

## COMPETITIVENESS OF MOLDOVAN AGRI-FOOD EXPORTS AT THE REGIONAL LEVEL IN THE CONTEXT OF CURRENT CRISES

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### Abstract

*In the context of current crises, the competitiveness of Moldova's agri-food exports emerges as a primary topic of interest, given that they account for over 50% of the nation's total exports. This study investigates the competitiveness of Moldova's agri-food exports compared to three EU candidate countries - Georgia, Moldova, and Ukraine - and two EU member states - Poland and Romania. Using the Balassa Index, it analyzes the comparative advantages of these nations in the agri-food sector, with particular attention to the sub-categories of food products and vegetables. The results indicate a high competitiveness of Moldova in the exports of food products and vegetables, while the category of animal products shows comparative disadvantages. The study contributes to the literature by highlighting the dynamics of comparative advantages and recommends focusing on the development of the agri-food processing industry to improve the external trade structure. The research emphasizes the need for a strategic approach in adapting and integrating national agricultural and food systems into global value chains to maximize economic benefits in a changing regional and global landscape.*

**Key words:** export competitiveness, Balassa Index, comparative advantages, economic impacts of regional crises

### INTRODUCTION

International trade serves as a pivotal element in the growth of national economies and in ensuring the equilibrium of domestic markets. It enables countries to export excess agricultural and food products and import those that are scarce or not produced in adequate volumes. Over the past two decades, the volume of agri-food products trade has quadrupled, reaching a staggering 1.66 trillion USD in 2021 [8]. This rapid expansion is primarily attributed to advancements in production and trading operations which have facilitated the creation of global value chains in the agriculture and food sectors. Additionally, the integration of digital technology and increasingly sophisticated uses of artificial intelligence have propelled this growth [19]. According to FAO, a significant part of international trade in agri-food products (about 1/3) is carried out through the global value chain [7]. This is due to factors including the desire for product variety, comparative production costs, seasonality, logistics, and the division of labour in global supply chains. Integrating

national agricultural and food systems into global supply chains does not hinder.

Moreover, it supports the growth of the local agro-industrial sector and the export of agricultural and food products. Within this framework, the competitiveness of agri-food exports plays a distinctive and critical role.

In the Republic of Moldova, where agri-food products account for over half of the total exports, assessing their market competitiveness is a key concern.

This assessment gains further importance as Moldova, alongside Ukraine and Georgia, steps into the role of EU candidate countries. Additionally, regional vulnerabilities, exacerbated by the military actions of Russia in Ukraine, heighten the need for a thorough evaluation of foreign trade competitiveness.

The competitiveness of exports, having a complex nature, could be improved in the dimensioning process. Competitiveness can be analysed from two different perspectives. On the one hand, competitiveness can be evaluated at the macroeconomic level and on the other at the microeconomic level, from the exporting companies' perspective. In the first case, the current account surplus of the Balance of Payments indicates the

competitiveness of exports, and in the second, the profitability of exporting companies [18]. The competitiveness of exports at the macro level, as in the case of other multidimensional concepts, can be evaluated by employing composite indices [9]. The most widespread is the World Competitiveness Index, developed by the IMD World Competitiveness Centre, which is based on 336 criteria selected from international, regional, and national sources for a relatively small number of 64 countries [15] the Global Sustainable Competitiveness Index (GSCI), calculated by [20] and includes 188 indicators, which are divided into six groups, for 180 economies [20].

Although composite indices cover many indicators, they cannot indicate the competitiveness of agri-food exports, as they are calculated for the entire economy. Another approach is based on the determination of comparative advantages in specific sectors of the economy, which focuses on highlighting the differences between countries in the endowment of production factors, which give them privileges [17].

This methodology determines a country's areas of comparative advantage based on the structure of production, consumption, and foreign trade. Therefore, it is assumed that the comparative advantage for a specific product is manifested in the country's export specialization for this product [5]. Thus, relative advantage will be reflected in a country's foreign trade structure. This method is known in the specialized literature as Balassa's indices [25].

Another approach, Hausman-Klinger, allows the assessment of the "exploitation potential" of a country's unexploited export opportunities [11]. It aims to assess the potential for export growth for those goods for which the analyzed country is not specialized and has no comparative advantage [2].

Constant market shares (CMS) analysis is a technique through which the factors that have a decisive impact on the comparative export performance of an economy are identified [1]. In the specialized literature, a combination of the GTAP quantitative method with the qualitative method, based on Delphi experts,

is proposed for evaluating the competitiveness of products. Therefore, combining these methods can enhance the order and comprehensiveness of foreign trade competitiveness [14].

A review of specialized literature reveals that, while the topic of foreign trade competitiveness receives considerable attention, the specific area of agri-food product export competitiveness is not as thoroughly explored. This gap underscores the need for focused research on this subject. Therefore, this study aims to evaluate the competitive standing of agri-food exports among EU candidate countries – Georgia, the Republic of Moldova, and Ukraine, as well as two neighbouring EU member states, Poland, and Romania. This research employs a methodological framework that assesses comparative advantages and seeks to understand their dynamics within these nations.

The objectives of this study are twofold: (1) to assess the comparative advantages of agri-food exports using quantitative methods of analysis; and (2) to perform a benchmarking analysis of these exports among EU candidate countries – Georgia, Moldova, and Ukraine, and EU member countries, Poland, and Romania.

To fulfil these objectives, the methodology involves employing quantitative techniques to evaluate the competitiveness of agri-food product exports. Relevant data for this analysis have been sourced from several international databases, including FAOSTAT [9], ITC [16], WITS [24], World Bank Data [23], and the National Bank of Moldova [6].

## MATERIALS AND METHODS

In the conditions of fierce competition, which characterize the contemporary world economy, only trade based on advantages can generate maximum benefits for the world's countries. The development of foreign trade based on comparative advantages is possible only if the parties engaged in the conduct of foreign trade retain the free choice of conditions for mutually beneficial exchange, excluding significant regulations by the state.

The effects of foreign trade can be distorted by state intervention using various trade policy instruments that should be limited and based on considering the country's existing and potential comparative advantages.

Foreign trade, like any economic process, is a stochastic one. Accordingly, the indicators of comparative advantages cannot be static. It is relevant for each country to analyse the dynamics of comparative advantages and elaborate on specific strategies for developing foreign trade.

The research carried out based on the methods of quantitative analysis of the comparative advantages of exports, developed by [3] (the Balassa index), allows the identification of their transformation tendencies and the elucidation of the priorities of foreign commercial policy [3].

The approach based on the determination of B. Balassa's comparative advantages assumes that implicit comparative advantages are directly reflected in trade flows and are manifested in a relatively large share of the product in the structure of exports [4].

The index calculates the ratio of a specific product's (or group of products') export share in a country's total exports to its share in the total global exports of that product.

$$RCA_i = \frac{X_{ij} / \sum_{i=1}^N X_{ij}}{X_{iw} / \sum_{i=1}^N X_{iw}}, i = 1, \dots, N \quad (1)$$

where:

$X_{ij}$  - the export of the goods  $i$  to country  $j$ ,

$N$  - the quantity of all goods,

$X_{iw}$  - global export of the commodity  $i$ .

If the value of the index is between 0 and 1, it indicates the lack of comparative advantages.

When the index exceeds the value of 1, the persistence of specialization in trade with this product (group of products) is attested, and thus comparative advantages are identified.

The approach based on the determination of B. Balassa's comparative advantages assumes that implicit comparative advantages are directly reflected in trade flows and are manifested in a relatively large share of the product in the structure of exports [4].

As an object of study, Balassa chose the structure of exports of industrial goods, as he

considered that they correspond most fully to the comparative advantages existing in countries: its volumes are influenced by both price and non-price factors.

One of this method's most significant advantages is the possibility of assessing the comparative advantages as a coefficient. Another advantage in choosing the Balassa index is its simplicity, which is sufficient to assess the specialization of a country in the export of a specific product or group of products or its absence.

Subsequently, the formula for calculating the Balassa index has been revised and improved several times. In this way, both a product's exports and imports were considered, making it possible to determine the comparative advantage by considering intra-industry trade [10].

J. Hinlupen and C. Marrevik, based on a more extensive statistical database. At the same time, a link was identified between export fluctuations and commodity price changes due to oil crises (70s–80s of the XX century), confirming the feasibility of using his methodology, Balassa [13]. Thus, numerous research studies have elucidated that, despite the different theoretical approaches that justify the need to improve the classic Balassa formula, this index is a valuable tool for analysing the competitiveness of countries' economic sectors.

The Balassa index is mainly recognized as a classic formula for evaluating countries' comparative advantages for a product or product category. Thus, A. Hillman, studying the presence of the correlation of the Balassa index, theoretically substantiated the possibility of using this indicator as an index of comparative advantage of countries [12].

## RESULTS AND DISCUSSIONS

Evaluating the competitiveness of agricultural and food products is crucial for Moldova, which saw the agriculture sector contribute 10.6% to its GDP in 2022, with agri-food exports accounting for over 60% of total exports [22][23].

The regional context for Moldova remains challenging. To analyze the competitive

standing of Moldova’s agri-food sector, a comparative study was conducted with three EU candidate countries - Moldova, Ukraine, and Georgia - all aspiring to align their economic frameworks with EU standards, and two neighboring EU nations, Poland and Romania. These countries were selected to benchmark the competitive advantages in agri-food exports over the period from 2011 to 2021, a time characterized by macroeconomic stability that provides clearer

insights into evolving economic indicators. The analysis excludes 2022 due to significant disruptions in Moldova’s economy and regional instability stemming from the conflict involving Russia and Ukraine. Figure 1 illustrates the agricultural sector's impact on GDP and its proportion in total exports among the chosen countries. Notably, Moldova and Ukraine contribute 10.63% and 10.39% respectively to their GDPs through agriculture.

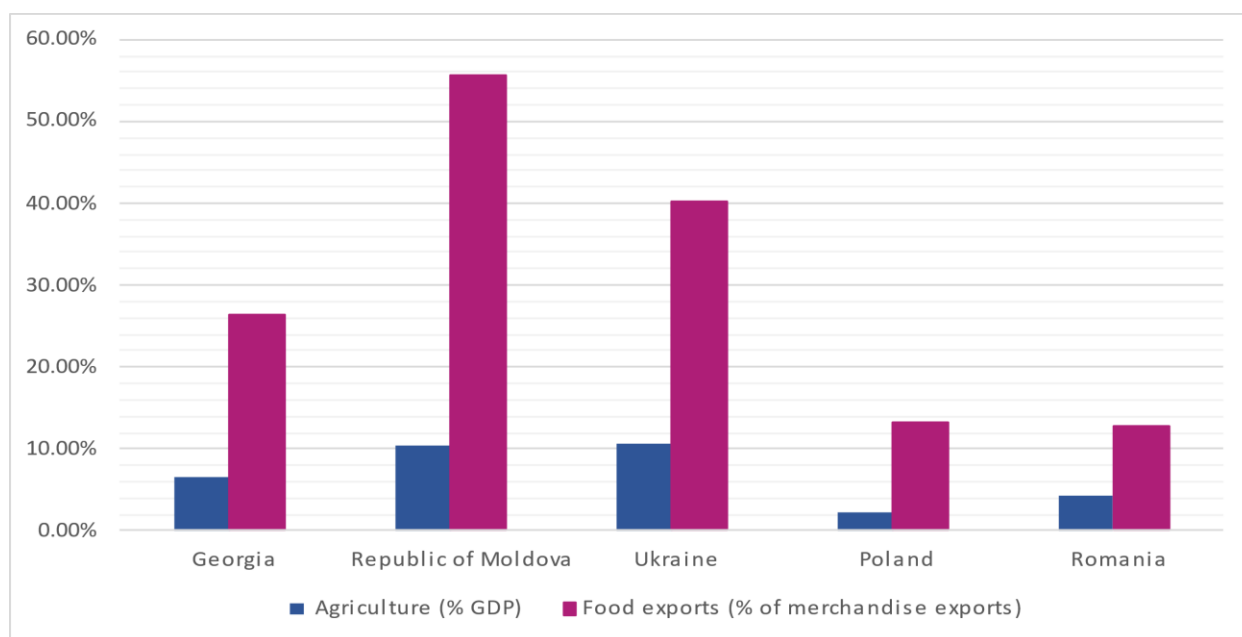


Fig. 1. Agriculture contribution to GDP and food export, 2021  
 Source: (The World Bank Data, 2021 a,b) [22], [23].

Additionally, the proportion of agri-food exports to total exports is substantial, with Moldova at 55.59%, Ukraine at 40.32%, Georgia at 26.32%, and EU member states Poland and Romania at 13.25% and 12.71%, respectively.

It is noteworthy that in the countries vying for EU membership, the proportion of agri-food products within total exports significantly surpasses this metric in the selected EU member states.

Among these, three countries stand out as key trading partners for the Republic of Moldova. Specifically, Romania and Ukraine occupy the first and second spots, respectively, with Poland not far behind in fifth place.

In the year 2021, Moldova's agri-food exports included 18 different products to Georgia, 33 to Poland, and 56 to Ukraine, with the number rising to 99 for Romania [6]. As for the most significant value of exports of agri-food products, we can see from Table 1 that in Georgia; these are the group's wine and undenatured ethyl alcohol of an alcoholic strength by volume of less than 80% vol; spirits, liqueurs, and other spirituous beverages (9,348 KUSD and 646 KUSD), in Poland apple juice, concentrated and wine (13,281 KUSD and 10,725 KUSD), in Romania sunflower seed and rape or colza seed (49,787 KUSD and 27,311 KUSD), in Ukraine rape or colza seed and wine (5,710 KUSD and 5,339 KUSD) [9].

Table 1. Agri-food products export of the Republic of Moldova to Georgia, Poland, Romania, and Ukraine to Georgia, Poland, Romania, and Ukraine, K USD

| Goods   | Georgia | Poland | Romania | Ukraine |
|---|---------|--------|---------|---------|
| Apples  | 0       | 0      | 344     | 0       |
| Apple juice, concentrated   | 0       | 13,281 | 233     | 1837    |
| Apricots  | 0       | 77     | 392     | 581     |
| Barley  | 0       | 0      | 9,421   | 0       |
| Bran of wheat   | 0       | 0      | 2,604   | 0       |
| Chocolate products nes  |         | 1,214  | 2,941   | 298     |
| Communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products.         | 0       | 0      | 619     | 4       |
| Crude organic material n.e.c.   |         | 70     | 501     | 318     |
| Food preparations n.e.c.  | 48      | 294    | 2,963   | 464     |
| Fruit prepared n.e.c.   | 4       | 0      | 1,922   | 1167    |
| Grapes  | 0       | 2,506  | 8,659   | 2259    |
| Maize (corn)  | 0       | 0      | 15,967  | 51      |
| Molasses  | 0       | 0      | 1,553   | 0       |
| Mustard seed  | 0       | 19     | 2,436   | 0       |
| Natural honey   | 0       | 995    | 2,356   | 0       |
| Other fruit n.e.c., dried   | 425     | 953    | 328     | 629     |
| Other non-alcoholic caloric beverages   | 162     | 79     | 3,204   | 35      |
| Pastry  | 255     | 501    | 10,260  | 827     |
| Plums and sloes   | 0       | 502    | 3,404   | 0       |
| Plums, dried  | 0       | 2,494  | 1,949   | 849     |
| Prepared nuts   | 0       | 0      | 9,144   | 0       |
| Rape or colza seed  | 0       | 2,330  | 27,311  | 5710    |
| Raspberries   | 0       | 1,509  | 0       | 0       |
| Refined sugar   | 0       | 0      | 7,481   | 0       |
| Soya bean oil   | 0       | 248    | 904     | 0       |
| Soya beans  | 0       | 0      | 2,901   | 0       |
| Sugar confectionery   | 38      | 212    | 907     | 0       |
| Sunflower seed  | 37      | 3,755  | 49,787  | 488     |
| Sunflower-seed oil, crude   | 0       | 0      | 12,416  |         |
| Sweet corn, prepared or preserved   | 0       | 0      | 1,586   | 465     |
| Undenatured ethyl alcohol of an alcoholic strength by volume of less than 80% vol; spirits, liqueurs and other spirituous beverages | 646     | 80     | 808     | 4,415   |
| Vegetables preserved nes (o/t vinegar)  | 42      | 442    | 1,030   | 174     |
| Walnuts, shelled  | 0       | 0      | 1,835   | 0       |
| Wheat   | 0       | 0      | 8,672   | 171     |
| Wine  | 9,348   | 10,725 | 25,296  | 5,339   |

Source: [10].

Before analyzing the competitiveness of agri-food product export, we will determine their share in Moldova compared with Georgia, Romania, Ukraine, and Poland. For a more detailed analysis, we divided the agri-food products category into three subcategories: food product, animal, and vegetable.

From Figure 2, the largest share of food products in total exports is recorded in Georgia and Moldova, weighing 17.51% and 12.98%, respectively; at the opposite pole are Romania and Ukraine (3.72 % and 5.72%).

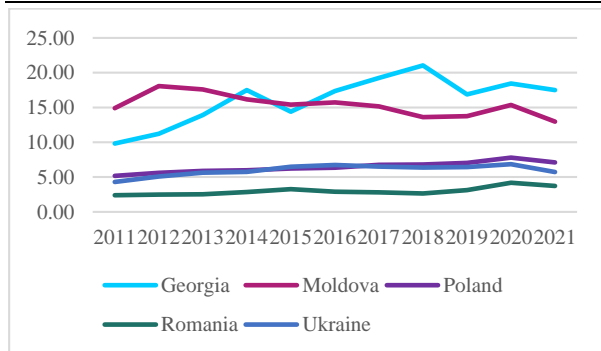


Fig. 2. Moldova Food Products Export Product Share compare with countries Georgia, Romania, Ukraine, Poland  
 Source: [24].

As for animal exports in total exports, this category has a higher share in Poland and Georgia (3.85% and 2.44%) and the lowest in Moldova and Romania (1.17% and 1.37%). The last more significant vegetable export category is in Ukraine and Moldova, 32.79% and 31.52%, respectively. The lowest shares were recorded in Poland and Romania (2.70% and 7.72%).

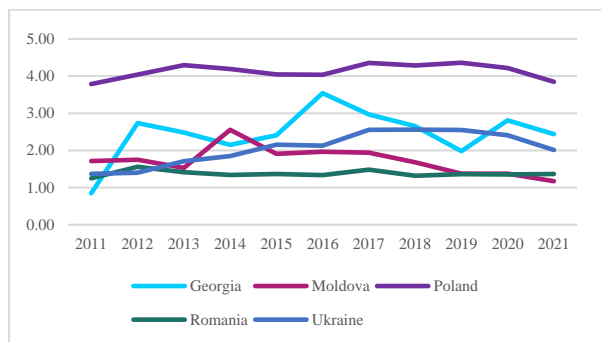


Fig. 3. Moldova Animal Export Product Share compare with countries Georgia, Romania, Ukraine, Poland  
 Source: [24].

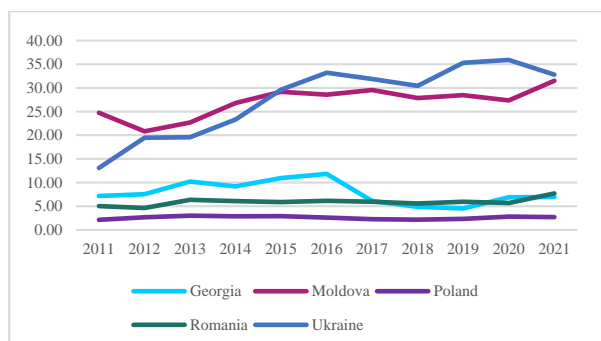


Fig. 4. Moldova Vegetable Export Product Share compare with countries Georgia, Romania, Ukraine, Poland  
 Source: [24].

The last more significant vegetable export

category is in Ukraine and Moldova, 32.79% and 31.52%, respectively.

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Another indicator that is important to determine is the growth of subcategories during the analyzed period. Figures 5-7 show the evolution of the three subcategories of agri-food products.

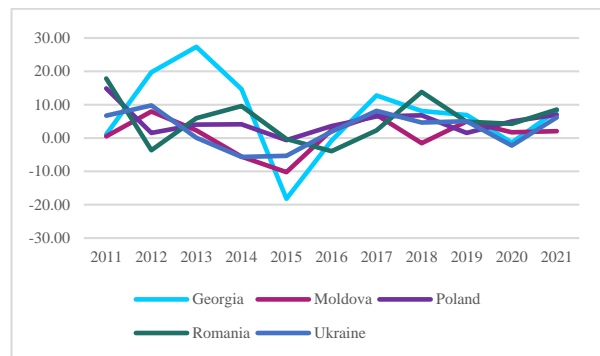


Fig. 5. Moldova Food Products Country Growth compare with countries Georgia, Romania, Ukraine, Poland  
 Source: [24].

CAGR indicates the compound annual growth rate to identify growth dynamics. Its value allows us to estimate the growth rate of the three subcategories, and we will use the CAGR compound yearly growth rate indicator. The CAGR value will permit us to estimate the exponential growth rate of agri-food production.

If we refer to food products, in the period 2011-2021, the CAGR recorded the highest growth in Georgia 13.22%, followed by Poland and Romania (8.81% and 8.18%); in Ukraine and Moldova, the growth was -2.51% and 2.13%.

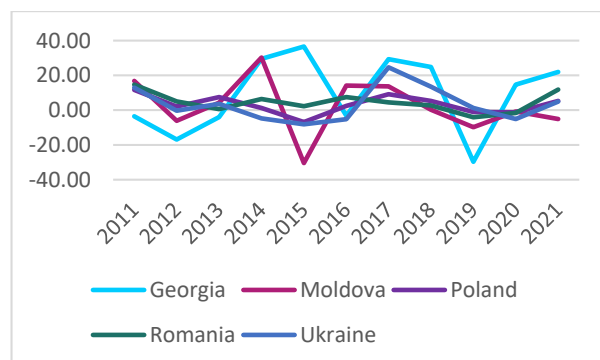


Fig. 6. Moldova Animal Country Growth compare with countries Georgia, Romania, Ukraine, Poland  
 Source: [24].

In the case of the animal export subcategory, the leader is the same Georgia, CAGR, during the analyzed period, was recorded at the value of 18.74%, by Poland and Romania (5.55% and 4.42%), in Ukraine- 3.53%, and in Moldova the CAGR had a negative value of -0.32%.

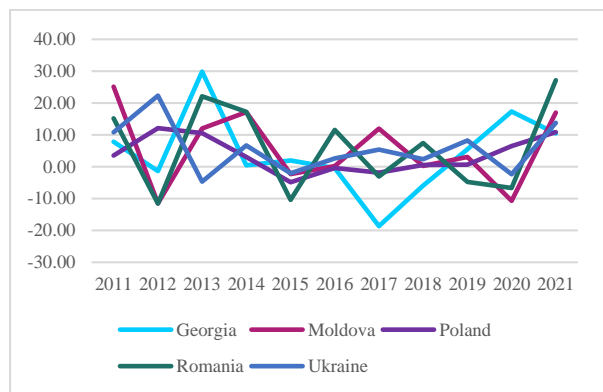


Fig. 7. Moldova Vegetable Country Growth compare with countries Georgia, Romania, Ukraine, Poland  
 Source: [24].

As for the vegetable category, the compound annual growth rate indicator recorded close values. The most significant increase in vegetable exports was in Ukraine at 9.21%, followed by Romania and Poland (CAGR

7.99% and 7.84% respectively), then Georgia at 6.53% and Moldova at 6.09%.

Moreover, the Export Potential Map specific to the Republic of Moldova identifies that two of the top three products with the highest potential are agri-food items: sunflower seeds, which rank first, and maize, in third position. In Ukraine, the top three products with the most substantial export potential all belong to the agri-food sector: crude oil from sunflower seeds or safflower, maize, and wheat (excluding durum and meslin). In Georgia, wine from fresh grapes holds the fourth position in terms of export potential, while in Romania, sunflower seeds are ranked sixth. As for Poland, an agri-food product appears at 21st place, specifically in the category of food preparations [16].

Furthermore, Table 2 illustrates the development of the Balassa index from 2011 to 2021 across three subcategories of agri-food products, indicating that Georgia shows the highest revealed comparative advantage in the food subcategory, closely followed by the Republic of Moldova.

Table 2. Moldova Agri Food Products Revealed comparative advantage compare with countries Georgia, Romania, Ukraine, Poland

|  | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019  | 2020 | 2021 |
|--|------|------|------|------|------|------|------|------|-------|------|------|
| <b>Moldova Food Products Revealed comparative advantage compare with countries Georgia, Romania, Ukraine, Poland</b> |      |      |      |      |      |      |      |      |       |      |      |
| Georgia  | 1.93 | 3.36 | 5.23 | 6.04 | 4.78 | 5.37 | 5.61 | 6.25 | 6.83  | 5.62 | 5.49 |
| Moldova  | 4.64 | 5.45 | 5.18 | 4.11 | 3.72 | 3.69 | 3.51 | 3.04 | 3.31  | 3.44 | 3.11 |
| Poland   | 2.09 | 2.22 | 2.11 | 2.11 | 2.15 | 2.1  | 2.22 | 2.32 | 2.3   | 2.32 | 2.41 |
| Romania  | 0.83 | 0.84 | 0.81 | 0.86 | 0.94 | 0.78 | 0.77 | 0.89 | 0.99  | 1.1  | 1.15 |
| Ukraine  | 1.33 | 1.65 | 1.76 | 1.74 | 1.97 | 2.09 | 2.12 | 2.13 | 2.24  | 2.07 | 1.9  |
| <b>Moldova Animal Revealed comparative advantage compare with countries Georgia, Romania, Ukraine, Poland</b>        |      |      |      |      |      |      |      |      |       |      |      |
| Georgia  | 0.3  | 0.26 | 0.22 | 0.32 | 0.75 | 0.8  | 1.1  | 1.65 | 0.76  | 0.86 | 1.07 |
| Moldova  | 0.81 | 0.73 | 0.71 | 1.03 | 0.6  | 0.74 | 0.79 | 0.72 | 0.56  | 0.57 | 0.45 |
| Poland   | 2.3  | 2.49 | 2.5  | 2.27 | 2.17 | 2.08 | 2.3  | 2.35 | 2.17  | 1.98 | 2    |
| Romania  | 0.58 | 0.7  | 0.6  | 0.58 | 0.71 | 0.73 | 0.75 | 0.71 | 0.65  | 0.66 | 0.73 |
| Ukraine  | 0.66 | 0.68 | 0.77 | 0.75 | 0.85 | 0.79 | 1.05 | 1.26 | 1.19  | 1.07 | 0.96 |
| <b>Moldova Vegetable Revealed comparative advantage compare with countries Georgia, Romania, Ukraine, Poland</b>     |      |      |      |      |      |      |      |      |       |      |      |
| Georgia  | 1.61 | 1.91 | 3.14 | 2.76 | 3.37 | 3.91 | 1.98 | 1.86 | 2.04  | 2.25 | 2.11 |
| Moldova  | 8.06 | 6.4  | 7.41 | 8.98 | 9.55 | 9.32 | 9.06 | 9.04 | 9.76  | 7.44 | 8.11 |
| Poland   | 0.72 | 0.93 | 1.02 | 0.99 | 0.92 | 0.85 | 0.71 | 0.73 | 0.74  | 0.72 | 0.74 |
| Romania  | 1.33 | 1.13 | 1.48 | 1.78 | 1.56 | 1.78 | 1.47 | 1.69 | 1.6   | 1.35 | 1.78 |
| Ukraine  | 3.67 | 5.69 | 5.6  | 7.03 | 8.46 | 9.36 | 8.4  | 8.97 | 10.26 | 9.03 | 8.73 |

Source: [24].

Moldova, Ukraine, and Romania have no competitive advantages in the animal export subcategory. Moreover, Ukraine and Moldova have the most advantage in the last category of vegetables, while Poland has no competitive advantage.

## CONCLUSIONS

The Republic of Moldova is a country where agriculture not only contributes to the formation of GDP [21] but also the branch whose products have the largest share in total product exports and with the highest export potential.

In this context, any vulnerability in the region could impact agriculture and the entire national economy in a situation where, in 2021, more than 50% of total exports were agri-food products.

Summarizing the data obtained, we can conclude that the results of the analysis indicate that in the category “Agri-food products,” the subcategories vegetables and “food products” have the most significant weight (32.79% and 17.51%). At the same time, the two vegetable products have the most significant export potential. It is also important to recognize that exporting food products entails a greater complexity compared to other agri-food subcategories. Thus, it would be more profitable for Moldova to improve the structure of foreign trade goods in this subcategory, stimulating the development of the agricultural processing industry.

The results obtained highlight the fact that two countries from the group selected for analysis have a significant share of exports of agri-food products (Ukraine - 40.32% and Moldova - 55.59%), at the opposite pole are EU member states (Poland - 13.25%), and Romania 12.71%).

Regarding the revealed comparative advantage, it is clear that the animal product segment does not demonstrate comparative advantages. Conversely, in the vegetable and food product segments, Moldova is positioned second according to the Balassa index values. Considering the unique aspects of Moldova's economy, it is advisable to sustain specific

advantages through innovative agricultural practices, along with the judicious utilization of natural resources, constrained labor resources, and effective management strategies.

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