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Analysis of Product Concentrations of Fragile Economies

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ABSTRACT

After the US Federal Reserve's tightening message in May 2013, the volatility in the economic indicators of some countries whose economy was financially dependent on foreign sources increased. The economies of some countries were more negatively affected by the said situation. These countries (Brazil, Turkey, Indonesia, South Africa, India) took place in the economic literature as the "Fragile Five". In this study, it is aimed to determine and analyze the product concentrations in the exports of Fragile Five economies. In this context, Entropy Index (EI) and Hirschman-Herfindahl Index (HHI) are used in the analyzes covering the 2000-2020 period. According to the results of the analysis, Turkey and India are the countries with the lowest export concentrations among the said countries.

Keywords: Concentration, Fragile Five, Entropy Index, Hirschman-Herfindahl Index

1. INTRODUCTION

The acceleration of global competition and the constant change of factors affecting competition cause countries to seek different ways and change their strategies. Over the years, the difference in production and exports between developed and developing countries is closing in favor of developing countries. Many developing countries, especially China, are improving their technology equipment in their production and exports and attaching more importance to research and development activities day by day. At the same time, the factors that determine global competition today are not only product quality, added value, production and export amount. The quality and added value level of the products produced and exported by a country may be high. However, if the export of the country in question concentrates only on certain products, in other words, if the country has not realized product diversification in exports, its global competitiveness will not be sufficient.

In this perspective, Fragile Economies (Brazil, Turkey, Indonesia, South Africa, India), which are frequently mentioned in the global economy and the subject of many studies, are discussed in this study. Because the mentioned countries are among the pioneers of developing countries in terms of production and export power. However, these economies have been called "fragile" in recent years due to their savings deficits and financial dependency on foreign sources. In this respect, the situation of export concentrations of Fragile Economies on product basis is analyzed in this study. First of all, general information about Fragile Economies is given and in the following sections, the method used in the study is mentioned together with the literature research. Finally, the concentrations of these economies in the global markets are analyzed using the Entropy Index (EI) and the Hirschman-Herfindahl Index (HHI).

With the 2008 global economic crisis, almost all of the developed economies had to struggle with the recession. For this reason, central banks of developed countries, especially the Fed, implemented expansionary monetary policies. As a result, the abundant amount of money supplied to the world increased the foreign currency inflows to some developing countries with high savings and external deficits and led to the revival of these

economies. As a matter of fact, even though their external deficits were high, serious economic problems did not occur in these countries due to foreign exchange inflows. However, the speech of FED Chairman Ben Bernanke on May 22, 2013 caused fragile economies to be shaken. Stating that the US economy started to recover from the crisis and that expansionary monetary policies would come to an end, Bernanke announced that they would follow a tightening monetary policy. This means that the abundant low-interest money pumped into the markets by the Fed would gradually reduce it (Nechio, 2014). It would be inevitable that fragile countries with high savings deficits, external deficits and financial dependency would be adversely affected by these possible tightening policies. As a matter of fact, according to the observation of Morgan Stanley, the national currencies of Brazil, India, Indonesia, South Africa and Turkey, which were among the emerging economies, depreciated at high rates against the dollar in 2013 (Stanley, 2013). For this reason, the five countries in question were referred to as the "Fragile Five" in the economics literature (Batbaylı, 2017).

Lack of new investment and volatility in economic growth rates made it impossible to finance many projects. This deficiency fed the slowdown in the economy and made their economy more vulnerable to the outside. Most of these economies experienced continued declines in 2015. Due to the continuous increase in the current account deficit, these countries relied on foreign investment more than before to close their deficits. This situation created a vicious circle for countries. Morgan Stanley scored emerging markets according to these six factors (The Balance, 2022):

- ✓ Current account balance
- ✓ The ratio of foreign exchange reserves to external debt
- ✓ Foreign holdings of government bonds
- ✓ U.S. dollar debt
- ✓ Inflation
- ✓ Real rate differential

2. LITERATURE REVIEW

Meilak (2008) examined the export concentrations of 20 countries at different levels of development in his study. In the study, in which 8 different concentration criteria were used, it was determined that the export concentrations are higher in countries with relatively small economic size (less developed countries) (Meilak, 2008).

Sattar and Ahmed (2012) analyzed export concentrations in Bangladesh during the period 1990-2011 in their study. In the study, in which the concentration index and HHI were used, it was also compared with countries like Bangladesh. It was the country with the highest HHI value among countries with volatile concentrations (Sattar & Ahmed, 2012).

Makonnen (2012) aimed to estimate the main determinants of export concentration in Ethiopia. Concentration Ratio, HHI, Hannah and Kay Index, EI were used to measure export concentrations. The results showed that the concentration in the country's exports decreased and exports started to move from west to east. It was stated that the lagged value of production, the change in the real effective exchange rate, the change in education expenditures and the ratio of the lagged value of investment to the GDP ratio were important determinants of export concentration (Makonnen, 2012).

Karahan (2017) analyzed the relationship between export concentrations and the collapse in trade, especially in the 2008-2009 crisis period of the BRICS and MINT economies. Results from the analysis using HHI showed a positive relationship between concentration and trade collapse (Karahan, 2017).

Dumičić et al. (2018) analyzed the concentration of global goods exports for developed, developing and transition countries in their studies, in which they used the concentration index and HHI for the 1948-2016 period. They stated that the market concentration of global goods exports decreased (Dumičić, Jošić, & Žmuk, 2018).

Ünlü and Yıldız (2019) analyzed the concentrations in foreign trade of technology-intensive products in Turkey in the period 1996-2017. They used the Concentration Index, HHI and EI in their analysis. As a result of the analysis, they determined that the concentrations were moderate (Ünlü & Yıldız, 2019).

Karadayı (2019) analyzed the foreign trade concentrations of Denizli at the sectoral and country level. Concentration index and provincial concentration coefficient were used in the analyses. According to the

findings, the sectoral concentration of the province in foreign trade was higher than the market concentration (Karadayi, 2019).

Ross (2019) analyzed the relationship between oil export diversification and Dutch Disease of the 38 largest oil producing countries. The concentration index was used in the study, which deals with the years 1962-2010. The results revealed that there was a positive relationship between concentration in poor African countries and Dutch disease (Ross, 2019).

Jošić et al. (2019) analyzed export market concentrations in European countries. HHI was used in the study covering the years 1995-2016. The lowest concentration was seen in EU-15 countries. Concentrations were high in the EFTA and CEFTA (Jošić, Žmuk, & Dumičić, 2019).

When we examine the literature, we see that scientific studies on export concentrations are mainly carried out using concentration ratio and HHI. In addition, we have not noticed a study on the export concentrations of fragile economies in the literature. For this reason, we can say that our work is original.

3. METHODOLOGY

In the study, two methods (indices) supporting each other were used to analyze the export concentrations of Fragile Five countries on product basis. The main purpose here was to determine whether the concentration scores obtained in one index overlap with other index scores. In this context, EI and HHI, which are frequently used methods for concentration analysis, were used. The study covers the years 2000 to 2020.

EI scores show dispersion, which is the opposite of concentration. EI scores are desired to be as high as possible. Because the increase in EI scores indicates that the diversity of the products exported by the country has increased compared to previous periods, that is, their concentration has decreased. This is an important and positive development in terms of increasing the country's global competitiveness. EI is formulated as follows (Ababa, 2012):

$E = \sum_{i=1}^{n} Si \times log\ (1 / S_i)$

In the formula, Si represents the trade share of country i in the export partner country. A low index value indicates low dispersion (high concentration), and a high index value indicates high dispersion (low concentration). If a country trades at the same rate with all its trading partners, diffusion will be at its highest. In this case, the EI reached the highest rating. There is no specific value range for EI. However, if the value approaches zero, it indicates that there is high concentration (Kuzmin, Volkova, & Fomina, 2019). It is desirable that the EI be as high as possible.

HHI is one of the most used indices to measure the export concentration of countries. HHI is calculated by squaring the export shares of all sectors and adding these values. HHI is formulated as follows (Vaid, 2018):

$HHI = \sum (Si)^2$

In the formula, 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 country's export diversification is very weak, that is, the concentration ratio is high.

EI scores and HHI scores are interpreted differently and in opposition to each other. In order to increase the global competitiveness of countries, concentrations in exported products should decrease. In this context, it is necessary to spread different types of products to different geographies. In this case, the country's EI scores will be high and HHI scores will be low.

4. CONCENTRATION ANALYSIS IN FRAGILE FIVE COUNTRIES

In this study covering the period of 2000-2020, export concentrations of Fragile Five economies on product basis were analyzed. In this context, EI and HHI were calculated for the analysis of the course of product concentrations by years, and the results were shown in separate charts (COMTRADE, 2022). HHI scores were given in Chart 1 and Table 1, and EI scores were given in Chart 2 and Table 2.

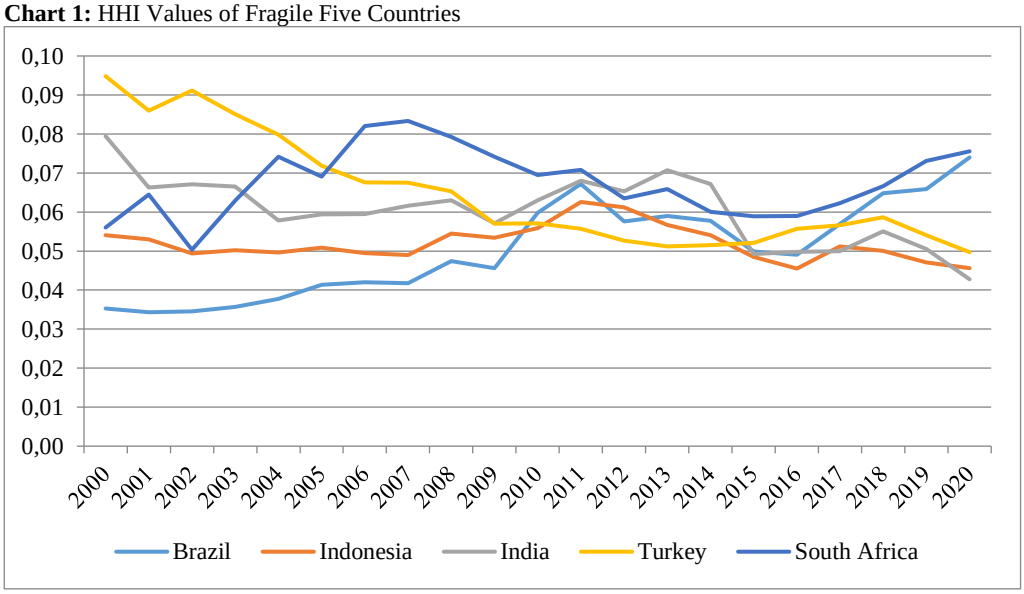
Table 1: HHI Values of Fragile Five Countries

	Brazil	Indonesia	India	Turkey	South Africa
2000	0,04	0,05	0,08	0,09	0,06
2001	0,03	0,05	0,07	0,09	0,06
2002	0,03	0,05	0,07	0,09	0,05
2003	0,04	0,05	0,07	0,09	0,06
2004	0,04	0,05	0,06	0,08	0,07
2005	0,04	0,05	0,06	0,07	0,07
2006	0,04	0,05	0,06	0,07	0,08
2007	0,04	0,05	0,06	0,07	0,08
2008	0,05	0,05	0,06	0,07	0,08
2009	0,05	0,05	0,06	0,06	0,07
2010	0,06	0,06	0,06	0,06	0,07
2011	0,07	0,06	0,07	0,06	0,07
2012	0,06	0,06	0,07	0,05	0,06
2013	0,06	0,06	0,07	0,05	0,07
2014	0,06	0,05	0,07	0,05	0,06
2015	0,05	0,05	0,05	0,05	0,06
2016	0,05	0,05	0,05	0,06	0,06
2017	0,06	0,05	0,05	0,06	0,06
2018	0,06	0,05	0,06	0,06	0,07
2019	0,07	0,05	0,05	0,05	0,07
2020	0,07	0,05	0,04	0,05	0,08

Source: Calculated using data from the COMTRADE database

When the HHI scores of the fragile five economies are analyzed (Table 1, Graph 1), it is seen that the concentrations of these countries are relatively similar to each other. Among these countries, the countries with the highest concentration are Brazil and South Africa. Especially South Africa's HHI scores are around 8 percent in 2006, 2007, 2008 and 2020. The countries with the lowest concentration are Indonesia and India. It is seen that the product concentrations of South Africa and Brazil, which have displayed an unstable appearance in HHI scores since 2000, have been increasing in recent years.

Chart 1: HHI Values of Fragile Five Countries



Source: Calculated using data from the COMTRADE database

The highest concentration score in the 2000-2020 period belongs to Turkey. Turkey achieved a relatively high concentration of 9 percent in 2000-2004. In the following years, the country's HHI values decreased. In other words, the country realized export diversification on a product basis. Like Turkey, the level of concentration in India at the beginning of the 2000s is higher than in other countries of the group. However, India also managed to reduce the level of concentration in the following years.

The EI values of fragile five economies were calculated as 2000=100 for ease of interpretation and comparison. In other words, 2000 was the base year and this value was accepted as 100 and the change in the values of the countries in other years was calculated accordingly.

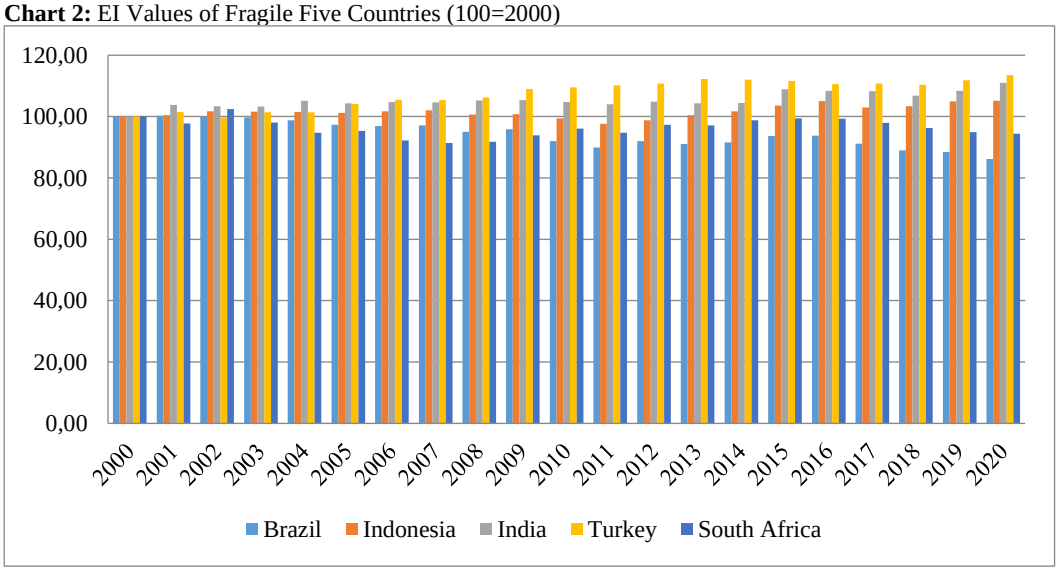
Table 2: EI Values of Fragile Five Countries (100=2000)

	Brazil	Indonesia	India	Turkey	South Africa
2000	100,00	100,00	100,00	100,00	100,00
2001	100,30	100,50	103,81	101,53	97,76
2002	99,94	101,74	103,35	99,77	102,46
2003	99,73	101,65	103,27	101,35	98,02
2004	98,82	101,51	105,11	101,44	94,75
2005	97,37	101,21	104,33	104,06	95,37
2006	96,87	101,68	104,74	105,49	92,23
2007	97,12	102,05	104,63	105,37	91,36
2008	95,04	100,67	105,26	106,18	91,80
2009	95,91	100,80	105,34	109,00	93,85
2010	92,02	99,47	104,77	109,50	96,08
2011	89,91	97,65	103,97	110,12	94,74
2012	91,97	98,81	104,87	110,75	97,30
2013	91,09	100,49	104,37	112,20	97,13
2014	91,60	101,74	104,43	112,09	98,77
2015	93,71	103,57	108,87	111,62	99,42
2016	93,76	105,03	108,42	110,59	99,29
2017	91,20	102,98	108,31	110,80	97,99
2018	88,97	103,34	106,82	110,39	96,27
2019	88,49	104,90	108,37	111,84	94,93
2020	86,20	105,19	111,03	113,51	94,45

Source: Calculated using data from the COMTRADE database

When the EI scores of the fragile five countries are analyzed, it is seen that the countries with the highest scores are Turkey and India. Especially since 2005, the EI scores of both countries have entered an increasing trend. However, after 2006, Turkey's EI scores increased even more and the country was positively differentiated among fragile five economies. In this perspective, the relatively high EI and low HHI values of Turkey and India show parallelism with each other.

Chart 2: EI Values of Fragile Five Countries (100=2000)



Source: Calculated using data from the COMTRADE database

Among the Fragile Five economies, the country with the lowest EI scores is Brazil. The index value, which is expected and targeted to increase over time, has gradually decreased in Brazil. The index value, which was relatively higher at the beginning of the 2000s, has steadily decreased since 2016. This shows that product concentrations have increased in Brazil over the years. Although not as much as Brazil, it is a country where concentrations are relatively high in South Africa. Because in the 2000-2020 period, only two years (2000 and 2002) were below the EI 100 score. In this context, it can be said that Brazil and South Africa are negatively segregated countries within the Fragile Five economies.

5. CONCLUSION

After the global economic crisis that occurred in 2008, many central banks struggling with the economic recession, especially the US Federal Reserve, increased the amount of money in circulation around the world by implementing expansionary monetary policies. This situation has increased foreign currency inflows primarily

to economies with foreign-dependent economies and high savings deficits. The aforementioned period of abundant money came to an end, especially after the announcement of FED Chairman Ben Bernanke on May 22, 2013. Because Bernanke emphasized that the US economy was about to overcome the crisis and that the Fed wanted to enter into normalization efforts by raising the interest rate in the near future. This situation came as a shock to some countries, which were positively affected by the abundant money period and thus appreciated their local currencies. Some economies with high savings and current account deficits were more affected by this situation and the five most affected countries were named the "Fragile Five".

In this study, it is aimed to analyze the product concentrations in the exports of the five countries (Brazil, Turkey, Indonesia, South Africa, India). Because the high product concentrations lead to a decrease in the global competitiveness of the countries. HHI and EI, which are among the popular concentration indices, were used in the study in which the 2000 and 2020 periods were analyzed. Both index scores gave parallel and consistent results. Although in a relatively negative situation at the beginning of 2000, the index scores of Turkey and India reveal that the concentration has decreased. In other words, Turkey and India are the two countries with the highest product diversification in the Fragile Five. It is obvious that this situation will lead to an increase in the global competitiveness of the two countries in question. Among the Fragile Five, the two countries with the highest level of export concentration are Brazil and South Africa.

The effects of every developing event and events in the world cause the global competition environment to heat up even more. Especially after the Covid-19 pandemic and the Ukraine-Russia War, the lack of supply, supply shortage and the global inflationary environment increase the competition between countries. In this perspective, it will not be enough for countries to produce high value-added products and sell them at high prices in order to increase their global competitiveness. For this reason, countries need to diversify the product pattern in their exports and appeal to a more diverse market with a wider variety of products.

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