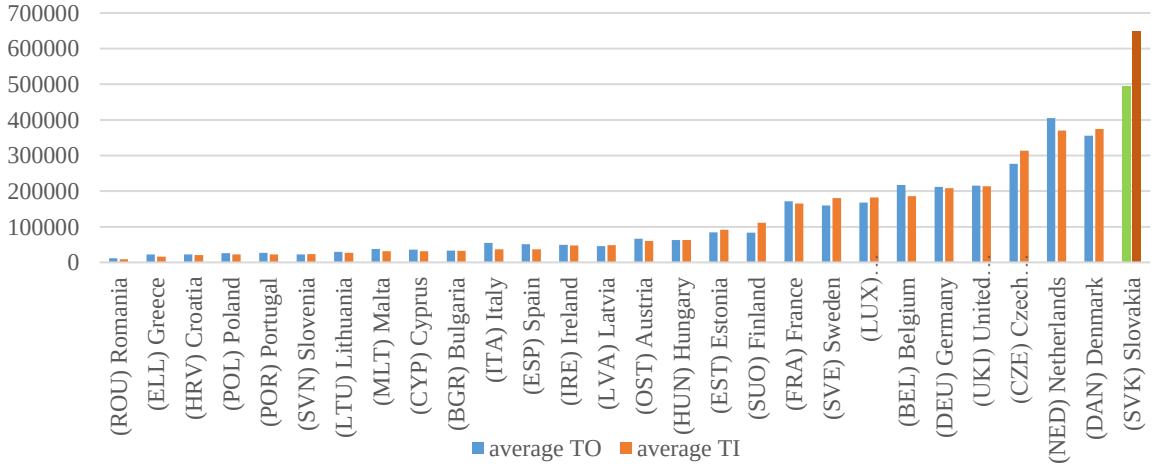

Figure 3 Average total output (EUR.farm^{-1}) and total input (EUR.farm^{-1}) in EU 28 (2004 – 2015).
Source: own calculations based on FADN (2018) data.

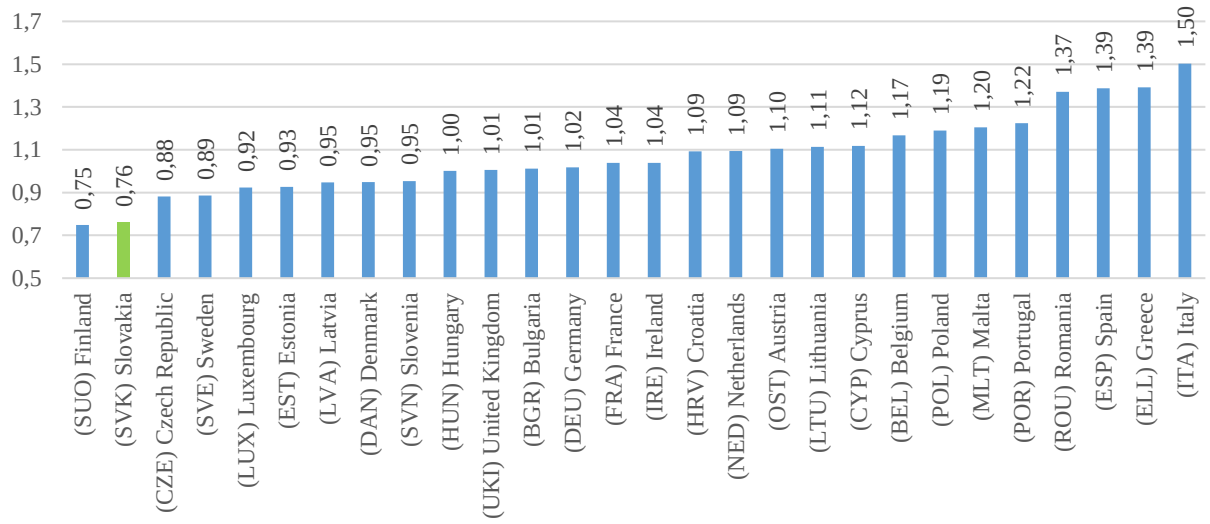

Figure 4 Total output (EUR.farm^{-1}) and total input (EUR.farm^{-1}) ratio in EU 28 (2004 – 2015).
Source: own calculations based on FADN (2018) data.

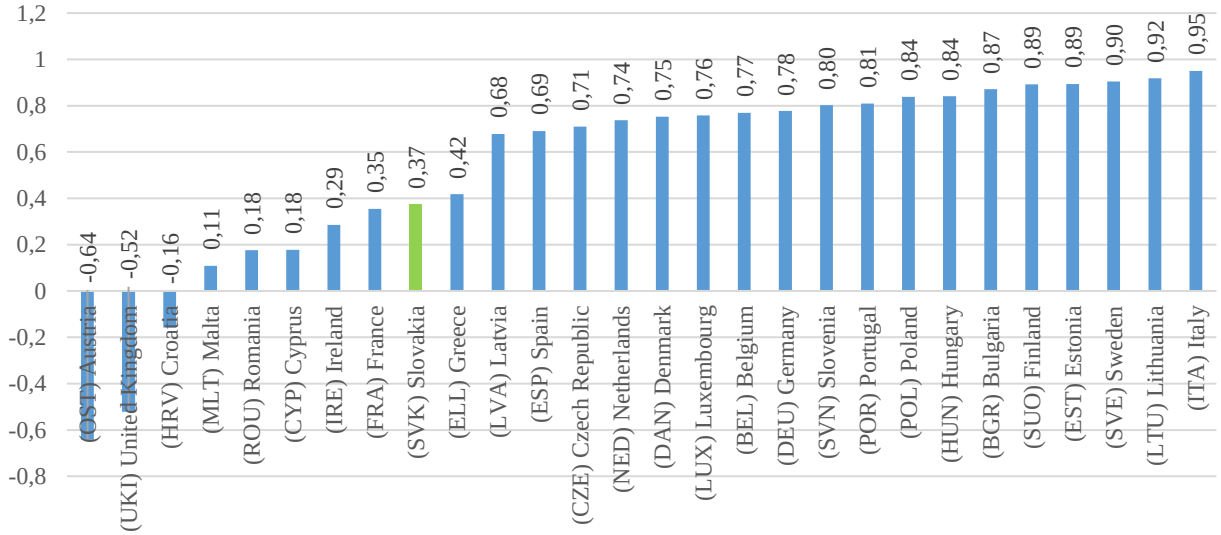

Figure 5 Correlation between total subsidies (EUR.farm^{-1}) and total output (EUR.farm^{-1}) in EU 28, (2004 – 2015).
Source: own calculations based on FADN (2018) data.

than 10,000 EUR.farm^{-1} yearly, with the lowest number in Romania 1,661 EUR.farm^{-1}.

It can be expected that immense acreage and simultaneously subsidies should be projected also in the great value of total output. This expectation can be proved in most of the examined EU countries, including SVK. But after closer view (Figure 3), it is important to compare the total amount of output with the amount of used input. When looking at the absolute values, Slovakia is leader in the number of total output and also input. However, the most important is to indicate the difference between these two variables in positive manner (TO – TI), which indicates the efficiency. Slovakia is leader also in the average amount of this difference, but surprisingly, in the negative manner (-155,076.33 EUR.farm^{-1}). Despite Slovakias input is the highest out of EU 28 (648,784.58 EUR.farm^{-1}), this brings much lower output (493,708.25 EUR.farm^{-1}), compared to other countries.

Ratio between input and output imply efficiency. These two indicators (measured in EUR per farm) have both the biggest value in Slovakia and also their ratio shows the biggest value between them which results in almost the lowest productivity (0.76). This indicator suggest that one euro used in Slovak agribusiness brings output in amount of just 0.76 EUR that is second lowest in EU 28 (Figure 4).

Low amount of output in Slovak agribusiness and high amount of subsidies at the same time indicates unusual attitude of Slovak farmers to primarily agricultural production. In addition when examining relationship between total subsidies and total output (Figure 5) the moderate positive relationship (0.37) can be found. This means that increase in total subsidy cause also an increase of total output.

In spite of fact, that there are several factors which affect total subsidies (state support system, the type of agricultural production, ect.), the current per hectare payment system indicates the acreage of utilise agricultural area as one of the most important. When examining correlation between utilised agricultural area and total subsidies (Figure 6) in Slovakia we can find strong negative correlation (-0.57). This relationship puts Slovakia in the position of leader again, since similar but not as strong relationship has been discovered in case of Czech Republic, United Kingdom and Romania. This surprisingly negative relation indicates

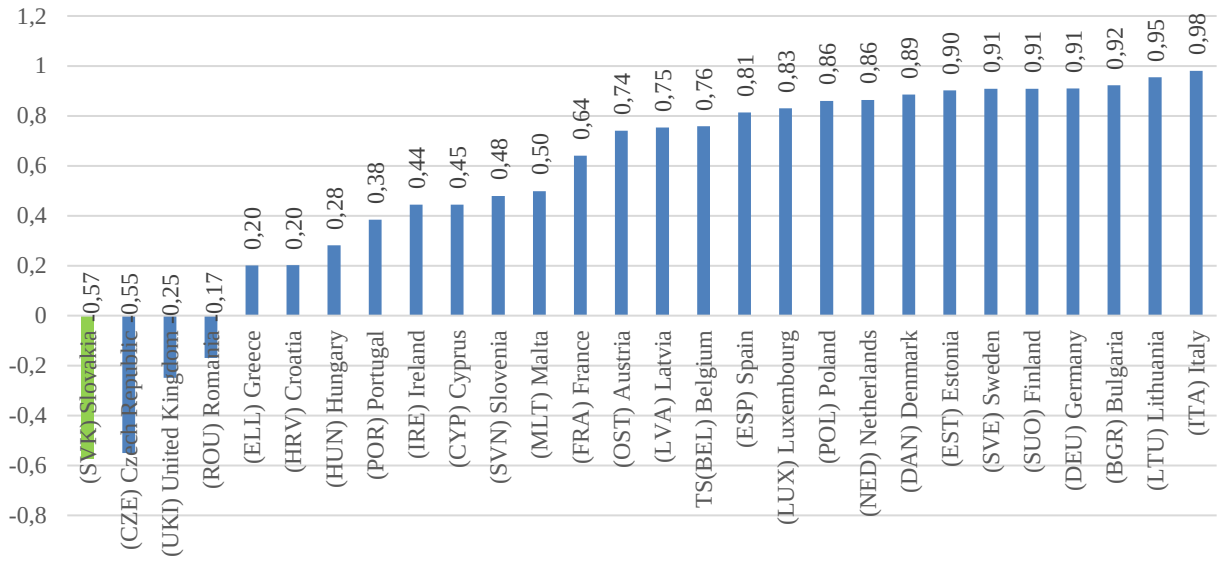

Figure 6 Correlation between utilised agricultural area (ha) and total subsidies (EUR.farm^{-1}) in EU 28 (2004 – 2015). Source: own calculations based on FADN (2018) data.

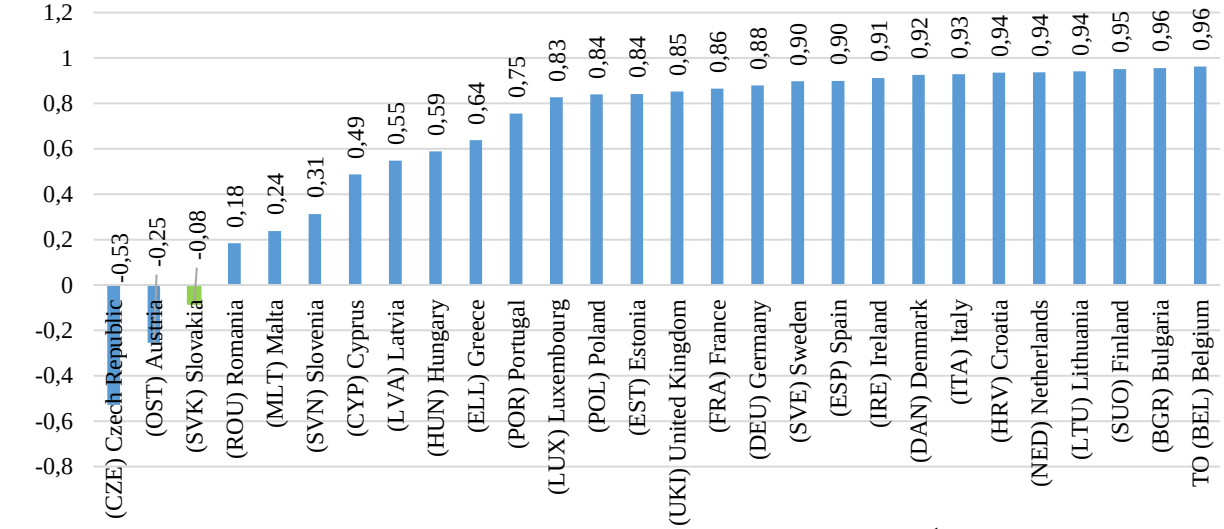

Figure 7 Correlation between utilised agricultural area (ha) and total output (EUR.farm^{-1}) in EU 28 (2004 – 2015 Source: own calculations based on FADN (2018) dat.

decreasing total subsidies when acreage of agricultural area increases or vice versa the more subsidies farmers get the less acreage they will utilise.

Productivity of farms can be represented by many indicators, for instance output, value added or revenue per hectare **(Ladvenicová and Miklovičová, 2015)**. The relationship between farm size and output is one of the basic questions in development economics which was already solved in many research studies. It is well known as the inverse relationship between farm productivity and farm size **(Ciaian, 2012)**. The inverse relationship can be also seen in the correlation of UAA and total output where the expectation of this relation is to be strong, but for namely Slovakia the correlation coefficient (Figure 7) shows trivial relationship with the value of (-0.083). On the other hand, the correlation does not strictly imply causation between two variables, thus these results can't be related explicitly with the subsidies. Therefore, it would be necessary to examine this problem along with the other factors affecting total output.

According to **Ladvenicovoá and Miklovičová (2015)** for Slovak farmers it would be better to operate on smaller size of farm than they do. The inverse relationship between farm productivity and farm size described by **Ciaian (2012)** states that Slovak farmers can profit from this size, since actually implemented CAP system is based on the per hectare support **(Tóth, et al., 2017).** Results of analysis of **Kravcakova, et al. (2016)**, also confirmed strong correlation between amount of gross agricultural production and the volume of subsidies granted in Slovakia.

Tangermann (2011) stated that the CAP after 2013 must move from the decoupling of direct payments to their connection to concrete goals and successes beneficial to society. In the future it would be worth considering the application of hybrid model which is successfully established, for example, in Sweden. Hybrid model **(Blomquist and Nordin, 2017)** is a combination of historical and the regional model, where direct payments are calculated according to the regional model, but with payments per hectare varying between different geographical regions. This approach would be more

suitable, since according to **OECD (2016)** Slovakia is on the 4th position out of 33 states with the biggest regional disparities.

CONCLUSION

Utilised agricultural area of farm in EU 28 varies from less than 3 hectares in Malta to more than 100 in Estonia, United Kingdom and Czech Republic. However, physical size of farm in Slovakia is more than twice bigger than mentioned. Slovakia has the absolutely biggest farms in EU 28 with the UAA value of 556.15 ha.farm^{-1}. This fact is considered by historical size of farm. Implemented CAP system is based on the support per hectare, which can be profitable for the countries with big UAA values as Slovakia. Therefore the implementation of the (CAP) system is bringing annually large amount of subsidies to Slovak agricultural sector, which greatly affects it and even deforms to some extent.

Slovakia has been the leader in the volume of average farm subsidies received over the two (yet finished) program periods and has surpassed all EU 28 countries. Surprisingly, Slovak records show much larger total farm input than farm output, with a difference of 155,076.33 EUR.farm^{-1}, which is the biggest difference among EU 28 countries. This discrepancy is visible also on the efficiency of Slovak farms which is second lowest in EU 28 with the value of 0.76 calculated as the ratio of total output and total input on the farm level. The inverse relationship between farm productivity and farm size was proven in the results of correlation between utilized agricultural area and total output, but for Slovakia with the trivial value of (-0.083). They indicate decreasing returns to scale, where each hectare of land leads to the decrease of production.

Slovakia's coefficient of the correlation between total output and total subsidies indicates moderate positive relationship with the number of 0.37, which means that when total subsidy increases, the value of total output increases proportionally. The strong negative correlation of total subsidies and utilised agricultural area (-0.57) showed inverse relationship what can be interpreted as the more subsidies farmers get, the less acreage will they utilize. Therefore, chosen model of CAP support seems to be not suitable for Slovak conditions and these facts indicate that the currently set subsidy system of CAP in Slovakia does not work entirely efficiently and should therefore be reformed in the forthcoming programming periods. The need to reform CAP system of farmers support in EU is strengthened by the existence of significant regional disparities in EU. Regarding to the generous production potential of individual areas, it is very difficult to select a suitable support system at Member State level.

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Acknowledgment:

Similar oriented research by authors was already presented on the international scientific conference Agrarian Perspectives 2017 and this paper methodically continue.

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