ANALYSIS OF EXPORT CONCENTRATIONS OF CHINA AND JAPAN ON PRODUCT BASIS

Birol ERKAN*

Elif Tuğçe BOZDUMAN**

Geliş/Received: 17.09.2021

Kabul/Accepted: 25.10.2021

Abstract

Nowadays, both developing countries and developed countries aim to increase their export competitiveness and become a stronger global actor. In this context, the most important key for countries to gain a competitive advantage is to increase exports and product diversification in exports. In this perspective, in this study, it is aimed to analyze the export competitiveness of China and Japan in a comparative way using export concentrations. In this analysis, which examines the 2000-2020 period, the Concentration Ratio (CR) and Herfindahl-Hirchman Index (HHI), which are concentration indices, are used. According to the results, when compared to Japan, China's export concentrations on product basis decreased. In other words, product diversification and competitiveness in China's exports have increased.

Keywords: Export Concentration, CR, HHI, China, Japan

ÇİN VE JAPONYA'NIN ÜRÜN BAZINDA İHRACAT YOĞUNLAŞMALARININ ANALİZİ

Özet

Günümüzde gerek gelişmekte olan ülkeler gerekse gelişmiş ülkeler ihracat rekabet güçlerini yükseltmeyi ve daha güçlü bir küresel aktör olmayı amaçlamaktadır. Bu bağlamda, ülkelerin rekabet avantajı sağlamaları açısından en önemli anahtar ihracatın ve ihracattaki ürün çeşitlendirmelerinin yükseltilmesidir. Bu perspektifte, bu çalışmada, ihracat yoğunlaşmaları kullanılarak Çin'in ve Japonya'nın ihracat rekabet gücünün karşılaştırmalı bir şekilde analiz edilmesi amaçlanmıştır. 2000-2020 döneminin incelendiği bu analizde yoğunlaşma endekslerinden Yoğunlaşma Oranı (CR) ve Herfindahl-Hirchman Endeksi (HHI) kullanılmıştır. Elde edilen sonuçlara göre, Japonya ile kıyaslandığında Çin'in ürün bazında ihracat yoğunlaşmaları azalmıştır. Diğer ifadeyle, Çin'in ihracatındaki ürün çeşitlendirmesi ve rekabet gücü artmıştır.

Anahtar Kelimeler: İhracat Yoğunlaşması, CR, HHI, Çin, Japonya

1. Introduce

In today's world, it is obvious that the most important word in any subject will be "competition". Because the main aim of countries in all fields from education to health, from sports to art, from economy to technology is to leave their competitors behind. However, competition is a highly dynamic concept. Countries that are at the forefront of global competition in certain periods may fall behind their competitors if they do not take the necessary precautions and make the necessary moves. One of the most important examples of this situation shows itself in the global export data.

Since 2000, China has outperformed its competitors in global exports (Table 1). While China was the seventh largest exporting country in the world in 2000, it came to the top in 2009 and has managed to be at the top consistently until today. However, countries such as France, Japan, USA, Canada, England, Germany have begun to fail to show their performance in the past years and lag behind China (https://www.worldstopexports.com/worlds-top-export-countries/, 2021).

* Prof. Dr., İskenderun Technical University, Department of Economy, birol.erkan@iste.edu.tr, ORCID ID: 0000-0001-8363-5543

** Res. Asst., Manisa Celal Bayar University, Department of Economics, tugce.bozduman@cbu.edu.tr, ORCID ID: 0000-0002-6145-8571

Table 1: World Export Ranking (Top 10, 2000-2020)

Rank	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	US	US	US	Germany	Germany	Germany	Germany	Germany	Germany	***China***	***China***
2	Germany	Germany	Germany	US	US	US	***China***	***China***	***China***	Germany	Germany
3	Japan	Japan	Japan	Japan	***China***	***China***	US	US	US	US	US
4	France	France	***China***	***China***	Japan	Japan	Japan	Japan	Japan	Japan	Japan
5	UK	UK	France	France	France	France	France	France	France	France	France
6	Canada	***China***	UK	UK	UK	UK	UK	Italy	Holland	Holland	Holland
7	***China***	Italy	Italy	Italy	Italy	Italy	Italy	Holland	Italy	Italy	Italy
8	Italy	Canada	Canada	Canada	Holland	Holland	Holland	UK	UK	Belgium	Belgium
9	Holland	Holland	Holland	Holland	Belgium	Canada	Belgium	Belgium	Belgium	Korea	Korea
10	Belgium	Belgium	Belgium	Belgium	Canada	Belgium	Canada	Canada	Russia	UK	UK

Rank	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	***China***	***China***	***China***	***China***	***China***	***China***	***China***	***China***	***China***	***China***
2	Germany	Germany	Germany	Germany	Germany	Germany	US	US	US	US
3	US	US	US	US	US	US	Germany	Germany	Germany	Germany
4	Japan	Japan	Japan	Japan	Japan	Japan	Japan	Japan	Japan	Japan
5	France	France	France	Holland	Korea	Korea	Holland	Holland	France	Holland
6	Holland	Korea	Holland	France	Holland	France	Korea	Korea	UK	Hong Kong
7	Korea	Holland	Korea	Korea	France	Italy	France	France	Holland	Korea
8	Italy	Italy	Russia	UK	Italy	Holland	Italy	Hong Kong	Korea	Italy
9	UK	UK	Italy	Russia	UK	UK	UK	Italy	Hong Kong	France
10	Belgium	Russia	UK	Belgium	Russia	Belgium	Belgium	UK	Singapore	Belgium

Source: Edited by us with data from https://data.worldbank.org/indicator/NE.EXP.GNFS.CD and https://www.worldstopexports.com/worlds-top-export-countries/

If China's product-based export is examined (World Bank, 2021), it can be seen that its export of high-tech product have steadily increased. China's exports of high-tech products regularly increase, When China's foreign trade balance is examined, there is a stable foreign trade surplus. In other words, China's exports exceed its imports. Taking into account trade in services and other items, China's current account balance also gives an excess (Workman, 2021).

In this study, the competitive profile of China and Japan, which are the leading players in global trade and competition, has been tried to be revealed and compared on the basis of export concentrations. In this context, firstly, the CR and HHI, which are frequently used in export concentrations, are conceptually defined in the study. Then, the indices in question were adapted to the foreign trade of China and Japan on a product basis and calculated.

In the literature, there are studies analyzing the product concentrations of country and country groups. Dani (2015) analyzed the product concentration of BRIC countries using the Product Concentration index. The results of the analysis showed that product concentration was high in BRIC countries. Huang and Chen (2016) analyzed the export diversification of China's industrial products using Theil index in their study. Karahan (2017) analyzed the export performance of BRICS and MINT countries in terms of product/sector and market diversification. The results of the analysis showed that export concentration was higher, especially in the global crisis of 2008-2009. As a result of the analyzes, it was revealed that China's export diversification in industrial products was higher compared to similar countries. Erkan (2019) analyzed China's export concentration in developed countries such as Japan, the United States and Germany with the Trade Concentration Ratio index, Herfindahl-Hirschman (HH) index, Deviation index and Penetration index. The results of the analysis showed that China's concentration has decreased over time and increased export diversification. Faiz and Miatra (2020) analyzed Bangladesh's export concentration in other Asian countries (China,

Thailand and Vietnam) using the Herfindahl-Hirschman (HH) index. The results of the analysis showed that Bangladesh's exports were highly concentrated in a single industry, while other countries were diversifying exports more in different sectors.

In the literature, there are studies on China's export concentration. However, there has been no study of export concentration on a product-by-product basis comparing China and Japan. Therefore, we think that this study may contribute to the literature.

2. Indices Used to Measure Export Concentration

Nowadays, both developed and developing countries are aware that they need to make more export in order to increase their economic level and share of global value-added. Along with the amount of diversificaton of the product and market in the export is also important in terms of exporting their economic and social development goals (Erkan, 2014).

The most widely used measure of the concentration of exported goods is the HHI, which expresses the degree of concentration in the country's exports (Tegene, 1990). However, the CR is also a widely used and easily calculated measure of concentration.

2.1 Trade Concentration Ratio (CR)

Concentration analysis can be done for the firm, product (sector), market or country. The most preferred method used for analysis is the CR.

The CR is formulated as:

$$CR = \sum_{i=1}^{k} Pi \ x\ 100$$

In the formula, the CR represents the concentration ratio and Pi represents the sector's share. Index results take values between 0 and 100. If the index value is close to 0, it is concluded that the concentration is low, that is, the export share of the country in that sector is low. On the contrary, if the index value approaches 100, it is concluded that the concentration is very high, that is, the export share of the country in that sector is very high (Erkan, 2019). The concentration rate approaching zero is very important in the context of countries ' global competitiveness. This indicates that countries increase their competitiveness by exporting a wide range of products. On the contrary, approaching 100 indicates that the country cannot compete adequately with its competitors by exporting a limited variety of products (Makonnen, 2012).

If the degree of concentration is less than 25 (CR< 25) there is low concentration, between 25 and 50 (25< CR < 50) medium concentration, if greater than 50 (CR > 50) there is high concentration (Kozáková & Barteková, 2020).

2.2 Herfindahl-Hirschman Index (HHI)

Another frequently used method for concentration analysis is the HHI. The HHI is calculated by squaring the export shares of all sectors.

The HHI is formulated as follows (Meilak, 2008):

$$HHI= (Si)^2$$

In the formula, the HHI indicates the concentration ratio, and Si indicates the share of exports in the sector in total exports. In short, the square of the export shares of each sector is taken and calculated in this way. Index results take values between 0 and 1. If the index value approaches 0, the country's export diversification is very strong, that is, the concentration ratio is low. If the index value approaches 1, the export diversification of the country is very weak, that is, the concentration ratio is high.

If the HHI scores are below 0.15, export concentration is low. In this case, the country's export diversification on the basis of products is high. Therefore, low levels of export intensification have a positive impact on the country's export competitiveness. If the HHI score is between 0.15 and 0.25, the country's export concentrations are moderate. If the score is greater than 0.25, the country's export

concentrations are high. This means that the country cannot diversify its exports on a product basis. As a result, the country's export competitiveness is negatively affected by this situation (Statistics Canada, 2017).

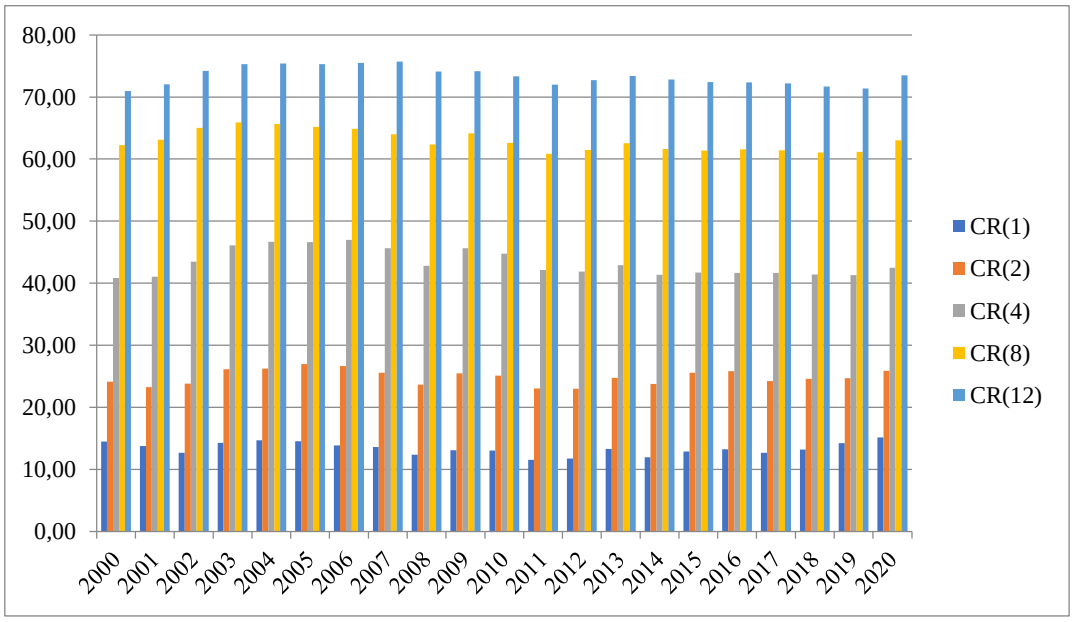
3. Export Concentration Analysis of China and Japan

In the study, firstly, we calculated the concentration ratios of China and Japan and analyzed their export concentrations. We made the analyzes for the years 2000-2020. In this perspective, we interpreted the analyzes using Standard International Trade Classification (2 digits) data. We determined the export concentration levels of Japan and China. in the analysis conducted on the 66 product groups.

3.1. Concentration Ratio (CR) Analysis

When the concentrations of China on the basis of CR(1) are examined, it is seen that it is generally between 10 and 20 (https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx, 2021). Considering the product that China exports the most over the years, it is seen that the product in question has a share of between 10 and 20 percent in total exports. However, when going from CR1 to CR(12), it is clearly seen that the concentrations increase. For example, CR(2) scores showing the share of the two most exported products in total exports are between 20 and 30. CR(4) scores range from 40 to 50 and have been declining in recent years. This situation reveals that China has increased its export diversification and competitiveness.

Chart 1. China's CR Analysis (2000-2020)

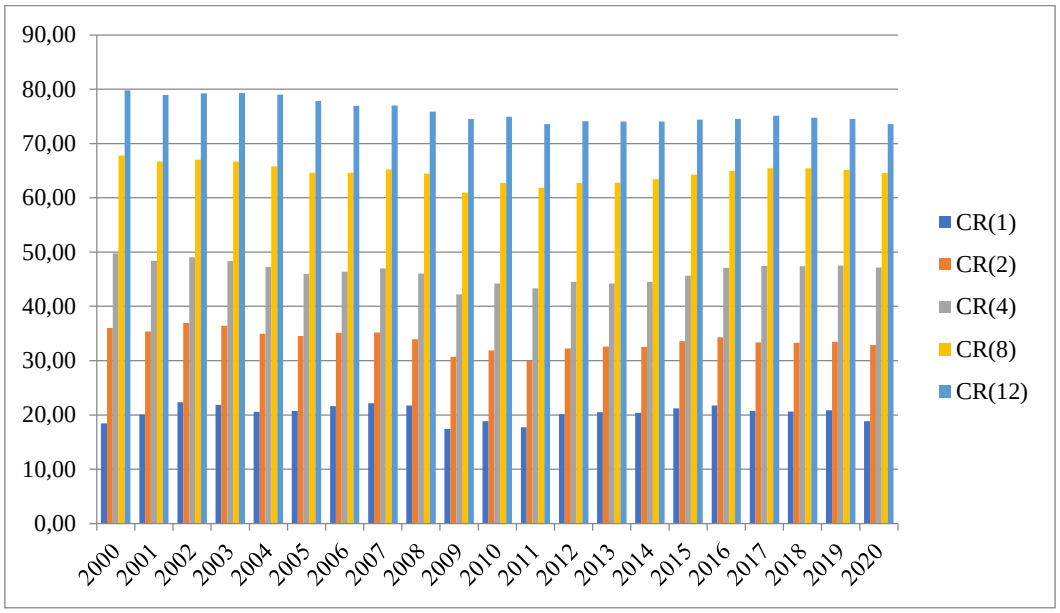


Source: It was created by us using the WITS World Bank dataset.

CR(8) scores are also between 60 and 70 and have been decreasing in recent years. CR(12) scores are also between 70 and 80. Especially between 2003 and 2008, China's export concentrations are relatively high. In the following years, concentrations decreased and the competitiveness of the country was positively affected.

When the concentrations of Japan on the basis of CR(1) are examined, it is seen that many years exceeded 20 years. Compared to China, of course, this is a negative indicator for Japan in the context of global competition (https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx, 2021). Japan's CR(2) scores range from 30 to 40. These scores are also against Japan. Japan's CR(4) scores range from 40 to 50 and are in line with China's scores.

Chart 2. Japan's CR Analysis (2000-2020)



Source: It was created by us using the WITS World Bank dataset.

Japan's CR(8) scores also show parallelism with China and are between 60 and 70. Japan's CR(12) scores are also between 70 and 80 and have been declining in recent years. In this context, the CR(12) scores are also similar to those of China.

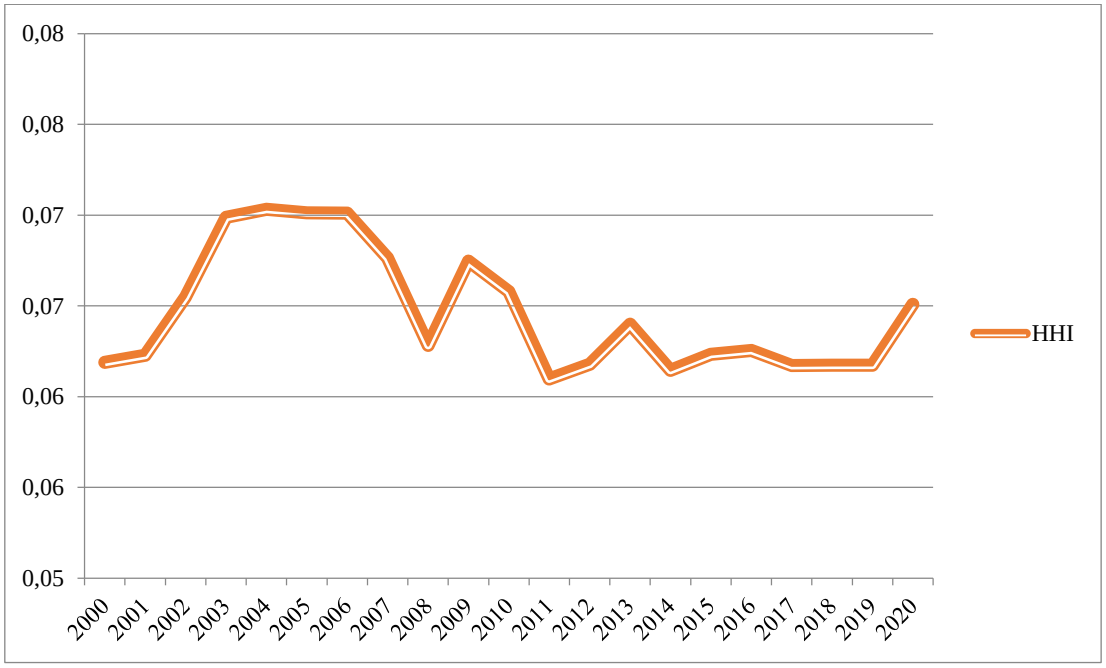
When the CR scores of China and Japan are compared in general, China's superiority is seen especially between CR(1) and CR(4). This situation positively affects China's competitiveness against Japan. In the other CR groups, the scores of the two countries are similar to each other.

3.2. Hirschman-Herfindahl Index (HHI) Analysis

When the HHI scores of China between 2000 and 2020 are examined in Chart 3, it is seen that the concentrations are not very high in general. Over the years, China's HHI scores range from 0.06 to 0.07. Export concentrations are relatively higher between 2003 and 2006. This negative situation is also expressed in CR values (https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx, 2021).

Although the HHI scores showed a stable outlook after 2014, the 2020 Covid-19 pandemic has increased China's export concentration and negatively impacted its competitiveness.

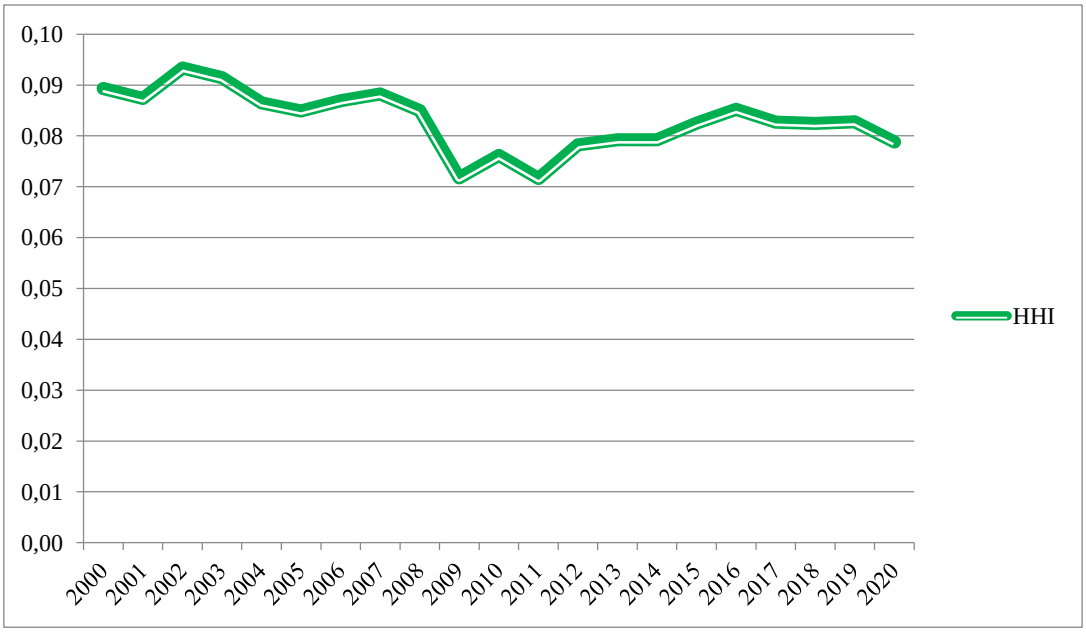
Chart 3. China's HHI Analysis (2000-2020)



Source: It was created by us using the WITS World Bank dataset.

When Chart 4 is examined, it is seen that Japan's HHI scores are higher when compared to China (https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx, 2021). Between 2000 and 2020, China's HHI scores range from 0.06 to 0.07, while Japan's HHI scores range from 0.07 to 0.10. It is seen that Japan's HHI scores increased (export diversification decreased) especially with 2010.

Chart 4. Japan's HHI Analysis (2000-2020)



Source: It was created by us using the WITS World Bank dataset.

4. Conclusion

The global macroeconomic performances of countries and, accordingly, their international competitiveness do not show a stable outlook. On the contrary, the global rankings of countries are constantly changing, depending on their export values and the rate of technology in the products they

export. The change in question shows itself especially between the years 2000-2020. While countries such as the USA, Germany, Japan, France and England were leading global exports in the early 2000s, the outlook has changed in favor of China in recent years. It is an undeniable fact that China is a much more important global power and competitor today.

In this study, in which the said global competition is examined on the basis of export concentrations, China and Japan are analyzed comparatively. In the study conducted for the years 2000-2020, the export concentrations of China and Japan were calculated and compared on the basis of the CR and HHI. The scores obtained show that the export concentrations have changed in favor of China in the mentioned time period. Likewise, both the CR and HHI scores reveal that China's concentration values are lower. The change in the concentration scores in favor of China also reveals that China has succeeded in diversifying its exports relatively. This result naturally reflected on the global export rankings of the two countries. In the early 2000s, China, which was behind Japan, surpassed Japan. Today, the rise of China's brand value in many products, especially in products with high added value, is an important indicator of this result.

In our age, where the concept of competition comes to the fore on every platform every year, the formula for countries to be at the forefront of global competition is to increase their export values. In this context, countries need to reduce their export concentrations and increase the diversification of exported products in order to increase their export values. However, in this case, countries will be able to take place as an influential actor on the global platform.

REFERENCES

Erkan, B. (2014). Product and Market Diversification in Turkey's Foreign Trade. *International Journal of Advances in Management and Economics, 3*(1), 1-15.

Erkan, B. (2019). China as a Global Power in the Face of Developed Countries such as The US, The EU, Germany and Japan: An Analysis in the Perspective of Concentration. *Global and Regional Powers- Relations, Problems and Issues in the 21st Century* (s. 73-87). içinde Berlin: Peter Lang.

Huang, S.-l., & Chen, Y.-f. (2016). The Evolution and International Comparison of China's Industrial Products Export Diversification. *First International Conference on Economic and Business Management* (s. 1-6). China: Advances in Economics, Business and Management Research.

Kozáková, M., & Barteková, M. K. (2020). Analysis of market concentration in creative industry. *SHS Web of Conferences, 83*, 1-8.

Makonnen, T. (2012). *Determinants of Export Commodity Concentration and Trade Dynamics in Ethiopia.* Addis Ababa: Ethiopian Economics Association/Ethiopian Economics Policy Research Institute (EEA/EEPRI).

Meilak, C. (2008). Measuring Export Concentration: The Implications for Small States. *Bank of Valetta Review, 37*, 35-48.

Statistics Canada. (2017, December 11). *Exportdiversification.* Component of Statistics Canada: www.statcan.gc.ca/daily-quotidien/171211/dq171211b-eng.pdf adresinden alındı

Tegene, A. (1990). Commodity Concentration and Export Earnings Instability: Evidence from African Countries. *The American Economist, 34*(2), 55-59.

Workman, D. (2021). World's Top Export Countries: https://www.worldstopexports.com/worlds-top-export-countries/

World Bank (2021), : https://data.worldbank.org/indicator/NE.EXP.GNFS.CD

https://www.worldstopexports.com/worlds-top-export-countries/. (2021).

https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx. (2021).