
The impact of Romania's accession to the EU on foreign trade with agri-food products

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ABSTRACT

In this paper we make an analysis of Romania's foreign trade with agri-food products between 2000 and 2020, dividing this period in two subperiods relative to the year of EU accession: pre-accession (2000-2006) and post-accession (2007-2020) periods. We identified the main effects of EU accession on the foreign trade with agri-food products emphasizing that this event has been beneficial for Romania, as since 2007 there has been a significant increase in exports for most categories of agri-food products. After the accession to the EU, we noted a specialization of the country's exports for several categories of agri-food products. Most exports consist of products with a low degree of processing, which have a low added value. Although, at least after 2007, these product categories recorded considerable surpluses, they were still insufficient to offset the accumulated deficits in most categories of agri-food products. Another important aspect in the activity of foreign trade with agri-food products that we analyzed was the competitiveness. Using the combined values of the TBI and LFI indicators, we obtained that the most competitive product categories are Cereals, Live Animals and Seeds. Romania's accession to the EU has allowed the creation of favorable conditions for ensuring the competitiveness of several product categories, both on the European market, but also on the markets in Asia and Africa.

Keywords: foreign trade; agri-food products; EU accession; concentration of exports and imports

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INTRODUCTION

Romania's foreign trade with agri-food products has undergone important changes with the political changes at the end of 1989 and the transition from a centralized economy to a market economy. The country's accession to the EU on 1 January 2007 gave a new impetus to trade with agri-food products. The effects of accession were manifested, both in the increase of exports and imports, and in important changes in the structure of exports and imports, at the level of agri-food categories and economic areas. These are also immediate effects that have been experienced by all Eastern European countries that have joined the EU (Svobodová 2014, Smutka, 2016). In Romania, as in the case of the other countries in the Eastern part of the continent that have joined the EU, the large increase of exports of agri-food products due to natural access to a large free market was accompanied by a massive increase of imports of agri-food products and implicitly an increase of the trade deficit with agri-food products (Gheorghe et al., 2018, Bojniec and Ferto, 2009).

Romania's accession to the single market also made it possible to access European funds for the modernization of agricultural production and, consequently, for the increase of export capacity. During the pre-accession period, Romanian agriculture benefited from European funds for restructuring the vegetable and animal agricultural production, so that, with the accession to the EU, Romania considerably increased its productions and implicitly exports of cereal products, the most competitive agri-food category in the country's exports. However, in a relatively short period of time, Romania did not have the capacity to overcome the problems in agriculture in order to increase both the agricultural production and the processing capacity of the raw material in the country (Albu et al., 2018).

The variation of the volume of imports, exports and trade balance with agri-food products in Romania is largely dependent on domestic demand and developments in agricultural production and the ability to capitalize the natural potential of each country (Rusali, 2019). The EU ascension led to an increase of the exported agri-food goods for Romania (Andrei et al. 2022a) with a competitive advantage on few products (Andrei et al. 2022b).

Under the conditions of the global economy, the goods that are the subject of international trade are the result of the interaction between economic operators from different countries. Only a small part of the exports of goods from a country is the exclusive result of the production of economic agents from a country, the largest are the result of the interaction between local and foreign economic agents (Zaman and Simion, 2020). Therefore,

it is very important for each country to join the global value chain with as many local economic agents as possible to participate as much as possible in creating the added value of exported products (Zaman et al., 2018). The current philosophy of developing the global economy does not help an economic zone to impose economic restrictions to protect its own products as it will lead to economic losses and cost increases (Xi, 2021). The rest of the paper is organized as follows. In the next section we present the data sources used in our analysis and the main indicators. Then, we discuss some general aspects regarding Romania's foreign trade with agri-food products and we present the most important characteristics of the structure of imports and exports of agri-food products. The paper continues with a section dedicated to a comparative index analysis and in the last section we present the conclusion of our study.

DATA AND METHODS

The article aims to identify characteristics of foreign trade with agri-food products for Romania during 2000-2020 period. We used data on exports and imports of Romanian agri-food products for each year aggregated at the level of product categories and by economic areas (Europe, EU-28, Asia, Africa and America). We considered 24 product categories according to the statistics nomenclature defined by the European Communities (European Communities, 1987) identified by Combined Nomenclature (CN) codes. Our analysis is based on data on foreign trade with agri-food products calculated by the National Institute of Statistics in Romania. The annual values of exports and imports of agri-food products are expressed in Euro. We used annual data to evaluate exports and imports of product categories during the pre-accession (2000-2006) and post-accession (2007-2020) periods.

The article aims to identify: the effects of Romania's accession to the European Union starting with January 1st, 2007 on the volume of exports and imports of agri-food products by categories of agri-food products; the changes in the structure of exports and imports by product category and economic area over time; those categories of agri-food products that define the specifics of Romania's exports; those categories of products that provide Romania with a comparative advantage in certain economic areas; to what extent Romania's domestic market for those categories of agri-food products important in population consumption depends on imports, most of the imports being from EU countries.

To achieve these objectives, we computed various indicators starting from the primary data. We denote by X_i^j the export from category i , $i = 1, \dots, n$

of the agri-food product to the economic area j , $j = 1, \dots, m$ and by M_i^j the import from category of agri-food i , $i = 1, \dots, n$ to the economic area j , $j = 1, \dots, m$. The categories of agri-food products were classified in a number of classes, and their number is denoted by p . We define the following weights for the exports:

- the share of the export volume of the product categories from a class in the economic zone in the total export of the product categories from the class: $P_1(X) = \frac{\sum_{i=1}^p X_i^j}{\sum_{j=1}^m \sum_{i=1}^p X_i^j}$;
- the share of the volume of exports in the economic area in total export: $P_2(X) = \frac{\sum_{i=1}^n X_i^j}{\sum_{j=1}^m \sum_{i=1}^n X_i^j}$;
- the share of exports of the categories of products in the class in the economic zone in the total exports in the economic zone: $P_3(X) = \frac{\sum_{i=1}^p X_i^j}{\sum_{i=1}^n X_i^j}$;

The weights for imports are defined in a similar way, if we replace X by the letter M in the above relations.

We compute three indicators using export and import data, which have a certain level of aggregation: the balance calculated as the difference between exports and imports ($\Delta = X - M$), the total trade as the sum between exports and imports $TT = X + M$ and foreign trade coverage ratio indicator calculated as the ratio between exports and imports $FTCR = \frac{X}{M} \cdot 100$. These indicators are calculated for each year of a longer period, as is the case in this paper, in the pre-accession period (2000 - 2006) or in the post-accession period (2007 - 2020).

We assessed the extent to which categories of products subject to Romania's trade with European or EU-28 countries have comparative advantages and the extent to which there are significant changes in foreign trade with agri-food products after EU accession relative to the comparative advantages. In this respect, we computed the Lafay Index (LFI) indicator (Lafay, 1992) for the 24 product categories for the pre-accession and post-accession period:

$$LFI(i, j) = 100 \cdot \left(\frac{\Delta(i, j)}{TT(i, j)} - \frac{\sum_{i=1}^n \Delta(i, j)}{\sum_{i=1}^n TT(i, j)} \right) \frac{TT(i, j)}{\sum_{i=1}^n TT(i, j)} \quad (1)$$

For both periods we evaluated the extent to which Romania specializes in the export or import of certain categories of products. To this end, the Trade Balance Index (Lafay, 1992) is calculated for each of the two periods:

$$TBI(i, j) = \frac{\Delta(i, j)}{TT(i, j)} \quad (2)$$

Depending on the sign of the indicator we will assess whether the country is “net-exporter” or “net-importer”: if $TBI(i, j) > 0$, then the country is “net-exporter” for product category j ; if $TBI(i, j) < 0$, then the country is a “net-importer”.

Another important objective of this study was to establish to what extent Romania’s exports / imports from an economic zone have a certain degree of concentration of exports / imports of agri-food products by categories. Thus, we computed the Herfindahl index (Hirschman, 1964) at the level of economic zones for a year or a period:

$$H_t = \sum_{i=1}^n y_{it}^2 \quad (3)$$

where, y_i represents the share of export / import from the category of goods to this economic zone in the exports / imports of Romania. The values of this indicator show to what extent a certain category of products is dominant in exports to a certain market or to what extent imports of products from a country have a higher degree of concentration around certain categories of products.

GENERAL ASPECTS REGARDING ROMANIA’S FOREIGN TRADE WITH AGRIFOOD PRODUCTS

During the 2000 – 2020 period, important changes took place in the exports and imports of Romanian agri-food products. The study did not use statistical data to characterize foreign trade for agri-food products from 1990 to 1999 as during this period we recorded large variations in both the volume of exports and imports of agri-food products and are not useful in assessing the effects of Romania’s accession to the EU starting with January 1, 2007. The main problem in Romanian agriculture in the first ten years of the transition was the restoration of private property, which was severely affected during the socialist economy (Andrei et al., 2011).

The data presented in Table 1 and in Figures 1 and 2 allow the identification of some characteristics of the foreign trade with agri-food products.

Firstly, we point out that during this period, exports and imports of agri-food products increased a lot, the average annual export rates being 15.9%, and imports rates 11.5%. Even under these conditions when the average annual growth rate of exports was higher than the growth rate of imports, Romania accumulated, except for two years, trade deficits in foreign trade with agri-food products between 2000 and 2020. In 2007, the year when Romania joined the EU, we registered the highest annual growth rates of exports and imports of agri-food products, being 31.4% for exports, respectively 37.7% for imports. We also registered the largest deficit in the trade balance with agri-food products, being equal to 2.22 billion euros. A large deficit, but not exceeding the value recorded in 2007, was also registered in the next two years. During this period, in only two years there was a surplus in the trade balance with agri-food products, but as we will see in the analysis, this was due to the accumulation of very large productions for cereals (CN code 10). The average value of agri-food exports in the pre-accession period was only 3.4 billion euros, rising to 4.8 billion euros in the post-accession period. The average annual value of imports in the pre-accession period was 4.4 billion euros, rising in the post-accession period to 5.7 billion euros.

Secondly, it should be noted that, through the predominant export of products with a low degree of processing and the massive import of a wide variety of processed agri-food products, Romania has managed to cover its imports of agri-food products through exports for only two years, 2013 and 2014. To assess the extent to which imports were covered by exports, we calculated the Foreign Trade Coverage Ratio (FTCR) as the ratio between exports and imports of agri-food products. The results obtained for each year in the analyzed period show an improvement of the imbalance between exports and imports of agri-food products only for certain subperiods. Evaluating this aspect, we must emphasize that, in the pre-accession period, Romania had a reduced capacity to ensure the imports of agri-food products through the exports of this category of products. Until 2007, the FTCR indicator did not exceed 40% with the lowest value of 32.4% reached in 2003. During the post-accession period, as a result of the dramatic increase in exports of certain product categories, the value of the FTCR indicator has considerably improved for the products belonging to the product categories identified by CN codes 10, 12 and 24. However, in the post-accession period, two subperiods with different evolutions were identified. Thus, in the period 2008 - 2014 the FTCR indicator appreciated relatively continuously reaching values higher than 100% in 2013 and 2014, which is equivalent to the fact that exports were higher than imports. Since 2015, FTCR values have been lower than 100 and have decreased each year. Given that the value of the indicator in 2015 was

97.7%, and in the period 2015-2020 the average annual rate of exports was 3.4%, and the average annual rate of imports was 8.1%, in 2020 the FTGR indicator was 78.3% (see Table 1).

The third aspect considered in the assessment of the characteristics of foreign trade with agri-food products starts from the sign and actual values of the normalized foreign trade balance (NTB), an indicator calculated as the ratio between balance and total trade (export plus import). During the period 2000 - 2020, this indicator registered positive values only in 2013 and 2014, these being two years when Romania registered large cereal productions, thus ensuring a large volume of exports for products included in this category. The positive aspect is related to the fact that until 2015 the value of this indicator has improved, but since 2016 there is a depreciation, largely due to the growth of the imports of agri-food products with a much higher average annual rate relative to that of the exports.

The fourth aspect to be emphasized is the positive effect of Romania's accession to the EU on the volume of exports of certain categories of agri-food products, both in EU countries and in other economic areas. In 2007, compared to 2006, Romania's exports of agri-food products increased by almost 32%, but at the same time imports increased by 38%. Equally, EU accession has brought significant changes in the economic areas structure of exports and imports. Thus, the major change after accession occurred in the territorial structure of imports, the share of products imported from European countries, especially from EU Member States significantly increasing since 2007. If in the pre-accession period the share of goods imported from European countries was 65.7%, it increased to 89.2% in the post-accession period. On the other hand, the share of goods exported to the European space decreased from 83.6% in the pre-accession period to only 74.9% in the post-accession period. In the period after accession, the share of Romanian products exported to Asian countries increased significantly. In 2020, a share of 22.1% of agricultural goods exported by Romania were to Asian countries (Table 2). Although during the post-accession period the volume of exports of agri-food products increased by an annual average rate of 14% and imports by only 7.3%, the accumulated imbalances between exports and imports of most categories of agri-food products have not been reduced.

Data on foreign trade with agri-food products

Table 1

Year	Export	Import	Balance	NTB	FTCR	Chain index of export flows	Chain index of import flows
2000	0.37	1.02	-0.65	-46.80	36.20	-	-
2001	0.48	1.35	-0.87	-47.20	35.80	131.70	133.10
2002	0.46	1.25	-0.79	-46.00	37.00	95.20	92.20
2003	0.50	1.54	-1.04	-51.00	32.40	108.10	123.30
2004	0.59	1.71	-1.13	-49.00	34.30	118.00	111.60
2005	0.67	2.02	-1.35	-50.00	33.30	114.60	118.00
2006	0.85	2.42	-1.57	-47.90	35.20	126.80	119.90
2007	1.12	3.34	-2.22	-49.70	33.60	131.40	137.70
2008	2.17	4.35	-2.18	-33.50	49.80	192.90	130.20
2009	2.24	3.82	-1.58	-26.10	58.70	103.60	88.00
2010	3.11	3.92	-0.81	-11.50	79.40	138.80	102.50
2011	4.02	4.45	-0.42	-5.00	90.40	129.20	113.40
2012	4.04	4.80	-0.75	-8.50	84.30	100.60	107.90
2013	5.28	4.95	0.33	3.20	106.70	130.70	103.30
2014	5.58	5.12	0.46	4.30	108.90	105.50	103.40
2015	5.92	6.06	-0.14	-1.10	97.70	106.10	118.20
2016	6.17	6.79	-0.62	-4.80	90.90	104.2	112.10
2017	6.41	7.42	-1.02	-7.40	86.30	103.80	109.30
2018	6.50	7.64	-1.13	-8.00	85.20	101.50	102.90
2019	7.19	8.43	-1.25	-8.0	85.20	110.50	110.40
2020	6.99	8.93	-1.94	-12.20	78.30	97.30	105.90

Data source: authors' calculations using primary data from NSI Romania, 2021

Annual average indicators (export, import and balance)

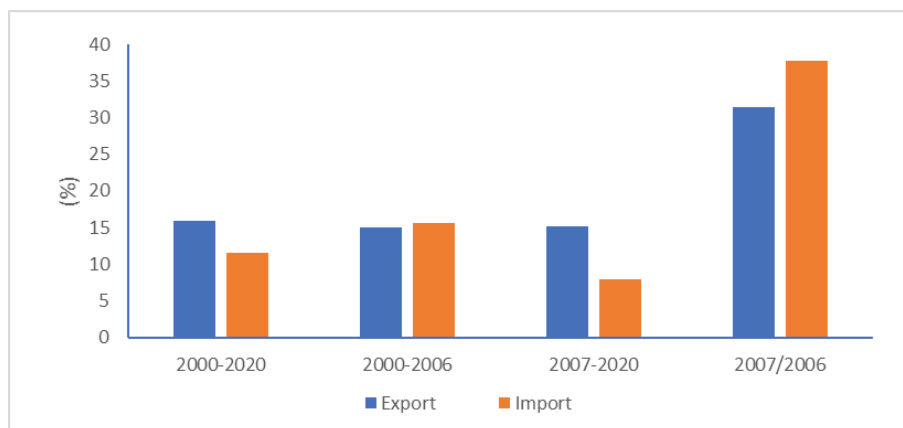
Figure 1



Data source: authors' calculations using primary data from NSI Romania, 2021

Cumulative average rate for exports and imports for various periods

Figure 2



Data source: authors' calculations using primary data from NSI Romania, 2021

Structure of exports and imports by economic areas (%)

Table 2

	Europe		Asia		Africa		America	
	Export	Import	Export	Import	Export	Import	Export	Import
2000	78.56	64.29	13.27	8.59	6.78	2.76	1.13	22.50
2001	78.82	64.86	12.24	6.45	7.85	2.59	0.84	25.29
2002	82.62	67.12	11.38	5.92	4.55	2.01	1.22	24.35
2003	86.86	70.43	9.31	6.77	2.12	1.53	1.49	20.81
2004	87.79	62.93	7.59	6.37	3.10	2.06	1.17	27.85
2005	89.22	63.60	6.50	6.44	3.01	2.01	0.93	27.00
2006	84.77	65.84	10.17	7.03	3.74	1.79	0.84	24.85
2007	88.95	82.13	7.80	4.51	2.14	1.08	0.75	12.00
2008	79.34	85.04	13.96	4.14	5.50	0.76	0.39	10.01
2009	84.95	85.78	10.89	3.76	3.05	1.42	0.35	8.96
2010	82.81	86.90	13.91	3.83	2.65	1.85	0.33	7.39
2011	82.78	84.88	13.19	3.59	3.78	1.27	0.19	10.23
2012	78.78	85.25	12.44	3.19	8.39	2.67	0.27	8.87
2013	67.86	86.69	17.77	3.11	13.76	1.53	0.56	8.65
2014	71.05	88.22	13.97	2.62	14.19	2.11	0.66	6.78
2015	74.24	88.43	14.42	2.65	10.56	2.10	0.60	6.80
2016	69.02	91.47	17.57	2.17	12.48	1.50	0.51	4.84
2017	75.74	91.37	13.19	2.02	10.18	1.13	0.33	5.48
2018	77.45	92.18	13.69	1.90	8.18	0.68	0.40	5.23
2019	73.97	93.05	15.81	1.75	9.34	0.81	0.41	4.36
2020	70.06	93.33	22.07	1.56	7.24	0.80	0.63	4.31
2000-2020	75.47	86.11	14.95	3.20	8.80	1.44	0.49	9.10
2000-2006	83.61	65.67	10.55	6.86	4.52	2.13	1.01	24.52
2007-2020	74.94	89.19	15.24	2.64	9.08	1.34	0.46	6.78

Data source: authors' calculations using primary data from NSI Romania, 2021

Foreign trade coverage ratio (FTCR) was computed for each year from the period 2000 - 2020 and separately for the pre-accession period (in this case between 2000 - 2006) and post-accession (2007 - 2020) globally, but also for each economic zone (Europe, Asia, Africa and America). The results presented in Table 3 show that for the trade with European countries the coverage of imports through exports was low in the pre-accession period, the value of the indicator was more than 50% in any year of the period. With Romania's accession to the EU, the value of the indicator ameliorated until 2014 but starting with 2015 up to 2020, the values of the indicator are on a decreasing trajectory. During the post-accession period, Romania accumulated a deficit of over 21.3 billion euros from trade with agri-food products with European countries, which is equivalent to an average annual deficit of over 1.5 billion euros. The second economic area where Romania exports agri-food products is Asia. During the pre-accession period, due to a low volume of exports, the value of the indicator was low, so that only in 2006 the indicator registered a value higher than 50%. After 2007, the volume of exports to Asian countries increased significantly, so that FTCR values increased significantly year by year, reaching over 1100% in 2020 when Romania registered a trade surplus from the trade with Asian countries of over 1.4 billion euros. During the post-accession period, Romania recorded a surplus of over 8 billion euros in the trade relations with agri-food products with Asian countries. With the accession to the EU, Romania's exports to African countries also increased, the value of the FTCR after 2007 far exceeded the 100% threshold (Table 3). Due to low imports of agri-food products from African countries, Romania recorded a surplus of almost 5 billion euros in the post-accession period, which represents an average annual surplus of over 360 million euros. The countries of American continent have a small share, both in exports and imports of agri-food products. In the post-accession period due to a low volume of exports to American countries and average annual imports of almost 400 million euros, Romania recorded a deficit of over 5.1 billion euros. The results presented above show us a major impact of Romania's accession to the EU in relation to the structure and efficiency of trade in agri-food products by economic areas (Gheorghe et al., 2018).

Coverage of exports by imports

Table 3

Year	Europe	Asia	Africa	America
2000	44.3	55.9	89.0	1.8
2001	43.5	68.0	108.6	1.2
2002	45.5	71.0	83.8	1.9
2003	40.0	44.6	44.9	2.3
2004	47.8	40.8	51.6	1.4
2005	46.7	33.6	50.0	1.1
2006	45.4	51.0	73.9	1.2
2007	36.4	58.2	66.7	2.1
2008	46.5	168.0	358.8	1.9
2009	58.1	169.8	126.0	2.3
2010	75.7	288.6	113.8	3.6
2011	88.2	332.3	269.4	1.6
2012	78.0	328.6	265.4	2.5
2013	83.5	610.2	959.5	6.9
2014	87.5	579.3	731.0	10.6
2015	82.3	533.2	493.2	8.6
2016	68.7	736.3	755.7	9.5
2017	71.6	564.5	781.3	5.3
2018	71.3	610.5	1015.0	6.6
2019	67.9	770.3	978.5	8.1
2020	58.6	1103.6	702.1	11.3
1999-2020	67.7	361.3	472.0	4.2
1999-2006	46.3	55.8	77.1	1.5
2007-2020	70.1	480.7	566.7	5.7

Data source: authors' calculations using primary data from NSI Romania, 2021

CHARACTERISTICS OF THE STRUCTURE OF IMPORTS AND EXPORTS OF AGRI-FOOD PRODUCTS

With the accession to the EU, Romania has considerably increased its value of exports and imports of agri-food products, both for total and by categories of agri-food products. For three product categories Cereals (CN code 10), Oil seeds and oleaginous fruits (CN code 12) and Tobacco and manufactured tobacco substitutes (CN Code 24) export increases were quite exceptional. The three categories are added Live Animals category (CN code 1) which has accumulated significant trade surpluses throughout the post-communist period. After the accession to the EU, Romania has increased and diversified its imports of agri-food products to satisfy, to a large extent, the consumption needs of the population.

Using the Herfindahl index, we assessed: (i) whether the degree of specialization of exports and imports of agri-food products by product category has changed over time; (ii) the extent to which there are significant differences between exports and imports of agri-food products, considering their degree of concentration by product category. The assessment of the

specialization of imports and exports was made based on annual data and also for cumulative data at the level of pre-accession and post-accession periods. The results obtained for the two periods for exports and imports of agri-food products, for the whole foreign trade but also for each economic areas are presented in Table 4. At the global level of economic trade there is a much higher level of specialization in exports of goods relative to that of imports. Moreover, specialization of the exports is much more pronounced in the post-accession period, and the concentration of imports has decreased significantly in the post-accession period.

Herfindahl index values determined for economic areas

Table 4

Economic area	Export		Import	
	pre-accession	post-accession	pre-accession	post-accession
World	1111	1630	771	565
Europe	1064	1236	730	587
Asia	2347	2866	1050	831
Africa	3835	6748	2313	2134
America	2439	1174	1584	1936

Data source: authors' calculations using primary data from NSI Romania, 2021

We noted a specialization of Romania for the foreign trade with agri-food products in the export of three categories of products for both periods, pre-accession and post-accession. In the pre-accession period (2000 - 2006) products from three product categories held half of the value of the export of agri-food products: Live animals had 23.1%, Oil seeds and oleaginous fruits around 14% and Cereals 12.7%. In the post-accession period, the three product categories held over 55% of the value of exports for the period 2007-2020: Cereals (32.6%), Oil seeds and oleaginous fruits (16.6%) and Live animals (6.3%). Also, during this period, Tobacco and manufactured tobacco substitutes (CN code 24) were added to the three product categories, holding 13.2%. Thus, four categories of products are essential for Romania's exports, two of which (CN code 10 and CN code 12) depend to a large extent on climatic conditions.

The results presented in Table 4 show an increase of the specialization of Romania's exports after the accession to the EU for the economic areas that have an important cumulative share in exports: Europe, Asia and Africa. In the pre-accession period, 37% of exports of agri-food products to the European market consisted of products belonging to two product categories: Live animals with 23.3% and Oil seeds and oleaginous fruits with 13.9%. During

the post-accession period, the specialization level of Romania's exports on the European market increased, two categories of products ensuring the accumulation of 40% of the volume of exports on this market: Cereals with 20.3% and Oil seeds and oleaginous fruits with 20.4%. The degree of specialization of exports is much higher for exports to the Asian market. In the pre-accession period, no less than three categories of products accounted for 77% of Romania's exports on this market: Cereals accounted for 30.9%, Live animals had a contribution of 26.2% and Oil seeds and oleaginous fruits of 20.5%. During the post-accession period, the high contribution of 82.5% of the three categories of products in the exports of agricultural goods on this market was maintained, only that the share of Cereals increased to 64%, Live animals decreased to 11.3% and Oil seeds and oleaginous fruits decreased to 7.3%. Even if the exports of agri-food goods to African countries have a small share in Romania's exports of agri-food products (8.8% for the period 2000 - 2020; 4.5% during the pre-accession period and 9.1% during the post-accession period) we still noted the specialization in the products belonging to two categories of products, both in the pre-accession and in the post-accession period: in the pre-accession period Live Animals represented 19.9% of Romania's exports on this market and Cereals 57.6%; in the post-accession period, the share of Cereals increased to over 81.4%, and Live Animals had almost 10%.

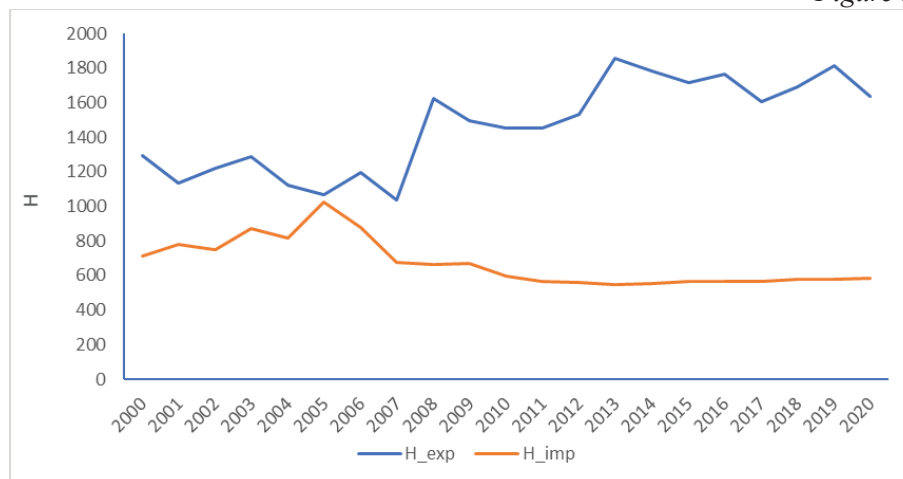
In order to assess to what extent there are significant differences from one year to another between the values of the Herfindahl index, we computed the annual values of this indicator based on the exports and imports of Romanian agri-food products and the results are shown in Figure 3. In the pre-accession period, there is a slow decrease, from one year to another, of the values of the Herfindahl index in the case of agri-food exports, the minimum value being reached in 2007. During this period of time the Cereals category did not exceed 20% of the total volume of exports of agri-food products in any year. The value of the indicator was relatively high for exports, due, in large part, to the high share of products in the Live Animals category.

On the other hand, in the post-accession period, due to the increase of the share of Cereals products in agri-food exports, the values of the Herfindahl index are on an increasing trajectory, with some variations of the indicator from one year to another. The highest annual increases of the Herfindahl index were registered in 2008, 2013 and 2019. An analysis of the annual growth rates of exports of Cereals will show that these are the years when high annual growth rates are recorded for exports of this category of products: in 2008 exports increased 4.2 times compared to the previous year, in 2013 the annual growth rate was 48% and in 2019 the annual growth rate was 20%. Equally,

a significant reduction of the Herfindahl index in 2017 and 2020 is doubled by significant negative annual rates for Cereals exports: in 2017 the rate was -5.7%, and in 2020 it was -17.3%. These results show once again the high degree of specialization of Romania for the export of cereals in the post-accession period. In fact, the products in this category, represent more than 32% of the total value of Romania's exports of agri-food products in the entire period 2007 - 2020, while in the pre-accession period their share was only 13.4% of the total volume of exports of agri-food products.

Herfindahl index for exports and imports

Figure 3



Data source: authors' calculations using primary data from NSI Romania, 2021

The concentration of imports of agri-food goods is much lower if we compare it to the degree of concentration recorded for exports of agri-food goods. We identified three periods in the dynamics of this indicator: (i) the period 2000-2005 shows a significant increase in the degree of concentration of imports; (ii) during the period 2005-2009 there is a sharp decrease in the degree of concentration, given that the volume of goods imported by Romania has increased significantly; (iii) after 2010 we observed a stability of the Herfindahl index series.

The data presented in tables 5 and 6 provide us with important information on the characteristics of Romania's trade in terms of the economic areas where it exported goods and the economic areas from which agri-food products are imported from Romania. The evaluation of the structure of exports and imports for each category of products by economic zones during the two

periods allowed us to identify some changes in the flow of agri-food goods from the foreign trade as a result of Romania's accession to the EU. Exports show a decrease in the share of goods delivered to the European market by 9.8 pp and an increase of 5.5 pp in the share of goods that were oriented to Asian market and by 4.9 pp in those delivered to African countries. On the other hand, the share of goods imported from European countries increased significantly, from 65.5% in the pre-accession period to 89.2% in the post-accession period. For 15 out of 24 product categories, more than 90% of the volume of imports is exclusively from European countries, which shows, on the one hand, a high degree of integration in the European market of agri-food products, but on the other hand a large dependence of the satisfaction of the internal consumption of the population on the European market.

With Romania's accession to the EU, important categories of agri-food products show an increase in the share of their exports to Asian countries and a decrease in the share of exports to EU countries. Exports to the European market of products in the Live Animals category decreased from 85.3% in the pre-accession period to 58.8% in the post-accession period. In contrast, their share increased from 11.1% to 27.2% for the Asian market. For Cereals, the share of the European market decreased from 57.1% to 46.8%, while the share held by the Asian market for this product, increased from 23.7% to 30%. On the other hand, together with the increase of Romania's exports of Tobacco products after the accession to the EU, the share of exports on the European market also increased from 78% to 93.1%.

Structure of the exports by economic areas

Table 5

CN codes	pre-accession						post-accession					
	Europe	EU-27	Asia	Africa	America	The rest	Europe	EU-27	Asia	Africa	America	The rest
01	85.30	82.10	11.06	3.62	0.00	0.02	58.81	52.60	27.16	14.03	0.00	0.00
02	97.19	98.38	0.95	0.59	1.15	0.12	92.08	90.31	6.95	0.67	0.26	0.05
03	96.84	92.02	0.37	0.04	2.08	0.67	94.34	82.90	5.58	0.00	0.04	0.03
04	87.42	85.94	4.09	0.65	7.12	0.72	94.65	91.36	3.51	0.19	1.62	0.04
05	97.25	92.16	2.74	0.00	0.01	0.00	97.26	92.61	2.37	0.15	0.22	0.00
06	97.08	92.77	2.80	0.08	0.04	0.00	98.05	85.19	0.67	0.08	1.19	0.00
07	99.42	93.97	0.39	0.01	0.15	0.03	93.51	89.82	6.38	0.05	0.05	0.00
08	91.23	69.53	7.45	0.16	1.07	0.09	93.96	83.19	3.59	0.33	2.10	0.02
09	57.48	38.43	26.37	11.67	1.17	3.31	91.14	81.28	5.68	1.91	0.91	0.36
10	57.11	46.00	23.72	19.08	0.02	0.07	46.75	36.58	29.95	22.72	0.31	0.26
11	92.70	44.09	1.61	5.38	0.22	0.10	87.47	68.92	5.95	6.24	0.33	0.00
12	83.20	67.45	14.14	2.63	0.03	0.00	91.81	78.66	6.64	1.21	0.32	0.01
13	93.76	44.64	1.65	0.00	4.60	0.00	80.52	93.15	9.44	7.49	2.39	0.16
14	95.41	95.28	0.00	0.00	4.59	0.00	99.72	98.77	0.13	0.05	0.09	0.02
15	91.17	54.30	5.78	2.78	0.26	0.02	87.79	81.07	3.17	8.59	0.21	0.24
16	96.16	90.84	0.62	0.02	2.98	0.21	98.75	95.73	0.83	0.07	0.32	0.03
17	96.39	80.76	1.29	0.21	0.19	1.92	92.63	95.27	6.59	0.54	0.11	0.13
18	93.02	63.75	1.26	0.00	0.61	5.11	88.46	78.86	7.58	1.18	1.54	1.24
19	90.39	81.75	4.10	4.47	0.93	0.12	91.51	80.80	4.22	1.38	2.45	0.44
20	95.62	91.73	2.10	0.03	0.94	1.31	97.36	91.33	1.46	0.07	0.96	0.14
21	93.92	90.20	1.63	0.22	3.74	0.49	92.91	81.19	3.97	0.43	0.93	1.76
22	85.22	55.99	5.55	0.12	7.52	1.59	91.04	78.97	4.17	0.10	2.69	2.00
23	91.78	68.42	6.23	1.90	0.09	0.00	76.38	61.86	19.57	3.51	0.33	0.20
24	78.04	76.30	13.91	2.73	0.32	5.00	93.10	90.28	6.22	0.12	0.11	0.45
Total	84.68	73.62	9.73	4.20	1.06	0.33	74.94	66.46	15.24	9.08	0.46	0.29

Data source: authors' calculations using primary data from NSI Romania, 2021

If we analyze the structure of imports by product categories and by economic areas, we noted an increase of the number of product categories for which imports are mainly from European countries. Thus, if during the pre-accession period the share of goods imported from the European area for only 6 product categories represented more than 90% of the total volume of imports, their number increased to 15 in the post-accession period. This result confirms that population demand is largely met by imports from European countries and most EU Member States.

Structure of the imports by economic areas

Table 6

CN codes	pre-accession						post-accession					
	Europe	EU-27	Asia	Africa	America	The rest	Europe	EU-27	Asia	Africa	America	The rest
01	99.56	98.89	0.05	0.00	0.31	0.08	99.96	98.80	0.03	0.00	0.01	0.00
02	65.97	65.49	0.55	0.00	33.34	0.13	98.64	96.50	0.01	0.00	1.30	0.04
03	70.09	26.42	9.44	1.60	17.88	1.00	87.96	79.95	6.54	2.07	3.37	0.06
04	97.88	84.12	0.29	0.00	0.79	1.03	99.76	97.19	0.20	0.00	0.04	0.01
05	36.79	37.94	39.29	0.02	20.67	3.23	66.33	62.90	30.58	0.10	2.82	0.16
06	98.36	86.53	1.20	0.12	0.30	0.01	99.01	96.76	0.61	0.08	0.31	0.00
07	76.94	52.08	18.10	3.77	0.86	0.34	94.06	73.50	2.84	2.81	0.28	0.00
08	54.35	30.86	4.09	1.87	39.61	0.07	91.13	75.33	2.52	1.25	5.09	0.01
09	42.63	42.27	33.84	9.36	13.96	0.20	79.19	78.47	8.98	4.30	7.46	0.08
10	65.58	47.68	4.04	10.47	19.90	0.01	96.92	94.62	0.68	0.38	2.02	0.00
11	99.04	96.14	0.34	0.00	0.57	0.04	99.79	97.83	0.06	0.11	0.02	0.02
12	48.33	35.52	11.99	0.68	38.85	0.15	81.97	62.11	2.89	0.27	14.85	0.01
13	73.83	73.54	11.07	0.44	14.66	0.00	82.47	79.51	16.02	0.01	1.49	0.01
14	86.82	83.20	9.24	0.24	3.67	0.04	94.04	90.40	5.70	0.12	0.13	0.02
15	76.19	58.66	23.09	0.00	0.69	0.03	90.84	80.29	8.49	0.24	0.43	0.01
16	61.25	59.87	34.95	0.92	2.87	0.01	90.81	89.56	6.12	1.08	1.93	0.06
17	24.93	19.86	1.19	0.02	73.76	0.10	64.43	51.61	0.83	11.07	23.34	0.33
18	93.76	83.46	4.09	1.80	0.19	0.16	99.77	95.27	0.16	0.05	0.01	0.01
19	98.74	91.41	0.68	0.02	0.50	0.06	99.65	87.70	0.31	0.01	0.03	0.00
20	75.17	57.92	19.01	0.76	4.96	0.11	93.11	82.29	4.72	1.74	0.42	0.01
21	76.51	71.83	9.29	1.47	12.62	0.11	88.74	84.51	5.55	0.41	5.24	0.05
22	87.39	66.95	0.13	0.04	9.30	3.14	95.13	89.71	0.85	0.05	3.80	0.16
23	67.95	70.64	0.39	0.41	31.23	0.03	62.08	60.33	0.33	0.06	37.53	0.00
24	59.13	43.24	2.67	3.23	30.36	4.61	72.55	61.76	4.93	4.48	17.92	0.12
Total	65.50	55.43	6.74	2.04	24.93	0.79	89.19	81.94	2.64	1.34	6.78	0.05

Data source: authors' calculations using primary data from NSI Romania, 2021

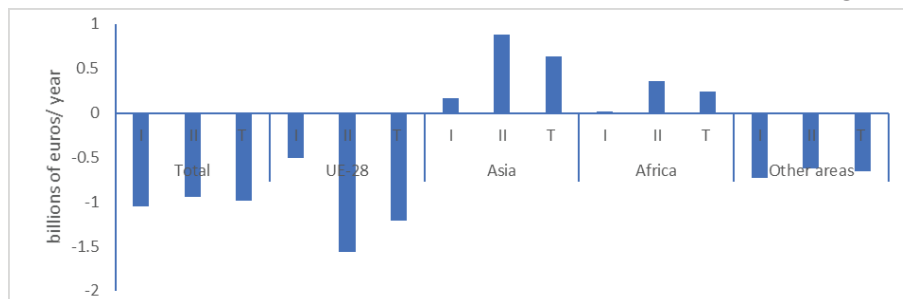
COMPARATIVE ADVANTAGE INDEX ANALYSIS

The results presented above show an increase, both in the volume of exports, but especially in the imports of agri-food products, and also the fact that Romania has a small number of product categories with trade surpluses. Moreover, the products of these categories are agri-food raw materials that have a low added value. During the period 2000 - 2020, Romania registered an average deficit of 980 million euros. While the global differences between the two periods are not major (the average accumulated deficit in the pre-accession period was 1.05 billion euros and 948 million euros in the post-accession period), the differences are major when we compare the accumulated results for foreign trade by economic areas (see Figure 4). After accession, Romania has significantly increased its average annual deficit from half a billion euros, which was recorded in the pre-accession period, to over 1.56 billion euros in the post-accession period for the trade with agri-food products with EU-28 countries, and it recorded trade surpluses in both periods for the trade with

agri-food products with countries from Asia and Africa. Moreover, Romania's surpluses in relation to countries from these economic areas increased significantly in the post-accession period. For the trade with countries from other economic areas than the EU-28, Asia and Africa, Romania recorded substantial trade deficits, exceeding an annual average of half a billion euros in both periods.

Average annual balance of trade by economic areas in the pre-accession (I) and post-accession period (II)

Figure 4



Data source: authors' calculations using primary data from NSI Romania, 2021

Trade balance by product categories in the pre-accession and post-accession period

Table 7

CN codes	Total (billion euro)			UE-28 (billion euro)		
	Pre-accession	Post-accession	Total 00-20	Pre-accession	Post-accession	Total 00-20
01	0.66	2.22	2.87	0.50	0.21	0.71
02	-1.85	-6.41	-8.26	-1.20	-6.52	-7.73
03	-0.24	-1.77	-2.02	-0.10	-1.45	-1.56
04	-0.06	-3.00	-3.07	-0.06	-3.17	-3.23
05	-0.07	-0.36	-0.43	0.00	-0.13	-0.13
06	-0.10	-1.41	-1.51	-0.09	-1.37	-1.45
07	-0.04	-2.70	-2.74	0.08	-1.80	-1.72
08	-0.45	-4.68	-5.13	-0.05	-3.46	-3.51
09	-0.48	-2.36	-2.84	-0.20	-1.84	-2.04
10	-0.35	16.29	15.95	-0.17	2.95	2.77
11	-0.27	-1.22	-1.49	-0.27	-1.25	-1.52
12	0.21	7.04	7.26	0.25	6.21	6.46
13	-0.04	-0.29	-0.33	-0.03	-0.24	-0.27
14	0.01	0.00	0.01	0.01	0.01	0.01
15	-0.11	-0.14	-0.25	-0.08	-0.07	-0.15
16	-0.03	-0.34	-0.37	0.01	-0.20	-0.19
17	-0.92	-2.93	-3.85	-0.15	-1.27	-1.43
18	-0.20	-2.03	-2.23	-0.17	-2.04	-2.20
19	-0.20	-2.81	-3.00	-0.20	-2.62	-2.81
20	-0.33	-2.54	-2.87	-0.17	-2.07	-2.23
21	-0.69	-3.32	-4.01	-0.51	-2.97	-3.48
22	-0.11	-2.35	-2.46	-0.10	-2.36	-2.46
23	-0.44	-3.11	-3.55	-0.29	-1.90	-2.19
24	-1.29	4.96	3.67	-0.54	5.49	4.95
Total	-7.38	-13.27	-20.65	-3.52	-21.88	-25.39

Data source: authors' calculations using primary data from NSI Romania, 2021

During both periods, according to the data in Table 7, there were commercial surpluses for four product categories, these being also product categories that had an important contribution in Romania's exports. A fifth product category (CN code 14) cannot be mentioned in this category as it has an insignificant share in trade. With regard to these products, we note that: (i) Cereals (CN code 10) and Tobacco and tobacco substitutes (CN code 24) are two categories of products that have been positively affected by the accession process. These products registered significant trade surpluses only after Romania's accession to the EU, while in the pre-accession period Tobacco was the category of products with one of the largest deficits for each

year; (ii) after accession to the EU, the zonal contribution of the trade surplus recorded in the category of Live Animals products (CN code 01) has changed significantly.

Figures 5-8 shows the distribution of product categories in the two periods and by some economic areas in relation to the values recorded for two important indicators for characterizing the economic efficiency of foreign trade with agri-food products. This is the TBI (Trade Balance Index) which allows us to determine whether a country is “net-importer”, when the value of the indicator is negative or is “net-exporter” when the value of the indicator is positive (Widodo, 2009) in relation with a product category. The second indicator is LFI (Lafay, 1992) which allows us to assess whether a country has a comparative advantage, if the value is positive (Zaghini, 2003) for a certain category of products. The results obtained and presented in Figures 5-8 allow the classification of the categories of agri-food products that are the object of the foreign trade activity in four classes.

Those product categories for which LFI (comparative advantage) and TBI (Trend Balance Index) have positive values were introduced into class A. In relation to Romania’s trade with the European market, there are six categories of products that fall into this class in the pre-accession period (categories with CN codes 01, 05, 07, 12, 14 and 16), while in the post-accession period the number of these categories was reduced to five (CN codes 01, 10, 12, 14 and 24). At EU-28 level, except for product categories with CN code 05, we found the same list of product categories in both periods. Tables 8, 9 and 10 present statistics on the product categories that are included in this class. Based on these results, we formulate the following comments.

First, we emphasize that for both periods the categories of products included in this class have an important share in the exports of agri-food products of Romania: in the pre-accession period they represented 49.3% of the exports of agri-food products and in the post-accession period, the share of product categories in this class increased to 62.7%. The second observation is related to the fact that the share of exports of these categories of products to European countries after EU accession has decreased. In the pre-accession period, the share of these product categories exported to European countries in the total exports of these product categories represented 87.5%, and it decreased to 67.7% in the post-accession period. The same characteristic is highlighted for exports of agri-food products to EU-28 countries, where the share decreased from 77.8% to 58.7%. The third observation concerns the surplus recorded by the product categories in this class. During the pre-accession period, the six product categories mentioned above registered a surplus of 877 million euros (an annual average of 125.3 million euros) for the trade relationships

with European countries, while for the trade with agri-food products there was a deficit of over 4.08 billion euros (an annual average of 583.3 million euros). Regarding only the EU-28 countries, the results are relatively similar: the accumulated surplus from the trade with the six categories of products amounted to 858 billion euros (an annual average of 12.7 million euros), while the accumulated deficit was 3.5 billion euros for all the trade with agri-food products with this economic area (an annual average of 502.6 million euros). In the second period, the five product categories had a surplus of 17.6 billion euros (an annual average of 1.26 billion euros), while the trade balance with agri-food products recorded a deficit of over 21.3 billion euros (an annual average of 1.52 billion euros). The trade with EU-28 countries during this period maintained the same trend: the categories of products in this class recorded a surplus of over 14.86 billion euros (the annual average was 1.06 billion euros), given that trade with agri-food products with EU-28 countries recorded a deficit of 21.88 billion euros (the annual average was 1.56 billion euros). The fourth observation is related to the fact that Romania registered a surplus in the trade relationship with European countries, respectively EU-28, for both periods mostly for those agri-food products that are included in the category of agri-food raw materials (CN codes 01, 10, 12). In the post-accession period, the share of cereals in the export of agri-food products is over 32.5%. Moreover, during this period, three product categories (CN codes 01, 10 and 12) which contribute to a large extent to the surplus of the class consisting of the five products registered more than 55.5% of the total exports of agri-food products of Romania.

Characteristics of the first class of the category of products for the European and EU-28 pre-accession market

Table 8

Category of products (CN codes)	Europe			EU-28		
	Weight in the category		Balance (millions of euros)	Weight in the category		Balance (millions of euros)
	Export	Import		Export	Import	
01	85.30	99.56	526	82.10	97.93	501
05	97.25	36.74	3			
07	99.42	76.94	26	93.85	52.06	84
12	83.20	48.34	297	67.44	35.52	253
14	95.41	86.85	8	95.28	63.58	9
16	96.16	61.25	17	90.80	61.10	12

Data source: authors' calculations using primary data from NSI Romania, 2021

Characteristics of first class of the category of products in the European and EU-28 market in the post-accession period

Table 9

Category of products (CN codes)	Europe			EU-28		
	Weight in the category		Balance (millions of euros)	Weight in the category		Balance (millions of euros)
	Export	Import		Export	Import	
01	58.81	99.96	475	52.54	99.91	211
10	46.75	96.92	4893	36.58	92.05	2947
12	91.81	81.97	6867	78.66	62.26	6206
14	99.73	94.03	4	98.41	82.35	6
24	93.10	72.55	5405	90.86	65.09	5494

Data source: authors' calculations using primary data from NSI Romania, 2021

Share of export / import of product categories included in class A in exports / imports of agri-food products in the post-accession period

Table 10

Category of products (CN codes)	Total		Europe		EU-28	
	Export	Import	Export	Import	Export	Import
01	6.34	2.52	4.97	2.82	5.04	3.05
10	32.55	6.79	20.31	7.38	18.03	7.58
12	16.63	5.06	20.37	4.65	19.80	3.82
14	0.03	0.02	0.04	0.03	0.05	0.02
24	13.18	4.80	16.37	3.90	18.13	3.79
$P_3(X)$	68.73	19.19	62.70	18.78	61.06	18.27
$P_1(X)$			67.68	87.28	58.67	78.47
$P_2(X)$			74.94	89.19	66.04	82.43

Data source: authors' calculations using primary data from NSI Romania, 2021

In the second class (class B) we included the product categories for which LFI is positive (comparative advantage) and are “net-importer” (TBI is negative). Five categories of products are recorded in this class in the trade relationship with European countries in the pre-accession period (CN codes 04, 08, 10, 15 and 22), while in the post-accession period their number decreased to three (CN codes 05, 15 and 16). If we consider the trade with EU-28 countries, then we included six products in this class in the first period (CN codes 04, 05, 08, 10, 15 and 22) and only three product categories during the post-accession period (CN codes 05, 15 and 16). In the case of these product categories, based on the results presented in Table 11, we emphasize some relevant aspects related to foreign trade with European and EU-28 countries:

(i) the share of exports of class B product categories in countries from Europe / EU-28 significantly increased in the post-accession period compared to the pre-accession period. This change was registered even if in the post-accession period we no longer find Cereals (CN code 10), as it happened in the pre-accession period. The transition of this category of products from class B to class A was due to the very large increase of the exports of products of this category in the post-accession period; (ii) while the average annual exports of products from the categories included in this class to EU-28 countries increased 2.4 times in the post-accession period compared to pre-accession period, the imports increased 3.4 times; (iii) the average annual deficit of products in this class in the post-accession period was 66 million of euros, and it was reduced to 57 million euros in the post-accession period.

Characteristics of the product categories included in class B

Table 11

Economic area	Unit	Export		Import		Balance	
		I	II	I	II	I	II
Total	Billion euros	1.38	4.45	2.46	7.59	-1.08	-3.14
Europe	Billion euros	1.07	4.09	1.72	4.62	-0.66	-0.53
EU-28	Billion euros	0.80	3.89	1.27	4.29	-0.46	-0.40
Share in total							
Europe	%	77.48	91.90	70.10	60.81	60.70	16.80
EU-28	%	58.32	87.49	51.48	56.56	42.77	12.76

Data source: authors' calculations using primary data from NSI Romania, 2021

The third class (class C) includes those product categories for which LFI is negative and TBI is positive. In the case of Romania, from the trade exchanges with agri-food products with European countries or only with EU-28 countries, such product categories were not identified.

The fourth class (class D) includes those product categories with a comparative disadvantage (LFI is negative) and trade deficits (TBI is negative). From the trade relationships with European or EU-28 countries, most of the product categories are included in this category, both in the pre-accession and in the post-accession period. For the trade with European or EU-28 countries, 13 product categories were included in the pre-accession period in this class (CN codes 02, 03, 06, 09, 11, 13, 17-21, 23 and 24), and their number increased to 16 in the post-accession period (CN codes 02, 03, 04, 06, 07, 08, 09, 11, 13, 17-23). In most cases they are products that are subjected to processing or require special storage conditions.

Characteristics of the product categories included in class D

Table 12

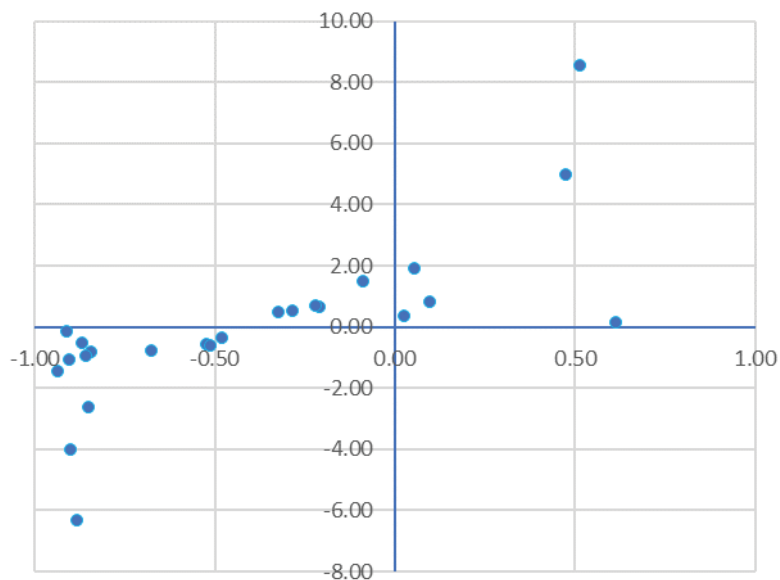
Economic area	Unit	Export		Import		Balance	
		I	II	I	II	I	II
Total	Billion euros	0.67	16.44	7.72	59.38	-7.04	-42.94
Europe	Billion euros	0.62	14.88	4.92	53.34	-4.30	-38.46
EU-28	Billion euros	0.53	13.27	4.44	49.61	-3.91	-36.34
Share in total							
Europe	%	91.47	90.51	63.78	89.84	61.13	89.58
EU-28	%	77.84	80.72	57.53	83.55	55.58	84.64

Data source: authors' calculations using primary data from NSI Romania, 2021

The data in Table 12 show that, during both periods, the product categories included in this class are mostly exported to European countries (91.5% in the first period, respectively 90.5% in the second period), and their share to total EU-28 countries exports increased significantly in the post-accession period compared to the pre-accession period (77.8% in the first period and 88.7% in the second period, respectively). On the other hand, in the pre-accession period the share of imports of these product categories in imports of these categories was much lower than in the case of exports: 63.8% if we consider imports from European countries, respectively 83.6%, if we refer only to EU-28 countries. After Romania's accession to the EU, the share of imports of these product categories increased significantly: 89.8% in the case of imports from European countries, respectively 83.6% in the case of EU-28 countries. Together with these increases, there was also a significant increase in deficits for these product categories after EU accession. If in the pre-accession period, the deficit was 4.3 billion euros for the trade with European countries (an average annual deficit of 615 million euros), and after accession it increased to 38.5 billion euros (the annual average deficit was 2.75 billion euros).

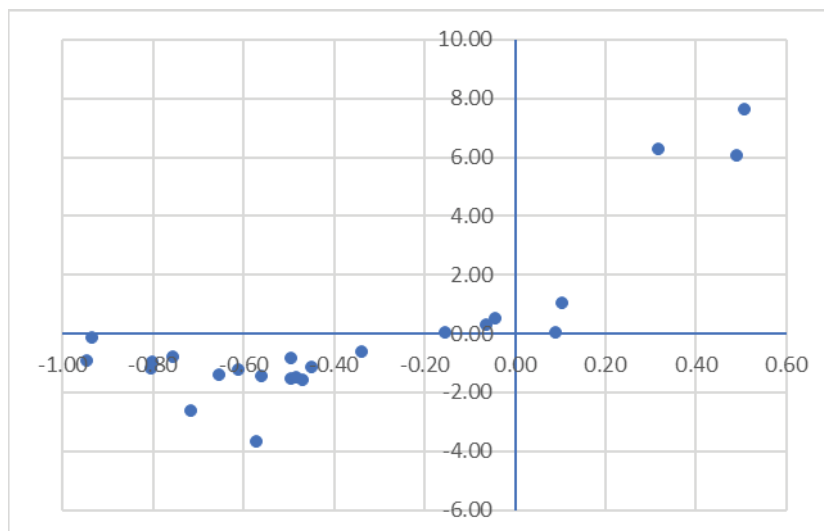
Modified product mapping scheme – Europe 2000-2006

Figure 5



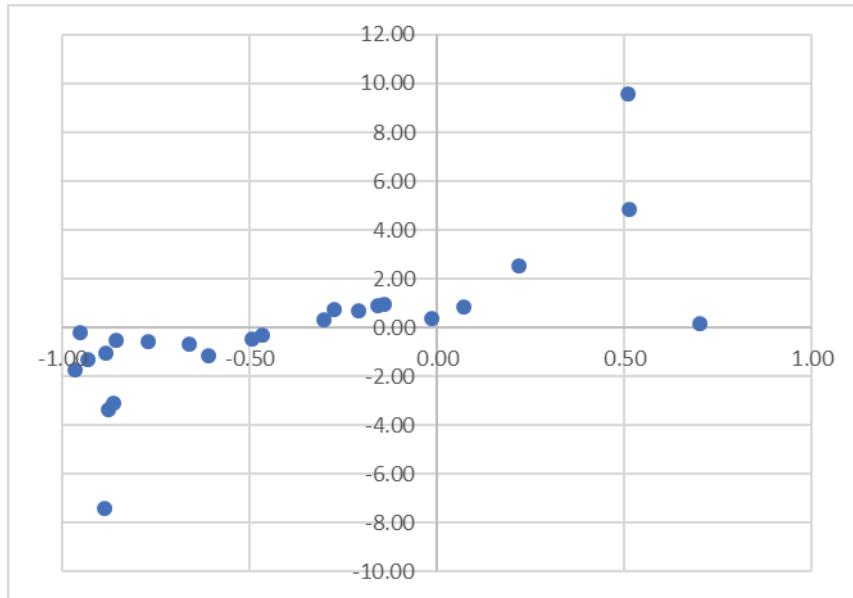
Modified product mapping scheme – Europe 2007-2020

Figure 6



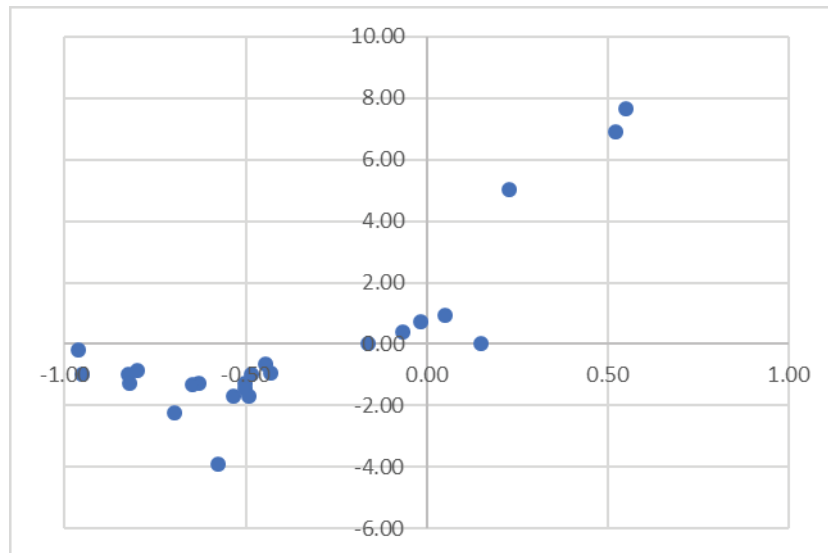
Modified product mapping scheme – EU 2000-2006

Figure 7



Modified product mapping scheme – EU 2007-2020

Figure 8



CONCLUSIONS

The results presented in this paper show that during 2000-2020 period, Romania significantly increased its exports and imports of agri-food products, while registering a significant increase in the degree of concentration of trade with European Union countries. The country's accession to the EU has been beneficial, as since 2007 there has been a significant increase in exports to most categories of agri-food products, both in the European area and to countries in other economic areas, especially Asia. On the other hand, with the accession to the EU, the dependence of the population's domestic consumption on imported agri-food products increased considerably, most of which have EU countries as their source of origin. The degree of concentration of exports by product categories is much higher than that of imports, this feature being much more evident after Romania's accession to the EU.

After the accession to the EU, a specialization of the country's exports was noted for several categories of agri-food products. Most exports consist of products with a low degree of processing, which have a low added value. Although, at least after 2007, these product categories recorded considerable surpluses, they were still insufficient to offset the accumulated deficits in most categories of agri-food products. Thus, Romania registered a surplus in the trade balance with agri-food products in only two years between 2000 and 2020. In these two years, 2013 and 2014, Romania registered completely exceptional productions for products included in the cereals category (CN code 10). In the following years, with the increase and diversification of imports of processed agricultural products, the increase in cereal production could not cancel the deficits recorded for most product categories, Romania registering chronic deficits for the trade with agri-food products.

Given that the export-import coverage ratio in 2000 was 36.3%, and in 2020 compared to 2000 exports increased 19 times and imports 8.8 times, the export-import coverage ratio indicator reached 78.3%. Considering this relatively positive evolution, if we refer only to the increases registered in certain categories of agri-food products, in 2020 Romania registered one of the highest annual deficits for the trade with agri-food products during the transition period, reaching 1.94 billion euro. Significant increases in exports and imports were recorded for all 24 product categories during the analyzed period, but the most important increases were recorded for the product categories which contributed each year to the reduction of the trade balance with agri-food products, but which appears to have been insufficient to close the imbalances between exports and imports of other important agri-food categories Romania's trade. If the exports from 2020 are compared to those

from 2000, then we will record an increase of over 60 times for cereals (CN code 10), over 23 times for seeds (CN code 12) and for tobacco (CN code 24) the increase was over 530 times. We emphasize that for two out of the three product categories (CN codes 10 and 24) there were significant trade deficits during the post-accession period, while during the same period these are the product categories with the largest contribution to reducing trade deficits in agri-food products.

If we aim to assess the degree of concentration of exports and imports of agri-food products during the period 2000-2020 we must emphasize two aspects. Firstly, both globally and for the economic areas that hold the most important share in exports and imports of agri-food products of Romania (Europe and EU-28) we noted a high degree of concentration of the exports compared with imports. At the level of the Asian and African economic zones, there is also a high degree of concentration of exports.

Given that globally, a deficit of almost 20.6 billion euros was accumulated between 2000 and 2020, we noted that from the trade with countries in Asia and Africa there were significant trade surpluses. Trade results with Asian countries are assessed by a share of exports to countries in this region equal to 10.6% of total exports of Romanian agri-food products and a low share of imports of only 2.9%. Therefore, a surplus of 7.67 billion euros was achieved. Romania registered significant commercial surpluses for three product categories: Cereals (CN code 10), Live Animals (CN code 01) and Seeds (CN code 12). A significant contribution to the realization of the trade surplus on this market was brought by products from the categories symbolized by 23 and 24 CN codes. Trade results in relation to African countries, are characterized by a share of exports in the total exports of Romania of 6.23%, and a share of the imports from this economic zone in the total imports of agri-food products of 1.30%. consequently, Romania registered a surplus of over 4.9 billion euros. The largest surpluses are from the trade with Cereals (CN code 10) and Live Animals (CN code 01).

An important aspect in the activity of foreign trade with agri-food products on a market is their competitiveness. Using the combined values of the TBI and LFI indicators, we obtained that the most competitive product categories are Cereals, Live Animals and Seeds. Romania's accession to the EU has allowed the creation of favorable conditions for ensuring the competitiveness of several product categories, both on the European market, but also on the markets in Asia and Africa. These are products belonging to the product categories: Cereals (CN code 10), Seeds (CN code 12), Live animals (CN code 01) and Tobacco (CN code 24). For most of the product categories, other than the four mentioned above, Romania is clearly importing

and not competitive on the European market. Domestic consumption of the population depends to a large extent on imports of agri-food products from other countries, mostly in Europe.

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