

THE COMPARATIVE EFFICIENCY IN ROMANIA'S FOREIGN TRADE WITH CEREALS, 2007-2016

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Abstract

The purpose of the paper was to analyze Romania's foreign trade with cereals in order to point out its efficiency by type of traded cereal in the period 2007-2016 using the empirical data provided by the National Institute of Statistics. The study required a large variety of specific indicators and methods to reach its goal. In the period 2007-2016, both cereal export and import value increased, accounting for Euro 2,097.2 Million export and for Euro 591.1 Million import. As a result, Romania is a net exporting country of cereals as its trade balance was Euro 1,505.1 Million. Also, the volume of cereal trade increased by 5.36 times, reaching Euro 2,689.3 Million in 2016, the export per inhabitant increased reaching Euro 106.13/capita, and the coverage degree of import by export was 3.54 by 6 times higher than in 2007. In 2016, in the agro-food trade of Romania, cereals represented 35 % in the export value and 9 % in the import value. In 2016, the share of various cereals in the cereal export value accounted for: wheat 55.3 %, maize 34.4 % and barley 9.15 %, all together totalizing 98.85%, while the share of these cereals in cereal import value accounted for: wheat 56.9 %, maize 24.9 %, barley 11.9 % and rice 5.1 %, all together accounting for 98.8 %. In 2016, the trade balance for the main traded cereals was positive: wheat Euro 823.4 million, maize Euro 574.3 million, and barley Euro 121 million. The index of coverage degree of import by export was: 4.9 for maize, 3.4 for wheat, 3.1 for oats, 2.7 for barley, 1.9 for sorghum, 0.4 for rice and 0.3 for rye. The main trade partner for cereal export is the EU with a share of 30.7 %, the difference being represented by countries from the extra-EU market, and for import the EU had the top position with 95.8 % market share. The hierarchy of the cereals, in the decreasing order of the efficiency of their trade was the following one: wheat, barley, maize, rye, sorghum, oats and rice. But, the main cereals which deserve to be traded on external markets are wheat, maize and barley. This analysis has drawn the conclusion that Romania must commercialize more cereals with a high efficiency in foreign trade in terms of high export value, low import value, high positive trade balance and a high index of coverage degree of import by export. The positive trade balance had a good impact on the payment balance and on the economic growth.

Key words: cereals, foreign trade, Romania, efficiency

INTRODUCTION

Cereals are a strategic food for humans and for animals, and also an important raw material for processing industry [5, 6].

The international trade with cereals is running by means of the activities carried out by the main "market actors": producers, exporters and importers in the context of the continuous of cereals demand and consumption.

However, at the world level, there is a gap between the developed and developing countries regarding cereals supply which will become more accentuated in close relationship with the demographic evolution.

Trade balance is the most synthetic indicator reflecting efficiency of the international trade

of a country. It places each country in the hierarchy of the global international trade and reveals its competitiveness among other "traders".

The flows of commercialized cereals in terms of export and import are determined by the relationship existing between production and consumption in different countries, by production factors and random items, by the benefits and the advantages of a country and by cereals price in various markets.

At the world level, the value of cereals export accounted for USD 118.9 Billion in 2014, being by 41 % higher than in 2010. The largest world exporting countries are: USA, India, France, Canada, Australia, Russian Federation, Ukraine, Thailand, Argentina,

Brazil and Germany [11, 21].

The market share of the top 10 exporters of cereals is 73.2 % in the world export value with cereals. The EU-28 is an important producer and trader of cereals worldwide. In 2016, it cultivated 57 million ha with cereals and harvested 301.3 million tonnes, representing 11.6 % of the global cereal production. [5]. In 2016, cereal production achieved by the EU was by 2.6 % higher than in the period 2000-2015, while the cultivated surface declined by 7.5 %. As a result, cereal production per inhabitant recorded 590 kg/capita in 2016.

The market share of the main cereals producers in the EU is: France 18 %, Germany 15.1 %, Poland 9.9 %, Spain 8 % and all together totalize 50 %.

With 21.8 million tonnes, Romania came on the 6th position among the top cereal producers in the EU-28 in 2016, after France, Germany, Poland, Spain, United Kingdom [8,9,10].

The EU-28 is a net exporter of cereals. In 2016, the EU-28 exported 33.15 million tonnes of cereals in grain equivalent, by 18.01 more than in 2013. Its export consists mainly of wheat (15 % of production) and barley. The main imported cereal by the EU is maize and also other grains [25].

Romania's agriculture is deeply oriented to grain production, whose contribution to GDP created in agriculture is about 5-6 % [24]. Wheat, maize, barley and oats are the main cereals produced in Romania with a share of 95 % in the cereal market. Wheat and maize are the most competitive cereals in the external market [28].

Romania is not only an important cereal producer, but also one of the most important exporters of the EU. Also, Romania is situated among the top 15 exporters of cereals in the world. In 2017, Romania was the main EU supplier of cereals, exporting 7.15 million tonnes, representing 1/4 of the EU export from the 2016-2017 harvest. Wheat is the most important cereal exported by Romania (70%).

The actual performance in cereal foreign trade of Romania is the result of many efforts done along the time. While the cultivated area

registered a decline compared to 2007, the year when Romania became an EU member state, production has grown grace to the new technologies applied [1,2,3, 16,17].

In this context, the present paper aimed to analyze Romania's cereal foreign trade at the cereal group level, but also by each type of cereal using some specific indicators such as export, import, trade balance, export/inhabitant, coverage of import by export in the period 2007-2016. The final purpose is to establish the hierarchy of the traded cereals based on their efficiency in the foreign trade of the country as a basis for developing a more adequate strategy in cereal trade in the international market.

MATERIALS AND METHODS

Study area.

The cereals trade analyzed in this study refers to Romania which is an important cereal producer, exporter and importer in the EU and even in the world. Located in South Eastern Europe, it lies between the latitudes 43° and 49°N and longitudes 20° and 30° E. Its surface accounts for 238,391 square kilometers. The relief is like an amphitheater including 1/3 mountains, 1/3 hills and 1/3 plains. It has a typical temperate continental climate with four seasons, and favorable soils for cereals cropping [23].

In 2016, of 8.9 million ha cultivated area, 5.486 million ha were cultivated with cereals representing 23 % of the total area of Romania, and 36.99 % of the agricultural surface which is 14.83 million ha.

The main cereals cultivated in Romania are: wheat, maize, barley, oats, rye, sorghum and rice. The cereal production has substantially grown along the time reaching 21.7 million tons in the year 2016, being by 178.5 % higher than in 2007. The share of various types of cereals is: 49.3 % maize, 38.7 % wheat, 5.8 % barley and 1.7 % oats, all together representing 95.5% in the cereals production.

The growth of cereal production was more intense after Romania's access into the EU. The modern technologies, high performance varieties and hybrids, the extend of irrigation

and the use of fertilizers and plant protection measures have contributed to the cereal sector development. However, the high production level has diminished cereals price in the domestic market and contributed to the growth of cereals export. This was also determined by the non sufficient capacity of storage for the whole cereal production. Also, the imports were justified to complete the internal offer mainly in the years when extreme phenomena (droughts, rainfalls etc) have diminished the production performance [22].

Data collection.

In order to set up this study, the primary empirical data were collected from various data bases represented mainly by the National Institute of Statistics, Tempo on line, Eurostat Statistics Explained and United Nations COMEXT Data Base [8,9,10, 13,14, 27].

The main current information was studied from various sources represented by research articles and EU reports regarding cereal production and Romania's position among the cereal producers and traders.

The main specific indicators used to characterize Romania's trade with cereals in the period 2007-2016 were the following ones:

- the value of cereal export, import and trade balance, determined for the group of cereals and also by category of cereal;
- the foreign trade volume (TV) with cereals;
- cereals export per inhabitant;
- the index of coverage degree (ICV) of import by export; this indicator was calculated at the cereal group level and also by each category of cereal;
- the cereal foreign trade concentration;
- the structure of export and import by type of cereal;
- the geographical orientation of cereals trade mainly with the EU-28, as the principal partner for export and with other extra-EU partners as well.

The utilized methods have been the following ones:

Index method based on the index with fixed basis, calculated according to the formula: $I_{FB} = (X_n/X_0) * 100$ in order to characterize the dynamics of each indicator in the analyzed

period. All the indicators mentioned above were analyzed in their dynamics in the period 2007-2016 computing the fixed indices taking into account the year 2007 as term of reference.

The foreign trade volume (TV) with cereals was calculated as the sum between export, E, and import, I, of cereals, according to the formula: $TV = E + I$.

The cereal export per inhabitant was calculated as a ratio between the export value divided by the population of Romania in each year of the analysis.

The index of coverage degree (ICV) of import by export was calculated according to the formula: $ICV = E/I$.

The cereal foreign trade concentration was determined based on Hirschman coefficient, as the share of cereals trade in Romania's agro-food trade.

The structure of export and import by type of cereal was established dividing the export value or import value recorded by each cereal in the total value of cereal export or cereal import, in percentage.

The geographical orientation of cereal foreign trade was discussed based on the share of each destination country for Romania's cereal export and also based on the share of various suppliers in Romania's cereal import [15].

Statistical parameters such as: *Mean, Standard Deviation and Coefficient of variation* have been also determined for each of the analyzed indicators in this study.

Point Method was used to compare the efficiency of each cereal in foreign trade. The method used a series of criteria such as: export value, import value, trade balance and index of coverage degree to evaluate the efficiency in foreign trade. For each criterion, each type of cereal received a position ranging from 1 to 7, having the following meaning in the decreasing order as importance:

1- for the highest value of export, trade balance and ICD;

7- for the lowest value of export, trade balance and ICD;

1- for the lowest value of import;

7- for the highest value of import.

Finally, the figures (numeric score) of the positions received for all these four criteria have been added up, resulting a total number of points. The hierarchy of the cereals was established based on the number of total points. On the top position was placed the cereal with the lowest number of points and on the last position the cereal with the largest number of points.

The results were compared among various cereals indentifying the type of cereal with the highest impact on the foreign trade efficiency [4].

All the results of this study were tabled and graphically illustrated and correspondingly interpreted. Finally, the conclusions pointed out the main ideas and were followed by recommendations how Romania's cereal trade could become more efficient.

RESULTS AND DISCUSSIONS

The dynamics of Romania's export, import and trade balance for cereals

Romania is an important cereals exporting country. In 2016, its cereals export value accounted for Euro 2,097.2 Million, being 13.85 times higher than in 2007.

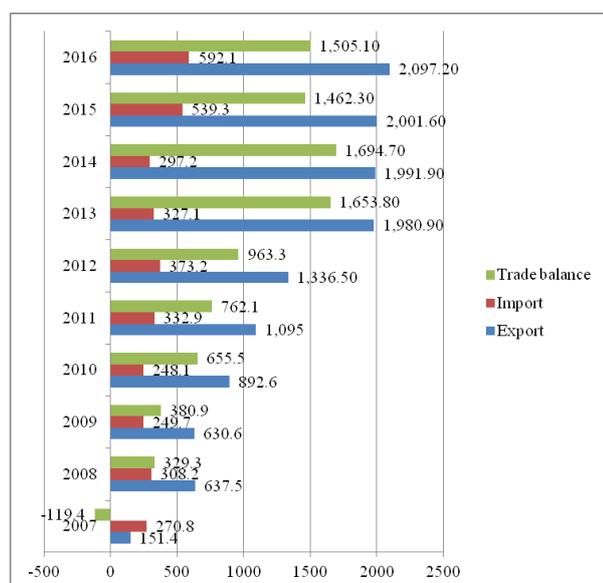


Fig.1. The dynamics of Romania's cereals export value, import value and trade balance, 2007-2016 (Euro Million)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018, [13].

At the same time, Romania is a cereals importing country, its cereals import value in the year 2016 accounted for Euro 591.1 Million, being 2.18 times higher than in 2007. Therefore, both cereal export and import increased. However, cereal export value has recorded a higher growth rate compared to import value.

As a result, the trade balance was a negative one only in the year 2007, but then it has become a positive one, being characterized by a continuous ascending trend. In 2016, the cereals trade balance accounted for Euro 1,505.1 Million, being 12.6 times higher than in 2007 (Fig.1.).

The dynamics of Romania's foreign trade volume for cereals

Taking into account both the cereal export value and import value, the volume of foreign trade with cereals increased by 536.97 % in the analyzed period from Euro 422.2 Million in the year 2007 to Euro 2,689.3 Million in 2016 (Fig.2.).

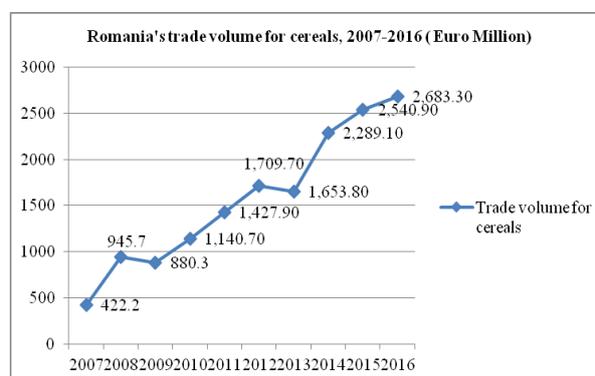


Fig.2. The dynamics of Romania's trade volume for cereals, 2007-2016 (Euro Million)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018, [13].

The dynamics of cereals export value per inhabitant has registered a continuous increasing trend in the analyzed period, from Euro 7.16/capita in 2007 to Euro 106.13/capita in the year 2016. Therefore, in 2016, the cereal export value per inhabitant was 14.82 times higher than in 2007, due to the growth of export and the decline of the population (Fig.3).

The dynamics of the coverage degree of cereals import by export. The index of the

coverage degree of cereals import by export (ICD) increased 6.43 times in the analyzed period, in 2016, it accounted for 3.54 compared to 0.55 in 2007. It was noticed a peak value of 6.7 in the year 2014. therefore, the ICD values are higher than 1, starting from the year 2008 till the last year of the chronological series of time (Fig.4).

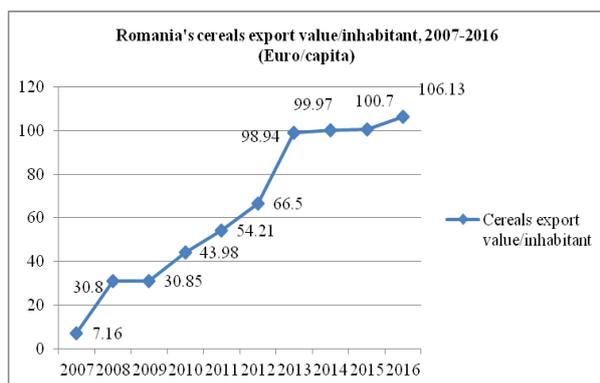


Fig. 3. The dynamics of Romania's cereals export value/inhabitant, 2007-2016 (Euro/capita)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

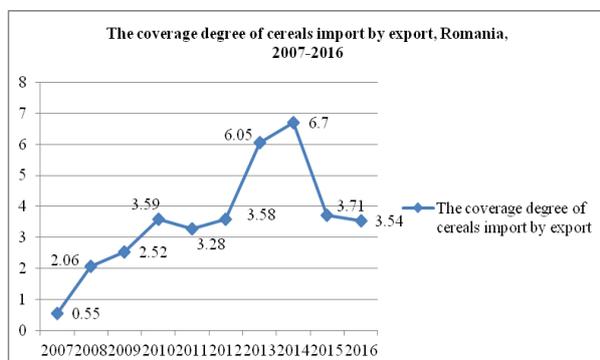


Fig. 4. The dynamics of the coverage degree of the cereals import by export, Romania, 2007-2016

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The dynamics of foreign trade concentration was reflected by the share of cereals trade value in Romania's agro-food trade. The share of cereals export value in Romania's agro-food export value increased from 13.45 % in the year 2007 to 34.60 % in the year 2016, i.e. 2.57 times. At the same time, the share of cereals import value in Romania's agro-food import value increased by only 7.64 %, from 8.11 % in 2007 to 8.73 % in 2016. A peak of 37.48 % was recorded

in the year 2013 (Fig. 5).

This reflects that more than 1/3 of Romania's agro-food export value is coming from cereals (raw materials). The cereals import value represents 8.7 % of Romania's import value with agro-food products.

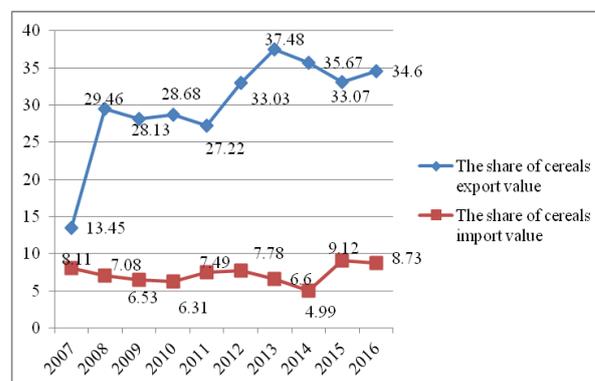


Fig. 5. The dynamics of the share of the cereals export value in Romania's agro-food export value, and the share of cereals import value in Romania's agro-food import value (%)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The dynamics of export value by type of cereal reflects that all the cereals exported by Romania: wheat, maize, barley, oats, rye, sorghum and rice recorded an ascending trend of their export value.

Wheat is on the top position with the highest export value in 2016, accounting for Euro 1,160.7 Million, being 24.96 times higher than in 2007 (Euro 46.5 Million).

Maize comes on the 2nd position with Euro 722.1 Million export value in 2016, being 9.48 times higher than in 2007 (Euro 76.1 Million).

Barley is on the 3rd position with an export value of Euro 192 Million in 2016, which was 7.19 times higher than in 2007 (Euro 26.7 Million).

Rice comes on the 4th position with Euro 12.81 Million export value in 2016, when it was 11.04 times higher than in 2007 (Euro 1.16 Million).

Sorghum is on the 5th position with an export value of Euro 2.42 Million in 2016, being by 93 times higher than in 2008. In 2007, Romania did not export this type of cereal.

Oats comes on the 6th position with Euro 1.12

Million export value in 2016, when it was 37.33 times higher than in 2007 (Euro 0.03 Million).

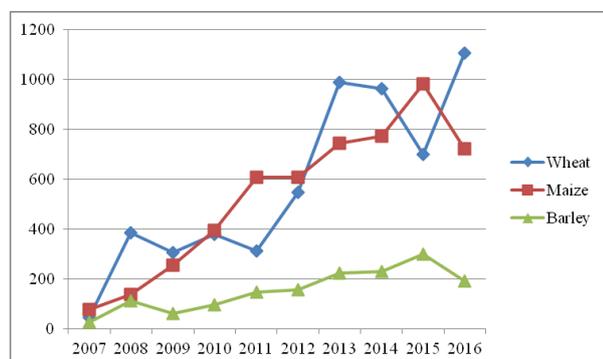


Fig.6. The evolution of the export value for wheat, maize and barley, Romania, 2007-2016 (Euro Million) Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

Rye comes on the 7th position with the smallest export value, Euro 0.067 Million, in 2016, but 11.16 times higher than in 2007 (Euro 0.006 Million).

Therefore, the most important cereals exported by Romania, in the descending order of their export value are the following ones: wheat, maize, barley and rice, which totalized Euro 2,087.61 Million in 2016, representing 99.5 % of the total cereals export value.

The evolution of the export value for wheat, maize and barley is graphically illustrated in Fig.6 and for oats, rye, sorghum and rice in Fig.7.

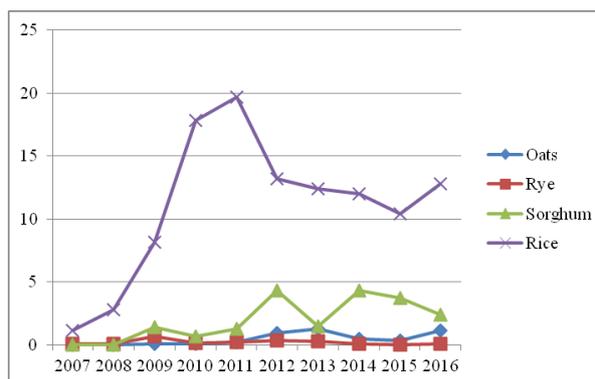


Fig.7. The evolution of the export value for oats, rye, sorghum and rice, Romania, 2007-2016 (Euro Million) Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The dynamics of the structure of cereals export value by type of cereal is presented in Table 1. This table shows that the main cereal crops in the cereals export value are wheat, maize and barley, all together representing 98.8 %.

In the analyzed period, the share of **wheat** in the cereals export value registered a relatively continuous growth from 30.7 % in the year 2007 to 55.3 % in 2016. **Maize** represented 50.2 % in the cereals export value in 2007, and its share varied along the years with a peak of 55.4 % in the year 2011, and then registered a decline reaching 34.4 % in 2016.

Table 1. The dynamics of the share of each cereal in the Romania's cereals export value, 2007-2016 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Wheat	30.70	60.40	48.3	42.3	28.5	41.0	49.9	48.3	34.9	55.3
Maize	50.20	21.70	40.3	44.3	55.4	45.5	37.6	38.8	49.0	34.4
Barley	17.60	17.30	9.50	10.7	13.4	11.6	11.3	11.5	14.9	9.15
Oats	0.001	0.003	0.01	0.01	0.02	0.06	0.07	0.02	0.01	0.05
Rye	0.003	0.010	0.10	0.01	0.002	0.03	0.01	0.002	0.0007	0.003
Sorghum	0	0.004	0.20	0.07	0.11	0.32	0.07	0.21	0.18	0.11
Rice	0.70	0.40	1.30	2.00	1.80	0.99	0.62	0.60	0.51	0.61
Other cereals	0.70	0.20	0.30	0.7	0.75	0.50	0.43	0.57	0.50	0.38

Source: Own calculations based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The weight of **barley** declined from 17.6 % in 2007 to 9.15 % in 2016 in the cereals export value. All the other cereals: oats, rye and rice recorded a small and decreasing share in the analyzed period, except Sorghum whose

weight accounted for 0.11 % in 2016 (Table 1).

The dynamics of the import value by type of cereal is presented in Fig.8 and 9.

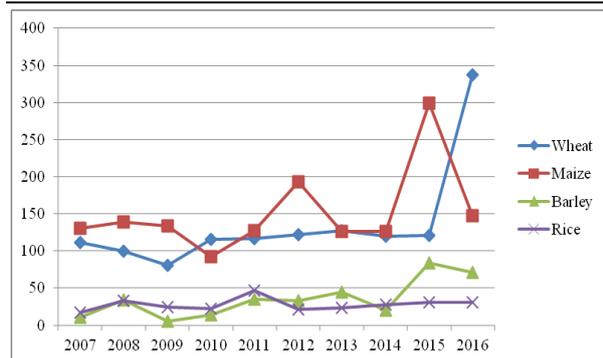


Fig. 8. The evolution of the import value for wheat, maize, barley and rice, Romania, 2007-2016 (Euro Million)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The figure reflects that all the cereals, except sorghum, registered an increasing trend of their import value in the period 2007- 2016. In 2016, the *wheat* import value was Euro 337.3 Million, 3.03 times higher than in 2007 (Euro 111.1 Million). The *maize* import value reached Euro 148.8 Million in 2016, being 1.13 times higher than in 2007 (Euro 130.2 Million), with a peak of Euro 196.3 in the year 2012. The import value of *barley* accounted for Euro 71 Million in 2016, being 6.7 times higher than in 2007 (Euro 10.5 Million).

The import value of *rice* increased 1.79 times, in 2016 accounting for Euro 30.5 Million, compared to Euro 17 Million in 2007. These four cereals: wheat, maize, barley and rice totalized Euro 586.6 Million import

value in 2016, weighting 99.4 % of the cereals import value of Romania.

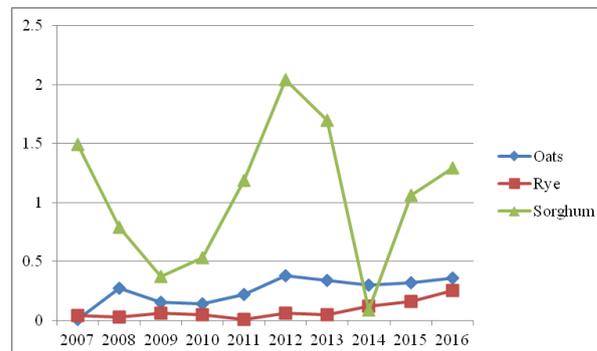


Fig. 9. The evolution of the import value for oats, rye, and sorghum, Romania, 2007-2016 (Euro Million)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The evolution of the import value for wheat, maize, barley and rice is presented in Fig.8 and for oats, rye and sorghum in Fig.9.

The dynamics of the structure of cereals import value is presented in Table 2. The figures from this table show that the highest share in the cereals import value in the year 2016 belonged to: wheat 56.9 %, maize 24.9 %, barley 11.9 % and rice 5.1 %, all together accounting for 98.8 %. All the cereals imported by Romania registered an increasing weight in the cereals import value, except maize, sorghum and rice, whose share declined in 2016 compared to the year 2007 (Table 2).

Table 2. The dynamics of the share of each cereal in the Romania's cereals import value, 2007-2016 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Wheat	41.00	32.20	32.30	46.70	35.10	32.60	39.00	40.30	22.30	56.90
Maize	48.00	45.00	53.50	37.40	38.30	51.80	38.60	42.50	55.30	24.90
Barley	3.80	10.90	2.24	5.80	10.50	8.70	13.70	6.69	15.50	11.90
Oats	0.003	0.08	0.06	0.05	0.06	0.26	0.10	0.10	0.005	0.06
Rye	0.01	0.009	0.02	0.02	0.002	0.01	0.01	0.04	0.02	0.04
Sorghum	0.55	0.25	0.14	0.21	0.35	0.54	0.51	0.03	0.19	0.21
Rice	6.27	10.80	9.70	9.18	13.90	5.60	7.30	9.40	5.80	5.10
Other cereals	0.39	0.77	2.04	0.64	1.79	0.45	0.78	0.94	0.89	0.99

Source: Own calculations based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The dynamics of the trade balance for each category of cereal. Taking into account the evolution of export and import value by category of cereal, the trade balance is

presented in Table 3. The figures from this table reflect that the value of trade balance registered an ascending trend from 2007 to 2016 in general in case of wheat, maize,

barley, oats and sorghum, and a decreasing trend in case of rye and rice.

In case of *wheat*, in 2007, the trade balance was a negative one, while in all the coming years it has become a positive one, registering a peak of Euro 862 Million in 2013, and in 2016, Euro 823.4 Million.

Maize registered a negative trade balance in 2007 and 2008, but a positive one in all the other years with a peak of Euro 683.9 Million in 2015 and in 2016, Euro 574.3 Million.

Barley recorded only a positive trade balance in each year of the analyzed period. The peak was Euro 215.5 Million registered in the year 2015, and in 2016, it was recorded Euro 121 Million, 7.46 times more than in 2007.

Oats had a positive balance in 2007, but in the period 2008-2011, it recorded a negative one, and in the last years 2012-2016, its trade balance was a positive one, with a peak of Euro 0.95 Million in 2013 and in 2016 it

registered Euro 0.76 Million, being 38 times higher than in 2007. In 2015, the trade balance of oats was zero as the export value was equal to import value.

Rye recorded a negative trade balance in 2007, and also in the period 2014-2016. In the years 2008-2013, oats trade balance was a positive one with a peak of Euro 0.29 Million in the year 2012. In 2016, rye recorded minus Euro 0.18 Million, being 5.29 times a higher deficit compared to the 2007 level.

Sorghum had a negative trade balance in 2007, 2008 and 2013, but a positive one in all the other years, with a peak of Euro 4.22 Million in the year 2014, and in 2016 Euro 1.13 Million.

Rice recorded a negative trade balance in all the analyzed years, in 2016, the deficit accounted for Euro 17.69 Million, being 1.11 times higher compared to the 2007 level (Table 3).

Table 3. The dynamics of the trade balance sheet by each category of cereal, Romania, 2007-2016 (Euro Million)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Wheat	-64.6	285.9	223.8	262.1	196.0	426.6	862.0	843.2	579.8	823.4
Maize	-54.1	-0.4	121.1	303.3	479.1	414.6	617.9	646.3	683.9	574.3
Barley	16.2	76.6	54.9	81.1	111.5	123	178.9	208.5	215.5	121.0
Oats	0.02	-0.25	-0.06	-0.05	-0.01	0.38	0.95	0.17	0	0.76
Rye	-0.034	0.034	0.59	0.10	0.21	0.29	0.24	-0.07	-0.14	-0.18
Sorghum	-1.49	-0.76	1.06	0.17	0.07	2.25	-0.21	4.22	2.69	1.13
Rice	-15.8	-30.6	-16.2	-4.95	-26.84	-7.97	-11.49	-15.8	-21.0	-17.69

Source: Own calculations based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The dynamics of the coverage degree of cereal import by export by category of cereal is presented in Table 4.

The values of the ICD have been > 1 in the period 2007-2016 in case of *wheat*, except the year 2007 (ICD=0.4). The peak accounted for ICD=8 in the year 2014. In 2016, the ICD value was 8.5 times higher than in 2007.

In case of *maize*, the ICD value accounted for 4.9 in the year 2016, being 8.1 times higher compared to the level recorded in the year 2007. Maize registered a peak ICD= 6.1 in the year 2014, and the lowest value, ICD=0.6, in 2007.

The ICD for *barley* was 2.7 in the year 2016, being by 8 % higher than in 2007. A peak of ICD = 10.8 was noticed in the year 2009.

Oats recorded ICD=3.1 in 2016, by 3 %

higher than in 2007 and a peak of this index, ICD=3.7, in 2013.

Rye increased its ICD 3 times in the analyzed period, reaching 0.3 in the year 2016. However, in 2011, rye recorded a peak of 24.4 and in 2009 another peak of 10.8.

The ICD for *sorghum* accounted for 1.9 in the year 2016, being 1.9 times higher than in 2007. The top value was 3.8 registered in the year 2009.

The ICD of *rice* increased 6.6 times from 0.06 in the year 2007 to 0.4 in 2016. Rice is the only cereal with an ICD < 1 in all the years, as export value exceeded the import value.

The dynamics of the coverage degree of import value by export value by type of cereal of Romania in the period 2007-2016 is presented in Table 4 and Fig.10.

Table 4. The dynamics of the coverage degree of import value by export value by type of cereal, Romania, 2007-2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2016/2007 %
Wheat	0.4	3.8	3.7	3.2	2.6	4.5	7.7	8	5.8	3.4	850.0
Maize	0.6	1.0	1.9	4.3	4.7	3.1	5.8	6.1	3.3	4.9	816.6
Barley	2.5	3.2	10.8	6.6	4.2	4.7	5.0	11.5	3.6	2.7	108.0
Oats	3.0	0.07	0.6	0.6	0.9	2.4	3.7	1.5	1	3.1	103.0
Rye	0.1	2.1	10.8	3.0	24.4	5.8	5.8	0.4	0.1	0.3	300.0
Sorghum	0	0.03	3.8	1.3	1.1	2.1	0.9	4.1	3.5	1.9	190.0
Rice	0.06	0.08	0.3	0.7	0.4	0.6	0.5	0.4	0.3	0.4	666.0

Source: Own calculations based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

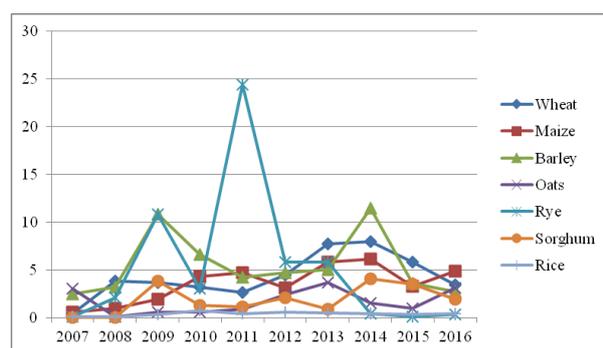


Fig.10. The dynamics of the index of coverage degree of import by export by type of cereal, Romania, 2007-2016

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

The dynamics of the geographical orientation of Romania's cereals export and import. The main trade partner in Romania's trade with cereals is the EU-28.

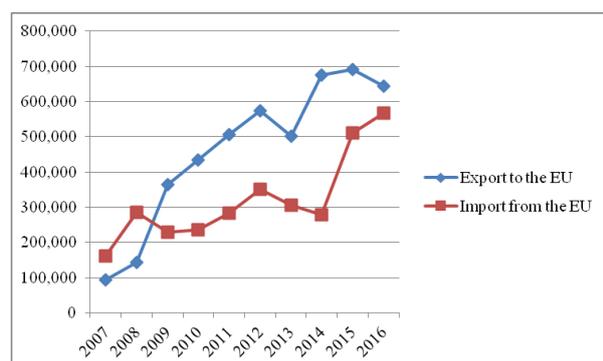


Fig.11. The dynamics of Romania's cereals export value to the EU-28 and import value from the EU-28, 2007-2016 (Euro Thousand)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

In 2016, Romania's cereals export value to the EU-28 accounted for Euro 645,243 thousand, being 6.88 times higher compared to the level

of 2007. Also, in 2016, Romania's import value of the cereals bought from the EU-28 was Euro 567,437 thousand, being 3.53 times higher than in 2007 (Fig.11).

The EU share in Romania's cereals export value declined from 61.8 % in the year 2007 to 30.7 % in 2016, while the share in the cereals import value increased from 59.3 % in 2007 to 95.8 % in 2016. Therefore, the EU-28 is an important destination for the Romanian cereals, with a market share of 30.7 % in 2016 and also the main cereals supplier with a market share of 95.8 % in the same year. Also, this means that about 2/3 of Romania's cereals export value is determined by the cereals sold in the extra-EU markets (Fig.12.).

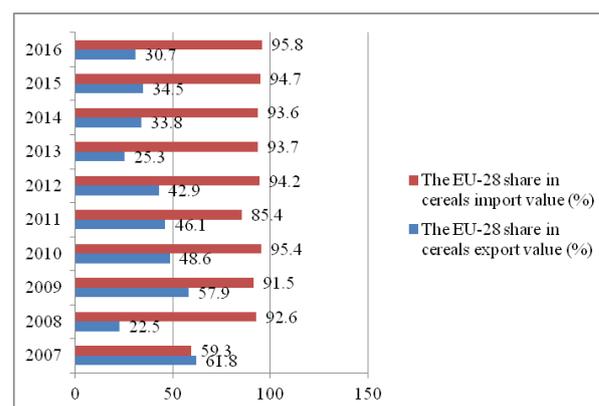


Fig. 12. The dynamics of the EU-28 share in Romania's cereals export and import value, 2007-2016 (%)

Source: Own design based on the data provided by the National Institute of Statistics, Tempo Online Data base, 2018 [13].

According to the United Nations Comtrade Data Base [28], as mentioned by Trading Economics [26] in 2016, Romania's cereals export value accounted for USD 2,226.04 Million and the market share of the

beneficiary countries was as presented in Table 5.

Making a simple calculus, it was identified that 71.3 % of Romania's export value was carried out with the extra-EU countries,

accounting for USD 1,537.24 Million, compared to 28.67 % in case of the intra-EU trade with cereals which accounted for USD 688.8 Million.

Table 5. Romania's cereals export value and the market share by beneficiary country in the year 2016

Romania's cereals export value in 2016 (USD Million)								
Country	Export value USD Million	%	Country	Export value USD Million	%	Country	Export value USD Million	%
1.Egypt	286	12.0	14.Djibouti	48.5	2.0	27.Irak	25.2	1
2.Jordan	188	7.8	15.Morroco	44.9	1.9	28.Germany	23.9	0.99
3.Spain	187	7.7	16.Portugal	38.8	1.6	29.Austria	23.9	0.99
4.Vietnam	169	7.0	17.Lebanon	38.5	1.6	30.Belgium	23.6	0.98
5.Lybia	135	5.6	18.United Arab Emirates	36.7	1.5	31.Syria	23.4	0.97
6.Italy	104	4.3	19.Tunisia	36.5	1.5	32.Cyprus	21.8	0.91
7.Saudi Arabia	92.8	3.9	20.Russia	35	1.5	33.Indoneasia	21.3	0.88
8.Ehiopia	77.9	3.2	21.Ukraine	34	1.4	34.South Korea	20.4	0.85
9.Netherlands	66.9	2.8	22.Hungary	34	1.4	35.Japan	10.9	0.45
10.Israel	62.9	2.6	23.Turkey	33.7	1.4	36.Iran	10.8	0.45
11.France	59.5	2.5	24.Bulgaria	28.1	1.2	37.Thailand	10.2	0.42
12.Sudan	52.2	2.2	25.Ireland	27.8	1.2	38.Nigeria	8.88	0.37
13.Greece	49.5	2.1	26.Bangladesh	25.9	1.1	39.Kuweit	8.66	0.36

Source: Trading Economics, <http://tradingeconomics.com/romania/exports/cereals/>, Accessed on January 11, 2018 [26].

Romania is on the 3rd position in the EU for the cereal export in the extra-EU markets and for maize export on the top position. The amounts of cereals exported in the extra-EU markets and the position of Romania export to

other destinations are presented in Table 6. In 2015, Romania was on the 1st position for maize, on the 3rd position for wheat and also on the 3rd position for barley [18].

Table 6. Romania's export of cereals in the extra-EU markets, 2007-2015

	MU	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Cereal exported quantities	Million tonnes	0.57	3.5	1.4	2.2	3.5	3.4	7	2.1
Position in the EU	-	5	3	3	3	2	3	3	3
The share in the extra EU deliveries	%	3.9	12.3	6.2	8.1	16.1	12.2	17.7	5.4

Source: Razi, G., 2014, Romania is on the 3rd position in the EU for the cereal export to the extraEU markets. For maize, it is on the 1st position. www.zf.ro/companii/retail-agrobusiness/romania-este-pe-locul-trei-in-UE-la-exportul-de-cereale-catre-pietele-extracomunitare-la-porumb-este-pe-primul-loc-13432403/24 Oct.2014, Accessed on January 13, 2018, [18].

In 2016, Romania exported 6.9 million tonnes wheat, of which 80 % in the extra EU markets. Compared to 2015, this means 2.09 times more exported cereals [14,19]. In the first nine months of the year 2017, Romania exported 7.87 million tonnes cereals [12,20].

The estimated efficiency of Romania's cereals foreign trade based on Point Method. Based on the numeric score or position received for export, value, import value, trade balance and index of coverage degree of import by export, it was calculated

the total sum of points received by each cereal. This sum has allowed to establish the hierarchy of cereals as follows:

-for the lowest sum, a cereal was placed on the 1st position, meaning that it has the most

efficient foreign trade;

- for the highest sum, a cereal received was placed on the 7th position, reflecting that the cereal has the lowest efficient foreign trade.

The results are shown in Table 7.

Table 7. The comparative position of each cereal reflecting the efficiency of foreign trade based on Point Method applied for the criteria: export value, import value, trade balance and index of coverage degree of import by export

	Position for Export value	Position for Import value	Position for Trade Balance	Position for Index of Coverage Degree	Total points	Final position in the hierarchy
Wheat	1	6	1	3	11	1
Maize	2	7	2	4	15	3
Barley	3	5	3	1	12	2
Oats	6	2	5	6	19	6
Rye	7	1	6	2	16	4
Sorghum	5	3	4	5	17	5
Rice	4	4	7	7	22	7

Source: Own calculations.

The figures show that the most efficient foreign trade was achieved in case of wheat, followed in the decreasing order by: barley,

maize, rye, sorghum, oats and rice.

The statistical parameters for all the studied indicators are presented in Table 8.

Table 8. The statistical parameters: Mean, Standard deviation and coefficient of variation for the indicators used in this study

	MU	Total 2007-2016	Mean	St. Deviation	Coeff. of var. (%)
Cereal export	Euro Million	12,815.2	1,281.51	705.71	55.06
Cereal import	Euro Million	2,538.6	253.86	118.74	46.77
Cereal trade balance	Euro Million	9,287.6	928.76	631.66	68.01
Cereal trade volume	Euro Million	15,693.6	1,569.36	753.73	48.21
Cereal export/inhabitant	Euro/capita	639.24	63.92	35.85	56.08
Cereal ICD	-	35.58	3.55	1.78	50.14
Cereal export to the EU	Euro Thousand	4,629,023	462,902.3	209,369.84	45.42
Cereal import from the EU	Euro Thousand	3,211,372	321,137.2	126,418.21	39.36
Wheat export	Euro Million	5,735.9	573.59	352.38	61.43
Maize export	Euro Million	5,302.3	530.23	300.3	56.63
Barley export	Euro Million	1,538.8	153.88	83.85	54.49
Oats export	Euro Million	4.57	0.45	0.28	62.22
Rye export	Euro Million	1.97	0.19	0.17	89.47
Sorghum export	Euro Million	19.67	1.96	1.65	84.18
Rice export	Euro Million	110.52	11.05	5.82	52.66
Wheat import	Euro Million	1,351.7	135.17	72.79	53.48
Maize import	Euro Million	1,516	151.63	57.38	37.84
Barley import	Euro Million	351.6	35.16	25.59	72.78
Oats import	Euro Million	2.49	0.24	0.11	45.83
Rye import	Euro Million	0.829	0.08	0.07	87.5
Sorghum import	Euro Million	10.55	1.05	0.61	58.09
Rice import	Euro Million	2578.9	27.89	8.24	29.54
Wheat trade balance	Euro Million	4,438.2	443.82	320.33	72.17
Maize trade balance	Euro Million	3,786	378.6	273.79	72.31
Barley trade balance	Euro Million	1,187.2	119.72	65.74	55.37
Oats trade balance	Euro Million	1.91	0.19	0.17	89.47
Rye trade balance	Euro Million	1.04	0.1	0.08	80.00
Sorghum trade balance	Euro Million	9.13	0.91	0.73	80.21
Rice trade balance	Euro Million	-168.34	-16.83	7.87	-46.76
Wheat ICD	-	43.1	4.41	2.31	53.59
Maize ICD	-	35.7	3.57	1.92	53.78
Barley ICD	-	54.8	5.48	3.22	58.75
Oats ICD	-	16.87	1.68	1.26	75.00
Rye ICD	-	52.8	5.28	4.55	86.17
Sorghum ICD	-	18.73	1.87	1.49	79.67
Rice ICD	-	3.74	0.37	0.20	54.05

Source: Own calculations.

The figures of the coefficients of variation are very high, reflecting a large variation of the data in the chronological series.

CONCLUSIONS

The study reflected the development of Romania's trade with cereals in the period 2007-2016. Both export and import value with cereals have substantially increased in the analyzed period so that in 2016 the export value accounted for Euro 2,097.2 Million and the import value for Euro 591.1 Million, resulting a positive trade balance of Euro 1,505.1 Million, reflecting that Romania is a net exporting country of cereals.

Taking into account the export and import values, the volume of cereal trade increased by 5.36 times, reaching Euro 2,689.3 Million in 2016. Also, the export per inhabitant increased, accounting for Euro 106.13/capita in the year 2016. Also, import was much better covered by export, as shown by ICD whose value accounted for 3.54 in 2016 compared to 0.55 in 2007.

In 2016, cereal trade contributed by about 35 % to the agro-food export value of Romania, and by about 9 % to the agro-food import value. While the contribution to the export increased more than 2 times, the contribution to the import remained relatively stable in the analyzed period.

The main cereals commercialized by Romania on the external markets are: wheat, maize, barley, oats, rye, sorghum and rice, but the most important cereals traded in other countries are: wheat, maize, and barley. In 2016, the share of these cereals in the cereal export value accounted for: wheat 55.3 %, maize 34.4 % and barley 9.15 %, all together totalizing 98.85%.

The most important cereals imported by Romania are: wheat, maize, barley and rice. In the year 2016, the share of these cereals in cereal import value accounted for: wheat 56.9 %, maize 24.9 %, barley 11.9 % and rice 5.1 %, all together accounting for 98.8 %.

In 2016, the trade balance was positive with high values for: wheat Euro 823.4 million, maize Euro 574.3 million, and barley Euro 121 million. Also it had low positive values

for sorghum and oats, and low negative values for rice and rye.

The index of coverage degree of import by export has recorded 4.9 for maize, 3.4 for wheat, 3.1 for oats, 2.7 for barley, 1.9 for sorghum, 0.4 for rice and 0.3 for rye in the year 2016.

The main trade partner for cereal export is the EU with a share of 30.7 % in 2016, two times lower than in the year 2007 (61.8%). In the cereal import value, the EU keeps the top position with a share of 95.8 % in 2016, compared to 59.3 % in 2007. Therefore, about 70 % of Romania's cereal export is represented by the extra-EU markets.

If we take into consideration the efficiency of each cereal in terms of four criteria: export value, import value, trade balance and ICD, the hierarchy established according to the results of the application of the Point Method was the following one, in the decreasing order: wheat, barley, maize, rye, sorghum, oats and rice. However, the principal cereals which deserve to be traded on external markets are wheat, maize and barley.

This analysis has allowed to draw the conclusion that Romania must commercialize more cereals which have a high efficiency in foreign trade in terms of high export value, low import value, high positive trade balance and a high index of coverage degree of import by export.

A new orientation in Romania's foreign trade is required in relation to the EU, because Romania import value is very high and the export value has declined two times. Romania is able to produce more cereals than it consumes, and this is reason to export more cereals on the markets where the price is more convenient and to reduce the imports from the EU where the price is high.

As a conclusion, Romania's foreign trade with cereals has a positive balance with a good impact on the payment balance and the economy in general.

REFERENCES

- [1] Alecu, I., Constantin, M., 2013, Romania's International Trade with Agricultural Foodstuffs, Quantitative and Structural Features, Romanian

- Statistical Review, 3rd Quarter/2013, Supplement, 81-91.
- [2] Arhrioiu, G. A., 2015, Foreign trade perspective with cereals and oleaginous of Romania in the context of Europe 2020 strategy implementation, Ph. D. Thesis, UASVM Bucharest.
- [3] Beldescu Alina, 2011, Romania, Cereals, Romania Trade and Invest (CRPCIS), Accessed on January 8, 2018.
- [4] Bergmann, T. J., Scarpello, V. G., 2001, Point schedule to method of job evaluation. In Compensation decision. This is one making. New York, NY: Harcourt.
- [5] Caraba-Meita Nela-Loredana, 2017, Perspectives and trends in the evolution of agricultural activities in countries with advanced economies, Annals of University of Craiova, Economic Sciences Series, 1, 45, 154-163, Link: http://feaa.ucv.ro/annals/v1_2017/0045v1-014.pdf, Accessed on January 6, 2018.
- [6] Chiran, A., Gîndu, Elena, Banu, A., Ciobotaru, Elena-Adina, 2004, The Agricultural and Agrifood Products Market, Ceres Publishing House, Bucharest
- [7] Cofas, E., Soare, E., 2013, Study on grain market in the world, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.13(2), 65-70
- [8] Eurostat Statistics Explained, Agricultural Production-Crops, 2017, http://ec.europa.eu/eurostat/statistics-explained/index.php/Agricultural_production_-_crops, Accessed on January 8, 2018
- [9] Eurostat Statistics Explained, Cereal production in the EU, <http://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20171130-1>, Accessed on January 8, 2018
- [10] Eurostat Statistics Explained, Main annual crop statistics, http://ec.europa.eu/eurostat/statistics-explained/index.php/Main_annual_crop_statistics, Accessed on January 8, 2018
- [11] Evolution of basic food, <http://www..agro-business/evolutia-alimentelor-de-baza/2014/08.04>, Accessed on January 10, 2018
- [12] Ministry of Agriculture and Rural Development, General data about Romania's agriculture, www.madr.ro, Accessed on January 7, 2018
- [13] National Institute of Statistics, Tempo Online Data base, www.insse.ro, Accessed on January 7, 2018
- [14] National Institute of Statistics, 2017, www.insse.ro, Accessed on January 7, 2018
- [15] Popescu Agatha, 2012, Home and International Trade, 2nd Ed., Publishers: Comunicare coediting with RawexComs, Bucharest, 401 pp.
- [16] Popescu Agatha, 2014, Trends in Romania's agro-food foreign trade in the period 2007-2014, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.14(4), 223-236
- [17] Popescu Agatha, 2017, Trends and correlations in Romania's agro-food foreign trade in the period 2007-2016, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.17(4), 293-304
- [18] Razi, G., 2014, Romania is on the 3rd position in the EU for the cereal export to the extraEU markets. For maize, it is on the 1st position. www.zf.ro/companii/retail-agrobusiness/romania-este-pe-locul-trei-in-UE-la-exportul-de-cereale-catre-pietele-extracomunitare-la-porumb-este-pe-primul-loc-13432403/24 Oct.2014, Accessed on January 13, 2018
- [19] Romania doubled its wheat export, <http://www.digi24.ro/Stiri/economie/agricultura/romania-si-a-dublat-exporturile-de-grau-717097>, Accessed on January 13, 2018.
- [20] Romania exported 8 million tonnes cereals, 8 January 2018, <http://www.agroino.ro/vegetal/romania-a-exportat-aproape-8-milioane-tine-de-cereale>.
- [21] Romania versus Central and Eastern Europe for the cereals exports to the USA market, cniipmmr.ro/2016/01.26, Accessed on January 12, 2018
- [22] Romanian Statistical Yearbook, Agriculture, www.insse.ro, <http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=45>, Accessed on January 8, 2018.
- [23] Romanian Statistical Yearbook, Geography, Meteorology and Environment, www.insse.ro, Accessed on January 7, 2018.
- [24] Soare, E., Chirciu, I., 2016, Research on the Romanian wheat market, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.16(2), 287-292
- [25] Trade in cereals, oilseeds and protein crops, European Commission, Agriculture and Rural Development, https://ec.europa.eu/agriculture/cereals/trade_en, Accessed on January 11, 2018
- [26] Trading Economics, <https://tradingeconomics.com/romania/exports/cereals>, Accessed on January 11, 2018
- [27] United Nations Comext Data Base, <https://comtrade.un.org/>, Accessed on January 8, 2018
- [28] Voicilas, D.M., 2014, Cereal market in Romania-regional competitiveness, MPRA Paper No. 61730, <https://mpra.ub.uni-muenchen.de/61730/>, Accessed on January 8, 2018.

