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DETERMINATION OF THE RELATIONSHIP BETWEEN OUTPUTS AND INPUTS IN AGRICULTURE IN THE EU MEMBER STATES

The EU member states have established FADN (The Farm Accountancy Data Network) system to collect and process accounting data from agricultural holdings. The system is based on precisely defined methodology that is unique for all member states.

At EU level, the data are integrated from all member countries, and bring common agricultural policy measures aimed at improving operations and improving financial results achieved in farms. This system operates on the representative sample of about 80.000 agricultural farms from the EU, which represent about 5 million of commercial farms. In this paper we present relationship of outputs and inputs in the agricultural sector of the EU Member States. On the basis of FADN data, there is a possibility of long-term planning of investment in agricultural production, the level of subsidization of agricultural production and adjusting the type and volume of production to market demand.

Key words: *agriculture, FADN, analysis, input, output.*

Introduction and review of literature. EU member states are planning development and improvement of its agricultural sector on the basis of detailed analysis stemming from data collected from farms. In order to observe the operations of agricultural holdings in the EU, FADN system (The Farm Accounting Data Network) is established.

European Commission Regulation No 118/66/EEC of 29 July 1966 provides the harmonization between Member States in terms of data collection for the purposes of EU FADN [8]. The system for collecting data from farms is a significant information base, which is the basis for continuous improvement for farm operations in the European Union.

EU countries use the FADN system for collecting and processing accounting data from farms, which through a representative sample, continuously provide quality information on the operations of farms. The sample is formed in such a way that all EU regions and different types of production and economic size are included in the sample.

F. Arfini [1] explains the reasons for the establishment of a system for collecting data from farms and points out that the FADN is created for the purposes of the common agricultural policy, but primarily for the purpose of monitoring of the annually income on farms. The lack of accurate data on the production and business

operations of agricultural holdings is one of the serious obstacles to the development of agriculture, and it is necessary to follow the system which collects data and creates information basis for the creation of quality of agricultural policy. As the European Union was growing bigger, FADN was developed in stages, pursuant to Council Regulation (ECC) No. 79/65/EEC of 15 June 1965 setting up a network for collecting accountancy data about the income and business operations of agricultural holdings in the European Economic Community [7].

S. Podruzsik et all. [6] put an emphasis on the formation of economic event diary. In addition of being the basis for establishing an accounting system, event diary serves as a guideline for investment decisions by the farmers.

A. Vazakidis et all. [10] pointed that accounting information can improve farm management (financial leverage, forecasting, farm viability), providing that the employed accounting reports are consistent with agro economic data and sustainable-logic plans, and also consonant with CAP and Ministry's Agriculture Policy. Adequate methodology can improve the efficiency of economic management of costs formation (L. Kucher [4]).

The option of uniform approach with harmonized statistics in Agriculture sector, seem to be prime principle for the farm community. The FADN data, which is obtained through the partial Union financing, has an official nature and, as such, represent starting point for arguments concerning the European Commission when quantifying the income position of farmers in the individual member states (V. Bašek [2]).

P. S. Gomez et all. [5] in their study show methodology by adapting the Agrarian System Diagnosis (ASD) approach to the quantitative information available from the national FADN databases.

V. Istvánné [8] points to the rapid development of the economy and the importance of timely information across industries. With regard to membership in the EU, it is necessary to monitor and its trends in the field of agriculture, in order to improve operations on farms. For its implementation it is necessary to have adequate information on the nature and extent of agricultural production in the state and its distribution by region.

FADN basically serves two objectives: On the one hand it serves as a basis for agricultural sector analyses whereby the profitability of agricultural holdings is in the focus. On the other hand it is an instrument for agricultural policy analyses (FACEPA, [3]). Based on a detailed analysis of the data, there is a possibility of long-term planning of investment in agricultural production, the level of subsidization of agricultural production and harmonization of the type and volume of production to market demand.

The purpose of the article. Agricultural production is characterized by continuity in realizing production activities relating to all of its types. Taking into account the variability of the basic factors of production in the agricultural sector, then the representation of different types of agricultural production in EU Member States, it is necessary to have adequate information arising from farms.

Disposition of reliable indicators from farms is an important information basis for undertaking adequate measures at all levels of decision making in agriculture. The starting point are the analysis of inputs and outputs in the agricultural sector of the Member States of the EU.

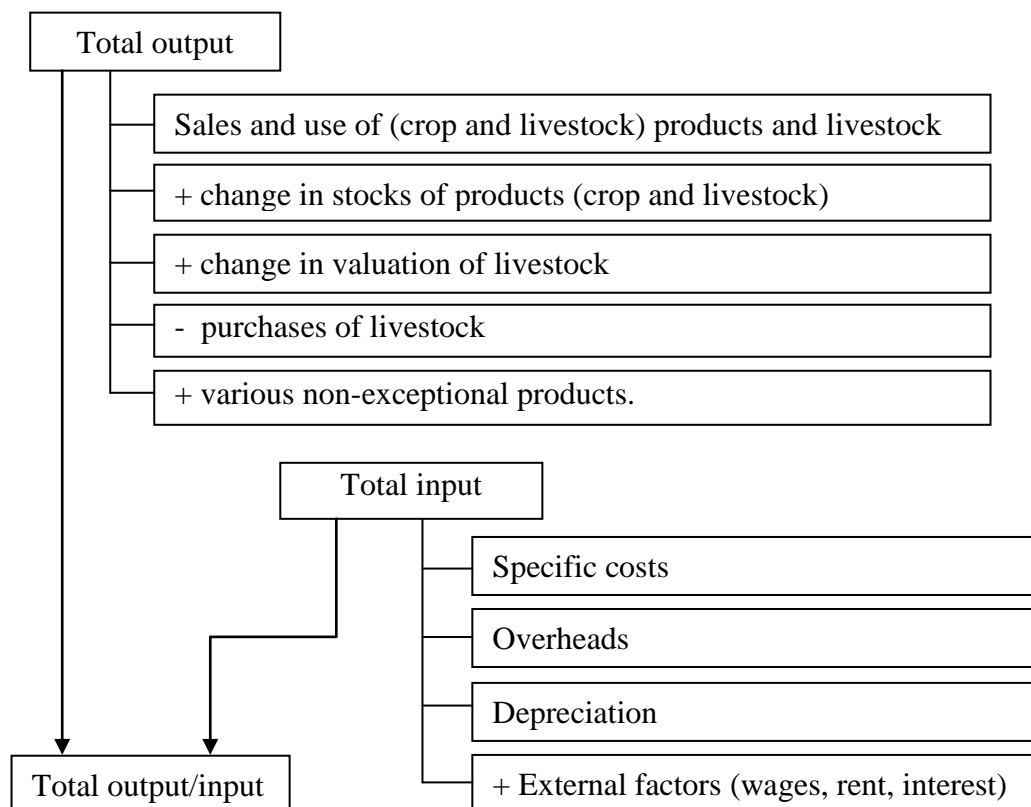


Fig. 1. Inputs and outputs of agricultural production in FADN system

Source: fadn.eu.

FADN approach should be a systematic and comprehensive way to encourage producers to use inputs more precisely, and adequate allocation of financial resources that are realized by selling the resulting output.

Total output crops & crop production = total of output of crops and crop products = sales + farm use + farmhouse consumption + (closing valuation - opening valuation).

Total output livestock & livestock products = livestock production + change in livestock value + animal products.

Livestock production = sales + household consumption - purchases

Change in livestock valuation = value at closing valuation – value at opening valuation. For animals which are present on the holding for more than one year, the value corresponding to the increase in volume is estimated.

Animal products = sales + household consumption + farm use + (closing valuation – opening valuation).

Total inputs represent the sum of specific costs, overheads, depreciation, and external factors. Costs are linked to the agricultural activity of the holder and related to the output of the accounting year. Included are amounts relating to inputs produced on the holding (farm use) = seeds and seedlings and feed for grazing stock and granivores, but not manure.

Total farming overheads = supply costs linked to production activity.

Depreciation = entry in the accounts of depreciation of capital assets over the accounting year. It is determined on the basis of the replacement value. Concerns plantations of permanent crops, farm buildings and fixed equipment, land improvements, machinery and equipment and forest plantations. There is no depreciation of land and circulating capital.

Total external factors = remuneration of inputs (work, land and capital) which are not the property of the holder. = wages, rent and interest paid.

Information about agricultural production, referring to quantity of production, yield and dynamics of investment and consumption inputs (starting from the quantities of seeds, fertilizers, the protective means, concentrates, the invested time, and etc.) are of great importance for planning and organizing the next production activities.

FADN system ensures that indicators of the invested amount generated inputs and outputs are current, objective, representative and methodologically unified. As such, constitute a reliable basis for planning and overall management of the development of the agrarian sector of EU member states.

Results and discussions. The analysis of inputs and outputs values of the Member States of the EU show that the largest average value of outputs and inputs on the farm is in Slovakia, where the average value of output was 609681 Euros, and the value of invested inputs was 780671 Euros.

Further analysis of indicators of the total value of inputs and outputs on farms leads to information that after the Slovak Republic, the Netherlands (with 490248 Euros – output, and 436823 Euros invested inputs) and Denmark (with 484484 Euros – output and 458104 Euros invested inputs) take a significant position among the EU member states. The minimum values of outputs and inputs on the farm were observed in Romania (output – 12967 Euros, input – 8698 Euros), Greece (output – 21783 Euro, input – 17171 Euros), Croatia (output – 23200 Euros, input 21969 – Euros).

After examining the relationship between output and input, it was determined that Slovakia and Finland recorded the lowest output/input ratio (the value of output/the total value of achieved production is lower than the invested inputs). In addition, the Czech Republic, Sweden, Bulgaria, Estonia, Luxemburg, Latvia,

Slovenia have also achieved output/input ratio less than one.

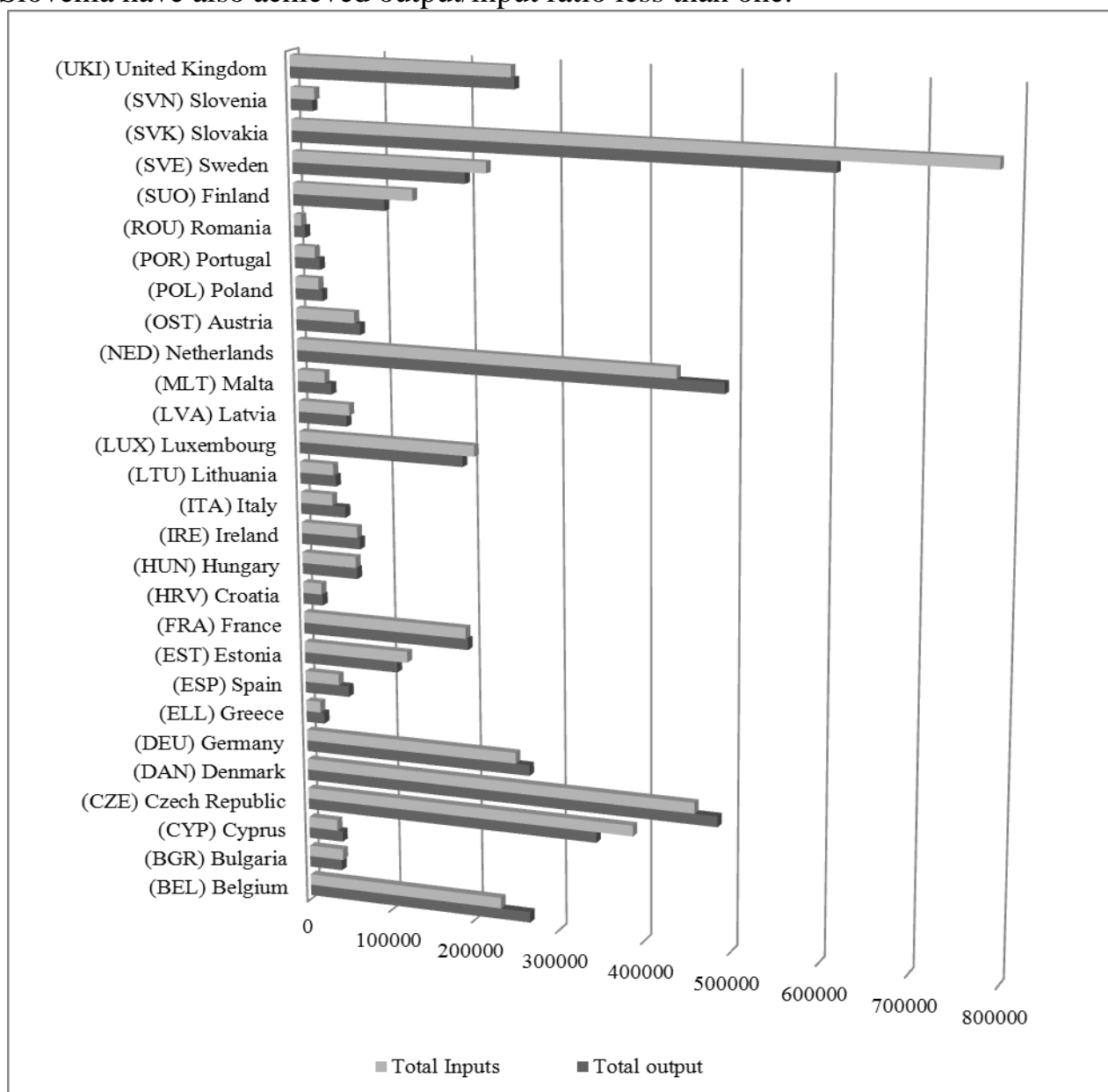


Fig. 2. Value of input and output on the farm in the EU member states (Euro), 2013

Source: fadn.database.

Further analysis of the output/input ratio, leads to the conclusion that the highest ratios were achieved by: Romania (1.49), Italy (1.41), Spain (1.3), Greece (1.27), Malta (1.25). It is interesting to note that of the five countries with the largest output/input coefficients, two European countries (Romania and Greece) recorded a minimum total value of output and input, which indicates that countries with the highest values of input and output don't have the largest output/input ratios and vice versa.

The authors also present an analysis of the output of plant and animal production. The fig. 4, shows the value of output of plant and animal production on farms in EU member states. Based on the data, it is evident that the largest average

value of the total output in the animal production was recorded in Denmark (312836 Euros), Netherlands (232519 Euros) and Belgium (155.681 Euros), while the lowest average values were observed in Romania (5456 Euros), Greece (6619 Euros) and Croatia (9392 Euros).

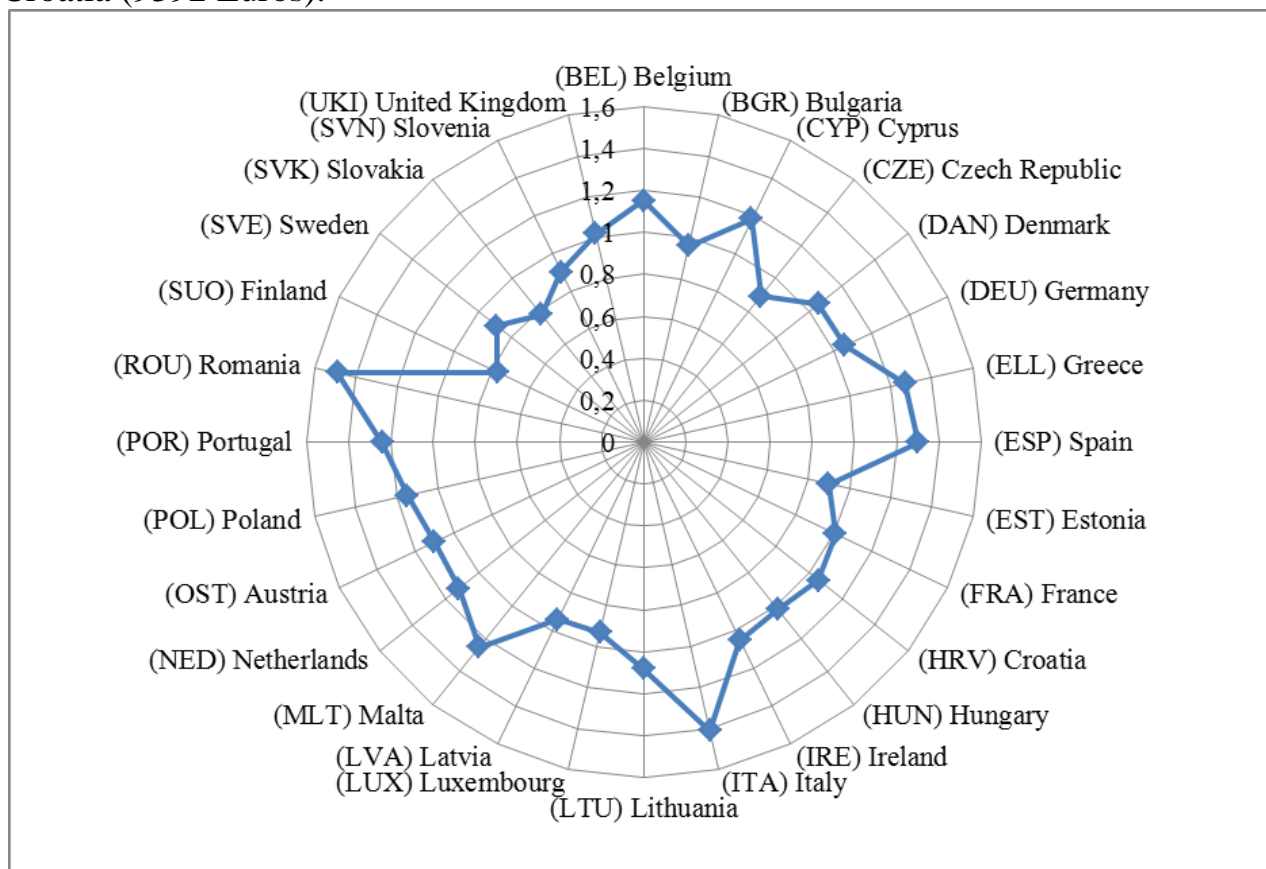


Fig. 3. Relationship between input and output in the agriculture sector in the EU member states, 2013

Source: fadn.database.

The analysis of the value of output in crop production, leads to information that the greatest value was achieved in Slovakia (366773 Euros), Netherlands (211722 Euros) and the Czech Republic (191841 Euros). Countries with the lowest value of output in crop production are Romania (7430 Euros), Slovenia (11820 Euros) and Croatia (12886 Euros).

Analyzing the structure of inputs, it is evident that specific costs have the largest participation (45%), and depending on the EU member states those costs vary from 31.79% (Austria) to 63.77% (Malta). The value of specific costs accounts for over 50% of the total value of inputs, also by the following EU countries: Belgium (53.06%), Cyprus (53.81%), Croatia (53.17%), Ireland (54.22%), Poland (52.04%), UK (50.4%).

Overhead costs, that are on the second place, vary from 16.18% (Croatia) to 34.99% (Finland). Their average share are about 25% in the total structure of invested inputs. The value of the depreciation on the agricultural holdings of the EU member states are about 15% of the total value of the inputs. Countries with the largest share of depreciation in the total value of inputs are: Slovenia with 28.61%, Luxembourg

with 26.78%, Austria with 25.58% and Greece with 20.98%.

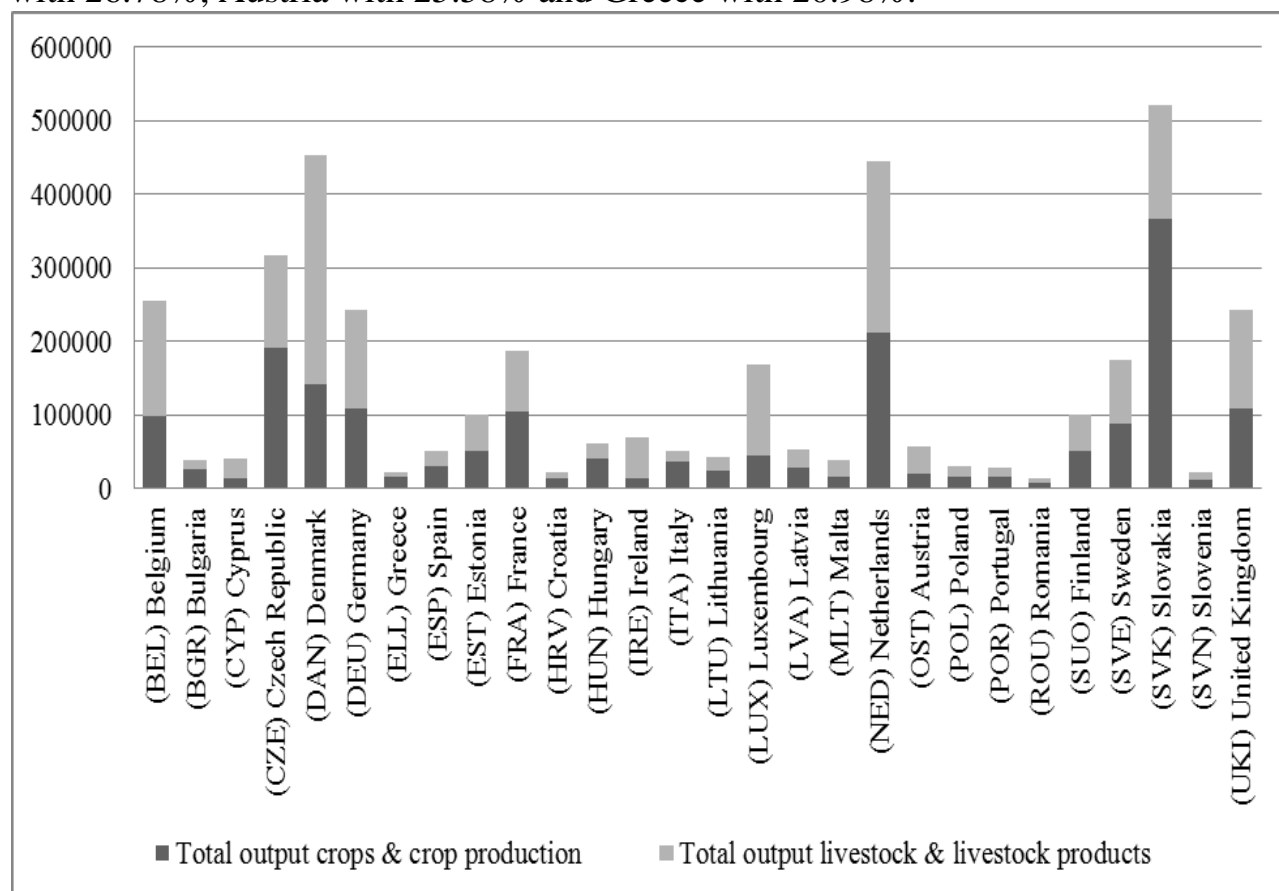


Fig. 4. Value of the output on farms with crop and animal production in the EU member states (Euro), 2013

Source: fadn.database.

The value of invested work also varies in the EU member states. The smallest participation of these costs in the total value of inputs was recorded in Slovenia (1.74%), Ireland (2.60%), Austria (2.84%), Luxembourg (4.27%), whereas the greatest share was in Slovakia (20.08%), Czech Republic (17.59%) and Hungary (12.72%). The average participation of human labor in the total value of inputs in EU member states is 8.43%.

Analysis of the data relating to paid rents leads to the conclusion that Bulgaria (13.47%), France (6.86%) and Germany (6.04%) have the highest values of these costs in their individual total inputs. The average share of paid interest in EU member states is about 2% of the total value of inputs. Countries that exceed this average are Denmark (9.56%), Netherlands (6.48%), Sweden (5.03%), Belgium (3.79%) and Luxembourg (3.04%).

Conclusions. Considering that achievement of higher level of living standards of rural residents represent the central objective of the CAP, the data about inputs and outputs of agricultural production are the vital components for development of this sector. The European Commission also stressed the importance of adaptation and harmonization in terms of data collection from farms that will allow timely overview of the inputs and outputs in the agricultural sector.

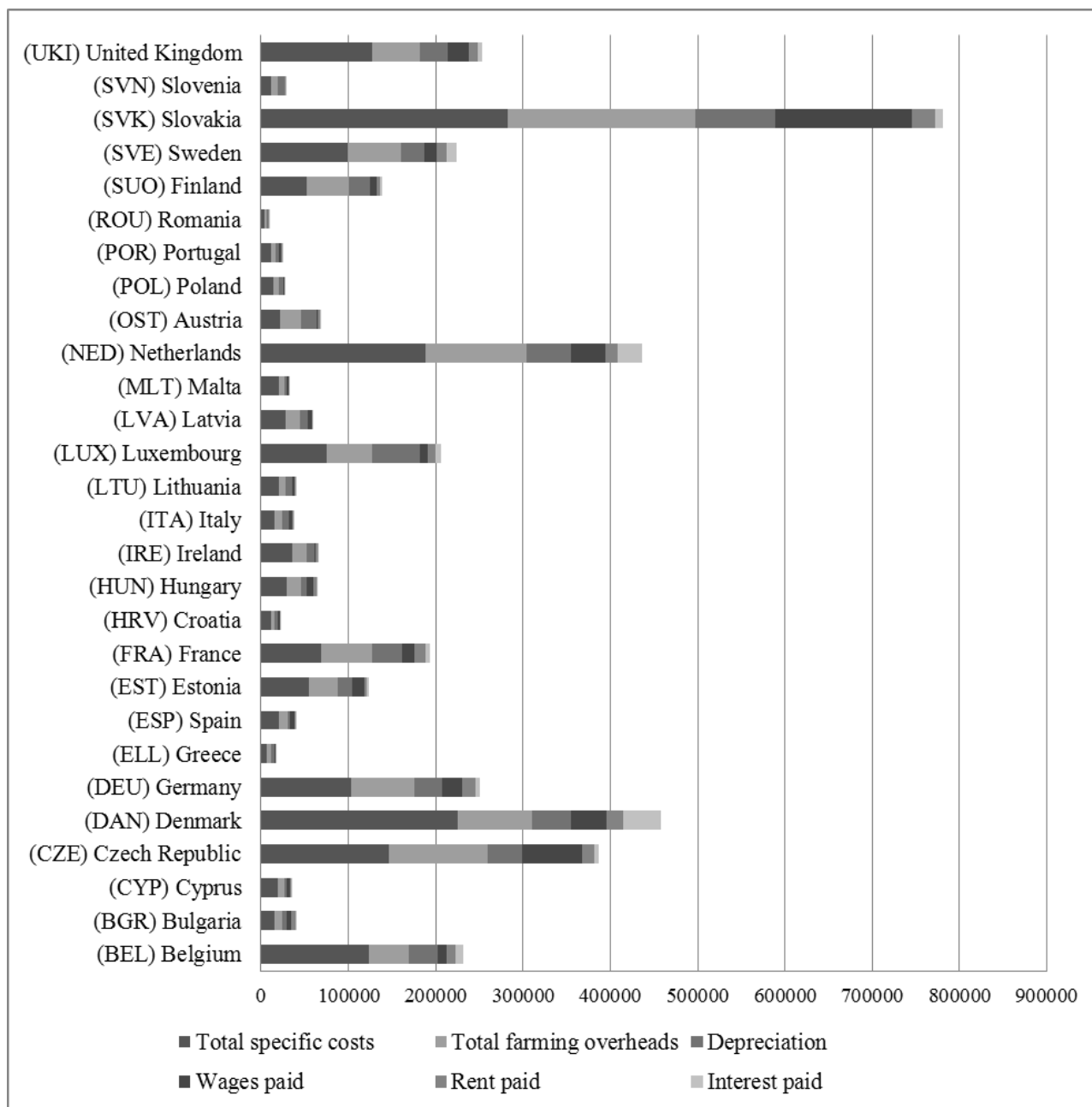


Fig. 5. Structure of costs within the total value of inputs on farms EU member states (Euro)

Source: fadn.database.

Data to be provided at the farm level through the FADN system are a rich source of information, which plays a key role for the improvement of the agriculture sector both at the national level of each EU member states and at EU level.

In this way, the creators of the agrarian policy of the European Union, gain insight into the prevalence and development of certain types of agricultural production in all Member States. They are then able to create quality measures of common agricultural policy and thus manage the development of agriculture in individual Member States and throughout the EU.

Given that each country has its own specificities in the agricultural sector and

possesses a variety of different agricultural resources, further research will be aimed at determining the efficiency of the use of certain resources and support for the agricultural sector of the EU member states.

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