COMPETITIVENESS AND MARKET REORIENTATION IN MOLDOVA'S AGRI-FOOD EXPORTS TO THE EUROPEAN UNION

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ABSTRACT

This paper examines how Moldova's trade in agricultural and food products has changed between 2013 and 2024, against the background of closer economic integration with the European Union (EU). The analysis covers 24 agri-food product groups, including both agricultural commodities and processed foods, using official data from the National Bureau of Statistics and a set of standard trade competitiveness indicators. The results reveal uneven patterns of competitiveness across product groups. While sectors such as meat, fish, and dairy continue to face structural weaknesses, products like cereals, oilseeds, fats and oils, and beverages retain strong competitive positions and positive trade balances. Trade in processed food products shows a moderate but gradually increasing level of intra-industry exchange, suggesting slow and uneven upgrading. Research results underline a continuing transformation of Moldova's agri-food trade and highlight the importance of targeted policies to strengthen competitiveness, diversify exports, and support deeper integration into EU value chains in a context of increased global uncertainty.

Introduction

Competitiveness in the agri-food sector is no longer understood in terms of cost efficiency or static comparative advantage. Recent research presents competitiveness as a multidimensional concept shaped by structural transformation, policy frameworks, innovation capacity, and sustainability constraints. In integrated markets such as the European Union (EU), agri-food competitiveness depends not only on productivity growth and technological change, but also on institutional quality, research and development, and compliance with increasingly demanding environmental, sanitary,

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and quality standards (Bojnec & Fertő, 2018; Bojnec & Fertő, 2025). From this perspective, sustained competitiveness is closely linked to the ability of agri-food systems to upgrade along value chains rather than relying primarily on natural factor endowments or price-based advantages.

The drivers of competitiveness and structural change in European agri-food value chains are examined by various researchers (Bojnec & Fertő, 2018; Bojnec & Fertő, 2025; Ambroziak et al., 2024; Charlebois et al., 2025). Recent studies emphasize the role of resource efficiency, innovation, and sustainability performance in shaping competitive positions within EU agriculture and food industries (Charlebois et al., 2025; Rodino et al., 2025). Comparative analyses of food producers operating in the EU market further show that competitive pressure has intensified in recent years, particularly following market disruptions linked to geopolitical instability (Ambroziak et al., 2024; Régnier & Aubert, 2025). Ambroziak et al. (2024) find that intensified competition in the EU agri-food market increasingly favors quality differentiation and structural upgrading over price-based competitiveness.

At the same time, deeper market integration does not automatically result in upgrading (Zdráhal, 2025; Ambroziak et al., 2024; Pătărlăgeanu et al., 2025). Many countries remain concentrated in primary or semi-processed exports due to technological constraints, scale limitations, and insufficient investment capacity (Zdráhal, 2025; Régnier & Aubert, 2025). Empirical analyses based on revealed comparative advantage and intra-industry trade indicators further show that competitiveness gains tend to be selective and product-specific, with limited spillover effects across the agri-food sector (Ignjatijević et al., 2025; Pătărlăgeanu et al., 2025). Evidence from non-EU trade relationships further supports this conclusion. According to Zhelev (2024), even where comparative advantages exist, export diversification and value-added upgrading remain constrained by structural and institutional factors.

Within Central and Eastern European (CEE) countries, EU accession and deeper integration into the Single Market have triggered significant adjustments in agricultural production and trade flows. Evidence suggests that EU membership has generally supported productivity growth, export expansion, and a reorientation of agri-food trade toward EU markets, although outcomes vary considerably across countries and product groups (Marković et al., 2021; Bojnec & Fertő, 2025). In several cases, integration has facilitated a gradual shift toward higher-value agri-food exports, particularly in beverages, processed foods, and niche segments, while other parts of the sector remain characterized by low value added and persistent import dependence (Popović et al., 2025; Hamulczuk & Cherevyk, 2025). However, these benefits are frequently accompanied by increased exposure to international price volatility and external shocks, which may constrain long-term upgrading and deepen structural asymmetries within agri-food sectors (Grujić Vučkovski et al., 2025; El Bilali & Ben Hassen, 2024).

The literature on trade liberalization agreements, including Association Agreements and Deep and Comprehensive Free Trade Areas (DCFTAs), highlights their role in

reshaping trade geography, institutional alignment, and market access conditions. While some studies point to adjustment costs, increased competitive pressure, and rising import dependence, empirical evidence generally confirms positive effects on export performance and market diversification in partner countries (Popović et al., 2025; Régnier & Aubert, 2025). These benefits, however, are frequently accompanied by heightened exposure to international price volatility and external shocks, which may amplify existing structural weaknesses and constrain long-term upgrading (Grujić Vučkovski et al., 2025; Hamulczuk & Cherevyk, 2025).

In the specific case of the Republic of Moldova, existing studies confirm that the EU–Moldova Association Agreement and the DCFTA have contributed to a reorientation of agri-food trade toward EU markets and improved competitiveness in selected product groups (Cimpoieș, 2021). Nevertheless, most prior analyses adopt static or short-term perspectives, offering limited insight into how competitiveness, specialization, and trade integration evolve across different phases of economic adjustment and external shocks. Recent regional research highlights persistent challenges related to technological upgrading, diversification, and deeper integration into EU agri-food value chains, particularly under conditions of increased volatility associated with the COVID-19 pandemic and regional geopolitical instability (Maśniak & Jędruchniewicz, 2024; El Bilali & Ben Hassen, 2024). Despite progress in market reorientation, Moldova's agri-food exports remain largely dominated by raw and semi-processed products, while value-added processing and intra-industry trade with the EU remain uneven.

Overall, there are both opportunities and limitations of trade liberalization and EU integration for agri-food competitiveness in small and transition economies. While improvements in market access and selective competitiveness gains are well documented, persistent structural constraints, uneven upgrading, and vulnerability to external shocks remain key challenges. These unresolved issues require an empirical analysis of Moldova's agri-food trade dynamics over time, particularly within the framework of DCFTA and EU candidate status while accounting for recent global disruptions.

The aim of this research is to analyze the evolution of Moldova's trade in agricultural and food commodities, with a focus on structural transformations and competitiveness shifts associated with the country's deepening economic integration with the European Union. The study examines trade dynamics across product groups and trading partners, considering the effects of trade liberalization and major external shocks over the period 2013–2024.

Based on the objectives of the study, the following hypotheses are tested:

- Moldova's agri-food exports have undergone a gradual structural transformation following the implementation of the DCFTA, reflected in a reorientation toward the European Union market.

- Moldova maintains a comparative advantage primarily in raw and semi-processed agricultural products, while competitiveness in processed food products has improved more slowly.
- The depth of Moldova's integration into EU agri-food value chains remains uneven, with higher levels of intra-industry trade concentrated in a limited number of processed food product groups.

Materials and methods

The methodological approach of this study combines quantitative analysis of trade indicators with comparative and structural evaluation techniques to assess Moldova's agri-food trade competitiveness and specialization between 2013 and 2024**.** The research relies primarily on secondary data obtained from National Bureau of Statistics of the Republic of Moldova, ensuring consistency and comparability across years and product categories. The analysis is conducted at the two-digit level of the Harmonized System (HS 01-24), which encompasses both agricultural commodities (HS 01-15) and processed food products (HS 16-24). To capture the multi-dimensional nature of trade competitiveness, three complementary analytical tools were applied:

- Revealed Trade Advantage (RTA) Index - integrates export and import performance to provide a more balanced measure of comparative advantage (Vollrath, 1991). The RTA was computed for each HS group annually, distinguishing between total trade and trade with EU countries, to observe competitiveness dynamics and structural shifts over time.
- Intra-Industry Trade (IIT) Index (Grubel-Lloyd, 1975) the intensity of intra-industry trade was calculated for each agri-food product group. This measure allows differentiation between vertical (quality-based) and horizontal (product variety-based) trade integration patterns and helps to identify structural upgrading tendencies in Moldova's agri-food sector.
- Product Mapping (RSCA-TBI Framework)-based on the Revealed Symmetric Comparative Advantage (RSCA) and Trade Balance Index (TBI) were combined to map product groups into four quadrants representing different competitiveness positions (Widodo, 2009):
  - *Group A:* Competitive net exports (RSCA > 0, TBI > 0)
  - *Group B:* Competitive imports (RSCA > 0, TBI < 0)
  - *Group C:* Non-competitive exports (RSCA < 0, TBI > 0)
  - *Group D:* Non-competitive imports (RSCA < 0, TBI < 0)

This mapping approach allows for visual comparison of product positioning and provides insight into structural asymmetries between agricultural raw materials and processed food exports. In this study, sustained positive RTA values and consistent

placement in the competitive RSCA - TBI quadrants are interpreted as indicators of strong competitiveness, whereas marginal or highly volatile values are considered as indication of sensitive or transitional competitive positions.

The combined use of these indicators allows for a structured and comparative assessment of Moldova's agri-food trade beyond aggregate export shares and general market reorientation trends. While each indicator captures a distinct dimension of competitiveness, their joint application makes it possible to distinguish between persistent export specialization, structural import dependence, and emerging signs of product-level upgrading and integration with EU markets across individual HS groups. This integrated analytical framework supports a differentiated interpretation of competitiveness dynamics across agri-food product groups and facilitates the identification of sectors with stable advantages, transitional characteristics, or structural vulnerabilities.

Data analysis was conducted using Microsoft Excel. The chosen period (2013 - 2024) captures key period influencing Moldova's trade dynamics. During 2014 - 2016, the implementation of the DCFTA agreement with the EU marked a key phase of trade liberalization; 2020 - 2021 trade flows were disrupted by COVID-19 pandemic followed by a recovery period; while 2022 - 2024 are characterized by regional instability due to the war in Ukraine which imposed several shocks and price volatility.

Results and discussions

Trade liberalization and structural changes have significantly influenced Moldova's integration into international markets. The agri-food sector has remained a key source of external stability, consistently generating a positive trade balance, while the overall trade balance has remained negative due to high import dependence on energy and gas resources. Between 2013 and 2024, agri-food exports maintained a relatively stable share in total exports, with only limited fluctuations. (Table 1).

This pattern indicates that, although agri-food products remain central to Moldova's exports, other sectors, as manufacturing and services are slowly gaining importance. At the same time, trade in both agricultural and non-agricultural goods has expanded, reflecting deeper integration into regional and global value chains and a gradual shift toward a more diversified trade structure.

Table 1. Moldova's trade dynamics, 2013-2024

Year	Total Exports (USD thousand)	Total Imports (USD thousand)	Agri-food Exports (USD thousand)	Agri-food Imports (USD thousand)	Agri-food Exports (% of total exports)	Agri-food Imports (% of total imports)
2013	2,428,303.0	5,492,393.1	1,015,545.5	783,795.6	41.8	14.3
2014	2,339,529.6	5,316,958.9	1,065,351.0	719,325.6	45.5	13.5
2015	1,966,837.2	3,986,820.3	914,488.7	586,576.3	46.5	14.7

Year	Total Exports (USD thousand)	Total Imports (USD thousand)	Agri-food Exports (USD thousand)	Agri-food Imports (USD thousand)	Agri-food Exports (% of total exports)	Agri-food Imports (% of total imports)
2016	2,044,538.6	4,020,356.9	945,477.8	608,048.5	46.2	15.1
2017	2,424,972.0	4,831,335.3	1,130,872.5	705,206.9	46.6	14.6
2018	2,706,173.3	5,760,057.1	1,167,316.7	774,312.4	43.1	13.4
2019	2,779,164.4	5,842,484.3	1,211,141.3	815,899.1	43.6	14.0
2020	2,467,106.1	5,415,988.3	1,087,847.2	846,073.2	44.1	15.6
2021	3,144,504.5	9,218,978.7	1,435,973.5	1,010,286.6	45.6	11.0
2022	4,332,145.1	9,218,978.8	1,936,222.9	1,289,311.9	44.7	14.0
2023	4,048,604.9	9,065,184.7	1,730,929.5	1,281,138.8	42.7	14.1
2024	3,555,061.7	9,065,184.7	1,624,289.9	1,464,520.6	45.7	16.2

Source: based on data from National Bureau of Statistics

Following the entry into force of the EU - Moldova Association Agreement and the DCFTA in 2014, Moldova's integration into the European economy accelerated markedly. These institutional changes facilitated the alignment of quality and safety standards, improved access to the EU market, and supported export-oriented investment in the agri-food sector. As a result, the European Union has become Moldova's main trading partner, absorbing more than half of agri-food exports in recent years. In parallel, the value of agri-food exports increased from about USD 1.07 billion in 2014 to nearly USD 1.94 billion in 2022, before moderating to USD 1.62 billion in 2024, reflecting both structural changes and recent market volatility (Table 1).

Over the same period, the agri-food sector consistently accounted for a substantial share of total exports, fluctuating within a relatively narrow range between 42.7% and 46.6%. This stability indicates that, despite the expansion of other export sectors, agri-food products remain a core component of Moldova's export structure. At the same time, agri-food imports also increased, particularly after 2020, reaching USD 1.46 billion in 2024 and raising their share in total imports to 16.2%, which points to continued dependence on external suppliers of processed and higher value-added food products.

The evolution of Moldova's agri-food trade between 2013 and 2024 reflects not only quantitative expansion but also a fundamental reorientation of export and import geography. Recent trends are also influenced by increased volatility in global agricultural markets in the later years of the period. Changes in export values over the period analyzed reflect the combined effects of volume dynamics and price movements, particularly during periods of increased commodity price volatility. In recent years, international price fluctuations, especially for cereals, oilseeds, and energy-intensive processed products, have amplified trade values without necessarily implying proportional changes in physical export volumes or underlying competitiveness.

Accordingly, the analysis of competitiveness in the later years focuses on relative positions and structural patterns across product groups, rather than on short-term fluctuations in trade values. However, the implementation of the DCFTA and Moldova's gradual alignment with EU trade and quality standards supported a clear reorientation of trade flows away from traditional eastern markets toward the European Union and other global destinations (Table 2).

Table 2: Geographical distribution of agri-food trade flows, 2013-2024, USD thousand

		2013	2014	2017	2019	2021	2023	2024
exports	EU countries	379,516.1	441,327.2	649,508.7	592,329.7	649,123.8	1,194,837.9	1,047,709.7
	C.I.S. countries	396,538.9	185,894.8	89,115.1	94,216.8	89,159.6	244,513.7	148,041.3
	Other countries	239,490.5	192,533.9	278,457.5	287,711.1	318,992.8	291,577.7	428,538.9
imports	EU countries	267,766.1	270,790.7	303,170.7	357,197.6	451,011.2	601,023.6	672,334.7
	C.I.S. countries	339,730.8	283,720.2	275,583.8	300,129.1	348,227.1	407,779.2	110,476.6
	Other countries	176,298.7	164,814.7	126,452.2	158,572.3	211,048.3	272,335.9	681,709.2

Source: authors calculations based on data from National Bureau of Statistics

The data on Moldova's agri-food trade between 2013 and 2024 reveals a profound structural transformation in the country's trade geography (Table 2). Over the twelve-year period, Moldova's agricultural exports have shifted decisively toward the European Union (EU), reflecting the country's growing economic integration with European markets and the effects of the EU-Moldova Deep and Comprehensive Free Trade Area (DCFTA) established in 2014. In contrast, exports to the Commonwealth of Independent States (CIS) have dramatically decreased, highlighting a lasting reorientation away from traditional eastern partners. Meanwhile, trade with countries outside both the EU and CIS - grouped as "others" - has expanded steadily, particularly after 2020, suggesting successful diversification toward new global markets.

In 2013, Moldova's agri-food exports were almost evenly split between the EU and CIS, with the CIS slightly ahead (USD 396.5 million versus USD 379.5 million). However, the geopolitical and economic shocks following 2014, including the Russian trade embargo and the implementation of the DCFTA, led to a sharp collapse in exports to the CIS. By 2016, exports to the CIS had fallen by nearly 80%, while those to the EU had increased by more than 40%. This westward reorientation accelerated in subsequent years, and by 2021, exports to the EU exceeded USD 649 million - nearly four times higher than those to the CIS. The peak came in 2022-2023, when exports to the EU reached over USD 1.15 billion, reflecting favorable prices and improved access to the European market (Table 2). Although 2024 registered a moderate decline (-12%), the EU remains Moldova's dominant export destination, accounting for most of the agricultural trade.

At the same time, the "other countries" category has become an increasingly important component of Moldova's export portfolio. Exports to these markets increased from USD 239 million in 2013 to more than USD 428 million in 2024, showing consistent growth despite global disruptions such as the COVID-19 pandemic and regional instability. This trend likely reflects Moldova's strategic outreach to Middle Eastern and Asian markets for products like cereals, wine, and vegetable oils, helping the country mitigate risks associated with overdependence on a single region.

On the import side, trade patterns reveal a clear geographical reorientation over the period under review. Imports originating from European Union member states expanded continuously, increasing from USD 267.8 million in 2013 to USD 672.3 million in 2024, which corresponds to more than a two-and-a-half-fold increase (Table 2). This evolution points to Moldova's progressive integration into European agri-food markets and value chains, alongside a growing demand for EU-sourced food products, agricultural inputs, and related technologies.

By contrast, imports from CIS countries declined sharply over the same period. From a level of USD 339.7 million in 2013, they fell to approximately USD 110.5 million in 2024, reflecting a substantial contraction of trade relations with traditional partners such as Russia and Ukraine (Table 2). This downward trend can be associated with geopolitical tensions, trade disruptions, and Moldova's strategic shift away from its historical dependence on eastern suppliers.

At the same time, imports from other countries gained importance, particularly after 2020. Their value increased markedly, reaching USD 681.7 million in 2024. This development suggests a deliberate diversification of import sources beyond the EU and CIS regions, likely driven by the need to mitigate supply risks and adapt to global market volatility and regional instability.

Beyond this territorial reorientation, Moldova's agri-food trade has also undergone important structural transformations in terms of product composition. These changes reflect both the country's natural resource endowment and the relatively gradual pace of its integration into global value chains. The structure of agri-food exports and imports highlights Moldova's existing comparative advantages, as well as its continued reliance on external markets for certain categories of agricultural and food products.

Moldova's agri-food trade structure reveals a clear imbalance between export specialization and limited domestic value-added capacity (Table 3). Exports are concentrated in a small number of product groups - mainly oilseeds, cereals, fruits and nuts, fats and oils, beverages, and processed fruit and vegetable products - reflecting strong advantages in primary production but also greater exposure to price, climate, and policy risks. The dominance of raw and minimally processed exports indicates that the sector remains largely resource-based, with limited technological upgrading.

By contrast, imports are more diversified and largely oriented toward processed and final consumption goods, including dairy products, beverages, and miscellaneous

food preparations (Table 3). This contrast highlights persistent structural constraints and points to the need for greater investment in processing, innovation, and product diversification to retain more value within the domestic agri-food sector.

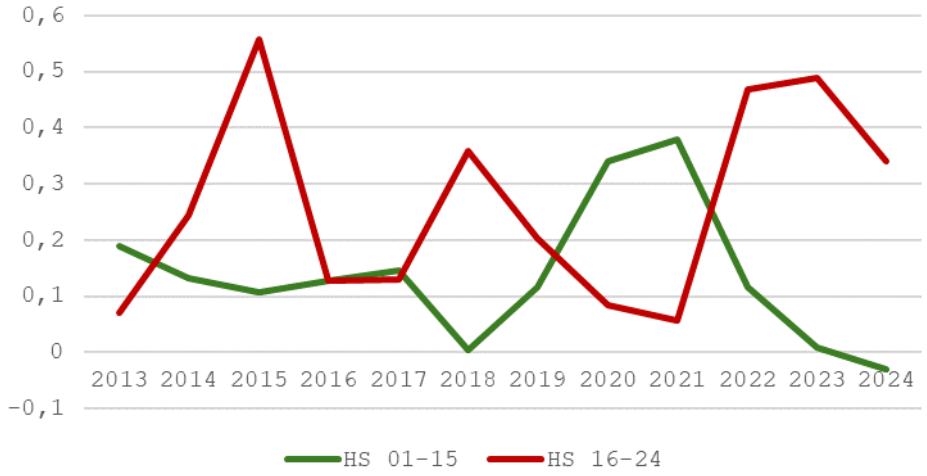
Table 3. Agri-food trade structure by commodities, 2013-2024

HS	Exports, USD thousand	Share, %	Imports USD thousand	Share, %	HS	Exports, USD thousand	Share, %	Imports USD thousand	Share, %
01 Live animals	0.1	0.0	7,951.1	2.0	13 Lac; gums, resins	17.9	0.00	826.4	0.2
02 Meat	96.5	0.01	26,046.9	6.7	14 Vegetable plaiting materials	414.0	0.06	13.7	0.00
03 Fish and crustaceans	41.5	0.01	14,333.3	3.7	15 Animal or vegetable fats and oils	98,736.5	14.2	7,321.6	1.89
04 Dairy produce	8,975.5	1.29	39,010.9	10.1	16 Preparations of meat or fish	57.7	0.01	10,316.7	2.6
05 Products of animal origin	110.2	0.02	5,809.5	1.5	17 Sugars	15,274.2	2.2	8,669.9	2.2
06 Live trees and other plants	236.6	0.03	14,516.5	3.7	18 Cocoa	4,733.8	0.68	11,560.4	2.9
07 Edible vegetables	2,597.7	0.37	17,637.1	4.5	19 Preparations of cereals	14,398.1	2.07	22,723.7	5.86
08 Edible fruit and nuts	105,163.4	15.1	20,800.1	5.3	20 Preparations of vegetables, fruit, nuts	51,528.2	7.4	16,114.1	4.16
09 Coffee, tea, mate and spices	1,010.5	0.15	8,799.8	2.2	21 Miscellaneous edible preparations	3,078.5	0.44	32,985.6	8.5
10 Cereals	131,632.2	18.9	15,864.6	4.09	22 Beverages, spirits and vinegar	67,342.4	9.6	33,013.2	8.5
11 Products of the milling industry	2,621.2	0.38	5,931.4	1.5	23 Residues and waste from the food industry	11,149.2	1.6	27,198.8	7.02
12 Oil seeds and oleaginous fruits	174,301.8	25.1	27,048.8	6.9	24 Tobacco	1,236.8	0.18	13,128.5	3.39

To complement the structural and geographical perspectives of Moldova's agri-food trade, the assessment of revealed trade advantage (RTA) offers insight into the country's export competitiveness at the product group level (Figure 1).

For agricultural commodities (HS 01-15), Moldova exhibited a consistent positive trade advantage throughout most of the analyzed period, with RTA values fluctuating between 0.10 and 0.38, except for slight downturns in 2018 and 2024, when the index approached zero or negative territory (-0.03 in 2024). This trend confirms Moldova's long-standing specialization and comparative strength in primary agricultural production. The improvement in RTA in 2020-2021 (rising from 0.11 to 0.38) coincides with strong export performance in oilseeds and cereals, boosted by favorable harvests and high global commodity prices (Figure 1). The modest decline in 2023-2024 suggests that while Moldova remains competitive in bulk agricultural exports, this advantage is somewhat sensitive to external price shifts, production variability, and input cost pressures.

Figure 1. Evolution of Moldova's Revealed Trade Advantage (RTA) index for agricultural and food products, 2013-2024.



Source: authors calculations based on data from National Bureau of Statistics

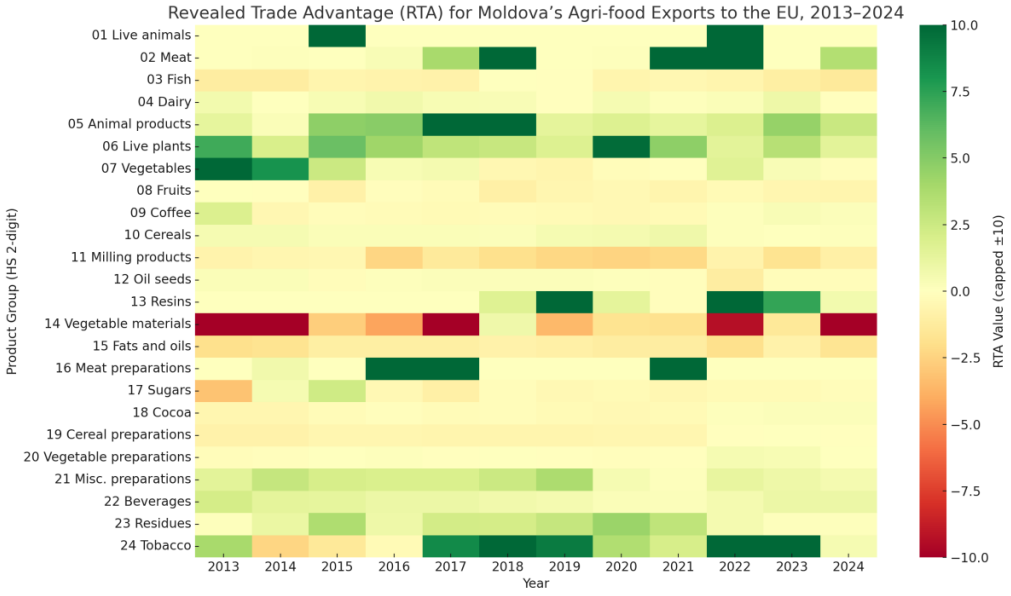
In contrast, the processed food products group (HS 16-24) demonstrates a more dynamic and upward trend in competitiveness. The RTA index rose from 0.07 in 2013 to around 0.34 in 2024, peaking at 0.56 in 2015 and again at 0.49 in 2023 (Figure 1). These results indicate that Moldova's comparative advantage in value-added food processing has strengthened over the past decade, supported by the expansion of wine, beverage, and preserved fruit exports, as well as growing access to European markets through the EU Association Agreement. Despite some year-to-year volatility, the persistence of positive RTA values confirms that the country has gradually improved its export performance beyond primary agriculture.

The RTA analysis for Moldova's agri-food trade with the European Union reveals distinct patterns of competitiveness and specialization between 2013 and 2024. Moldova has maintained a relatively narrow but persistent set of comparative advantages, with signs of gradual transition from raw agricultural exports toward more processed, value-added agri -food products (Figure 2).

Moldova's natural resource base and the expansion of horticulture are reflected in sustained comparative advantages for live plants, selected animal products, and edible vegetables (HS 05–07). Strong RTA values in these categories between 2016 and 2021 coincide with favorable weather conditions, growing EU demand and gradual improvements in compliance with European quality standards. By contrast, traditional bulk products such as oilseeds and cereals show more volatile and generally weaker RTA performance, reflecting intense price competition and limited progress toward higher value-added activities (Figure 2).

Among processed food products, only a few categories show a clear improvement in competitiveness (Figure 2). Beverages, miscellaneous edible preparations, and animal feed register positive RTA values, suggesting selective integration into European agri-food value chains. In contrast, the unusually high RTA levels for tobacco products are likely driven by re-export or contract processing arrangements rather than by strong domestic competitiveness.

Figure 2. Revealed Trade Advantage (RTA) for Moldova's Agri-food Exports to the EU, 2013-2024



Source: authors calculations

The impact of important external factors on trade performance is also reflected in the evolution of RTA values. Between 2014 and 2016, Moldova's agri-food exports experienced a first adaptation to Deep and Comprehensive Free Trade Area (DCFTA) framework, which expedited structural reorientation away from traditional CIS partners and redefined market access conditions. COVID-19 problems during the 2020–2021 period initially limited demand and logistics, but they were followed by a significant export recovery, particularly in higher-value food products. Finally, between 2022 and 2024, the war in Ukraine and related logistical challenges reshaped Moldova's trade routes and pricing environment, producing greater volatility in RTA values-particularly for cereals, oilseeds, and energy-dependent processed goods.

While the RTA results reveal Moldova's product-level export competitiveness and specialization patterns within the EU market, they do not assess the degree of structural integration between exports and imports. To complement this perspective, the Grubel-Lloyd index is employed to assess the intensity of intra-industry trade and the extent

to which Moldova's agri-food exchanges with the EU reflect vertical specialization or diversification within the same product categories. Comparing the two indicators allows for a more comprehensive understanding of Moldova's trade position-where high RTA values signal strong export advantages, but low Grubel-Lloyd scores may indicate a continued reliance on inter-industry trade in primary goods rather than balanced participation in integrated agri-food value chains.

The results of the Grubel-Lloyd index presented in Table 4 provide complementary evidence to the RTA analysis by assessing the degree of intra-industry trade (IIT) within Moldova's agri-food sector. Overall, the findings indicate that Moldova's trade remains predominantly inter-industry in nature, though a gradual increase in product overlap-particularly with EU partners-suggests a slow integration into more complex agri-food value chains.

Table 4: Intra-industry trade level for agri-food commodities, %

HS	All trading partners	EU countries	HS	All trading partners	EU countries
1	78.20	0.00	**13**	10.74	2.29
2	37.56	0.33	**14**	48.53	20.65
3	0.16	0.52	**15**	50.31	16.66
4	46.71	42.31	**16**	1.60	0.41
5	14.11	3.24	**17**	71.10	70.14
6	17.73	3.53	**18**	44.40	60.94
7	33.88	26.79	**19**	51.42	82.21
8	51.12	33.47	**20**	54.93	47.94
9	13.83	22.15	**21**	23.97	14.49
10	20.72	25.29	**22**	47.57	65.39
11	20.09	48.15	**23**	78.54	43.07
12	33.91	28.36	**24**	37.45	25.54

Source: authors calculations based on data from National Bureau of Statistics

At the aggregate level, IIT values are considerably higher for all trading partners than for EU trade alone, reflecting Moldova's continued engagement in two-way exchanges with traditional non-EU markets, where product differentiation is less pronounced. However, several categories reveal notable EU-linked integration. High intra-industry trade shares are observed for dairy products (HS 04, 42.31%)**,** milling products (HS 11, 48.15%)**,** cocoa-based goods (HS 18, 60.94%)**,** processed cereal foods (HS 19, 82.21%), and beverages (HS 22, 65.39%) - all of which correspond to processed food industries that also exhibit positive RTA values (Table 4). While the Grubel–Lloyd index does not allow for a direct empirical separation between vertical and horizontal intra-industry trade, the observed increase in two-way trade for selected processed food categories suggests a gradual move toward more differentiated trade structures.

Overall, the evidence indicates selective upgrading and closer EU market integration, rather than broad structural transformation of the agri-food sector.

By contrast, primary agricultural commodities such as live animals (HS 01), fish (HS 03), and oilseeds (HS 12) show low or near-zero intra-industry trade with the EU, reinforcing the pattern of unidirectional exports and limited reciprocal flows of similar products (Table 4). These findings complement the RTA results by illustrating that while Moldova has achieved comparative advantage in several agri-food sectors, the depth of integration into EU supply chains remains concentrated in a few high-value product groups.

Taken together, the RTA and Grubel-Lloyd analyses reveal a dual structure in Moldova's agri-food trade: strong specialization in raw agricultural exports alongside emerging, though still limited, intra-industry exchanges in processed food segments. Further the RSCA-TBI mapping approach (Widodo, 2009) was applied to characterize the structural positioning and to identify the balance between export specialization and net trade performance across agri-food product groups.

The mapping approach identified two significant trends in Moldova's agri-food trade system (Table 5). The Group A quadrant contains Moldova's main exports, which combined account for about 90% of the country's total agri-food exports (RSCA > 0; TBI > 0). These consist of processed fruits and vegetables (HS 20), oilseeds (HS 12), fats and oils (HS 15), cereals (HS 10), edible fruits and nuts (HS 08), and beverages (HS 22). These industries' strong export orientation and continued competitiveness are demonstrated by their positive comparative advantage and trade balance. Their emphasis also aligns with previous RTA findings that emphasized Moldova's advantages in primary and semi-processed agricultural goods. Only sugar (HS 17), which has a positive TBI but a negative RSCA, is included in Group C.

However, Group D is dominated by structurally weak or import-dependent industries (RSCA < 0; TBI < 0). Meat and meat products (HS 02, HS 16), dairy products (HS 04), prepared foods (HS 19, HS 21), and animal feed (HS 23) are among the categories that lack the ability to produce or process commodities on a competitive scale, despite their rising domestic demand (Table 5). Significantly, a few high-import categories, including dairy (HS 04) and other food preparation products (HS 21), have substantial import shares (above 8–10%) in the EU trade structure, reflecting Moldova's dependence on imports for basic materials and processed foods. The Group B and Group D positions, characterized by a mismatch between comparative advantage and trade balance, illustrate transitional or vulnerable sectors (Table 5). For instance, live plants (HS 14) and residues (HS 23) demonstrate competitive potential but a mixed trade orientation, suggesting opportunities for value chain upgrading through processing or diversification.

The persistence of key product groups in the same RSCA–TBI quadrants over multiple years indicates that Moldova's agri-food competitiveness is largely structural rather than transitory, reflecting stable specialization patterns rather than short-term trade fluctuations.

Table 5: Product Mapping - Moldova's agricultural trade commodity structure with EU (exports and imports, USD thousand)

	Group B:					**Group A:**				
RSCA>0	HS	Exports, USD thousand	Share in export, %	Imports, USD thousand	Share in imports, %	**HS**	Exports, USD thousand	Share in export, %	Imports, USD thousand	Share in imports, %
						08	105,163.3	15.14	20,800.1	5.37
						10	131,632.2	18.95	15,864.6	4.09
						12	174,301.8	25.09	27,048.8	6.98
						14	414.01	0.06	13.7	0.00
						15	98,736.5	14.21	7.321.6	1.89
						20	51,528.3	7.42	16,114.04	4.16
						22	67,342.4	9.69	33,013.2	8.52
RSCA<0	**Group D:**					**Group C:**				
	HS	Exports, USD thousand	Share in export, %	Imports, USD thousand	Share in imports, %	**HS**	Exports, USD thousand	Share in export, %	Imports, USD thousand	Share in imports, %
	01	0.135	0.00	7,951.1	2.05	**17**	15,274.2	2.20	8,669.9	2.24
	02	96.46	0.01	26,046.9	6.72					
	03	41.51	0.01	14,333.4	3.70					
	04	8,975.4	1.29	39,010.9	10.06					
	05	110.22	0.02	5,809.5	1.50					
	06	236.63	0.03	14,516.5	3.75					
	07	2,597.72	0.37	17,637.1	4.55					
	09	1,010.4	0.15	8,799.8	2.27					
	11	2,621.2	0.38	5,931.3	1.53					
	13	17.9	0.00	826.4	0.21					
	16	57.7	0.01	10,316.7	2.66					
	18	4,733.8	0.68	11,560.4	2.98					
	19	14,398.2	2.07	22,723.7	5.86					
	21	3,078.5	0.44	32,985.6	8.51					
	23	11,149.2	1.60	27,198.8	7.02					
	24	1,236.8	0.18	13,128.4	3.39					
	TBI <0					**TBI>0**				

Source: authors calculations based on data from National Bureau of Statistics

Taken together, the RSCA-TBI mapping confirms that Moldova's agricultural trade with the EU remains concentrated in a few high-performing export sectors**,** primarily raw and semi-processed goods, while import dependence persists in high-value food segments. These structural asymmetries underline the importance of shifting from comparative to competitive advantage, as integration into EU agri-food value chains remains limited and uneven, requiring stronger processing capacity, product differentiation, and technological upgrading in most sectors.

Conclusions

This study examined the evolution of Moldova's agri-food trade over the period 2013–2024, with a focus on competitiveness, structural change, and market reorientation in the context of deeper integration with the European Union. The results confirm that the implementation of the DCFTA marked a clear turning point, accelerating the redirection of agri-food exports toward the EU and reducing Moldova's dependence on traditional eastern markets.

The analysis shows that Moldova's agri-food exports remain concentrated in a limited number of product groups, particularly oilseeds, cereals, fruits and nuts, fats and oils, beverages, and selected processed foods. While these sectors benefit from strong comparative advantages, the overall export structure continues to be dominated by raw and semi-processed products. Competitiveness in processed food products has improved only selectively, and integration into EU agri-food value chains remains uneven, as reflected by moderate levels of intra-industry trade concentrated in a small number of categories.

These findings point to persistent structural constraints, but also to clear opportunities. The agri-food sector continues to play a key role in Moldova's external competitiveness, while also offering a pathway for gradual modernization. However, sustaining competitiveness will require greater investment in processing capacity, innovation, and product diversification, in order to retain more value domestically and reduce vulnerability to external shocks.

The results should be interpreted as indicators of structural trade positioning rather than short-term performance, especially given the high price volatility observed in recent years. Overall, the study provides a comprehensive overview of Moldova's evolving agri-food trade structure and offers relevant insights for policymakers seeking to support targeted upgrading and deeper integration into European markets. Future research could extend this analysis by exploring firm-level dynamics, product quality differentiation, or the role of sustainability standards in shaping agri-food competitiveness.

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Conflict of interests

The authors declare no conflict of interest.

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