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# COMPARATIVE ADVANTAGE IN HONEY TRADE AMONG THE TOP EXPORTING COUNTRIES IN THE WORLD

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***Abstract***

*The paper aimed to analyze the competitiveness of top 16 honey exporting countries in the world in the period 2018-2021 using World Bank data, based on the specific indicators Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Comparative Export Performance Index (CEP) and Trade Balance Index (TBI). The results showed that in 2021, New Zealand, Argentina, Ukraine, Greece, Hungary, Romania, Brazil, India, Spain, Vietnam, Poland and Mexico had a comparative advantage, while EU, China and Germany have a comparative disadvantage in the international honey market. A strong comparative advantage belongs to New Zealand, Argentina, Ukraine, Hungary and Romania, and partially to Greece, a moderate comparative advantage belongs to Brazil, India, Spain, Mexico, Vietnam and Greece in specific years, a weak comparative advantage belongs to Poland, Vietnam, China and Spain in specific years, and finally, China, EU and Germany are disadvantaged. The highest RSCA is characteristic to New Zealand, Argentina, Ukraine, Greece, Hungary, Romania and Brazil. New Zealand has the highest CEP against EU, China, Germany, and the smallest CEP versus Brazil, Romania, Hungary, Greece and mainly Ukraine. New Zealand, Argentina, Brazil, Ukraine, Hungary, Mexico, followed by India and Vietnam have a high TBI being net exporting countries. EU, Germany, Poland had a negative TBI, reflecting that they are net importers and also Greece in 2018. As any country desires to be more competitive, exports and imports have to be kept under control, larger amounts to be available to be sold at the best price and the geographic area of influence to be extended looking for new trade partners.*

***Key words*****:** *comparative advantage, honey, top 15 exporting countries, RCA, RSCA, CEP, TBI, world*

## INTRODUCTION

Bees play a very important role on the Earth from an economic, social and environment point of view [48].
They are vital for our planet as the history of civilization proved for thousands years.
Picking up the nectar from agricultural and forage crops and also from the wild flora, bees assure the pollination which allows reproduction of numerous plant species [17, 36, 37, 43]. According to FAO, bees contribution to food security at the global level is about 30% [9].
Beekeeping is an important subsector of agro-economy assuring jobs for an important number of farmers, additional income for farmers and bee lovers, a higher living standard and contribute to the growth of agricultural production value, to the support of agriculture to GDP and economic prosperity in the world [39].
Honey, pollen, royal jelly, propolis, bee wax, venom etc are the most important bee products for human nutrition and health [34, 35].
By their existence, bee colonies assure environment protection, biodiversity preservation and the perennial beauty of the landscapes.
Despite this important role in maintaining life, nowadays, bee colonies are facing obstacles in their development like: decrease of their habitat, intensive agricultural technologies

based on high consumption of chemical substances (fertilizers, herbicides, pesticides), parasites and diseases, invasive species, climate change. All these factors affect bees life and work, pickings and honey yield and led to the decline of bee population at the global level, which is an "alarm bell" for the their existence and of mankind as well [40, 41, 52].

To sustain bee colonies and beekeeping development, United Nations issued an "Environment Programme destined to support biodiversity, to preserve the habitat and management, to mitigate the effects of climate change [47].

In the year 2021, the statistical data showed that the world honey production reached 1.77 million metric tons, meaning by 41% more than in the year 2000 (1.25 million MT) and by 5.4% less than the peak reached in 2017 (1.87 million MT) [44].

The leaders in honey production in the year 2021, in the decreasing order, were: China, Turkiye, Iran, Argentina, Ukraine, India, Russia, Mexico, United States, Brazil, Canada, Spain, Tanzania, Romania, Rep. Korea, which all together carried out 1,260,537 MT, representing 71.13% of the global honey output [10] (Fig. 1).

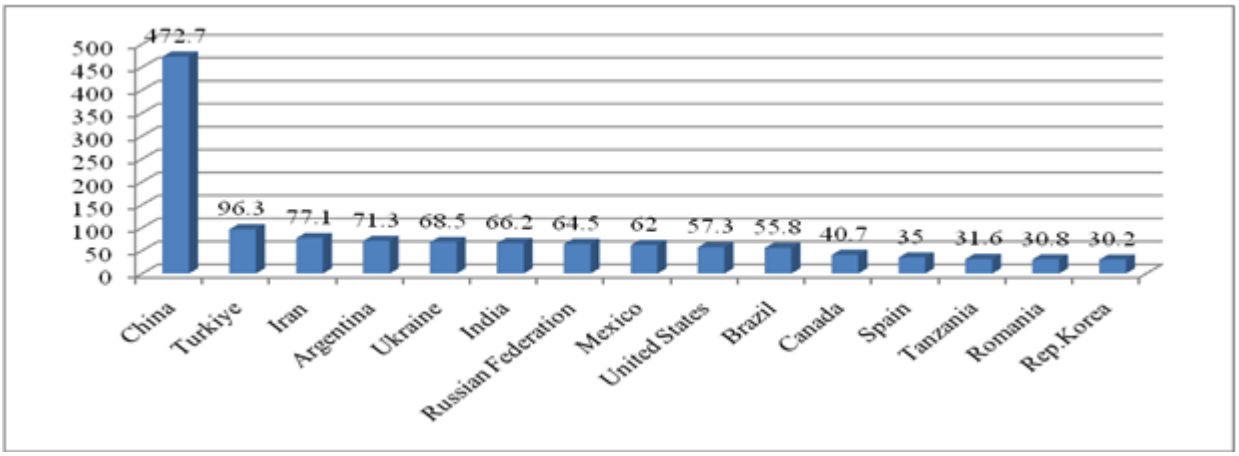


Fig.1. Honey production in the top 15 producing countries worldwide in 2021 (Million tons)
Source: Own design based on the data from [49].

In 2021, the value of global export of honey accounted for USD 2,824.84 Million, and the value of import was USD 3,157.56 Million [50]. In 2021, the top 15 honey exporting countries in the world were: New Zealand, China, Argentina, European Union, Brazil, Germany, Ukraine, India, Spain, Hungary, Mexico, Vietnam, Poland, Greece and Romania (Fig.2).

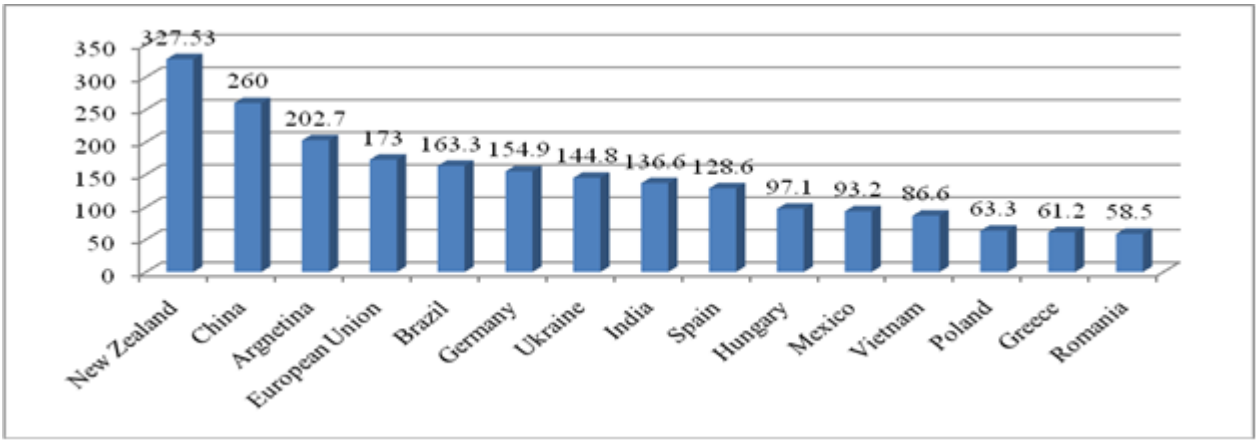


Fig. 2. Honey export value in the top 15 exporting countries worldwide in 2021 (USD Million)
Source: Own design based on the data from [49].

In the same year, the top 15 importing countries were; Unites States, European Union, Germany, Japan, United Kingdom, France, Italy, China, Poland, Saudi Arabia, Spain, Netherlands, Belgium, Switzerland, Canada (Fig. 3).

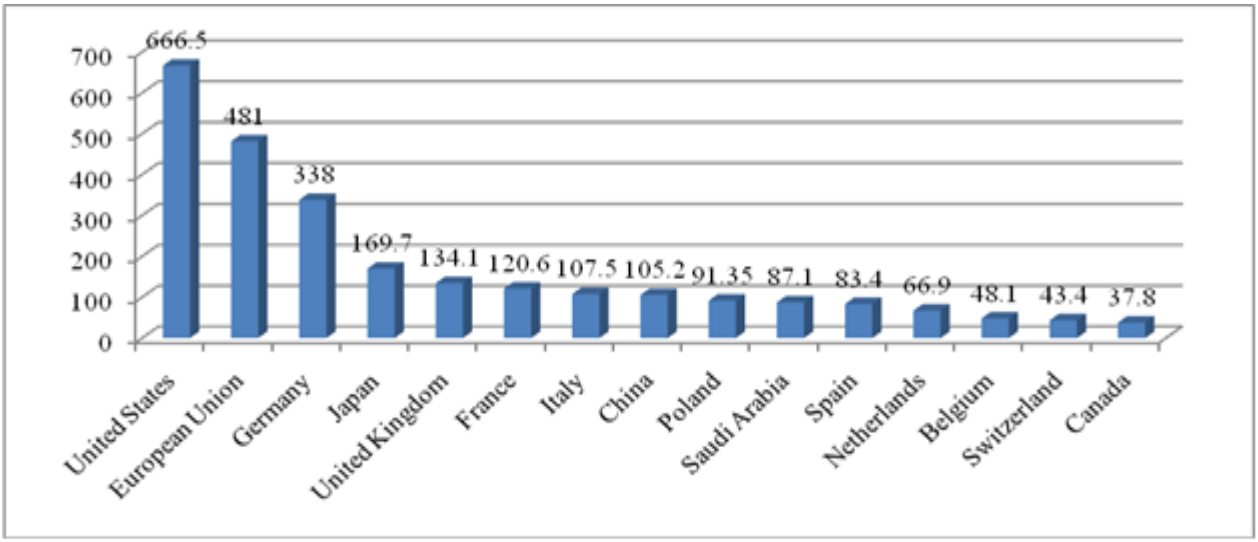


Fig. 3. Honey import value in the top 15 importing countries worldwide in 2021 (USD Million)
Source: Own design based on the data from [49].

Honey market was studied from various points of view: the number of bee hives, bee families [51, 18], number of apiarists, honey yield per family, honey production [4, 15, 34, 38, 39, 42], gross margin in honey production [15], optimization of apiary size [3, 17, 23, 25, 26, 29], beekeepers income [1, 31, 32], honey price volatility [33], demand and offer, main producing, exporting and importing countries, produced, exported and imported honey quantities, export, import and trade balance, geographical trade partners, efficiency in honey trade etc. [11, 22, 24, 27, 28, 35, 46].

The development of honey trade has led to a higher and higher competition among producers, exporters and importers, an aspect of high interest for each country which has to know its competitors and their power, and more than this to quantify in what measure a country could have a comparative advantage or disadvantage in the international market.

In this respect, from a methodological point of view, researchers have at their disposal specific indices developed to measure the comparative advantage [29].

The revealed comparative advantage index, RCA, was established by Balassa (1965) to compare the export share of a country for a certain product in the total export of that country with the weight of the product world export in the global export of all goods [6].

A more detailed interpretation of Balassa index was given by Hinloopen and Marrewijk (2001) [12].

RCA was adjusted by Laursen (1998) who set up the Revealed symmetric comparative advantage, RSCA [20].

Lafay (1992) developed Trade Balance Index, TBI, in order to find out if a country is a net exporter or importer of a certain product [19].

Starting from Balassa index, Donges (1992) developed Comparative Export Performance Index, CEP, which measures the competitiveness of a country's export versus a competitor country for a special product [8].

These indices and other alternatives of indices have been used by various researchers to analyze the comparative advantage of a country or a group of countries for a product or group of products or sectors.

However, the literature offers just a few examples regarding the competitiveness of honey in the international market.

Ma Lunjiao (2009) found that China, Argentina and Mexico are among the major honey exporters in teh world and have a RCA

higher than 1, reflecting their comparative advantage [21].

Ignjatijević et al.(2015) used RCA, RXA, RTA, lnRXA, RC and RSCA to measure the comparative advantage of Serbian honey export in the global market [13].

De Paula et al. (2017) studied the comparative advantage index of the Brazilian honey and affirmed that its honey is high competitive in the international market [7].

Terin et al. (2018) calculated RCA and TBI and found out that Turkiye is a net exporter of honey with a weak comparative advantage in relation to the Balkan countries ( Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Greece, Moldova, Montenegro, Macedonia, Romania, Serbia and Slovenia) [45].

Avila et al. (2019) analyzed the comparative advantage of Mexican honey [5].

Pippinato et al. (2019) analyzed the EU honey market emphasizing the Italian market using TXA, RMA, RTA, finding out that Italy is not so competitive in honey export, being more oriented to export [23].

Illés et al. (2021) used RCA for analyzing the competitiveness of honey production between the four Visegrad country group and also mentioned that Hungary has a comparative advantage [14].

Kalita et al. (2021), studied the export pattern of India in the world [16].

In 2022, Akdeniz and Kantar analyzed honey export potential and competitiveness in Turkiye using RCA, RSCA AND TBI and affirmed that Turkiye is a net honey exporter and with a high comparative advantage [2].

In this context, the purpose of the paper was to analyze the comparative advantage of honey among the top 15 honey exporters in the world in the period 2018-2021 using RCA, RSCA, CEP and TBI in order to identify for which countries the comparative advantage is revealed or not, and which countries are net exporters and have a high export performance.

## MATERIALS AND METHODS

The empirical data needed to setup this research were picked up from the following official information sources; WITS World Bank and FAOStat for the period 2018-2021.

The main indices used for measuring the comparative advantage in the global honey market in the top exporting countries were: Revealed Comparative Advantage -RCA, Revealed Symmetric Comparative Advantage-RSCA, Comparative Export Performance Index- CEP and Trade Balance Index-TBI.

These indices were calculated for the following countries: New Zealand, China, Argentina, European Union, Brazil, Germany, Ukraine, India, Spain, Hungary, Mexico, Vietnam, Poland, Greece and Romania.

the formulas used for the determination of these indices are given below:

*(a) Revealed Comparative Advantage* $RCA\,{}^{j}_{it}$:

$$RCA\,{}^{j}_{it} = \frac{(X^{j}_{it})}{(X^{j}_{t})} / \frac{(X^{w}_{it})}{(X^{w}_{t})} \quad \text{.....(1)}$$

where:

$RCA\,{}^{j}_{it}$ = comparative advantage index for commodity i ( honey) of the country j (the world top 15 exporting countries of this commodity) in the year t ( 2018 2019, 2020, 2021).

$(X^{j}_{it})$ = export of commodity i (honey) of the country j in the year t;

$(X^{j}_{t})$ = country j's export of all goods in the year t;

$(X^{w}_{it})$= world export of the commodity i in the year t;

$(X^{w}_{t})$ = world export of all goods in the year t.

The interpretation of RCA value according to Balassa's classification (1965) [6] is the following one:

- If $RCA\,{}^{j}_{it}$ has a value higher than 1, the country j has a comparative advantage in honey in the year t. Therefore, honey is more important for that country's export than the exports of the reference countries. This value results because the weight of honey export in the total export of the country j is higher than the share of the global honey export in the global export.

-If $RCA_{it}^{j}$ has a value smaller than 1, the country j has a comparative disadvantage in honey in the year t. In this case, the share of honey export in the total export of the country j is smaller than the weight of global honey export in the global export.

- If $RCA_{it}^{j}$ is equal to 1, for the country j, the comparative advantage is revealed.

According to Hinloopen and Marrewijk's classification (2001) [12], RCA values are interpreted as follow:

- "No" comparative advantage when 0 < RCA ≤ 1;
- "Weak" comparative advantage when 1 < RCA ≤ 2;
-"Moderate" comparative advantage when 2 < RCA < 4;
-"Strong" comparative advantage when RCA > 4.

*(b) Revealed Symmetric Comparative Advantage-$RCSA_{it}$*

$$RSCA_{it}^{j} = \frac{(RCA_{it}^{j} - 1)}{(RCA_{it}^{j} + 1} \quad \text{.....(2)}$$

This index could take values between 1 and -1.

If RSCA has a positive value, 0 < RSCA < 1;honey has a comparative advantage , and if RSCA has a negative value, -1 ≤ RSCA < 0, this product has a comparative disadvantage for the country j in the year t.

*(c)Comparative Export Performance Index-$CEP_{it}$*

$$CEP_{it}^{j} = \frac{(X_{it}^{j}/X_{it}^{r})}{(X_{t}^{j}/X_{t}^{r})} \quad \text{.....(3)}$$

where:

$(X_{it}^{j})$ = export of commodity i (honey) of the country j in the year t;

$(X_{t}^{j})$ = country j's export of all goods in the year t;

$(X_{it}^{r})$= export of commodity i (honey) of the competitor country r in the year t;

$(X_{t}^{r})$ = export of all goods of the competitor country r in the year t.

*(d)Trade Balance Index-$TBI_{it}^{j}$*

$$TBI_{it}^{j} = \frac{(X_{it}^{j} - M_{it}^{j})}{(X_{it}^{j} + M_{it}^{j})} \text{.....(4)}$$

where:

$(X_{it}^{j})$ = export of commodity i (honey) of the country j in the year t;

$(M_{it}^{j})$ = import of commodity i (honey) of the country j in the year t;

The interpretation of TBI values is the following one:

-If TBI has a positive value, 0 < TBI < 1, the country is a net exporter of that commodity (honey); this means that honey export is more important for that country.

- If TBI has a negative value, - 1 ≤ TBI < 0, the country is a net importer of that commodity. In this case, this means that honey import is more important for that country or the country is disadvantaged.

If TBI = 0, the export value is equal to import value.

## RESULTS AND DISCUSSIONS

### Revealed Comparative Advantage-RCA

RCA registered different values from a year to another and also from a country to another.

From all the group of countries, New Zealand recorded the highest performance in all the years. In 2021, its RCA was 58.41, lower than in 2020, when it had a peak of 66.48.

On the 2nd position is Argentina which recorded RCA 20.56 in the year 2021, the lowest value, compared to 25.15 achieved in the year 2018.

Then, Ukraine is ranked the 3rd for an RCA equal to 17.38 in the year 2021, a little smaller than in the year 2020 when the country carried out 22.32, the top value.

Greece comes on the 4th position having an RCA value of 10.24, the highest in the analyzed period.

Other countries like Hungary and Romania has a relatively similar RCA, 5.44 and, respectively 5.23 in the year 2021, being followed by Brazil with 4.59.

India, Spain and Vietnam carried out RCA Values between 2 and 3 (2.73, 2.59 and 2.04), while Poland and Mexico recorded values between 1 and 2 (1.57 and, respectively 1.49).

In the remaining countries China, EU and Germany, are on the last position for their RCA smaller than 1 (Table 1).

Table 1. Revealed Comparative Advantage for the top 15 honey exporting countries in the world in the period 2018-2021

| Country | 2018 | 2019 | 2020 | 2021 | 2021/2018 % |
|---|---|---|---|---|---|
| 1.New Zealand | 56.16 | 58.09 | 66.48 | 58.41 | 104.02 |
| 2.China | 0.91 | 1.12 | 0.77 | 0.62 | 68.13 |
| 3.Argentina | 25.15 | 21.77 | 23.65 | 20.56 | 81.74 |
| 4.European Union | 0.55 | 0.58 | 0.67 | 0.53 | 96.36 |
| 5.Brazil | 3.75 | 3.08 | 3.72 | 4.54 | 121.06 |
| 6.Germany | 0.85 | 0.93 | 0.89 | 0.74 | 87.05 |
| 7.Ukraine | 18.88 | 20.15 | 22.32 | 17.38 | 92.05 |
| 8.India | 2.88 | 3.11 | 2.39 | 2.73 | 94.79 |
| 9.Spain | 2.78 | 2.62 | 2.85 | 2.59 | 93.16 |
| 10.Hungary | 6.67 | 6.93 | 6.32 | 5.44 | 81.55 |
| 11.Mexico | 2.22 | 1.37 | 1.19 | 1.49 | 67.11 |
| 12.Vietnam | 2.46 | 1.99 | 1.98 | 2.04 | 82.92 |
| 13.Poland | 1.50 | 1.71 | 1.93 | 1.57 | 104.66 |
| 14.Greece | 4.23 | 0.95 | 3.64 | 10.24 | 242.08 |
| 15.Romania | 5.62 | 5.66 | 5.48 | 5.23 | 93.06 |

Source: Own calculations based on the official data from [49].

In 2021, RCA was higher than in 2018 in Greece (+141.08%), Brazil (+21.06%), Poland (+4.66%) and New Zealand (+4.02%), while in the other countries was noticed a decline.

The comparative interpretation on RCA values taking into account the two classification systems is shown in Table 2.

Table 2. Comparative RCA interpretation based on Balassa's classification and Hinloopen and Marrewijk's classification

| Country | RCA interpretation based on Balassa's classification | RCA interpretation based on Hinloopen and Marrewijk's classification |
|---|---|---|
| 1.New Zealand | Comparative advantage | "Strong" comparative advantage |
| 2.China | Comparative disadvantage | "No" comparative advantage in 2018, 2020 and 2021, and "Weak" RCA in 2019 |
| 3.Argentina | Comparative advantage | "Strong" comparative advantage |
| 4.European Union | Comparative disadvantage | "No" comparative advantage in all the years |
| 5.Brazil | Comparative advantage | "Moderate" comparative advantage |
| 6.Germany | Comparative disadvantage | "No" comparative advantage in all the years |
| 7.Ukraine | Comparative advantage | "Strong" comparative advantage |
| 8.India | Comparative advantage | "Moderate" comparative advantage |
| 9.Spain | Comparative advantage | "Moderate" comparative advantage in 2018, and "Weak" RCS in 2019, 2020 and 2021 |
| 10.Hungary | Comparative advantage | "Strong" comparative advantage |
| 11.Mexico | Comparative advantage | "Moderate" comparative advantage in 2018 and "Weak" RCS in 2019, 2020 and 2021 |
| 12.Vietnam | Comparative advantage | "Moderate" comparative advantage in 2018 and 2021 and "Weak" RCS in 2019 and 2020 |
| 13.Poland | Comparative advantage | "Weak" comparative advantage |
| 14.Greece | Comparative advantage | "No" comparative advantage in in 2019, "Moderate" comparative advantage in 2020 and " Strong" RCA in 2018 and 2021 |
| 15.Romania | Comparative advantage | "Strong" comparative advantage |

Source: Own calculations based on the official data from [49].

The hierarchy of the top honey exporting countries based on RCA in 2021 is shown in Figure 4.

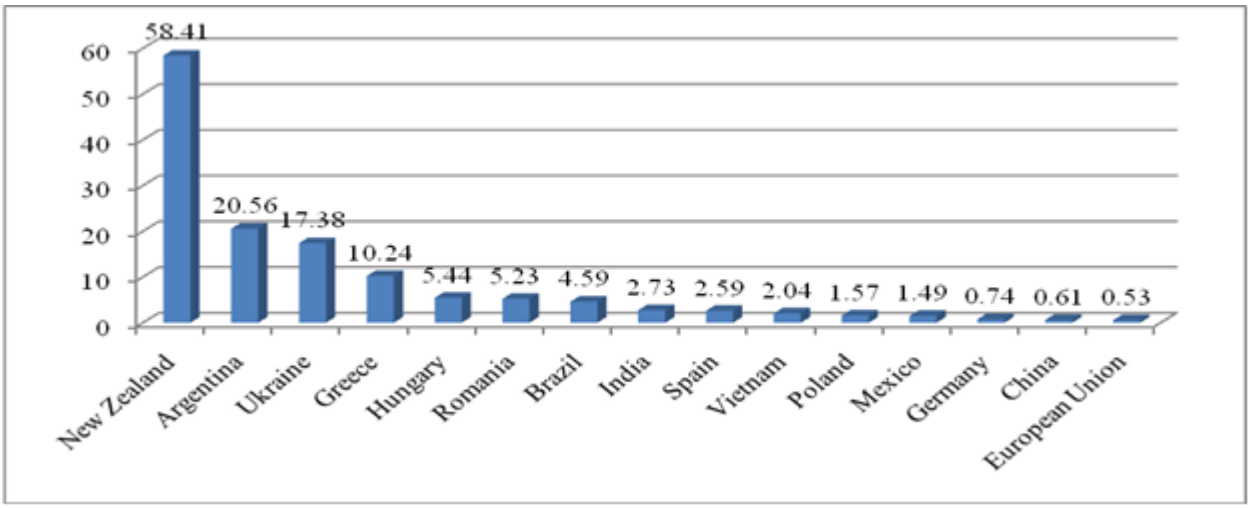


Fig. 4. The hierarchy of the top honey exporting countries based on RCA in 2021
Source: Own design based on own results.

**Revealed Symmetric Comparative Advantage-RSCA**

The countries with a positive RSCA: New Zealand, Argentina, Brazil, Ukraine, India, Spain, Hungary, Mexico, Vietnam, Poland, Romania have a comparative advantage in all the years, except Greece which has a symmetric comparative advantage only in the years 2018, 2020 and 2021.

The countries with the highest RSCA, in the decreasing order, are New Zealand, Argentina, Ukraine, Greece, Hungary, Romania and Brazil.

The countries which registered a negative RSCA: China, European Union, Germany in all the studied years and Greece in 2019 have a comparative disadvantage for honey.

In 2021 versus 2018, China registered an increase of the negative RSCA by 380 %, while the European Union by 6.89%. In case of Greece, it was found an increase by 34.42% and in Poland by 10% for RSCA value.

In all the other countries, RSCA value recorded a decline in various proportions ranging between 48.65% in Mexico and 2.18% in Argentina.

In New Zealand and Ukraine, in 2021 it was achieved the same RSCA (Table 3).

Table 3. Revealed Symmetric Comparative Advantage for the top 15 honey exporting countries in the world in the period 2018-2021

| Country | 2018 | 2019 | 2020 | 2021 | 2021/2018 % |
|---|---|---|---|---|---|
| 1.New Zealand | 0.96 | 0.96 | 0.97 | 0.96 | 100.0 |
| 2.China | -0.05 | 0.05 | -0.13 | -0.24 | 480.0 |
| 3.Argentina | 0.92 | 0.91 | 0.92 | 0.90 | 97.82 |
| 4.European Union | -0.29 | -0.26 | -0.19 | -0.31 | 106.89 |
| 5.Brazil | 0.67 | 9.51 | 0.57 | 0.64 | 95.52 |
| 6.Germany | -0.08 | -0.07 | -0.05 | -0.14 | 175.0 |
| 7.Ukraine | 0.89 | 0.90 | 0.91 | 0.89 | 100.0 |
| 8.India | 0.48 | 0.51 | 0.41 | 0.46 | 95.83 |
| 9.Spain | 0.47 | 0.44 | 0.48 | 0.44 | 93.61 |
| 10.Hungary | 0.73 | 0.74 | 0.72 | 0.68 | 93.15 |
| 11.Mexico | 0.37 | 0.15 | 0.08 | 0.19 | 51.35 |
| 12.Vietnam | 0.42 | 0.33 | 0.32 | 0.34 | 80.95 |
| 13.Poland | 0.20 | 0.26 | 0.31 | 0.22 | 110.0 |
| 14.Greece | 0.61 | -0.02 | 0.56 | 0.82 | 134.42 |
| 15.Romania | 0.69 | 0.70 | 0.69 | 0.67 | 97.10 |

Source: Own calculations based on the official data from [49].

The hierarchy of the top honey exporting countries based on RSCA in 2021 is presented in Figure 5.

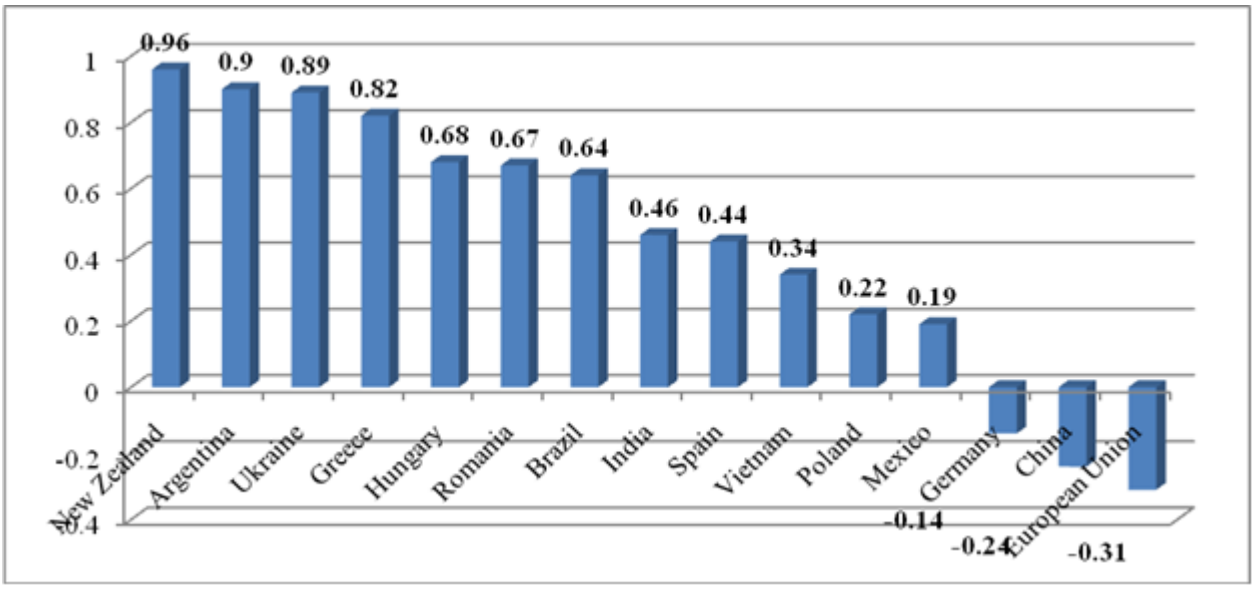


Fig. 5. The hierarchy of the top honey exporting countries based on RSCA in 2021
Source: Own design based on own results.

**Comparative Export Performance Index-CEP**

This index was calculated only for New Zealand, ranked the 1st honey exporter and for Romania, which is placed on the last 15th position among the top exporting countries in the world.

*In case of New Zealand against the other exporting countries*, CEP values have registered a general decreasing trend in all the countries from the year 2018 to the year 2021. In 2021, CEP index has the highest value in New Zealand versus its level performed in the European Union, China and Germany, but New Zealand registered a lower CEP value against Mexico, Poland, Vietnam, Spain and India. Also, the lowest values were carried out against Brazil, Romania, Hungary, Greece and mainly versus Ukraine (Table 4).

Table 4. Comparative Export Performance CEP for Argentina against the other 14 honey exporting countries in the world in the period 2018-2021

| Country | 2018 | 2019 | 2020 | 2021 | 2021/2018 % |
|---|---|---|---|---|---|
| 2.China | 61.43 | 65.26 | 84.73 | 48.42 | 78.82 |
| 3.Argentina | 2.23 | 2.66 | 2.81 | 1.42 | 63.67 |
| 4.European Union | 103.11 | 101.52 | 99.49 | 55.64 | 53.96 |
| 5.Brazil | 15.02 | 21.57 | 17.91 | 6.34 | 42.21 |
| 6.Germany | 66.84 | 72.13 | 74.67 | 39.12 | 58.52 |
| 7.Ukraine | 2.97 | 3.30 | 3.01 | 1.67 | 56.22 |
| 8.India | 19.60 | 21.51 | 27.78 | 10.64 | 54.28 |
| 9.Spain | 20.18 | 25.50 | 23.42 | 11.21 | 55.55 |
| 10.Hungary | 8.43 | 9.62 | 10.50 | 5.36 | 63.68 |
| 11.Mexico | 25.37 | 4.85 | 55.87 | 19.60 | 77.25 |
| 12.Vietnam | 22.87 | 33.43 | 33.50 | 14.31 | 62.57 |
| 13.Poland | 37.57 | 33.93 | 34.71 | 18.53 | 49.32 |
| 14.Greece | 13.27 | 11.69 | 13.64 | 2.88 | 21.70 |
| 15.Romania | 10.00 | 11.78 | 12.12 | 5.56 | 55.60 |

Source: Own calculations based on the official data from [49].

Comparative Export Performance of New Zealand against the other 14 honey exporting countries in 2021 is shown in Figure 6.

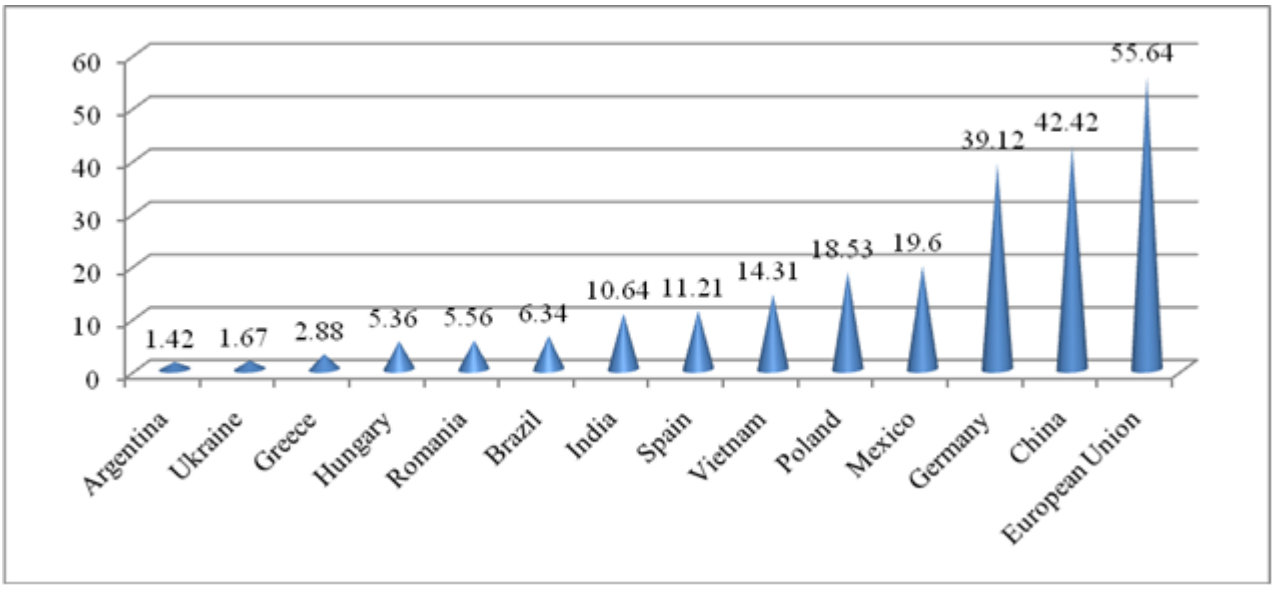


Fig. 6. Comparative Export Performance of New Zealand against the other 14 honey exporting countries in 2021
Source: Own design based on own results.

*In case of Romania against the other exporting countries*, in 2021, CEP index had the highest values versus European Union, China, Germany, followed by Mexico, Poland and Spain. The lowest index value was noticed against New Zealand 0.08, Argentina 0.25, Ukraine 0.30, Greece 0.53 and Hungary 0.96. In 2021, CEP values for Romania increased in general in relation to almost all the other exporting countries, except New Zealand, European Union, Brazil, India, Spain, Poland and Greece (Table 5).

Table 5. Comparative Export Performance CEP for Romania against the other 14 honey exporting countries in the world in the period 2018-2021

| Country | 2018 | 2019 | 2020 | 2021 | 2021/2018 % |
|---|---|---|---|---|---|
| 1.New Zealand | 0.10 | 0.09 | 0.08 | 0.08 | 80.00 |
| 2.China | 6.15 | 6.20 | 7.14 | 8.54 | 138.86 |
| 3.Argentina | 0.22 | 0.26 | 0.23 | 0.25 | 113.63 |
| 4.European Union | 10.35 | 9.93 | 8.34 | 9.91 | 95.74 |
| 5.Brazil | 1.49 | 1.83 | 1.47 | 1.14 | 76.51 |
| 6.Germany | 6.58 | 6.17 | 6.17 | 6.98 | 106.07 |
| 7.Ukraine | 0.29 | 0.28 | 0.24 | 0.30 | 103.44 |
| 8.India | 1.95 | 1.81 | 2.29 | 1.91 | 97.94 |
| 9.Spain | 2.02 | 2.16 | 1.92 | 2.01 | 99.50 |
| 10.Hungary | 0.84 | 0.81 | 0.86 | 0.96 | 114.28 |
| 11.Mexico | 2.53 | 4.14 | 4.60 | 3.51 | 138.73 |
| 12.Vietnam | 2.28 | 2.83 | 2.76 | 2.56 | 112.28 |
| 13.Poland | 3.76 | 3.31 | 2.84 | 3.32 | 88.29 |
| 14.Greece | 1.32 | 0.99 | 1.12 | 0.53 | 40.15 |

Source: Own calculations based on the official data from [49].

The comparative Export performance of Romania versus the other top 14 competitors in honey export in the international market in presented in Figure 7.

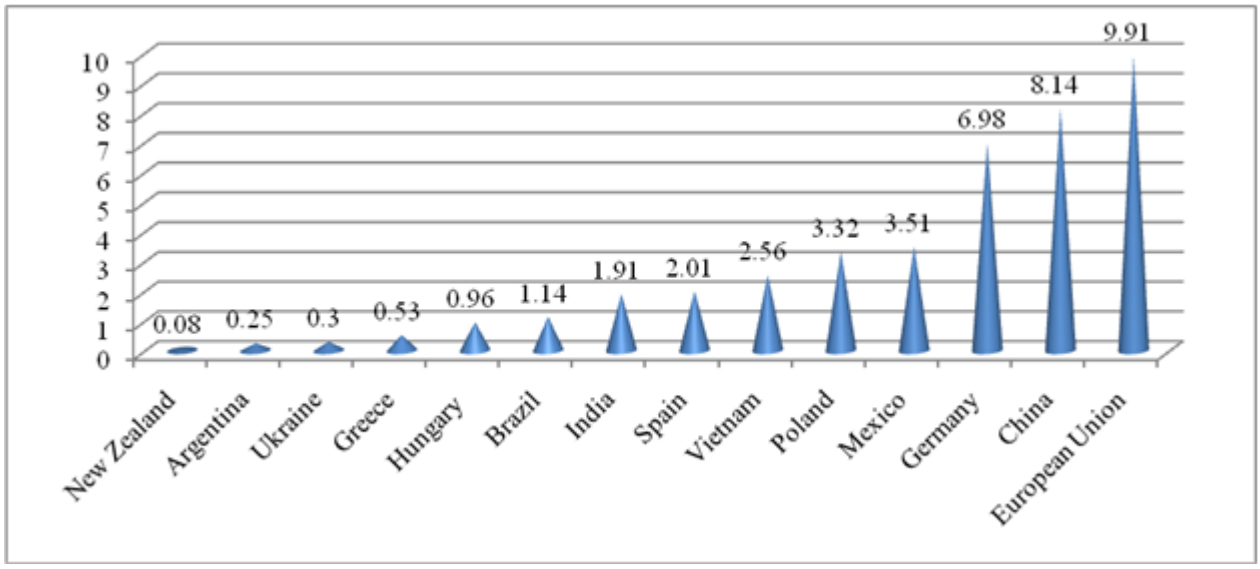


Fig. 7. Comparative Export Performance of Romania against the other 14 honey exporting countries in 2021
Source: Own design based on own results.

## Trade Balance Index- TBI

TBI index values are different from a country to another depending on each country's honey export and import value. Most of the countries situated in the top at the global level do not import too much honey and have in general low import value, a fact which led to a TBI =0.99 in case of New Zealand, Argentina, Brazil, Ukraine, Hungary and Mexico, but, in case of India 0.92 and Vietnam 0.98. The countries with a smaller import value compared to export value, like: China, Spain and Romania, have registered a TBI positive with variations between:

- 0.42-0.56 in case of China, and decreasing values to the year 2021;
- 0.26-0.21 in case of Spain, with a tendency to grow to the year 2021;

-0.62 in 2018, the highest TBI, and 0.57 in 2021 in case of Romania, with the smallest TBI, accounting for 0.44 in 2019.

The countries with a negative TBI like: EU, Germany and Poland have higher imports than exports.

Greece registered a positive TBI, but small in the period 2019-2021, but, in 2018, it recorded a negative value.

Table 6. TBI values registered by the top 15 exporting countries in the world in the period 2018-2021

| Country | 2018 | 2019 | 2020 | 2021 | 2021/2018 % |
|---|---|---|---|---|---|
| 1.New Zealand | 0.99 | 0.98 | 0.99 | 0.99 | 100.00 |
| 2.China | 0.56 | 0.46 | 0.48 | 0.42 | 75.00 |
| 3.Argentina | 0.99 | 0.99 | 0.99 | 0.99 | 100.00 |
| 4.European Union | -0.58 | -0.55 | -0.37 | -0.47 | 81.03 |
| 5.Brazil | 0.99 | 0.99 | 0.99 | 0.99 | 100.00 |
| 6.Germany | -0.33 | -0.37 | -0.29 | -0.37 | 112.12 |
| 7.Ukraine | 0.99 | 0.98 | 0.99 | 0.99 | 100.00 |
| 8.India | 0.92 | 0.96 | 0.96 | 0.96 | 104.34 |
| 9.Spain | 0.21 | 0.21 | 0.25 | 0.26 | 123.80 |
| 10.Hungary | 0.99 | 0.99 | 0.99 | 0.80 | 80.80 |
| 11.Mexico | 0.99 | 0.99 | 0.99 | 0.99 | 100.00 |
| 12.Vietnam | 0.98 | 0.98 | 0.98 | 0.98 | 100.00 |
| 13.Poland | -0.18 | -0.17 | -0.12 | -0.18 | 100.00 |
| 14.Greece | -0.02 | 0.09 | 0.14 | 0.27 | 1,350.00 |
| 15.Romania | 0.62 | 0.44 | 0.49 | 0.57 | 91.93 |

Source: Own calculations based on the official data from [49].

Therefore, the countries having a positive TBI are net honey exporters, for them honey export is more important than import and they are more competitive than the other competitors. The countries with a negative TBI are net importers and have a comparative disadvantage in honey international market.
In 2021 versus 2018, it was noticed a similar TBI for the most countries and even higher like in case of Germany, India and Spain, while in China EU, Hungary and Romania, it was noticed a decrease, reflecting a reduction of exports versus imports.
Greece passed from a honey trade importer in 2018 to honey exporter in 2021 (Table 6).
Trade Balance Index in the top 15 exporting countries in 2021 is reflected in Figure 8.

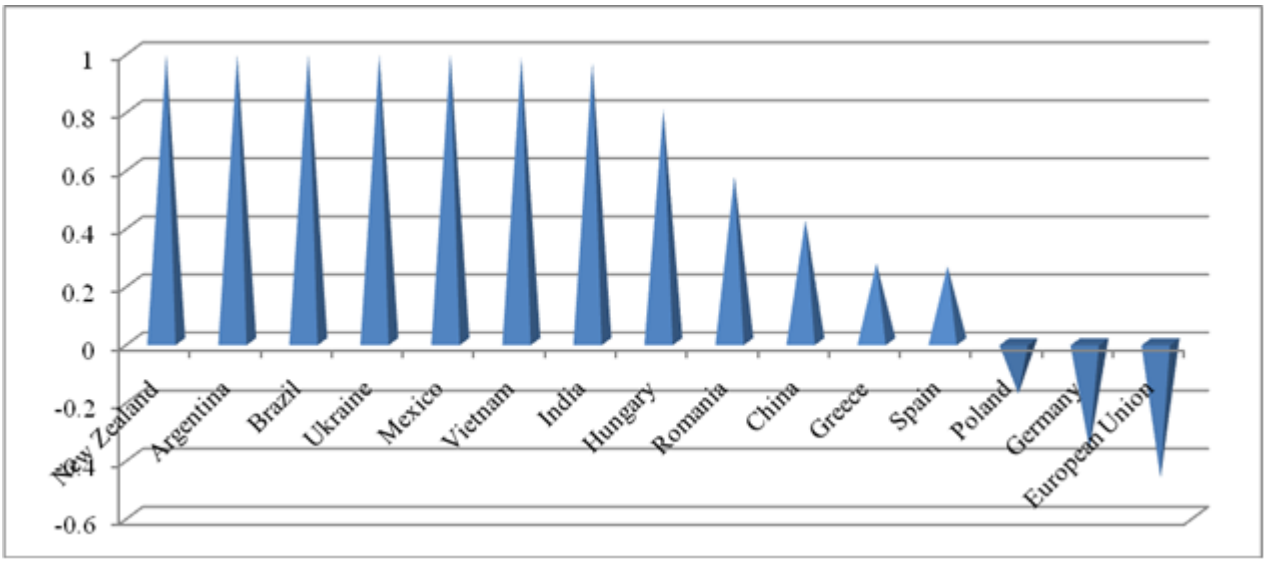


Fig. 8. Trade Balance Index in the top 15 exporting countries in 2021
Source: Own design based on own results.

## CONCLUSIONS

The analysis for comparative advantage for honey in case of the top exporting countries at the global level led to the following conclusions:
A number of 12 top exporting countries of honey have a comparative advantage, as shown by RCA index, in the decreasing order in the year 2021 being: New Zealand, Argentina, Ukraine, Greece, Hungary, Romania, Brazil, India, Spain, Vietnam, Poland and Mexico.
The EU, China and Germany have a comparative disadvantage in the international honey market as they are mainly importing countries.
Based on Hinloopen-Marrewijk classification, it resulted that:
- A strong comparative advantage in all the studied years belongs to New Zealand, Argentina, Ukraine, Hungary and Romania, whose RCA was higher than 4 and to Greece in the years 2018 and 2021.
-A weak comparative advantage belongs to Poland, as its RCA ranged between 1 and 2 in all the years, and also a "weak" advantage in case of Vietnam in the years 2019 and 2020, and also China in 2019, Spain in 2019, 2020 and 2021, and Mexico in 2018 and 2021.
-A moderate comparative advantage was registered by Brazil for a RCA between 2 and 4, India, Spain in 2018, Mexico in 2018, Vietnam in 2018 and 2021, and Greece in 2020.
-No comparative advantage ( RCA between 0 and 1) was found in China in 2018, 2020, 2021, the EU, Germany, Hungary, Romania in other analyzed years and Greece in 2018 and 2021.
Based on RSCA value, the countries with the highest comparative advantage in honey market are New Zealand, Argentina, Ukraine, Greece, Hungary, Romania and Brazil.

In the opposite side, there are China, the EU, Germany which have a comparative disadvantage in all the years and also Greece in 2019.

Regarding the competitiveness in export performance, reflected by CEP values, it was noticed that New Zealand has the highest export performance against the EU, China, Germany, and a lower CEP level against Mexico, Poland, Vietnam, Spain and India. The smallest CEP is versus Brazil, Romania, Hungary, Greece and mainly Ukraine.

According to TBI value, New Zealand, Argentina, Brazil, Ukraine, Hungary, Mexico, followed by India and Vietnam have a higher export value versus import value, and in consequence they are net exporting countries of honey.

China, Spain and Romania have also a positive TBI, but with a smaller value. They are also net exporting countries of honey in the world market.

The countries with the negative TBI are the EU, Germany, Poland as they are net importing countries and also Greece in 2018.

As a final conclusion, comparative advantage system of indicators reflects the level of competitiveness of a country in the international market.

Any country desires to have a high competitiveness, and this means permanent efforts to keep under control export and imports from a quantitative point of view, and value in relations to price volatility which depends on demand/offer ration in the international market and opportunities to extend the geographic area of influence looking for new trade partners.

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