

Cimpoieș, Liliana

**Conference Paper**

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**Provided in Cooperation with:**

The Research Institute for Agriculture Economy and Rural Development (ICEADR), Bucharest

*Suggested Citation:* Cimpoieș, Liliana (2021) : Moldova's trade with agri-food products on international markets, In: Agrarian Economy and Rural Development - Realities and Perspectives for Romania. International Symposium. 12th Edition, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest, pp. 85-94

This Version is available at:

<https://hdl.handle.net/10419/263025>

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# MOLDOVA'S TRADE WITH AGRI-FOOD PRODUCTS ON INTERNATIONAL MARKETS

LILIANA CIMPOIEȘ<sup>1</sup>

## Abstract

*This paper examines the transformations that occurred in Moldova's foreign trade on international markets, with focus on agricultural and food commodities. The research includes the analysis of Moldova's foreign trade activity with agricultural and food commodities, the changes that occurred in their structure, territorial distribution dynamics and competitiveness. The data used examines the trade flows within the last decade, regarding the agricultural and food trade products. The methodology is based on the analysis of trade indicators results as Relative Trade Advantages (RTA) and Grubel-Lloyd (GL) index. From the obtained results, most Moldova's trade flows had been of inter-industry type. Regarding RTA index results, we delimitate trade advantages in the case of six agri-food commodities. High magnitudes of intra-industry trade, according to the average GL indices results have certain commodities as: live animals, sugar, meat, dairy produce, animal or vegetable fats and oils, residues, preparations of vegetables, fruit, nuts, preparations of cereals, beverages.*

**Keywords:** agri-food commodities, inter-industry trade, intra-industry trade

**JEL Classification:** Q17, F10

## INTRODUCTION

Foreign trade benefits countries, when production inside a country is more expensive in terms of prices due to demand and supply (technology available). Differences in prices might occur due to demand which is determined by consumer preferences and their income level. Nevertheless, those are not the main factors that affect international trade rather than differences in technology.

Traditional trade theory starts with Adam Smith ideas regarding differences in prices and international trade due to absolute advantages in costs of production between countries. David Ricardo, mentions not absolute but relative advantages required for foreign trade. Differences in relative advantages and costs of production are related to country's specialization due to a different technological level but also because of the endowment with factors of production. This idea was supported by the economists Heckscher and Ohlin. The Heckscher Ohlin theory assumes that countries are endowed differently in factors of production, some are endowed more in capital or more in labor. All these theories assume that countries import or export certain commodity. Nevertheless, it excludes analysis of simultaneous trade flows within the same group of commodities. This refers to inter-industry trade, that is significant in analyzing trade between countries, not related with relative advantages or differences in technology, but scale effects related to imperfect competition and product differentiation. Inter-industry trade allows a country to focus on producing less commodities but higher amount of output with increased productivity and lower costs. Simultaneous export and import trade flows of the same commodity are analyzed within intra-industry trade. Intra-industry trade determines commodities turnover among countries. It is based on scale effects which leads to imperfect competition and product differentiation. Intra-industry trade allows a country to focus on producing only certain "fewer" commodities but in larger quantities with increased productivity and minimized cost of production.

For many Eastern European countries, the transition process implied important changes for the agri-food trade. Different researchers examined changes that occurred in terms of different aspects of inter and intra-industry trade (Luka O et al., 2004, Levkovich I et al., 2007).

The aim of this paper is to analyze the transformations that occurred in Moldova's foreign trade on international markets, with focus on agricultural and food commodities. The research

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<sup>1</sup>Ph. D., associate professor, Academy of Economic Studies of Moldova, 61 B. Bodoniu Blvd, Chisinau, Moldova, lcimpoies@ase.md

includes the analysis of Moldova's foreign trade activity with agricultural and food commodities, the changes that occurred in their structure, territorial distribution dynamics and competitiveness.

## MATERIALS AND METHODS

The paper examines changes in both inter industry and intra industry trade of Moldova through the analysis of trade indicators as Relative Trade Advantages (RTA), Grubel Lloyd (GL) index.

The research analysis of trade indicators is based on secondary data provided by National Bureau of Statistics. The trade flows between 2010 and 2020 were examined. The analyzed data refers to trade flows dynamics and their territorial distribution on main trade partners. The agri-food trade data includes the 24 Harmonized Sections (HS) that belongs to agricultural and food products, according to the Combined Nomenclature of Goods. Aggregations 01-15 belong to agricultural commodities, while 16-24 refers to food commodities.

Most common measure to estimate specialization of revealed comparative advantage is Relative Trade Advantage index (RTA), developed by Vollrath (Vollrath, 1991). This index is estimated as the difference between relative export advantage (RXA) and relative import advantage (RMA):

$$RTA = RXA - RMA \quad (1)$$

Relative export advantage, sometimes named also Balassa index and can be computed as:

$$RXA = B = (X_{ij}/X_{it}) / (X_{nj}/X_{nt}) \quad (2)$$

$X$  – exports;  $i$  – a country;  $j$  – a commodity;  $t$  – a set of commodities;  $n$  – a set of countries.

Relative import advantages is calculated as:

$$RMA = (M_{ij}/M_{it}) / (M_{nj}/M_{nt}); \quad (3)$$

$M$  – import.

A comparative trade advantage is revealed through a value greater than zero of RTA index, while trade disadvantages indicates values lower than zero. If a country or sector has comparative advantage, then the given sector and/or industry in country  $i$  is trade competitive.

For intra-industry trade dynamics assessment, Grubel-Lloyd index (GL) (Grubel and Lloyd, 1975) was used. Intra-industry trade (IIT) refers to the trade between countries, where the costs of exports of particular industry/sector are compared to the costs of imports of same industry/sector. GL index reveals share of intra industry trade in the total amount of exports of a particular industry and/or sector. GL index can take values from 0 to 100, and is computed according to the following:

$$GL_i = \frac{[(X_i + M_i) - |X_i - M_i|]}{X_i + M_i} \times 100\%, \quad (4)$$

where,

$GL_i$  – index of intra industry trade;

$X_i$  - value of export in industry  $i$ ;

$M_i$  - value of import in industry  $i$ ;

$X_i + M_i$  - total value of trade;

$|X_i - M_i|$  - trade balance of industry  $i$ .

When GL index takes value close to 100, most trade flows are of intra-industry trade, while values closer to zero indicates that most trade is of inter-industry type.

Intra industry trade (IIT) according to the Grubel Lloyd index is estimated according to the following equation:

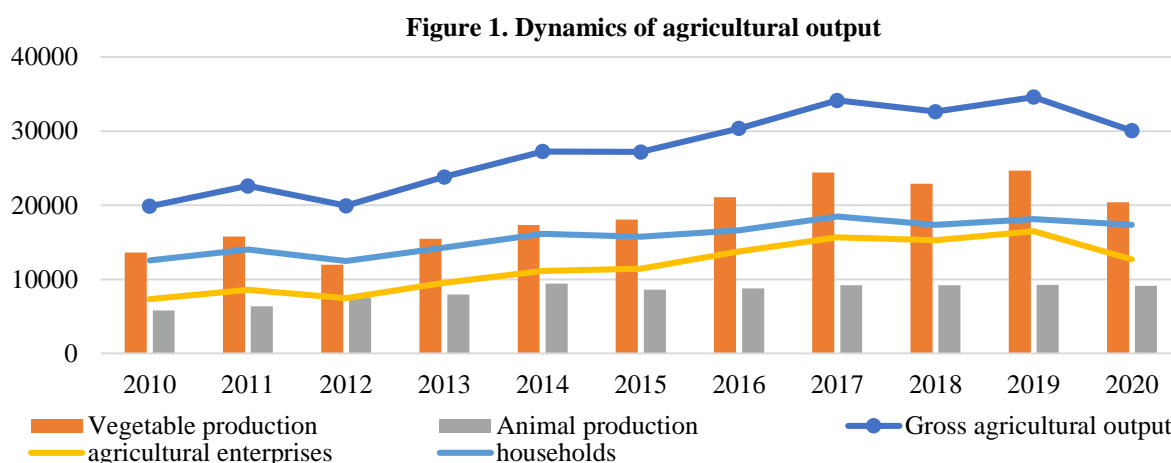
$$GL_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)}$$

(5) where,  $X_i$  represent the export in a certain type of commodities and  $M_i$  shows imports within the same group of commodities. GL values are situated between 0 and 1, higher values indicating higher magnitudes of intra-industry trade.

## RESULTS AND DISCUSSION

Moldova's economy traditionally relies on the agricultural sector. Despite the fact that the share of the agricultural sector in GDP decreased over the last decades and accounts about 12 percent in 2020. About half of Moldavian exports belong agricultural and food products (45 percent). Also, about one third of labor force is employed in agriculture. As non-agricultural activities have a small share in rural areas, the incomes of most of rural population depends on the development of the agricultural sector.

Gross agricultural output had increased over the examined period and accounted 30061 million MDL in 2020, with 12 percent less than in 2019. About 70 percent belongs to vegetable production, while animal production has a share of 30 percent. Households contribute with about 60 percent to Gross Agricultural Output (Figure 1).



Source: based on data from National Bureau of Statistics

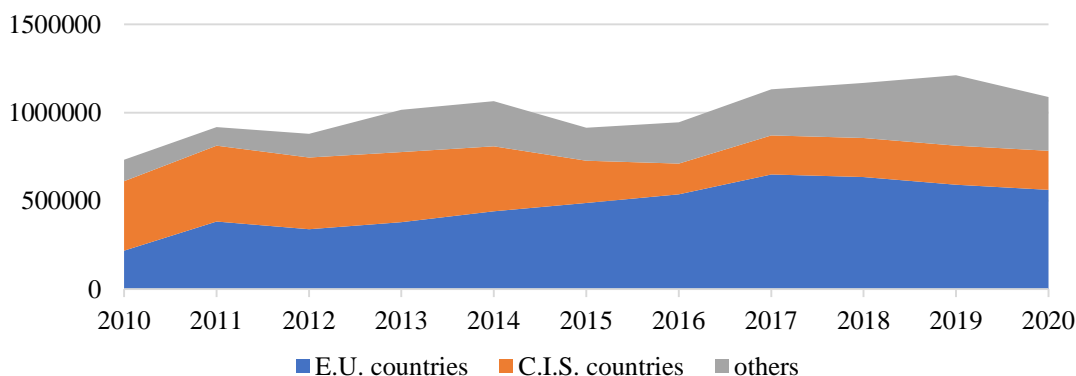
Moldova's trade flows dynamics on global markets experienced changes, both exports and imports flows with agricultural and food products increased considerable. The amount of exported agri-food exports to foreign markets constituted 1006 million US dollars while imported goods 714,5 million US dollars (average value during 2010-2020). The amount of exported agri-food products on international markets increased by 48 percent in 2010-2020, while imports increased by 43 percent within the same period. Moldova's total trade balance is maintained negative, as a result of large imported amounts of natural gas, energetic resources, oil etc. Agri-food products represent almost half of all exported goods. As result, trade balance for agri-food products is positive, despite the fast growth in imports in recent years.

The territorial distribution of trade flows on international agri-food markets changed after 2012-2013. The trade flows towards the European market for agri-food products had grown considerably after 2014. A major contribution to this change was due to the fact that Moldova signed a Deep and Comprehensive Free Trade Agreement (DCFTA) with E.U. at the end of 2013. In general, Moldova's trade flows to E.U. market started to increased slowly since 2005. Traditionally, C.I.S. countries were the main distribution market for Moldova's agricultural and food products, mainly Russian Federation, Ukraine, Belorussia. Due to several embargoes applied by Russian Federation, first in 2006 on Moldova's wine and other alcoholic beverages, followed by other restrictions in 2013 initially for wines, and extended lately to meat products, in 2014 were added new interdiction to fruit exports, local producers needed to find new markets.

A closer approach to E.U. market started earlier by being granted initially with General System of Preferences (GSP) and GSP plus in 2006. Later, Moldova benefitted from Autonomous Trade Preferences (ATP) in 2008 for several agri-food products as beverages, sugar etc (Cimpoies, 2016).

During 2010-2020 Moldova exported agricultural and food products on the European market in value of 475.1 million US dollars (Figure 2). The largest amount of exported agri-food products to E.U. countries were recorded in 2017 in value of 649.5 million US dollars, followed by a slight decrease in the next year. Traditionally Romania is the main distribution market for Moldova’s agricultural and food products among E.U. countries. In 2019 Moldova exported to the Romanian agri-food market products in value of 183.2 million US dollars among which the largest share belongs to oil seeds and oleaginous plants (HS 12), beverages (HS22), fruits (HS 08), cereals (HS 10). In 2019 exports of agri-food products were also distributed on the market of Italy, Poland, Bulgaria, Germany.

**Figure 2. Geographical distribution of Moldova’s exports with agricultural and food products on international markets, 2010-2020**



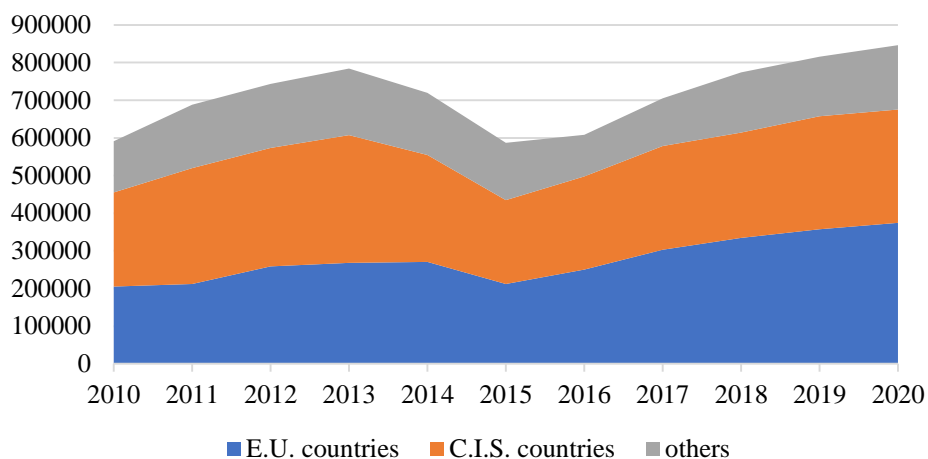
Source: based on data from National Bureau of Statistics

In recent years had decreased considerably the share of Moldova’s exports of agri-food products to the C.I.S. market. During 2010-2020 the exports of agricultural and food products to this market constituted 299052.8 thousands U.S. dollars. The main distribution market for Moldova’s agri-food products on the C.I.S. market is Russian Federation, Belorussia and Ukraine. In 2019 Moldova exported agricultural and food products on the Russian market in value of 121 million US dollars, among which the largest share belongs to edible fruits and nuts (HS 08), beverages (HS 22) and preparations of vegetables and fruits (HS 20). To Belorussia, were exported agri-food commodities in value of 62 million US dollars, mostly beverages (HS 22) in 2019. To Ukrainian agri-food market were exported commodities in value of 24 million US dollars.

In the same time, the agri-food exports towards other countries than the groups mentioned above had increased. Among this category of countries we can mention the agri-food trade flows oriented to Turkey, Switzerland, China, Georgia. Turkey was the destination market for Moldova’s exported agri-food commodities in 2019 in value of 138 million US dollars. Among these products the largest share is for oil seeds and oleaginous fruits (91.7 million US dollars) and cereals (27.9 million US dollars).

In 2020, from the 846.5 million US dollars of imported agricultural and food commodities, 373,9 million US dollars were from European Union countries and 300,9 million US dollars from the C.I.S market. The imported agri-food products from both markets increased in the last decade, with a slight decrease in 2015 with all trade partners (Figure 3).

**Figure 3. Geographical distribution of Moldova's imports with agricultural and food products on international markets, 2010-2020**



Source: based on data from National Bureau of Statistics

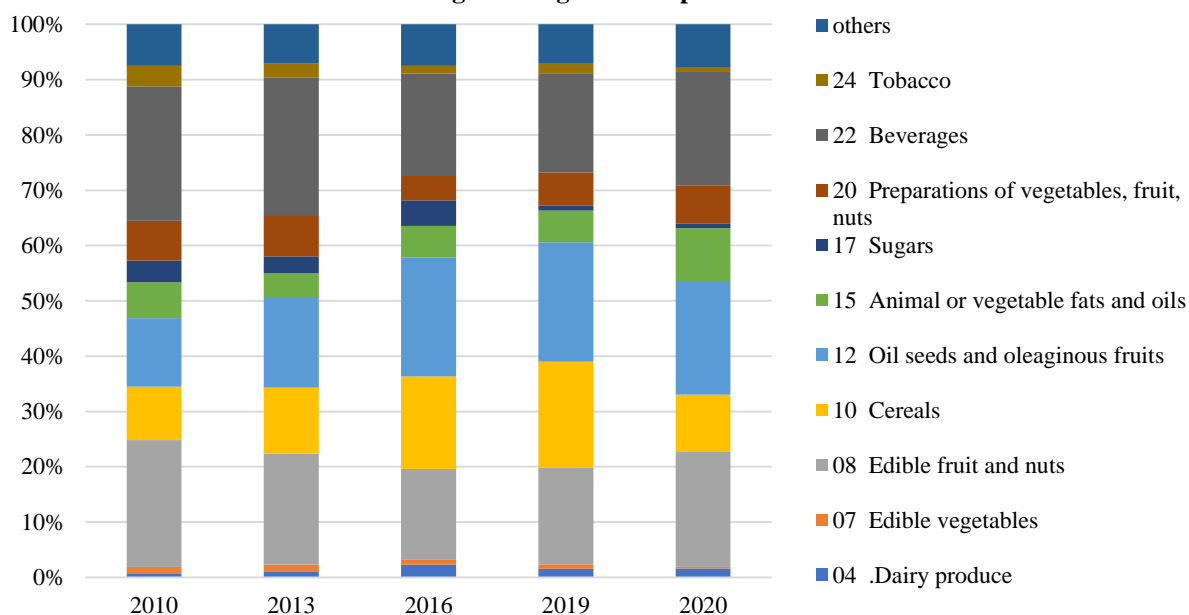
Among main trade partners for imported agri-food products on the European market are Romania, Poland, Greece, Germany, France etc. In 2019 the amount of imported agri-food products from Romania was in value of 74,5 million US dollars, mainly residues (HS 23), products of animal origin (HS 05), cereals (HS 10) and lac, gums, resins (HS 13).

From the C.I.S. market most of agri-food imports are originated from Ukraine (197,4 million US dollars in 2019), followed by Russian Federation and Belorussia. From Ukrainian market are imported mainly dairy products (HS04), beverages (HS22), preparations from cereals (HS19).

Imported agricultural products and foodstuffs are mainly originated from Turkey (HS06, HS07), Ecuador (HS08), China (HS24, HS10), United States of America (HS22, HS03, HS12).

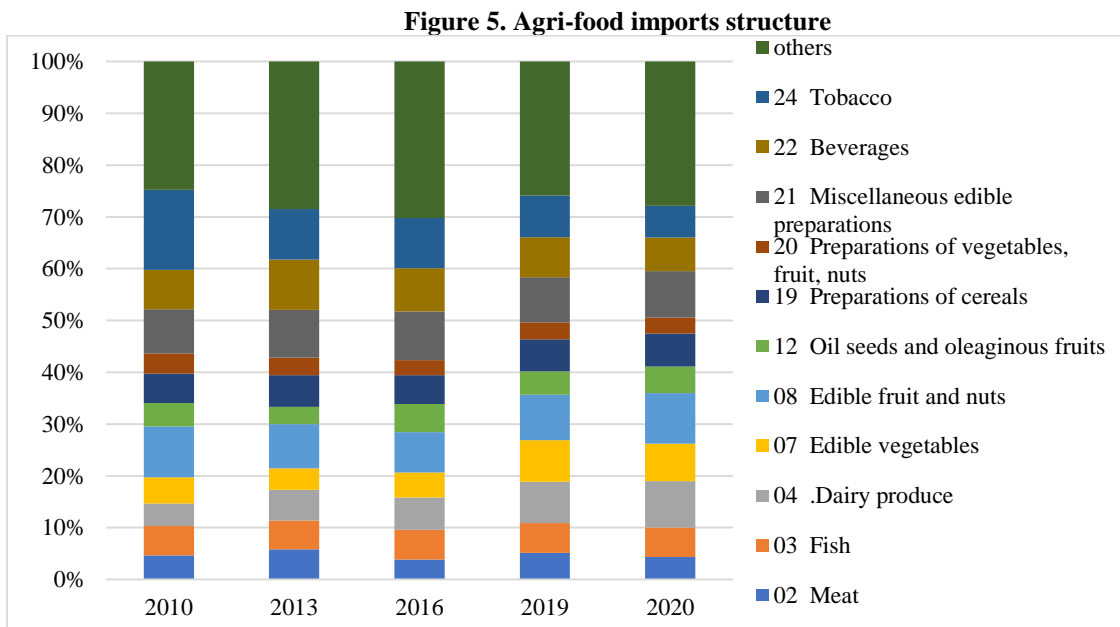
Moldova's agri-food exports are dominated by four products that represent 80 percent of total exported agri-food products (Figure 4). These are: edible fruits and nuts (HS08), beverages (HS22), oil seeds and oleaginous fruits (HS 12), cereals (HS10) (Figure 4). Over the examined time series, the share of beverages and edible fruits and nuts had decreased. In the same time, increased the amount exported of oil seeds and oleaginous plants and cereals.

**Figure 4. Agri-food exports structure**



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

Agri-food imports are more diversified (Figure 5). Main imported commodities are: tobacco (HS24), beverages (HS22), miscellaneous edible preparations (HS21), preparations of vegetables, fruit and nuts (HS20), preparations of cereals (HS19), oil seeds and oleaginous fruits (HS12), edible fruit and nuts (HS08), edible vegetable (HS07), meat (HS02) dairy produce (HS04), fish (HS03). Due to Moldova's geographical position and weather some particular agri-food products and only imported as exotic fruits, fish and seafood, coffee and tea.

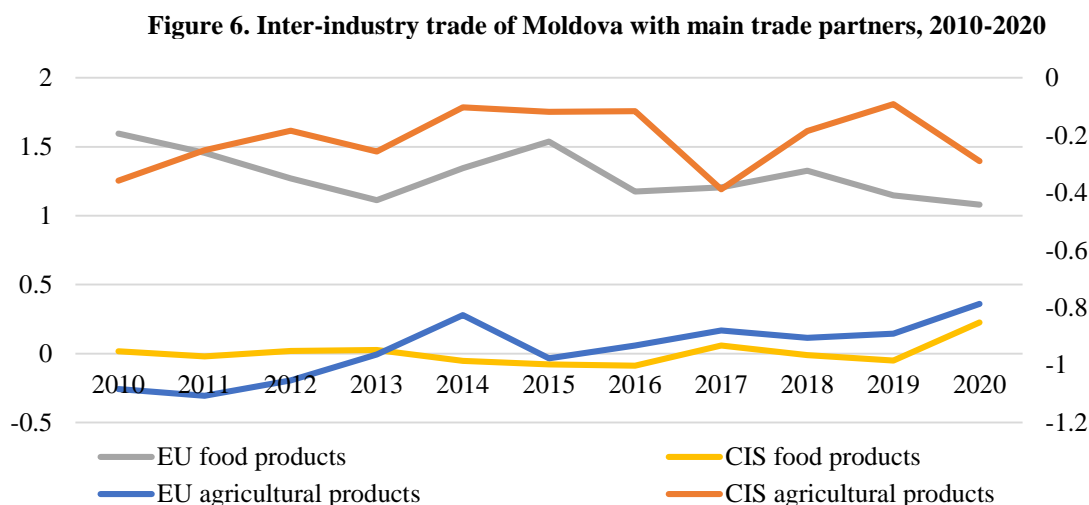


Source: Source: based on data from National Bureau of Statistics

We used exports and imports statistical data to analyze agri-food trade of Moldova during 2010-2019. The data include the 24 product groups that refer to agricultural commodities and foodstuffs. The analysis include section 01-15 for agricultural commodities and 16-24 for foodstuffs.

Moldova's relative trade advantages were calculated to show the competitiveness at regional level with European countries and C.I.S. countries.

According to the obtained results (Figure 6), Moldova has disadvantages in trade with agricultural commodities with both C.I.S. and E.U. countries.



Source: own calculations

A more detailed analysis reveals that trade disadvantages are common for specific imported commodities as fish, coffee and tea. In relation to the European market, disadvantages are common for preparations of fruits and vegetables, preparations of cereals. In terms of competitiveness in the regional C.I.S. market, Moldova has also disadvantages for commodities as dairy products, edible fruits and nuts, beverages (Table 1).

The competitiveness of Moldova's foodstuffs on foreign markets is improving (Figure 6). Currently most foodstuffs have trade advantages of different agri-food markets.

**Table 1. Relative agri-food trade advantages of Moldova by products**

RTA >0		RTA <0		RTA switching values	
E.U.	C.I.S.	E.U.	C.I.S.	E.U.	C.I.S.
Edible vegetables 07	Animal or vegetable fats and oils 15	Fish 03	Meat 02	Edible fruit and nuts 08	Edible vegetables 07
Animal or vegetable fats and oils 15	Preparations of meat 16	Coffee, tea 09	Fish 03	Cereals 10	Cereals 10
Preparations of meat 16	Sugars 17	Cocoa 18	Dairy products 04	Products of the milling industry 11	Products of the milling industry 11
Miscellaneous edible preparations 21	Preparations of cereals 19	Preparations of cereals 19	Products of animal origin 05	Oil seeds and oleaginous fruits 12	Oil seeds and oleaginous fruits 12
Beverages 22	Miscellaneous edible preparations 21	Preparations of vegetables, fruit, nuts 20	Edible fruit and nuts 08	Lac; gums, resins 13	
Tobacco 24	Tobacco 24		Preparations of vegetables, fruit, nuts 20	Sugars 17	
			Beverages 22		

*Source: own calculations*

Moldova has trade advantages on the European market for aggregations HS 07 edible vegetables, HS 16 preparations of meat, HS22 beverages, HS24 tobacco. In relation to C.I.S. countries, trade advantages are present in the case of six aggregations: HS15 animal or vegetables fats and oils, HS 17 sugars, HS 16 preparations of meat, HS19 preparations of cereals, HS 24 tobacco etc. (Table 1).

Certain agri-food commodities register fluctuating values of RTA index. This refers to aggregations as HS 10 cereals, HS 12 oil seeds and oleaginous plants etc. Such aggregations include intense changes in relative trade advantages. In certain periods they register positive values of RTA index, while in some periods they tend to have negative values. These commodities have potential to improve their competitiveness in these markets.

In international economics, an important concept is intra-industry trade which refers to simultaneous exchange of commodities within the same industry. There are different indices that allows us to estimate the level of intra-industry trade. One of most used indices to appreciate the level of intra-industry trade is considered to be Grubel-Lloyd Index (GL). Table 2 presents the results of calculated GL indices for agri-food commodities.

**Table 2. Intra-industry trade with agri-food commodities between Moldova and all trading partners**

GL	2010	2012	2014	2016	2018	2020	average
01 Live animals	75.91	92.95	54.40	79.28	58.67	77.15	78.34
02 Meat	54.13	68.07	78.83	53.53	42.51	28.41	54.54
03 Fish	0.82	0.31	0.04	0.31	0.00	0.13	0.24
04 .Dairy produce	34.25	32.45	59.92	72.57	59.99	37.32	51.41



GL	2010	2012	2014	2016	2018	2020	average
05 Products of animal origin	11.67	23.01	5.35	1.74	16.13	16.78	13.10
06 Live trees	38.31	31.05	18.14	32.76	18.11	20.60	25.80
07 Edible vegetables	45.03	66.85	66.78	43.76	23.31	9.77	46.44
08 Edible fruit and nuts	51.43	50.72	50.50	46.64	51.20	53.41	50.19
09 Coffee, tea	9.84	0.24	7.79	20.16	26.16	11.03	13.35
10 Cereals	24.07	51.22	15.88	17.20	17.77	45.28	24.70
11 Products of the milling industry	4.68	10.13	15.61	6.94	17.03	10.62	11.35
12 Oil seeds and oleaginous fruits	45.49	37.33	30.47	28.09	34.20	32.62	30.51
13 Lac; gums, resins	3.24	5.77	0.26	21.14	9.57	4.27	6.94
14 Vegetable plaiting materials	48.40	30.08	3.74	51.58	79.48	34.40	43.78
15 Animal or vegetable fats and oils	57.69	48.06	49.62	62.03	47.31	34.35	52.89
16 Preparations of meat	10.35	1.92	4.32	0.22	0.25	0.09	1.71
17 Sugars	60.27	93.54	47.77	74.84	97.34	66.35	74.23
18 Cocoa	21.00	24.22	41.92	46.92	52.21	42.36	38.65
19 Preparations of cereals	35.36	47.59	55.50	66.53	54.26	49.69	51.64
20 Preparations of vegetables, fruit, nuts	60.60	57.61	53.51	59.53	66.57	52.37	55.14
21 Miscellaneous edible preparations	16.31	19.95	19.58	25.04	26.37	15.54	21.08
22 Beverages	40.29	48.21	45.96	44.95	44.01	39.54	43.70
23 Residues	91.09	99.72	83.36	73.19	77.28	90.51	81.83
24 Tobacco	45.79	58.36	43.42	37.45	52.86	28.36	44.80

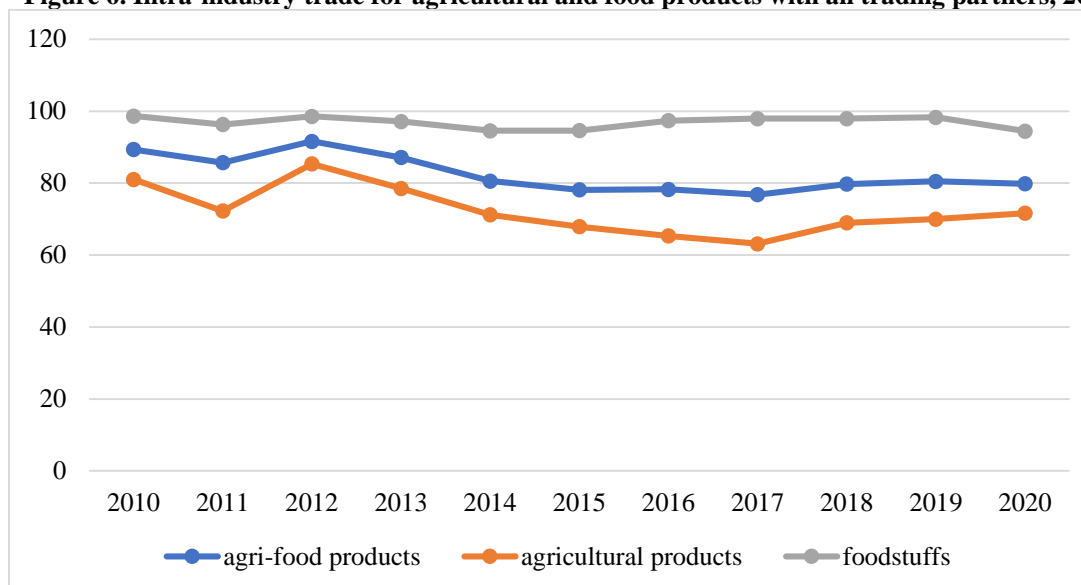
*Source: own calculations*

From the observed results in the evolution of GL indices, for certain commodity groups, high variability over time is noticed. High magnitude of intra-industry trade, according to the average GL indices results is present in the following commodities: live animals (HS 01), sugar (HS17), meat (HS02), dairy produce (HS04), animal or vegetable fats and oils (HS15), residues (HS23), preparations of vegetables, fruit, nuts (HS20), preparations of cereals (HS19), beverages (HS22). For some commodities, low levels of intra-industry trade is observed: fish (HS03), products of animal origin (HS05), coffee, tea (HS09), cereals (HS10), products of milling industry (HS11), preparations of meat (HS16).

Intra-industry trade indices were computed separately for agricultural products (HS01-15), foodstuffs commodities (HS 16-24) and all agri-food products (HS01-24) (Figure 6).

From the results, foodstuffs commodities have higher intra-industry trade indices (97 percent on average), comparing to agricultural products that have 72 percent on average in 2010-2020. This is due to the fact that intra-industry-trade is more common in sectors with product differentiation, and is less significant in sectors that produce mainly standardized products (agricultural products), where trade is mostly inter-industry (Kandogan 2003)

**Figure 6. Intra-industry trade for agricultural and food products with all trading partners, 2010-2019**



Source: own calculations

We could mention that for both foodstuffs and agricultural products the indices of intra-industry trade fluctuated in the same direction. The intra-industry trade indices for all agri-food products registered a high level during 2010-2020 (91.7 on average).

## CONCLUSIONS

Moldova's trade flows dynamics on global markets experienced certain changes within the examined time series. The trade flows towards the European market for agri-food products had grown considerably after 2014. A major contribution to this change was due to the fact that Moldova signed a Deep and Comprehensive Free Trade Agreement (DCFTA) with E.U. at the end of 2013. In general, Moldova's trade flows to E.U. market started to increase slowly since 2005. Moldova's agri-food exports are dominated by four products that represent 80 percent of total exported agri-food products.

Trade disadvantages are common for specific imported commodities as fish, coffee and tea. In relation to the European market, disadvantages are common for preparations of fruits and vegetables, preparations of cereals. In terms of competitiveness in the regional C.I.S. market, Moldova has also disadvantages for commodities as dairy products, edible fruits and nuts, beverages.

High magnitudes of intra-industry trade, according to the average GL indices results is present in the following commodities: live animals (HS 01), sugar (HS17), meat (HS02), dairy produce (HS04), animal or vegetable fats and oils (HS15), residues (HS23), preparations of vegetables, fruit, nuts (HS20), preparations of cereals (HS19), beverages (HS22). For some commodities, low levels of intra-industry trade is observed: fish (HS03), products of animal origin (HS05), coffee, tea (HS09), cereals (HS10), products of milling industry (HS11), preparations of meat (HS16).

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