# ANALYSIS OF THE DEGREE OF CONCENTRATION ON ROMANIA'S FOREIGN TRADE

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**Abstract**
*The present study aims to highlight the existence or non-existence of a degree of concentration in Romania's foreign trade in agri-food products. For this purpose, data from national databases (National Institute of Statistics) on the value of imports and exports were used and subjected to quantitative and qualitative analysis as well as the determination of indicators and coefficients on the degree of concentration according to import sources and export destinations. The results showed a low degree of concentration, but a slightly higher degree of concentration was observed for imports than for exports.*

**Introduction**
Foreign trade is the oldest form of economic link between countries. Initially, the main object of trade transactions was the exchange of goods of various degrees of processing: from primary agriculture, mining and manufacturing (Blanovschi, 2015).

Foreign trade comprises all relations and transactions carried out in the form of exports and imports. It, therefore, covers a country's flows and services with the rest of the world. Foreign trade is one of the main drivers of economic growth and welfare. It contributes directly to the quantitative increase in macroeconomic indicators, the modernisation of production, the growth of the population's wealth, etc. In our era, no country can provide all the products it needs from its own production alone, regardless of its size or wealth. As a result, every country has to engage in foreign trade. (Cotelea, 2011).

Since joining the EU in 2007, Romania's foreign trade has undergone significant changes. Positive steps have been taken, notably the removal of trade barriers that lead to the free movement of goods, services and capital. Thus, a European single market created through economic integration helps to increase trade flows but also helps to expand the size of the cross-border economy. (Bojnec and Ferto, 2009; Vlad, 2011).

Regarding agri-food trade, Gavrilescu and Voicilas (2017) found that Romania's accession to the EU partially changed the previous general trends in agri-food trade. In the latest period, Romanian exports mainly comprised processed food, wine, dairy and oilseed products, compared to the pre-2011 period, when the export profile was more oriented towards cereals, oilseeds and beverages. In perspective, it is desirable to see an intensification and

diversification of Romania's agri-food trade, taking into account historical traditions, geographical proximity, and especially the increased opportunities arising from the implementation of the DCFTA Agreement (Nica and Stoian, 2018).

## 1. Material and method

This paper aims to determine the existence or non-existence of a degree of concentration of imports or exports according to sources or destinations in Romania's foreign trade in agri-food products. For this purpose, data from national databases, i.e. the National Institute of Statistics, were used on the value of imports and exports both according to the chapters of the Combined Nomenclature and according to the partner countries in this foreign trade. At the same time, these data were analysed from a quantitative and qualitative point of view, in terms of dynamics and the calculation of certain coefficients and indicators that can determine the degree of concentration.

At the Combined Nomenclature level, there are 19 sections comprising 96 chapters. The first 4 sections, namely the first 24 chapters include all the agri-food products that are marketed outside Romania (Table 1), so these 24 chapters were taken into consideration in this study. (Pătărlăgeanu et al., 2020)

**Table 1. Chapters of agri-food products in the Combined Nomenclature**

| Chapter Combined Nomenclature |
| --- |
| Product: 01 Live animals |
| Product: 02 Meat and edible meat offal |
| Product: 03 Fish and crustaceans, molluscs and other aquatic invertebrates |
| Product: 04 Dairy products; birds' eggs; natural honey; edible products of animal origin, not elsewhere ... |
| Product: 05 Products of animal origin, not elsewhere specified or included |
| Product: 06 Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage |
| Product: 07 Edible vegetables and certain roots and tubers |
| Product: 08 Edible fruit and nuts; peel of citrus fruit or melons |
| Product: 09 Coffee, tea, maté and spices |
| Product: 10 Cereals |
| Product: 11 Products of the milling industry; malt; starches; inulin; wheat gluten |
| Product: 12 Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ... |
| Product: 13 Lac; gums, resins and other vegetable saps and extracts |
| Product: 14 Vegetable plaiting materials; vegetable products not elsewhere specified or included |
| Product: 15 Animal or vegetable fats and oils and their cleavage products; prepared edible fats |
| Product: 16 Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates |
| Product: 17 Sugars and sugar confectionery |
| Product: 18 Cocoa and cocoa preparations |
| Product: 19 Preparations of cereals, flour, starch or milk; pastrycooks' products |
| Product: 20 Preparations of vegetables, fruit, nuts or other parts of plants |
| Product: 21 Miscellaneous edible preparations |
| Product: 22 Beverages, spirits and vinegar |

| Product: 23 Residues and waste from the food industries; prepared animal fodder |
|---|
| Product: 24 Tobacco and manufactured tobacco substitutes |

<div align="center"><em>Source: NIS</em></div>

To study the degree of concentration, the GINI coefficient was determined using the following formula (Dorfman, 1979; Abounoori & McCloughan, 2003):

$$\text{Gini Coefficient} = \sqrt{\frac{n*\sum_{i=1}^{n} p_i^2 - 1}{n-1}}, \text{ where}$$

pi – share of each indicator observation in the total
n – number of observable units
The HERFINDHAL indicator was also calculated according to the following calculation methodology:

$$H = \sum p_i^2 \text{ , where}$$

pi – share of each indicator observation in the total

## 2. Results and discussions
This paper aims to determine the degree of concentration of Romania's foreign trade activity, in this regard, data on imports and exports will be analysed from the perspective of the degree of concentration on certain directions/sources (countries).

## 2.1 Import
In the first part, we will study the values of agri-food imports that Romania is carrying out in the period 2012-2021 (Table 2), as well as the determination of the index in the current year compared to the reference year (2012).

<div align="center">

**Table 2. Dynamics of agri-food import values and ranking by country (thousands of euros)**

</div>

| Exporters | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2021/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Germany | 608776 | 691767 | 745207 | 837496 | 953734 | 1106718 | 1156441 | 1347247 | 1397279 | 1594102 | 162% |
| Hungary | 873308 | 804132 | 723961 | 969658 | 1090976 | 1088843 | 969312 | 1198024 | 1376963 | 1414836 | 62% |
| Poland | 315883 | 380257 | 419648 | 500566 | 612364 | 717477 | 785444 | 851168 | 898097 | 950183 | 201% |
| Netherlands | 314136 | 336505 | 371438 | 406664 | 450336 | 521080 | 535141 | 596421 | 587667 | 745706 | 137% |
| Bulgaria | 405477 | 383080 | 409626 | 427552 | 494764 | 413058 | 466469 | 502133 | 536733 | 662019 | 63% |
| Italy | 274065 | 281427 | 295062 | 345794 | 416196 | 456646 | 475978 | 508164 | 496389 | 608674 | 122% |
| Türkiye | 93125 | 92101 | 123076 | 137030 | 175720 | 212456 | 244295 | 205659 | 250565 | 346441 | 272% |
| Spain | 60778 | 76471 | 102673 | 129194 | 176973 | 220559 | 257074 | 299277 | 292631 | 326141 | 437% |
| France | 119286 | 140817 | 129061 | 139099 | 169634 | 169645 | 188206 | 228033 | 255964 | 282866 | 137% |
| Belgium | 74626 | 88635 | 99117 | 137265 | 150293 | 180913 | 190053 | 224974 | 228530 | 269913 | 262% |
| Brazil | 248586 | 192866 | 140716 | 195254 | 157037 | 167896 | 238917 | 215488 | 206884 | 250239 | 1% |
| Greece | 73296 | 102893 | 105683 | 135490 | 182783 | 192377 | 203820 | 218671 | 231877 | 247979 | 238% |
| Austria | 116939 | 115704 | 103243 | 112170 | 126656 | 130374 | 127938 | 140339 | 148985 | 196067 | 68% |
| Czech Republic | 62207 | 68993 | 76874 | 82314 | 94253 | 103932 | 122787 | 115499 | 117027 | 149133 | 140% |
| Republic of Moldova | 43256 | 29146 | 39056 | 81127 | 93681 | 127433 | 123246 | 131716 | 139894 | 130048 | 201% |
| Ukraine | 6698 | 4368 | 5743 | 27551 | 31561 | 33085 | 37221 | 46209 | 69421 | 78169 | 1067% |
| Denmark | 21090 | 27989 | 23382 | 30140 | 34408 | 46326 | 44367 | 51815 | 60046 | 63052 | 199% |
| United Kingdom | 21886 | 19075 | 19163 | 21312 | 25149 | 30667 | 36597 | 40635 | 29041 | 52507 | 140% |
| Argentina | 23942 | 78072 | 79214 | 38232 | 38239 | 65710 | 19013 | 13955 | 29438 | 46913 | 96% |
| United States of America | 22228 | 27785 | 22579 | 60467 | 28664 | 32367 | 54631 | 28670 | 29824 | 35874 | 61% |
| Slovakia | 20826 | 26119 | 23953 | 22871 | 50980 | 26309 | 21959 | 21463 | 29615 | 29566 | 42% |
| Croatia | 1570 | 1823 | 2692 | 5532 | 9004 | 12599 | 18201 | 17740 | 31553 | 28797 | 1734% |
| China | 10694 | 8030 | 8794 | 11112 | 13009 | 14908 | 17034 | 18760 | 13347 | 26252 | 145% |
| Australia | 5 | 34 | 43 | 42 | 25 | 0 | 0 | 0 | 10 | 21701 | 433920% |
| Lithuania | 182 | 661 | 2793 | 2258 | 3052 | 1030 | 5913 | 9576 | 6470 | 20957 | 11415% |
| Egypt | 2078 | 3062 | 5014 | 8000 | 5697 | 10199 | 16877 | 17933 | 19790 | 852% |
| Sweden | 7632 | 10705 | 10714 | 15650 | 13145 | 10883 | 7962 | 10060 | 15697 | 12919 | 69% |
| Malaysia | 12605 | 13107 | 10536 | 10128 | 10014 | 11637 | 11458 | 11538 | 8520 | 12459 | -1% |
| South Africa | 0 | 0 | 2755 | 0 | 0 | 624 | 0 | 0 | 0 | 11566 | - |
| Serbia | 9946 | 4045 | 4600 | 5200 | 5271 | 2101 | 5560 | 10078 | 19994 | 10969 | 10% |
| Cuba | 24905 | 0 | 0 | 15531 | 16987 | 22157 | 0 | 0 | 6434 | 9073 | -64% |
| Colombia | 4398 | 4193 | 5051 | 5801 | 5534 | 4761 | 5767 | 6314 | 6668 | 7243 | 65% |
| Bosnia and Herzegovina | 0 | 0 | 0 | 0 | 0 | 1364 | 4898 | 3583 | 4524 | 6508 | - |
| Pakistan | 10588 | 5905 | 4798 | 4016 | 2697 | 2372 | 3064 | 2470 | 3020 | 6008 | -43% |
| Mexico | 13 | 1 | 7 | 23 | 30 | 43 | 50 | 63 | 69 | 515 | 3862% |
| Philippines | 653 | 891 | 375 | 427 | 278 | 428 | 391 | 644 | 495 | 429 | -34% |

*Source: NIS*

According to INS data, considering the imports of agri-food products, regardless of their nature, analysed by exporting countries, the hierarchy can be seen in Table 2, according to the value of imports in 2021. Thus, Germany ranks first, with a value of imports in the last year of 1.59 billion euros, being 162% higher than in the first year. Imports from Germany ranked first for agri-food products (chapters) such as Live animals, Meat and edible meat offal, Dairy products, Products of animal origin, Edible vegetables and certain roots and tubers, Edible fruit and nuts, Coffee, tea, maté and spices and Sugars and sugar confectionery. Of the 24 chapters, for half of them, Germany is the first source for Romania's imports.

Hungary ranks second, with the value of Romania's imports from this source amounting to €1.41 billion, 62% higher than the first year. Romania imports from this source agri-food products from the following chapters: Live animals, Dairy products, Cereals, Products of the milling industry, Vegetable plaiting materials, Beverages, spirits and vinegar and Residues and waste from the food industries.

And in third place is Poland, as a source of Romania's imports of agri-food products, with a value of 950 million euros last year, 200% higher than in the first year analysed.

On average, the dynamic index of imports of Romanian agri-food products recorded a value of 111% during the period under review, which determines an increase in the value of imports of 2.1 times.
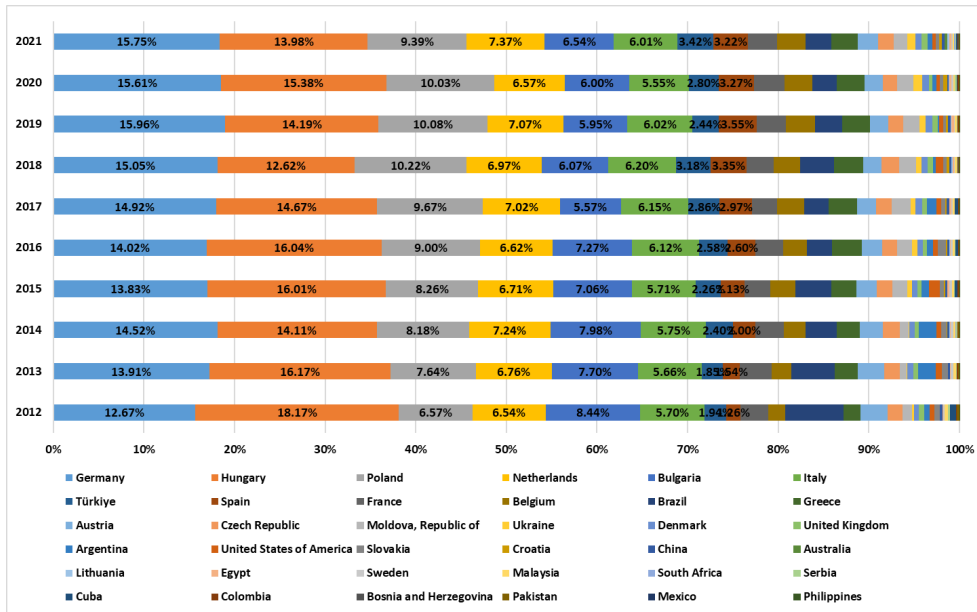
**Figure 1. Share of the value of Romanian imports by source**
*Source: authors' calculations*

Analysing the share of the value of Romania's imports of agri-food products by source (Figure 1), it can be seen that the first three sources account for a large share of the value of imports. Even though Germany was the source of imports with the highest share in the last year, i.e. 15.75%, and Hungary ranked second with a share of 13.98%, averaged over the ten years, it was found that Hungary ranked first with an average share of 15.13% per year, then Germany with 14.62% and followed by Poland with 8.91%. These first three sources contributed around 40% of Romania's total agri-food imports.

A dynamic analysis shows that Germany's share increased by 3.08 percentage points last year compared to the first year, while Poland's share increased by 2.81 percentage points, but Hungary's share decreased by 4.19 percentage points.
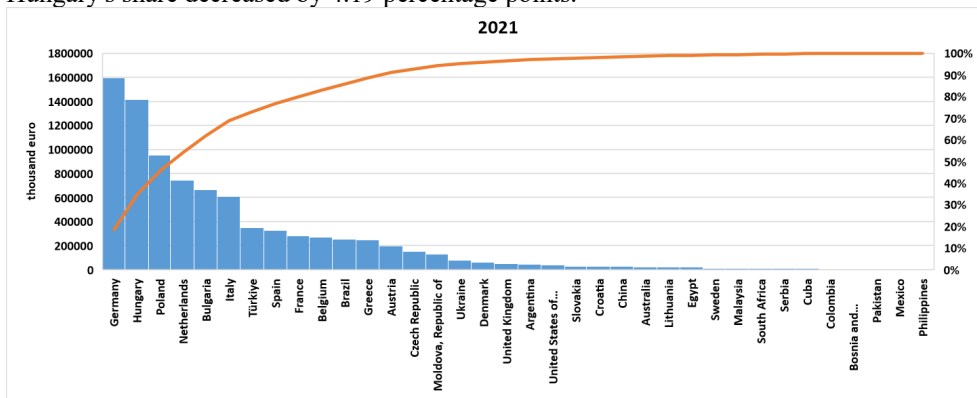


**Figure 2. Value of agri-food imports in 2021 by source and its share**
*Source: authors' calculations*

Analysing the share in the last year, applying the Parreto principle (80/20), it is estimated that the first 20% of the sources (i.e. 7 in number: Germany, Hungary, Poland, Netherlands, Bulgaria, Italy and Turkey) reach a share in total agri-food imports of 62.45%; even if the 80% share is not reached according to the principle, these first seven sources reach a significant share in Romania's imports (Figure 2).

## 2.2 Export

A similar analysis of Romania's export values by destination was carried out below.

**Table 3. Dynamics of agri-food export values and ranking by country**
**(thousands of euros)**

| Importers | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2021/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Italy | 533698 | 663731 | 897905 | 1062338 | 803783 | 805749 | 822421 | 842242 | 772406 | 805375 | 51% |
| Bulgaria | 320692 | 288222 | 280882 | 336393 | 337583 | 344477 | 366045 | 447962 | 471926 | 616437 | 92% |
| Egypt | 170322 | 315856 | 390532 | 282226 | 258659 | 184226 | 204223 | 345006 | 202909 | 584137 | 243% |
| Netherlands | 195853 | 297613 | 271487 | 348321 | 334828 | 384690 | 411460 | 382164 | 386128 | 521776 | 166% |
| Hungary | 270137 | 293361 | 263792 | 245020 | 222437 | 253909 | 270507 | 270040 | 302641 | 473398 | 75% |
| Spain | 208760 | 173322 | 193201 | 259799 | 233256 | 325211 | 366708 | 319095 | 223800 | 426458 | 104% |
| Jordan | 64755 | 133935 | 200546 | 196433 | 252987 | 173510 | 187191 | 179234 | 223185 | 371314 | 473% |
| Islamic Republic of Iran | 71348 | 39063 | 10799 | 45826 | 9721 | 26743 | 41443 | 34349 | 48054 | 329849 | 362% |
| Germany | 118470 | 165954 | 173709 | 199162 | 236354 | 281804 | 322617 | 249963 | 271574 | 321870 | 172% |
| Türkiye | 103757 | 158042 | 195788 | 242430 | 136777 | 172634 | 177888 | 388502 | 155504 | 302233 | 191% |
| Israel | 25034 | 78238 | 77074 | 117339 | 141605 | 115751 | 103578 | 171293 | 177863 | 296345 | 1084% |
| France | 97173 | 160257 | 169621 | 202293 | 218743 | 196842 | 242826 | 245373 | 197135 | 293882 | 202% |
| Czech Republic | 19100 | 22143 | 10421 | 34511 | 83155 | 91258 | 76401 | 120939 | 88995 | 228787 | 1098% |
| United Kingdom | 50107 | 76183 | 87314 | 115649 | 134113 | 158956 | 164808 | 176864 | 213318 | 217376 | 334% |
| Poland | 27868 | 28299 | 45522 | 39935 | 44232 | 52071 | 54848 | 115743 | 206902 | 212863 | 664% |
| Greece | 122018 | 128832 | 138905 | 146433 | 141896 | 161330 | 160683 | 179786 | 158256 | 185337 | 52% |
| Korea, Republic of | 68941 | 169062 | 33180 | 74779 | 18410 | 6380 | 4405 | 84630 | 77575 | 155247 | 125% |
| Japan | 8 | 3 | 102 | 5 | 433 | 29726 | 65267 | 59119 | 256656 | 131821 | 1647663% |
| Belgium | 18511 | 85991 | 87126 | 101416 | 177541 | 202272 | 89685 | 44276 | 62762 | 127978 | 591% |
| Moldova, Republic of | 23682 | 26188 | 30761 | 32678 | 42540 | 51321 | 54011 | 68781 | 82341 | 100720 | 325% |
| Iraq | 10843 | 15625 | 0 | 4619 | 22778 | 6057 | 5543 | 10175 | 18030 | 99018 | 813% |
| Saudi Arabia | 0 | 0 | 0 | 0 | 0 | 0 | 864 | 42925 | 105905 | 89973 | - |
| Portugal | 34910 | 51015 | 38921 | 48233 | 37440 | 90856 | 89545 | 76900 | 37983 | 59551 | 71% |
| Lithuania | 4148 | 4216 | 5511 | 6179 | 4839 | 6788 | 5917 | 5746 | 25670 | 47856 | 1054% |
| Croatia | 35454 | 25719 | 20995 | 41540 | 39217 | 46967 | 47124 | 48669 | 37105 | 40456 | 14% |
| South Africa | 0 | 10966 | 41897 | 18798 | 17804 | 30870 | 7951 | 13616 | 30647 | 30401 | - |
| Serbia | 2662 | 3379 | 3522 | 12714 | 14317 | 15138 | 15872 | 17855 | 18174 | 26104 | 881% |
| Austria | 24241 | 26956 | 24891 | 22983 | 18364 | 19385 | 22535 | 23134 | 19005 | 25305 | 4% |
| Morocco | 371 | 1728 | 4078 | 9263 | 10887 | 3304 | 15968 | 6635 | 4560 | 24906 | 6613% |
| China | 19 | 0 | 39 | 277 | 86 | 349 | 185 | 238 | 1805 | 19602 | 103068% |
| Slovakia | 18776 | 8693 | 13390 | 9723 | 11115 | 6820 | 7675 | 12801 | 10930 | 14937 | -20% |
| Thailand | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 5 | 33 | 12373 | - |
| Denmark | 10442 | 10763 | 8246 | 7308 | 7925 | 6762 | 8049 | 8623 | 10563 | 11365 | 9% |
| Libya, State of | 75380 | 103417 | 90306 | 44754 | 49131 | 69713 | 66107 | 45792 | 12255 | 8942 | -88% |
| Palestine, State of | 0 | 0 | 0 | 0 | 1358 | 1073 | 1445 | 277 | 1101 | 8376 | - |
| Viet Nam | 175 | 0 | 88 | 425 | 2450 | 4318 | 3328 | 5763 | 7912 | 8033 | 4490% |
| Ireland | 390 | 429 | 749 | 1050 | 1341 | 1528 | 2098 | 3416 | 4544 | 5320 | 1264% |
| United States of America | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 1804 | 4000 | 5239 | - |
| Finland | 0 | 0 | 0 | 11 | 642 | 1731 | 3917 | 3769 | 4008 | 3955 | - |
| Ukraine | 7 | 51 | 9 | 68 | 119 | 208 | 198 | 543 | 1275 | 1253 | 17800% |
| India | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 214 | 166 | 186 | - |
| Slovenia | 0 | 0 | 0 | 28 | 31 | 108 | 105 | 44 | 57 | 59 | - |
| Belarus | 28 | 44 | 50 | 26 | 44 | 50 | 51 | 58 | 14 | 43 | 54% |
| Bangladesh | 0 | 0 | 0 | 0 | 52 | 27 | 0 | 0 | 0 | 35 | - |
| Sweden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 3 | - |

*Source: NIS*

Table 3 shows the value of Romania's exports in the period 2012-2021, by destination, regardless of the nature of the products, and the ranking is based on the current values, those of 2021.

The first country importing agri-food products from Romania was Italy, with the value of exports going there last year amounting to 805.3 million euros, 51% higher than in the first year under review. Analysing by chapters (product categories) it can be seen that products such as Dairy products, Products of animal origin, Edible vegetables and certain roots and tubers, Edible fruit and nuts and Tobacco and manufactured tobacco substitutes are directed to Italy.

The second largest export destination for Romania is Bulgaria with an export value of 616.4 million euros in 2021, 92% higher than in the first year. Romania exports to this destination agri-food products from the following chapters: Dairy products, Products of the milling industry, Oil seeds and oleaginous fruits, Animal or vegetable fats and oils and their cleavage products, Sugars and sugar confectionery, Cocoa and cocoa preparations, Preparations of cereals, Preparations of vegetables, fruit, nuts or other parts of plants and Beverages, spirits and vinegar.

And in third place is Egypt, a destination for Romania's exports of agri-food products, with a value of 584.1 million euros last year, which is 243% higher than the first year analyzed. Egypt is the first destination for products in the category (chapter) Cereals.

On average, the dynamic index of exports of Romanian agri-food products recorded a value of 137% during the period under review, which determines an increase in the value of imports of 2.37 times.
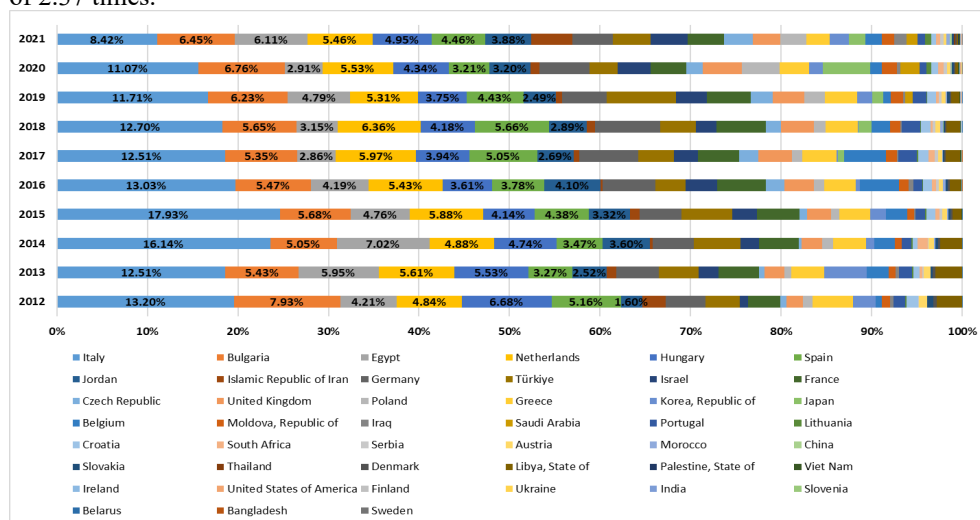


**Figure 3. Share of Romania's export value by destination**
*Source: authors' calculations*

Analysing the share of the value of exports that Romania achieves concerning agri-food products, according to destination, it can be seen that the first three destinations reach about 20% of the import value (Figure 3). Last year Italy imported 8.42% of total exports from Romania, then Bulgaria with 6.45%, followed by Egypt with 6.11%, the Netherlands with 5.46% and Hungary with 4.95%. Looking at the average over the whole period, the ranking of the top destinations is slightly different, with Italy retaining its first position with an average share of 12.92%, then Bulgaria retaining its second position with 6%, the Netherlands with 5.53%, followed by Egypt with 4.6% and Hungary with 4.58%.

A dynamic analysis shows that Italy's share has decreased in the last year compared to the first by 4.78 percentage points and that Bulgaria's share has decreased by 1.49 percentage points, but Egypt's share has increased by 1.9 percentage points.
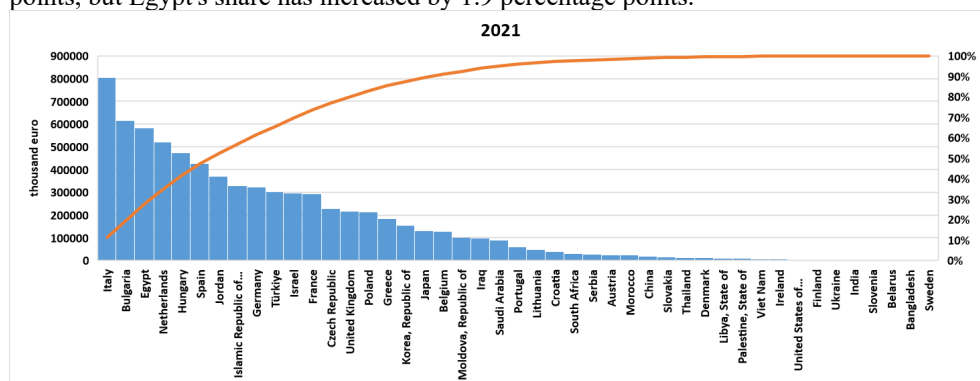
**Figure 4. Value of agri-food exports in 2021 by destination and its share**
*Source: authors' calculations*

Analysing the share in the last year, applying the Parreto principle (80/20), it is estimated that the first 20% of destinations (i.e. 9 destinations: Italy, Bulgaria, Egypt, the Netherlands, Hungary, Spain, Jordan, Iran and Germany) reach a share in total agri-food imports of 46.54%; even if the 80% share is not reached according to the principle, these first nine destinations reach a significant share in Romania's exports (Figure 4).

**2.3 Trade balance and degree of concentration**

The difference between the value of exports and imports made it possible to determine the balance of trade in agri-food products, both by chapter and overall (Figure 5).
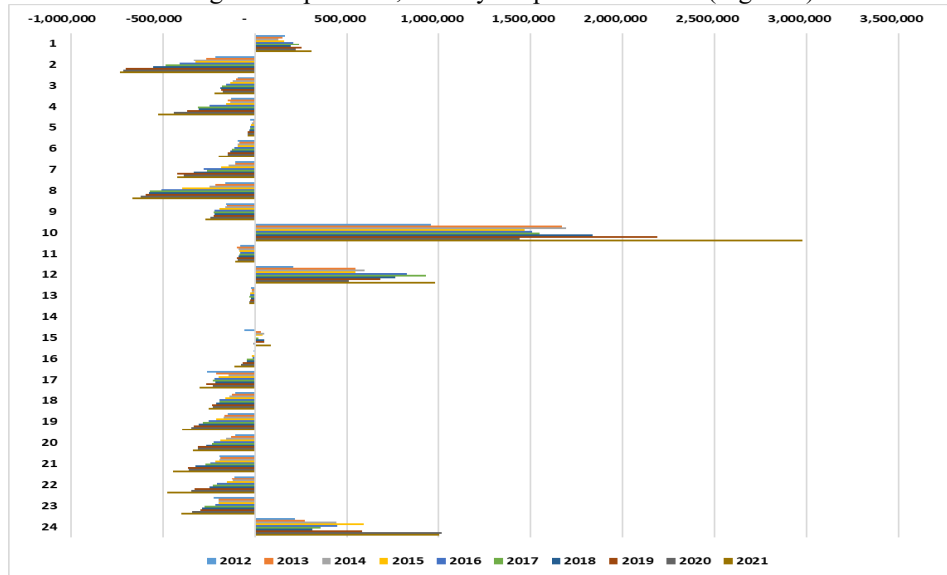


**Figure 5. Dynamics of the trade balance for agri-food products by chapter (thousands of euros)**
*Source: authors' calculations*

It can be seen that during the period under review, there is a surplus for categories such as 01 Live animal, 10 Cereals, 12 Oil seeds and oleaginous fruits, 15 Animal or vegetable fats and oils and their cleavage products and 24 Tobacco and manufactured tobacco substitutes.

The largest surplus was recorded for the cereals category last year, amounting to almost 3 billion euro, while the largest deficit was recorded for the meat and offal category, amounting to 733.9 million euro.
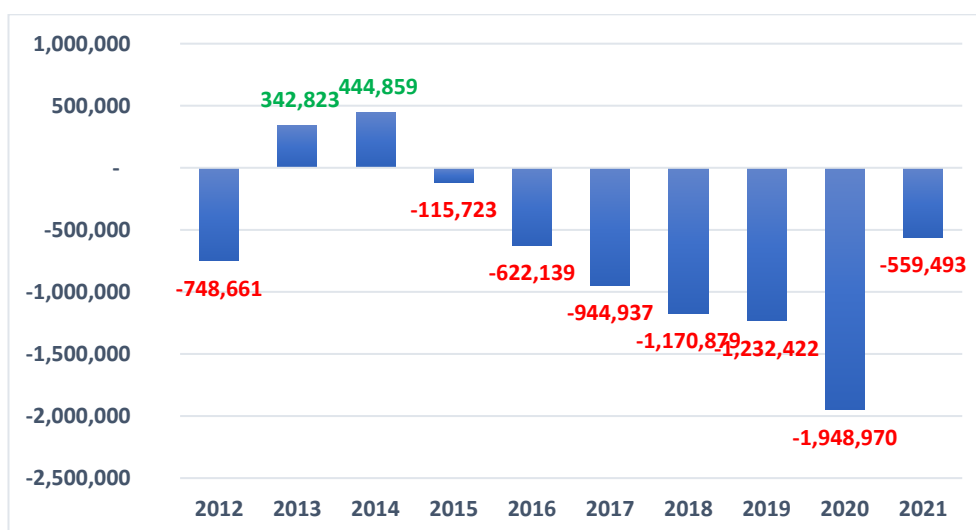
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**Figure 6. Dynamics of the total trade balance for agri-food products**
**(thousands of euros)**
*Source: authors' calculations*

Regarding the final balance of trade calculated regardless of product group, it can be seen that in the last decade, in the years 2013 and 2014 there was a trade balance surplus of 342.8 million euros and 444.8 million euros respectively (Figure 6). In the rest of the period, there was a trade balance deficit ranging from -115.7 million euros to -1.95 billion euros in 2020 being one of the worst productive agricultural years, thus the export of cereals was negatively influenced. In the last year analysed there was a trade balance deficit of about 560 million euro.

The final research will analyse the degree of concentration of imports and exports according to sources and destinations, respectively, to determine the existence or non-existence of strong trade relations with and affinity towards, certain sources.

**Table 4. Determination of the GINI coefficient on import and export values**

| GINI | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Avg. |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Import | 0.216 | 0.208 | 0.200 | 0.205 | 0.212 | 0.208 | 0.202 | 0.217 | 0.219 | 0.214 | 0.210 |
| Export | 0.134 | 0.118 | 0.155 | 0.175 | 0.115 | 0.113 | 0.124 | 0.114 | 0.103 | 0.101 | 0.125 |

*Source: authors' calculations*

Using the Gini coefficient, calculated in Table 4, it is possible to determine the existence or non-existence of a degree of concentration of imports and exports according to sources and destinations. Therefore, if imports or exports from, respectively, are directed mainly to certain countries, then the possibility of a concentration in that area is greater, so the value of the Gini coefficient will come closer and closer to the value of the whole.

As far as imports are concerned, it can be observed that the value of the coefficient varied between 0.2 and 0.219, and on average, over the whole period analysed, it was 0.21, which denotes a weak concentration, or rather a lack of a degree of concentration towards a particular source, thus Romania imports as diversified as possible, from several sources.

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As regards exports, the Gini coefficient values varied between 0.101 and 0.175, and on average, in the last decade, the coefficient value was 0.125, which determines a lack of concentration, even more, profound than in the case of imports, exports being even more diversified in terms of destinations.

**Table 5. Determination of the HERFINDHAL indicator for import and export values**

| HERFINDHAL | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Import | 0.073 | 0.070 | 0.067 | 0.069 | 0.072 | 0.070 | 0.067 | 0.073 | 0.074 | 0.072 | 0.071 |
| Export | 0.040 | 0.036 | 0.046 | 0.052 | 0.035 | 0.035 | 0.037 | 0.035 | 0.033 | 0.032 | 0.038 |

*Source: authors' calculations*

The Herfindhal indicator is the sum of the squares of the shares of each import source or export destination (state) in the total value imported and exported. Thus, the higher the indicator, the higher the weight for a particular country, or conversely, the more balanced.
For imports, the Herfindhal indicator ranged from 0.067 to 0.074, with an average of 0.071. This value represents a low sum of the squares of the weights, thus the share of sources from which Romania is supplied is quite low.
Concerning the export of agri-food products, the Herfindhal indicator ranged from 0.032 to 0.052, and on average this indicator was 0.038, which is lower than that of imports, thus the share of destinations of agri-food products that Romania exports is even lower than that of imports, so there are many destinations with low weights (Table 5).

**Conclusions**
Following the analysis carried out, the following aspects of Romania's foreign trade activity could be noted. The total import value increased by 111% from the first year analysed (2012) to the last (2021). Analysing the sources of Romania's imports, it could be identified that the highest share reached 18% in 2012, representing imports from Hungary. In 2021, the highest share was almost 16%, representing imports from Germany.
Analysing the weighting of import values, it could be observed that the first sources (countries) accumulate important weightings, thus, the first three countries that exported agri-food products to Romania accounted for approximately 40% of total imports.
The value of exports also increased during the period under analysis, being 137% higher in the last year than in the first. Thus, it can be seen that exports have increased more than imports, but the value of exports is much lower than that of imports. Regarding the share of import destinations in the total, it can be seen that the highest share was 13% in 2012, to Italy, and in the last year the same destination had the highest share, but only 8.4%.
Combined in the same way, the top three export destinations account for about 21% of the total export value, while last year the top 20% of destinations accounted for only 46% of the total export value.
Studying the balance of trade for the entire spectrum of agri-food products, it was found that in the period 2013-2014, there was a surplus, while in the remaining years, there was a deficit, the largest being in 2020, of about 2 billion euros (1.95 billion). Although 2020 was a very poor agricultural year, similar in terms of yields to 2012, which was also affected by drought, there is a fairly large difference between these two years in terms of the trade balance, with a 2.6 times deficit, given inflation and price increases.
As regards the degree of concentration, it can be concluded that neither imports nor exports show a high degree of concentration by country, i.e., export destinations and import sources are balanced, so there is no significant weight for a particular partner country. However, the

value of the Gini coefficient and the Herfindhal indicator show that imports are more concentrated than exports.

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