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***Research Article/Araştırma Makalesi***

# Country-Based Export Concentration of Türkiye and BRICS and Export Similarity to the EU Market (2001-2021)[1]

## *Türkiye ve BRICS İhracatının Ülke Bazlı Yoğunlaşması ve AB Pazarına İhracat Benzerliği (2001-2021)*

**Zeynep AKTAŞ ÇİMEN[2], Levent KÖSEKAHYAOĞLU[3]**

**Abstract**

The aim of the study is to examine the country-based concentration of exports of Türkiye and BRICS (Brazil, Russia, India, China, South Africa) and export similarity to the European Union (EU) common market. Data were obtained from the International Trade Center Trademap database. In the study, according to the data of 2021, Türkiye and the first five countries in the export of BRICS are included. While the country-based concentration of Türkiye and BRICS for the period 2001-2021 was analyzed using the Gini-Hirschman Index (GHI), the Export Similarity Index (ESI) was used for export similarity to the EU common market. The results of the study show that while the product variety in Türkiye's exports to the United Kingdom, the United States, and Germany has increased significantly over time, the product variety in exports to Italy and Spain shows a fluctuating course, according to the coefficient values calculated by the GHI method. While there was no major change in product diversity in BRICS exports to the USA, Japan and South Korea during the period under review, product diversity in exports to Hong Kong showed a fluctuating course, but product diversity decreased significantly in 2021. There is no radical change in product diversity in BRICS exports to China. The fact that the exports of Türkiye and BRICS to the EU market have an ESI value of 60.75 means that they are in competition in the relevant product groups and pose a threat to each other.

**Jel Codes:** *F10, F13, F15*
**Keywords:** *Foreign Trade, Concentration, Gini Hirschman Index, Export Similarity Index, Türkiye, BRICS*

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**Öz**

Çalışmanın amacı, Türkiye ve BRICS'in (Brezilya, Rusya, Hindistan, Çin, Güney Afrika) ihracatının ülke bazlı yoğunlaşmasını ve Avrupa Birliği (AB) ortak pazarına ihracat benzerliğini incelemektir. Veriler, Uluslararası Ticaret Merkezi Trademap veri tabanından elde edilmiştir. Çalışmada 2021 yılı verilerine göre Türkiye ve BRICS'in ihracatında yer alan ilk beş ülkeye yer verilmiştir. 2001-2021 dönemi için Türkiye ve BRICS'in ülke bazlı yoğunlaşması Gini-Hirschman İndeksi (GHI) kullanılarak incelenirken, AB ortak pazarına ihracat benzerliği için İhracat Benzerlik İndeksi (ESI) kullanılmıştır. Çalışmanın bulguları, GHI yöntemiyle hesaplanan katsayı değerlerine göre Türkiye'nin özellikle Birleşik Krallık, ABD ve Almanya'ya yaptığı ihracatta ürün çeşitliliği zaman içerisinde önemli ölçüde artış gösterirken, İtalya ve İspanya'ya yapılan ihracattaki ürün çeşitliliği dalgalı bir seyir sergilemektedir. İncelenen dönemde BRICS'in ABD, Japonya ve Güney Kore'ye ihracatında, ürün çeşitliliği konusunda büyük değişimler meydana gelmezken, Hong Kong'a yapılan ihracatta ürün çeşitliliği dalgalı bir seyir göstermekle birlikte, 2021 yılında ürün çeşitliliği ciddi oranda azalmıştır. BRICS'in Çin'e yaptığı ihracatta ise ürün çeşitliliği bakımından köklü bir değişim söz konusu değildir. Türkiye ve BRICS'in AB pazarına ihracatının 60.75 gibi bir ESI değerine sahip olması, ilgili mal gruplarında rekabet içinde olduklarını ve birbirleri için tehdit oluşturdukları anlamına gelmektedir.

**Jel Kodları:** *F10, F13, F15*
**Anahtar Kelimeler:** *Dış Ticaret, Yoğunlaşma, Gini Hirschman İndeksi, İhracat Benzerlik İndeksi, Türkiye, BRICS*

## 1. Introduction

Globalization and trade integration gained momentum in the post-1980 period with the strong participation of developing countries. Liberalization measures taken by developing countries since the mid-1980s paved the way for these economies to integrate into the world market to grow faster under an expanding set of opportunities.

In the 1990s, the growth rate of world trade was faster than the growth of world national income, and world trade reached a much higher rate of increase than in the 1970s and 1980s (Ohtsubo, 1996: 1-12). Globalization has also led to an increase in the international interdependence of the world economic system. These forms of interdependence have existed for centuries, and countries have become increasingly interdependent. It is known that the production and consumption patterns in the world are becoming increasingly interdependent, and each nation or region is now increasingly having difficulty in supplying goods and finding markets for their products (Glyn & Sutcliffe, 1992: 77). Foreign trade, which is of great importance in economic growth, has gained more importance with the transition of countries to free market economies.

The leaders of the countries Brazil, Russia, India, and China (BRIC) attended St. Petersburg, and in September 2006 the group became the official BRIC. At the BRIC Foreign Ministers meeting held in New York in September 2010, the name of the BRIC group was changed to BRICS (Brazil, Russia, India, China, South Africa) with the acceptance of South Africa as a full member. BRICS accounts for 41% of the world's population, 24% of the global GDP, and 16% of world trade (BRICS, 2021).

After 1980, with the transition of Türkiye to the free market economy of the BRICS countries since the 1990s, export and import rates have increased. Today, while the share of developed countries in world trade in the global system is gradually decreasing, the share and importance of BRICS countries, which are called 'emerging markets', are increasing. Contrary to the slowdown in the global economy in recent years, the increasing importance of BRICS in world trade draws attention, the balance of power is changing and competition is increasing. BRICS countries are seen as an important economic power for today and the future in the globalizing world. These countries have achieved success above the economic performances of many developed countries (Kuşat, 2015: 222). In fact, “due to the enormous success of China, despite the problems Brazil and Russia have, it is projected that by the mid-2030s the BRICS countries may be larger than the G-6 (Germany, Italy, Japan, the UK, and the USA) (Kumar & Gyftopoulou, 2022). Therefore, the extent to which Türkiye and BRICS are integrated with global markets, in which products and markets they concentrate, and in which sectors they compete with Türkiye in the EU market, which is Türkiye's most important export market, has become an important research topic. To contribute to answering these questions at the theoretical and empirical levels, this study has two main purposes. The first one is to analyze the country concentration of the export markets of BRICS countries and Türkiye, which have an increasing share in global markets in terms of population, national income, and trade. The second objective of the study is to investigate the extent to which BRICS countries and Türkiye are competitors to each other by making a comparative analysis of BRICS countries and

Türkiye in terms of the similarity of products exported to the European Union (EU) market, which is of strategic importance for Türkiye.

The limitation of the study is related to product codes. Instead of analyzing each product individually, sectoral export data were narrowed down by grouping them, and the total number of products, which was 99, was grouped under 41 sub-product groups, and concentration and similarity indices were calculated (see Annex 1 for the products analyzed). In addition, concentration coefficients were calculated for the top five countries in Türkiye and BRICS exports, while the remaining countries were not included in the study.

The study uses the GH concentration index to evaluate whether there is a diversification in the distribution of countries in the exports of Türkiye and BRICS in the 2001-2021 period. Moreover, the extent to which BRICS is a competitor to Türkiye in the EU market is analyzed using the Export Similarity Index. This analysis is expected to make a significant contribution to Türkiye's strategic foreign trade policy after the global Covid-19 pandemic.

The study consists of six sections. In the first section, the performance of Türkiye and BRICS, which transitioned to a liberal economy after 1980, in the global economy is analyzed. In the second section, the literature on the subject is reviewed, and the methodology of the study is mentioned in the third section. The fourth section presents the data set, followed by the results in the fifth section. The market concentration of Türkiye and BRICS in exports is calculated by GHI and the export similarity of Türkiye and BRICS to the EU market is measured by ESI. The index values obtained are presented and interpreted in tables and graphs. In the sixth section, which includes the conclusion, a general evaluation of the study is made and policy recommendations are presented.

## 2. Literature Review

Exports are considered the driving force of economic growth and development. Therefore, GHI and ESI measures are widely used to analyze the concentration and competitiveness of exports by country (sector or product) in order to evaluate the results of preferred trade strategies. The diversity and intensity of exporting countries are important for the performance and sustainability of foreign trade, while the similarity of exports is important in terms of showing the intensity of competition between countries. For this reason, in the literature review, firstly the studies involving GHI and then the studies involving ESI were included.

Andic & Andic (1964), in their study using the GHI, show that countries that are geographically close in a country's exports stand out. In their studies by Ergün (1991) and Togan (1994) using GHI and Trend Analysis, Ergün reveals that Türkiye's export concentration by countries increased during the 1980-1990 period, while Togan reveals that the concentration of Turkish exports was quite low in the 1980s. Yavuz Çil (2000), in his study using the GHI, shows that although Türkiye's exports and imports have increased and diversified in terms of quantity, there has been no significant change in the diversity of exported goods by country in the 1975-1998 period and that the concentration on OECD countries continues. Yıldız & Delice (2001),

using the GHI and the Intra-Industry Trade Index, conclude that the high performance of Türkiye's exports after 1980 continued in the 1990s (albeit at a slower pace). In their study with the GHI, Yükseler & Türkan (2006) show that Türkiye's imports have become increasingly Asianized after the 2001 crisis and that there has been no significant change in export markets despite country diversification. Seymen et al. (2009), using GHI, Trade Concentration Ratio, Herfindahl-Hirschman, Entropy and Bilateral Trade Concentration Index, reaches a similar finding to Yükseler & Türkan (2006) and reveal that country diversification in Türkiye's foreign trade has increased especially after 1980. It also shows that the country concentration in trade is concentrated with Germany (9.8% in exports and 15.5% in imports), albeit gradually decreasing; that geographical proximity between countries is important; and that European countries that have recently joined the EU are important in Turkish exports. Aldan et al. (2012), using the GHI, basically find that Türkiye's export market has reached more regions with a wider variety of products over time (especially after the global crisis). Erkan & Sunay (2016), using GHI and Trade Concentration Ratio, show that Türkiye's exports have increased market and product diversity. Bashimov (2017), using GHI and Concentration Ratio, reveals that Turkmenistan and Kazakhstan have a high concentration ratio, while Kyrgyzstan, Uzbekistan and Tajikistan have a medium level of concentration. In conclusion, the findings of the studies using the GHI and other indices together with the GHI show that although product and market diversification in exports has increased over time, geographical proximity is important in country-based concentration.

In the literature, ESI and the Revealed Comparative Advantage (RCA) index are generally used to measure export competitiveness among countries or country groups. Trung (2002), using the ESI and the RCA Index, concludes that exports between Vietnam and Indonesia are highly similar but gradually declining. It also shows that the overall export similarity between Vietnam and Thailand is gradually increasing, albeit at a lower level; that Vietnam's export structure appears to be different from Singapore and the Philippines; and that the export composition of Vietnam and Brunei is not similar. Majkovič et al. (2007), using the ESI and the RCA Index, finds that the export structures of the ten new EU member states are not significantly similar but slightly increasing. Altay (2008), using ESI, Balassa, and Vollrath Index, finds that Türkiye's closest competitors in the EU-15 market are Poland, Romania, Portugal, China, India, Indonesia, Italy, Thailand, Slovenia, Morocco, and Israel. Erlat & Ekmen (2009), using ESI, show that Türkiye faces strong competition in the EU-15 market and that the degree of competition varies across countries and sectors over the years. It also shows that Türkiye's export similarity has increased with respect to Central and Eastern European countries, Latin America, and developed countries, while it has decreased with respect to the Middle East and North Africa region.

Erkan (2012), using ESI and RCA Index, shows that BRIC economies generally specialize in exports of raw materials and labor-intensive products, while Türkiye specializes in exports of labor- and capital-intensive products. Kalaycı (2013), in his study using ESI, RCA, and Grubel Lloyd Index, concludes that the similarity of the countries in terms of the groups of goods they export is quite low in the trade with Türkiye and the Russian Federation. Yücel (2014) analyzes the competitiveness of Türkiye's fig, olive, olive oil, and cotton exports to the EU vis-à-vis

Greece, Italy, Spain, and Portugal using ESI and RCA Index. It finds that Türkiye's competitiveness is high in figs against the competitor countries mentioned and in cotton against other countries except Greece. Wang & Liu (2015), using ESI, show that between 2007 and 2013, China and the EU had higher levels of ESI in the developed country market, which increased competition among export products. Nguyen et al. (2017), using ESI, finds that export similarity has changed among ASEAN+3 member states in the period 1990-2014 and that China, Japan, Malaysia, Singapore, and South Korea have the highest ESI values. Li (2018) shows that the export similarity between China and India has increased in recent years and that they are in serious competition in his study with ESI, Trade Integration Index, RCA Index, Expertise Coefficient, and Conformity Coefficient. Vlasenko (2020), in his study with ESI, concludes that among the 40 largest global exporters, China's likely competitors as of 2018 are the neighboring Asian economies of Vietnam, the Republic of Korea, Japan, Malaysia, and Singapore, and its weakest competitors are oil exporters Kuwait, Saudi Arabia, and Iran.

Türkiye and BRICS countries transitioned to free market economies after the 1980 and 1990s, respectively. Studies analyzing the diversity and concentration of Türkiye's export markets with the GHI index have been conducted at different times after 1980. However, this is the first study on the diversification and concentration of BRICS export markets. It is the first study to examine in which markets Türkiye and BRICS are concentrated in the global economy and whether BRICS is a competitor to Türkiye in the EU market, which is Türkiye's most important export market.

## 3. Method

In this section, firstly, the country-based concentration of Türkiye and BRICS foreign trade for the period 2001-2021 and then the similarity of exports between Türkiye key and the BRICS countries to the EU common market, which is Türkiye's most important export market, will be examined. While the GHI was used to analyze the concentration, the ESI was used to analyze the export similarity.

### 3.1. Gini-Hirschman Index (GHI)

GHI is known as an index used to measure the concentration in foreign trade between countries (Massell, 1970: 623; Love, 1979: 61). A country's trade intensity is thought to depend on the number of countries with which it trades and the more or less equal distribution of its trade among these countries (Hirschman, 1945: 98). The index shows the degree of sectoral concentration of the country in foreign trade (Sarıçoban, 2016: 92).

Since GHI includes all sectors subject to foreign trade, it is seen as a more reliable index than the concentration ratios index (Saraçoğlu, 2017: 162). According to the GH method, the concentration index of a country's exports and imports is handled in two different ways as "Export Concentration Index" and the "Import Concentration Index".

### 3.2. Export Concentration Index

The Export Concentration Index shows the distribution ratios of products in a country or countries' exports (Tegene, 1990: 55). The index is obtained as a result of taking the square root of the sum of the squares of the shares of the goods groups subject to export in the year under consideration, and multiplying by 100. In this index, the export concentration index of a country for each good varies according to the number of goods exported by the relevant country and the number of goods (Yavuz Çil, 2000: 4).

The Export Concentration Index is formulated as follows (Sarıçoban & Kösekahyaoğlu, 2017: 436);

$$C_{tx} = 100\sqrt{\sum_{k=1}^{n}\left(\frac{X_{kt}}{X_t}\right)^2}$$

$C_{tx}$, export concentration index in period t,

$X_{kt}$, export of goods k in period t,

$X_t$, shows the total export value in period t.

The index takes a value between “0” and “100”; The closer it is to “100”, the more concentrated exports are in a few sectors, and the closer to “0”, the more concentrated exports are. High concentration values mean that the country has a more vulnerable structure against economic crises due to the fact that a small number of product and goods groups are exported. In addition, the index is accepted as an indicator that serves as a warning to increase export diversity over time (Sarıçoban & Kösekahyaoğlu, 2017: 437).

### 3.3. Export Similarity Index (Export Similarity Index, ESI)

The export similarity index is used to measure the similarity of export sections between two countries or groups of countries. The index shows whether the exports between two countries or groups of countries are similar and the course of the situation over time. Thus, it is possible to evaluate whether the economic structures of two countries or groups of countries are similar or different (Finger & Kreinin, 1979: 905). However, this index only compares exported goods groups. ESI is of particular importance in that it allows the export structure of a small country to be compared with a large country or group of countries (Sarıçoban & Kösekahyaoğlu, 2017: 437). The index is used to determine a country's competitors in the international market. For countries or country groups to compete with each other in international markets, they must be concentrated on the export of similar products and commodity groups. It is possible to talk about high competition among countries with high export similarity (Erkan, 2012: 106). In addition, the very similar export structure between two countries or country groups indicates that inter-industry trade between the said country or country groups is limited (Mikic & Gilbert, 2009: 82). The difference between this index from other indexes is that it requires the use of standardized international trade data (Alper, 2014: 133).

The export similarity index is formulated for two countries j and m as follows (Finger & Kreinin, 1979: 905-906);

$$\mathrm{ESI} = \sum \min[\mathrm{X_k}(\mathrm{j_w}), \mathrm{X_k}(\mathrm{m_w})] \times 100$$

$X_k(j_w)$, The share of the export value of k product group to the world by country j in its total exports to the world,

$X_k(m_w)$, It represents the share of the k product group export value of country m to the world in total exports to the world.

When the index is calculated, the resulting values vary between “0” and “100”. If the export structure between the two countries or groups of countries is exactly similar, the index takes the value "100" and indicates that there is high competition. If there is no similarity in the export structure between the two countries or group of countries, the index takes the value "0" and no competition situation can be mentioned (Rahman et al., 2004: 4). The index also allows observing whether there is a similarity in trade between trading partners over time. High cohesion indicates the need for higher competitiveness (Mikic, 2005: 16).

## 4. Data set

The analysis is based on 99 product classifications with 2 digits, in other words, two digits, according to the Trademap Harmonized System (HS) (Trademap, 2022). Product classification in Trademap is based on the so-called Harmonized System published by the World Customs Organization (WCO). Trademap creates its database by compiling the data obtained from the official statistical units of the relevant countries and UN Comtrade (Trademap, 2022f).

In the analyzed period of 2001-2021, the countries in the top five in exports of Türkiye and BRICS were taken into account in 2021, and country concentration levels were calculated with GHI. The aim of the product concentration analysis made based on these countries is to reveal the changes in world trade between Türkiye and the BRICS group in the period 2001-2021 with Türkiye's transition to a liberal economy after 1980 and to reveal whether Türkiye and BRICS are competitive in their exports to the EU.

## 5. Results

In this section, the product-based concentration of the foreign trade of Türkiye and BRICS is examined with the GHI. In the analysis, as a result of the narrowing made based on two-digit 99 product classifications according to the Trademap Harmonized System (HS), 41 sub-product groups were created and a 21-year data set covering the period 2001-2021 was used (Trademap, 2022).

### 5.1. Country-Based Concentration of Türkiye's Foreign Trade

The concept of country-based concentration in foreign trade is used to evaluate country-based changes in a country's trade (Kuşat, 2015: 223).

### 5.1.1. Distribution of Türkiye's Exports by Countries

When we look at the distribution of Türkiye's exports to the world countries, it is seen that Germany, USA, United Kingdom, Italy, Iraq, and Spain take place respectively in terms of their percentage share in total exports in 2021. Table 1 shows the percentage shares of the first six countries to which Türkiye exports the most in total exports. The EU is the main market for Turkish export goods and the total share of EU members Germany, Italy and Spain in Türkiye's exports is 17.94%. Although Germany is the first country to export the most with a share of 8.58%, its share in Türkiye's exports decreased from 17.13% in 2001 to 8.58% in 2021. Maintaining its second position in Türkiye's exports, the share of the USA decreased from 9.98% in 2001 to 6.53% in 2021.

**Table 1: Share of Top 6 Countries in Türkiye's Exports (%)***

| Countries | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Germany | 17.13 | 16.32 | 15.84 | 13.85 | 12.87 | 11.32 | 11.18 | 9.81 | 9.59 | 10.08 | 10.34 |
| 2.USA | 9.98 | 9.33 | 7.94 | 7.68 | 6.68 | 5.92 | 3.89 | 3.27 | 3.18 | 3.31 | 3.40 |
| 3.United Kingdom | 6.94 | 8.41 | 7.77 | 8.78 | 8.05 | 7.97 | 8.04 | 6.18 | 5.81 | 6.35 | 6.04 |
| 4.Italy | 7.47 | 6.60 | 6.76 | 7.35 | 7.65 | 7.90 | 6.97 | 5.92 | 5.77 | 5.71 | 5.82 |
| 5.Iraq** | 0.00 | 0.00 | 1.75 | 2.88 | 3.74 | 3.03 | 2.65 | 2.97 | 5.02 | 5.30 | 6.16 |
| 6.Spain | 3.03 | 3.12 | 3.79 | 4.15 | 4.10 | 4.35 | 4.27 | 3.07 | 2.76 | 3.11 | 2.90 |
| | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| 1.Germany | 8.61 | 9.19 | 9.77 | 9.33 | 9.82 | 9.63 | 9.61 | 9.19 | 9.42 | 8.58 | - |
| 2.USA | 3.68 | 4.12 | 4.16 | 4.45 | 4.65 | 5.51 | 4.95 | 4.96 | 6.00 | 6.53 | - |
| 3.United Kingdom | 5.70 | 5.65 | 6.14 | 7.34 | 8.20 | 6.12 | 6.61 | 6.24 | 6.62 | 6.08 | - |
| 4.Italy | 4.18 | 4.63 | 4.50 | 4.79 | 5.32 | 5.40 | 5.69 | 5.39 | 4.76 | 5.09 | - |
| 5.Iraq | 7.10 | 8.02 | 7.90 | 5.94 | 5.36 | 5.77 | 4.97 | 5.65 | 5.39 | 4.94 | - |
| 6.Spain | 2.44 | 2.82 | 2.99 | 3.30 | 3.50 | 4.01 | 4.59 | 4.50 | 3.94 | 4.27 | - |

*Trademap, by 2021 ranking.
**Mirrored data.

Table 1 also shows that the share of Germany and the USA in Türkiye's total exports has a steadily decreasing trend between 2001 and 2009. While exports to Germany followed a fluctuating course from 2010-2021; It is observed that Türkiye's exports to the USA increased regularly between 2010 and 2017, and after the sharp decline in 2019, they started to increase again. Türkiye's exports to the United Kingdom and Italy follow a fluctuating course; Exports to the UK remained below the 8.78% share in 2004, with a share of 6.08% in 2021. Contrary to Germany and the USA, Türkiye's exports to Spain showed a regular upward trend from 2001 to 2006 but declined between 2007 and 2012 and fluctuated between 2013-2021.

The export values of Türkiye to Iraq in 2001 and 2002 are not included in the Trademap due to the embargo. Data on Iraq for other years have been compiled by Trademap from the data of countries trading with Iraq and following a fluctuating course.

### 5.1.2. Country-Based Concentration in Türkiye's Exports

The concentration coefficients calculated for 41 sectors, which are also included by combining the 99 product groups in the Turkish Customs Tariff Schedule Divided into Statistical Positions, with the GH method of the five countries that have a high share in Türkiye's exports in the 2001-2021 period are given in Table 2[4]. Using these data, it is examined whether there is a country-based product diversification in Türkiye's foreign trade with certain countries in the period under consideration. As in the analysis of Türkiye's total exports, increases in GH coefficients indicate product concentration, while decreases indicate product diversification.

Table 2 shows the country-based concentration coefficients in Türkiye's exports. As can be seen from the table, the product variety in Türkiye's exports to the United Kingdom, USA, and Germany has increased significantly over time in the 2001-2021 period. The product variety in exports to Italy decreased regularly in the 2001-2009 period and increased in the 2010-2013 period.

**Table 2: Country-Based Concentration Coefficients in Türkiye's Exports (2001-2021)**

| **Countries** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Germany | 42.17 | 41.40 | 41.54 | 39.28 | 37.39 | 36.94 | 35.57 | 34.62 | 38.06 | 35.44 | 34.37 |
| 2.USA | 37.78 | 41.44 | 38.48 | 35.62 | 31.12 | 30.44 | 30.25 | 28.71 | 34.26 | 27.99 | 28.91 |
| 3.United Kingdom | 45.00 | 42.74 | 41.10 | 37.13 | 38.19 | 36.95 | 34.99 | 34.25 | 36.13 | 35.00 | 33.18 |
| 4.Italy | 31.03 | 31.84 | 31.93 | 34.17 | 33.21 | 34.55 | 36.95 | 35.00 | 43.76 | 35.91 | 33.74 |
| 5.Spain | 28.26 | 28.79 | 29.80 | 30.78 | 31.86 | 32.76 | 34.77 | 32.98 | 38.20 | 35.36 | 36.28 |
| | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| 1.Germany | 33.65 | 33.96 | 33.55 | 33.23 | 33.86 | 33.58 | 33.34 | 32.11 | 31.02 | 30.77 | - |
| 2.USA | 28.74 | 26.98 | 29.25 | 29.31 | 28.39 | 28.89 | 27.42 | 27.85 | 26.91 | 26.27 | - |
| 3.United Kingdom | 33.10 | 35.61 | 36.17 | 35.57 | 37.83 | 36.46 | 34.43 | 32.41 | 32.58 | 32.40 | - |
| 4.Italy | 32.90 | 32.06 | 32.35 | 33.43 | 39.57 | 39.56 | 38.18 | 35.19 | 32.87 | 30.51 | - |
| 5.Spain | 36.75 | 34.57 | 35.08 | 36.72 | 38.77 | 36.98 | 35.36 | 34.12 | 34.16 | 33.23 | - |

*****Trademap, by 2021 ranking.

It is possible to state that the product variety in exports to Italy decreased between 2014 and 2016 and that the product variety in exports showed an almost stagnant performance with a small increase in 2017. As of 2017, it is seen that the product diversity in exports to Italy has an increasing trend and 2021, 2021-2021 is the year with the highest product diversity in exports. In Türkiye's exports to Spain, on the other hand, it is observed that the product variety decreased between 2001 and 2009, showed a fluctuating performance in the period of 2010-2016, and entered an upward trend in the period covering the years 2017-2021, including 2021.

[4]See Annex-1 for the list of 41 product groups discussed in the study.

**Table 3: Türkiye's Export Deviation Index by Country (2001=100), (2001-2021)**

| Countries | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Germany | 100.00 | 98.17 | 98.51 | 93.07 | 88.26 | 87.06 | 83.35 | 80.68 | 90.61 | 83.73 | 80.71 |
| 2.USA | 100.00 | 109.69 | 102.54 | 95.11 | 82.48 | 80.29 | 79.67 | 74.58 | 93.91 | 75.61 | 78.90 |
| 3.United Kingdom | 100.00 | 94.98 | 91.14 | 81.48 | 84.34 | 81.09 | 75.78 | 73.67 | 79.16 | 76.03 | 70.83 |
| 4.Italy | 100.00 | 102.61 | 102.89 | 109.91 | 107.10 | 111.13 | 118.08 | 112.80 | 137.83 | 119.89 | 113.85 |
| 5.Spain | 100.00 | 101.88 | 105.38 | 108.67 | 112.18 | 115.01 | 121.14 | 115.99 | 131.82 | 124.39 | 126.99 |
| | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| 1.Germany | 78.62 | 79.54 | 78.33 | 77.38 | 79.27 | 78.44 | 77.73 | 74.04 | 70.65 | 69.84 | - |
| 2.USA | 78.31 | 72.18 | 80.60 | 80.80 | 77.66 | 79.42 | 74.34 | 75.90 | 72.53 | 70.15 | - |
| 3.United Kingdom | 70.59 | 78.17 | 79.75 | 78.09 | 84.44 | 80.82 | 75.25 | 69.38 | 69.91 | 69.36 | - |
| 4.Italy | 111.36 | 108.81 | 109.71 | 113.05 | 131.42 | 131.39 | 127.90 | 120.07 | 113.48 | 106.30 | - |
| 5.Spain | 128.28 | 122.35 | 123.83 | 128.50 | 134.08 | 129.47 | 125.09 | 121.58 | 121.70 | 118.98 | - |

*****Trademap, by 2021 ranking.

Table 3 shows Türkiye's export deviation index by country. In the period covering the years 2001-2021, deviations are observed especially in the German market.

Although there is no stable deviation in exports to the USA as in Germany, it is thought that the political crises with the USA in the fluctuating course of the 2001-2021 period affected trade relations[5]. As can be seen from Table 3, while exports from Türkiye to Italy and Spain, in particular, increased during the 2001-2021 period, it is observed that exports to both Italy and Spain have decreased gradually since 2017.

### 5.2. Country-Based Concentration of BRICS Foreign Trade

The diversity of the economic potentials of the group countries plays an active role in the integration of the BRICS group countries with the global economy (Kuşat, 2015: 222).

#### 5.2.1. Distribution of BRICS' Exports by Country

Table 4 shows the percentage shares of the first five countries to which BRICS exports the most in total exports. When we look at the distribution of BRICS exports to the world countries, the countries with the highest share in the total exports of 2021 are the USA, Hong Kong (China), China, Japan, and South Korea, respectively.

[5] The incident, which emerged between Türkiye and the USA in these fluctuations and turned into a political crisis, and the fact that the Turkish soldiers were sacked by the US soldiers in Northern Iraq in 2003, the strategic partnership signed in 2006 in the relations between the two countries was the result of the Obama administration after Türkiye's intervention in Syria in 2013. Acting in the opposite direction of the strategic partnership in question, the divergence of the policies of Türkiye and the USA in the Middle East in 2014-2015, the existence of allegations that the USA supported the coup attempt on 15 July 2016, the arrest of the American priest Brunson in 2018. It is thought that the mutually imposed sanctions after the political crisis between Washington and Ankara are effective (Ekşi, 2016: 60-62; VOA, 2018; BBC, 2021).

**Table 4: Share of Top 5 Countries in BRICS Exports (%)***

| Countries | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.USA | 17.20 | 18.11 | 17.51 | 17.22 | 16.85 | 16.57 | 15.11 | 13.74 | 14.33 | 13.96 | 13.24 |
| 2.Hong Kong (China)** | 10.10 | 10.93 | 11.03 | 10.73 | 10.30 | 10.21 | 9.91 | 10.31 | 9.38 | 9.33 | 9.24 |
| 3.Chinese | 1.80 | 2.00 | 2.21 | 2.10 | 2.24 | 2.16 | 2.04 | 2.68 | 2.85 | 3.07 | 3.52 |
| 4.Japan | 10.77 | 9.83 | 9.38 | 8.68 | 7.78 | 6.90 | 6.39 | 7.44 | 6.19 | 6.13 | 6.02 |
| 5.South Korea | 3.10 | 3.32 | 3.25 | 3.33 | 3.29 | 3.31 | 3.51 | 4.64 | 3.54 | 3.56 | 3.50 |
| | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| 1.USA | 13.66 | 13.35 | 13.91 | 15.58 | 16.00 | 16.16 | 16.09 | 14.67 | 15.48 | 15.16 | - |
| 2.Hong Kong (China)** | 10.64 | 11.94 | 11.03 | 11.14 | 10.60 | 9.31 | 8.92 | 8.31 | 8.23 | 7.65 | - |
| 3.Chinese | 3.19 | 3.24 | 2.89 | 2.53 | 2.73 | 3.33 | 4.04 | 4.12 | 4.17 | 4.48 | - |
| 4.Japan | 5.85 | 5.61 | 5.38 | 5.18 | 5.15 | 5.01 | 4.81 | 4.75 | 4.68 | 4.21 | - |
| 5.South Korea | 3.49 | 3.43 | 3.70 | 3.88 | 3.84 | 3.85 | 3.80 | 3.85 | 3.85 | 3.87 | - |

***Trademap, by 2021 ranking.

**People's Republic of China Hong Kong Special Administrative Region[6].

While 35.37% of BRICS' export goods go to these five countries, the USA seems to be a fairly stable market for BRICS with an average share of 15.01% in the last ten years. The share of Hong Kong (China), which ranks second in the exports of BRICS, showed a partially fluctuating course from 2001-2015 but displayed a regular downward trend since 2016. The share of China, which is among the BRICS group countries and plays an important role in world trade, has increased regularly since 2015 and peaked at a share of 4.48% in 2021. It is seen that exports to Japan, which ranks fourth, exhibited a regular decline in the 2001-2021 period, excluding 2008, and fell to the lowest levels of the period with a share of 4.21% in 202. It is observed that BRICS exports to South Korea followed a fairly stable course with an average share of 3.70% in the post-2009 period.

### 5.2.2. Country-Based Concentration in Exports of BRICS

The concentration coefficients calculated for 41 sectors, which are also included by combining 99 product groups in the Turkish Customs Tariff Table Divided into Statistical Positions, with the GH method of the five countries that have a high share in the exports of BRICS in the 2001-2021 period are given in Table 5. Using these data, it is examined whether there is a country-based product diversification in the foreign trade of BRICS with certain countries in the period under consideration. As in the analysis of the total exports of BRICS, increases in GH coefficients indicate product concentration, while decreases indicate product diversification.

Table 5 shows the country-based concentration coefficients in BRICS exports. From the table, it is understood that there were small fluctuations in product diversity, but no major changes occurred, especially in exports to the USA, Japan, and South Korea in the 2001-2021 period. However, the product diversity in exports to Hong Kong, ranks second; is possible to state that

[6] The region has developed into one of the world's leading financial centers and commercial ports, and is the world's tenth largest exporter and ninth largest importer (Wikipedia, n.d.c).

it decreased regularly in the 2001-2009 period, followed a fluctuating course in the 2010-2017 period, decreased again as of 2018, and reached the lowest level in 2021. It is observed that the product variety in exports from BRICS to China decreased in the 2001-2008 period and fluctuated in the 2009-2021 period. As can be understood from the small changes in the concentration coefficients over the years, there is no radical change in product diversity in the exports of BRICS to China.

**Table 5: Country-Based Concentration Coefficients in Exports of BRICS (2001-2021)**

| Countries | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.USA | 26.37 | 27.76 | 29.48 | 30.12 | 30.57 | 30.99 | 31.56 | 30.66 | 32.74 | 32.20 | 31.23 |
| 2.Hong Kong (China) | 33.03 | 35.11 | 36.61 | 38.21 | 41.2 | 43.72 | 46.06 | 46.76 | 48.37 | 48.07 | 46.97 |
| 3.Chinese | 27.96 | 28.38 | 30.96 | 32.02 | 35.83 | 36.96 | 37.93 | 40.73 | 39.67 | 42.25 | 45.22 |
| 4.Japan | 26.92 | 27.54 | 27.76 | 27.42 | 26.71 | 26.59 | 26.88 | 26.84 | 28.08 | 28.34 | 27.23 |
| 5.South Korea | 27.36 | 27.21 | 26.96 | 29.41 | 29.24 | 29.02 | 30.27 | 33.38 | 32.94 | 31.14 | 30.92 |
| | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| 1.USA | 31.44 | 31.50 | 31.84 | 31.59 | 31.92 | 32.44 | 32.71 | 32.30 | 33.39 | 31.38 | - |
| 2.Hong Kong (China) | 47.23 | 50.6 | 47.69 | 53.32 | 51.96 | 50.83 | 52.17 | 53.99 | 55.95 | 56.14 | - |
| 3.Chinese | 42.76 | 41.86 | 42.94 | 39.28 | 39.04 | 42.09 | 47.54 | 45.66 | 40.23 | 43.20 | - |
| 4.Japan | 28.42 | 29.18 | 29.62 | 29.78 | 30.07 | 29.69 | 29.60 | 29.13 | 30.20 | 28.68 | - |
| 5.South Korea | 33.28 | 35.02 | 35.34 | 36.40 | 34.89 | 34.08 | 33.94 | 33.79 | 32.88 | 32.13 | - |

Table 6 shows the BRICS export deviation index by the country for the period 2001-2021. In the 2001-2021 period, especially in Hong Kong (China) and Chinese markets, there are great deviations, and it is observed that the diversity in exports to China and especially to Hong Kong decreased in this period. In exports to the USA, Japan, and South Korea, there is no deviation as high as Hong Kong (China) and China; It is understood that the deviation index in these countries, albeit partially, has followed a more stable course, especially in the post-2007 period.

**Table 6: BRICS Export Deviation Index by Country (2001=100), (2001-2021)**

| Countries | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.USA | 100.00 | 105.27 | 111.47 | 113.64 | 115.13 | 116.51 | 118.35 | 115.49 | 122.28 | 120.63 | 117.62 |
| 2.Hong Kong (China) | 100.00 | 106.30 | 110.57 | 114.94 | 122.77 | 128.88 | 134.23 | 135.75 | 139.20 | 138.58 | 136.29 |
| 3.Chinese | 100.00 | 101.50 | 110.59 | 114.02 | 125.92 | 129.07 | 131.69 | 139.08 | 136.47 | 142.98 | 150.01 |
| 4.Japan | 100.00 | 102.30 | 103.10 | 101.88 | 99.29 | 98.84 | 99.93 | 99.78 | 104.40 | 105.33 | 101.41 |
| 5.South Korea | 100.00 | 99.45 | 98.53 | 107.62 | 107.04 | 106.29 | 110.60 | 120.87 | 119.55 | 114.09 | 113.38 |
| | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| 1.USA | 118.29 | 118.48 | 119.56 | 118.77 | 119.82 | 121.45 | 122.28 | 121.03 | 124.4 | 118.38 | - |
| 2.Hong Kong (China) | 136.84 | 143.98 | 138.23 | 150.03 | 147.48 | 145.31 | 147.94 | 151.43 | 155.06 | 155.40 | - |
| 3.Chinese | 144.57 | 142.46 | 145.04 | 136.52 | 135.91 | 143.72 | 156.67 | 152.71 | 140.82 | 148.20 | - |
| 4.Japan | 105.78 | 108.45 | 109.96 | 110.50 | 111.48 | 110.21 | 109.91 | 108.32 | 111.99 | 106.96 | - |
| 5.South Korea | 121.02 | 126.24 | 127.16 | 130.16 | 126.01 | 123.69 | 123.28 | 122.83 | 120.14 | 117.86 | - |

### 5.3. Türkiye-BRICS Export Similarity Index (ESI)

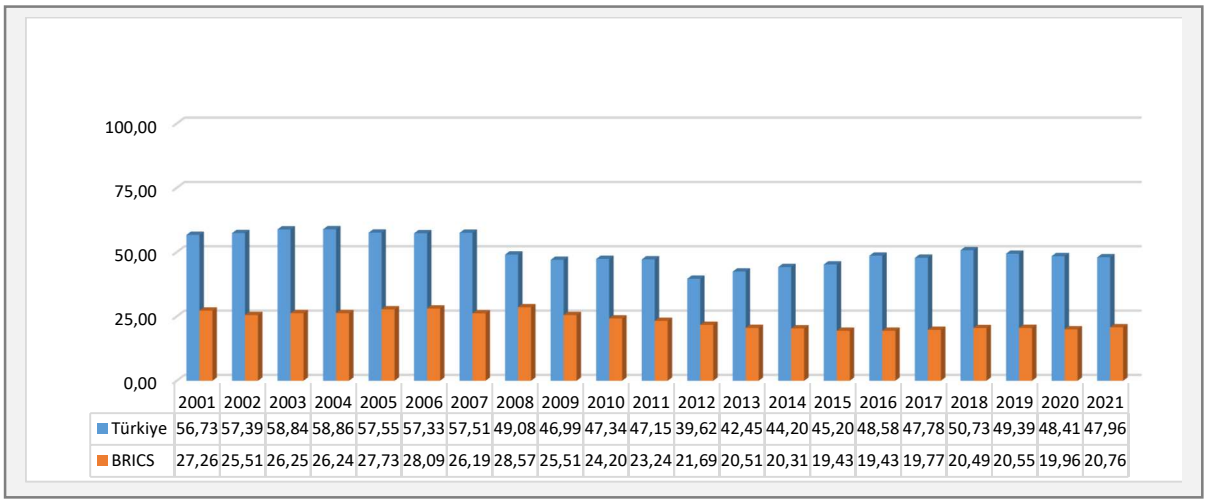
With the developments in the global economy, production and trade structures are changing and global competition is increasing (Sarıçoban & Yalçın, 2020: 99). Commercial competition brings huge gains to emerging economies. In this section, the export similarity index is used to determine which countries rival countries in exports.

For a country or country group to compete with another country in international markets, it must be concentrated on the export of similar products and goods groups with that country. For this reason, it can be said that the country or country groups with high export similarity face high competition. When the index takes the value of "100", the export structure between the two countries or group of countries is exactly similar and there is high competition between the parties; When the index takes the value "0", it means that the export structure between the two countries or country groups is not similar at all and there is no competition.

This part of the study, it is aimed to measure the similarity of exports of Türkiye and BRICS to the EU common market for the period 2001-2021 with the help of the Export Similarity Index. Thus, it is aimed to reveal whether Türkiye and BRICS are similar in terms of export outlook in the EU market, in other words, whether BRICS is a competitor of Türkiye.

According to Trademap 2021 data, while the share of EU in Türkiye's total exports is 47.96%, the share of EU in total exports of BRICS is 20.76% (Figure 1).

**Figure 1: Share of EU in Total Exports of Türkiye and BRICS (%)**




| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Türkiye | 56,73 | 57,39 | 58,84 | 58,86 | 57,55 | 57,33 | 57,51 | 49,08 | 46,99 | 47,34 | 47,15 | 39,62 | 42,45 | 44,20 | 45,20 | 48,58 | 47,78 | 50,73 | 49,39 | 48,41 | 47,96 |
| BRICS | 27,26 | 25,51 | 26,25 | 26,24 | 27,73 | 28,09 | 26,19 | 28,57 | 25,51 | 24,20 | 23,24 | 21,69 | 20,51 | 20,31 | 19,43 | 19,43 | 19,77 | 20,49 | 20,55 | 19,96 | 20,76 |

**Source:** Trademap (n.d.).

While Türkiye's EU exports had a relatively stable course in the 2001-2007 period and had an average share of 57.74%. However, during the financial crisis that emerged in the USA in 2008 and was felt more strongly in Türkiye in 2009, Türkiye's exports to the EU rapidly declined to 46.99%. Afterwards, Türkiye's exports to the EU increased slightly in 2010, exhibited a partial stagnation in 2011, and declined to the lowest rate of the 2001-2021 period with a share of 39.62% in 2012.

Türkiye's exports to the EU showed a regular increasing trend in the 2013-2016 period and reached the highest level of 50.73% in 2018. In the post-2018 period, this share started to

decrease again and took its final form with a 47.96% share in 2021. The share of EU in the total exports of BRICS was 20.29% on average between 2012 and 2021, and it did not experience radical changes.

With the help of ESI, which shows the similarity of the proportional distribution of exports by product groups, it is possible to monitor the similarity of exports of Türkiye and the BRICS group to the EU over time. Thus, it is possible to evaluate whether the export and economic structure of the said countries and country groups show similarities or differences in a certain period. ESI was first used by Finger & Kreinin in 1979.

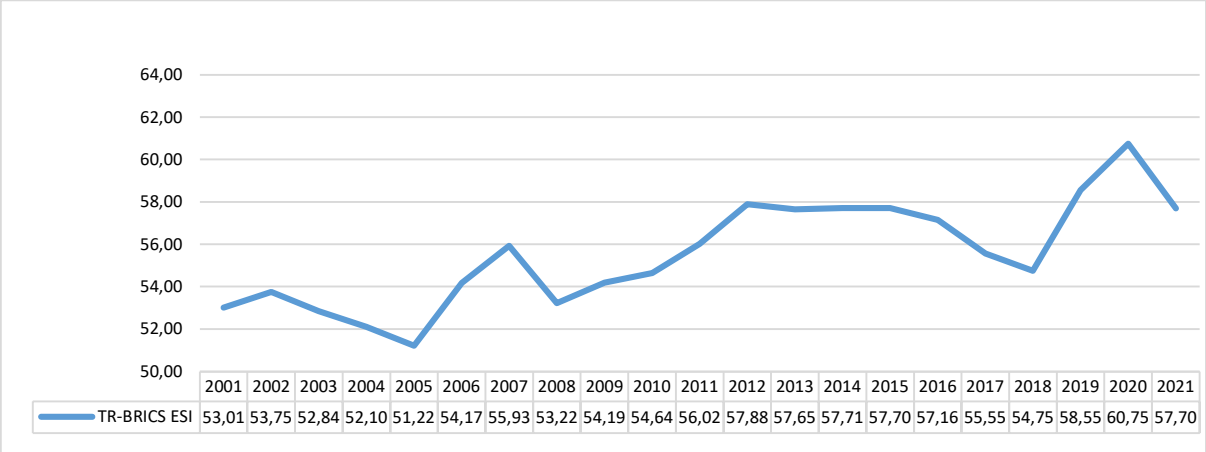
The study is based on two-digit 99 product classifications according to Trademap HS (Trademap, 2022e). By narrowing down these 99 product classifications, 41 product classifications were made, and the results of the export similarity index calculated based on the export data of Türkiye and BRICS to the EU between 2001-2021 were obtained[7].

According to Table 7 and Figure 2, when the post-2006 period, when BRICS became official, is compared with the 2001-2006 period, it is possible to state that the export similarity of Türkiye and BRICS has increased in the post-2006 period.

**Tablo 7: Türkiye (TR)-BRICS ESI Results (2001-2021)**

| Year | TR-BRICS ESI | Year | TR-BRICS ESI |
|---|---|---|---|
| 2001 | 53.01 | 2012 | 57.88 |
| 2002 | 53.75 | 2013 | 57.65 |
| 2003 | 52.84 | 2014 | 57.71 |
| 2004 | 52.10 | 2015 | 57.70 |
| 2005 | 51.22 | 2016 | 57.16 |
| 2006 | 54.17 | 2017 | 55.55 |
| 2007 | 55.93 | 2018 | 54.75 |
| 2008 | 53.22 | 2019 | 58.55 |
| 2009 | 54.19 | 2020 | 60.75 |
| 2010 | 54.64 | 2021 | 57.70 |
| 2011 | 56.02 | | |

**Figure 2: Türkiye-BRICS ESI Curve (2001-2021)**




[7] See Annex-1 for the list of 41 product groups discussed in the study.

The export similarity of the group, which turned into BRICS with the participation of South Africa in 2011, in the EU market with Türkiye, followed a stable course in the 2012-2016 period, and the ESI average of the mentioned period was found to be 57.61. The similarity decreased in 2017-2018 and with a 54.75 ESI level in 2018, this value was also behind 2011. Since 2018, the similarity index of exports of Türkiye and BRICS to the EU has increased rapidly and this increase continued in 2020 when the global epidemic was effective. The highest ESI value of the 2001-2021 period, which was examined with a value of 60.75, was reached in 2020. The fact that the exports of Türkiye and BRICS in the EU market have an ESI value of 60.75 means that the said parties are in competition with each other in terms of export markets in the EU market and pose a threat to each other. It also shows that they mostly export to the EU market in similar product groups.

ESI allows for comparison between countries of different sizes and development stages. However, Mikic & Gilbert (2007: 74) state that ESI has some limitations. It draws attention to the fact that it takes into account only the structure of exports, not the level, that it can be misleading when the size of the economies analyzed is very different and subject to aggregation bias.

## 6. Conclusion

Since the 1980s, Türkiye has been making great efforts to strengthen its ties with national economies and to integrate into the international system within the globalization process. The BRICS group, which is one of the main forces of global economic growth and brings together the world's leading emerging economies, constitutes 41% of the world's population, 24% of the world's GDP, and carries out more than 16% of world trade. Since the EU has a fairly stable share of approximately 50% in Türkiye's total exports and the EU's approximately 20% in total exports of BRICS, the exports of Türkiye and BRICS are examined in this study.

In the study, the country-based concentration coefficients of Türkiye and BRICS were analyzed with the help of the GH Index. ESI has been calculated to reveal whether the exports of Türkiye and BRICS, which are also defined as emerging economies with a very similar foreign trade structure, are similar in the EU common market and the level of competition between them. It is expected that this study will contribute to the international trade literature, especially in measuring the country-based density of the trade between Türkiye and BRICS countries and determining the similarity level of exports of Türkiye and BRICS to the EU common market.

While the decrease in concentration, which is the subject of the study, means an increase in product and market diversity and competitiveness in exports, an increase in concentration means a decrease in product and market diversity, an increase in the dependency and risks on a small number of products and countries. The high similarity of exports between two countries or groups of countries and their course over time means that the competition between the two countries or groups of countries is high; A decrease in similarity means a decrease in competition.

While calculating the concentration coefficient ratios for Türkiye and the first five countries in the export of BRICS, Trademap 2021 data is taken as a basis. The analysis made shows that the top five countries in Türkiye's exports are all European countries, except the USA, and that exports generally followed a fluctuating course in the 2001-2021 period, although Germany ranks first in Türkiye's exports in 2001. It shows a decrease from 17.13% in 2021 to 8.58% in 2021. The evaluation made in this section also reveals that although Türkiye ranks second in its exports, Türkiye's exports to the USA showed a steady decrease between 2001-2009 and showed a fairly stable increase between 2010-2021. The results obtained show that the product variety in Türkiye's exports, especially to the United Kingdom, the USA, and Germany, increased significantly over time in the 2001-2021 period, while the product variety in exports to Italy decreased in the 2001-2009 period, it increased in the 2010-2013 period, It shows that it decreased between 2014-2016 and the product variety in exports showed almost stable performance with a small increase in 2017. It is observed that the product variety in exports to Spain decreased in the 2001-2009 period and increased in the post-2017 period, although it displayed a fluctuating performance in the 2010-2016 period.

Country-based concentration in BRICS exports over the 2001-2021 period, exports to the US, Japan, and South Korea, show small changes in terms of product diversification. However, while product diversity in exports to Hong Kong declined steadily in the 2001-2009 period, it followed a fluctuating course in the 2010-2017 period and reached its lowest level in 2021. Although there are small fluctuations in BRICS exports to China, there is no fundamental change in terms of product diversity.

Country concentration in Türkiye's and BRICS export markets has not changed. The US ranks among the top 5 countries in both Türkiye 's and BRICS' exports. In addition, the top 4 countries other than the USA in Türkiye's exports are Germany, Italy, Spain, and the United Kingdom. These 4 European countries show that geographical proximity is important in country-based concentration. The situation is similar for BRICS. The top 4 countries in BRICS exports, excluding the US, are China, South Korea, Hong Kong (China), and Japan.

To demonstrate whether Türkiye and BRICS are competitive in their exports to the EU common market, ESI has been calculated in the EU common market of Türkiye and BRICS. The fact that the exports of Türkiye and BRICS in the EU market have a high ESI value of 60.75 shows that these countries export similar products in the relevant product groups in the EU market and therefore are in competition with each other. Since the high export similarity index of Türkiye and BRICS in the EU common market will cause fierce competition in the exported products, it would be more beneficial to strengthen the commercial cooperation between Türkiye and the BRICS and to show a conciliatory approach that will reduce the conflict in bilateral trade disputes. In addition, an appropriate competitive relationship between Türkiye and BRICS can also encourage the improvement of the industrial structure and technological progress of the two countries. Due to the supply chain and supply security problems especially in China during the global epidemic, Türkiye's geographical proximity to the EU market may provide a significant advantage in favor of Türkiye. Although Türkiye's full membership to the EU does not develop as expected, it is thought that it will be in favor of Türkiye not moving away from the membership negotiations with the EU.

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**Etik Beyanı:** Bu çalışmanın tüm hazırlanma süreçlerinde etik kurallara uyulduğunu yazarlar beyan eder. Aksi bir durumun tespiti halinde Fiscaoeconomia Dergisinin hiçbir sorumluluğu olmayıp, tüm sorumluluk çalışmanın yazarlarına aittir.

**Ethics Statement:** The authors declare that ethical rules are followed in all preparation processes of this study. In case of detection of a contrary situation, Fiscaoeconomia has no responsibility, and all responsibility belongs to the authors of the study.

## ANNEXES

### ANNEX-1: 41 Product Groups Considered in the Study

| | |
|---|---|
| **AGRICULTURAL PRODUCTS** | |
| 1 | (1) Live Animals |
| 2 | (2) Meat and meat products |
| 3 | (10) Cereals |
| 4 | (7, 8) Fruits and Vegetables |
| 5 | (17) Candy and Confectionery |
| 6 | (9) Coffee, tea, paraguayan tea and spices |
| 7 | (3, 4) Other Animal Products |
| 8 | (23) Food Industry Waste and Waste; Processed Animal Feed |
| 9 | (11,13) Other Foodstuffs |
| 10 | (22) Soft drinks, spirits and vinegar |
| 11 | (24) Tobacco and tobacco substitutes |
| 12 | c- (15) Animal or Vegetable Fats and Oils and Products |
| 13 | d- (12) Oilseeds and Fruits, Various Cereals |
| 14 | (5, 6, 14, 16, 18, 19, 20, 21) Unprocessed Animal and Vegetable Products |
| **MINERAL MATERIALS** | |
| 15 | i- (26) Mineral Ores, Crumbs and Ashes |
| 16 | ii- (27) Mineral Fuels, Mineral Oils and Products |
| 17 | iii- (25) Salt; Sulfur; Soil and Stone; Plastering Materials, Lime and Cement |
| **INDUSTRY** | |
| 18 | (72) Iron and Steel |
| 19 | (73) Articles of Iron or Steel |
| 20 | (76) Aluminum and Aluminum Products |
| 21 | (74, 75, 77, 78,79,80, 81, 82, 83) Other Base Metals and Miscellaneous Derived from Them |
| 22 | (28) Inorganic Chemicals |
| 23 | (29) Organic Chemicals |
| 24 | (30) Pharmaceutical Related Products |
| 25 | (31) Fertilizers |
| 26 | (32, 33, 34, 35, 36, 37, 38) Other Chemical Products |
| 27 | (39) Plastics and Products Made of Plastic |
| 28 | (40) Rubber and articles of rubber |
| 29 | (71) Pearls, Precious or Semi-Precious Stones, Metals, Made from Them |
| 30 | a-Raw Skins and Leathers, Leathers, Skins, Furs and Articles Made of These Materials; Travel Goods, Handbags and Similar Cases; Articles Made of Animal Gut (Excluding Silkworm Gut) (41,42, 43) |
| 31 | b-Wood and Wooden Goods; Wood coal; Mushrooms and Articles Made of Cork; Products of Straw, Reed or Other Knitting Materials, Basketmaker and Wickerware- Pulp of Wood or Other Fibrous Cellulosic Materials and Recycled Paper or Cardboard (Waste, Clippings and Scraps); Paper, Cardboard and Products (44, 45, 46, 47, 48, 49) |
| 32 | (62) Articles of clothing and accessories, not knitted |
| 33 | (50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63) Other Textile Materials and Articles Made from Them |
| 34 | vii-Shoes, Headgear, Umbrellas, Sun Umbrellas, Walking Sticks, Chair Canes, Belts, Whips and Parts Thereof; Prepared Feathers and Articles Made From Them; Artificial Flowers, Articles of Human Hair (64, 65, 66, 67) |
| 35 | viii-Articles of Stone, Gypsum, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass or Glassware |
| 36 | (84) Machinery Parts, Mechanical Equipment |
| 37 | (85) Electrical Appliances and Parts |
| 38 | (87) Vehicles and Parts other than Train or Tramway Wagons |
| 39 | (86, 88, 89) Other Transport Means |
| 40 | (90) Optical, Photographic Cinematographic Products |
| 41 | xii-Other Miscellaneous Manufactured Goods (91, 92, 93, 94, 95, 96, 97, 98, 99) |