RESEARCH ARTICLE

Product and Market Diversification in Turkey's Foreign Trade

Birol Erkan*

Department of Economics, Faculty of Economics and Business Administration,   Kilis 7 Aralık University, Turkey.

*corresponding Author: E-mail: **birolerkan@kilis.edu.tr**

Abstract

One of the most important criteria in determining the economic size and the level of mastery of countries in international markets is the ratio of the volume of foreign trade to GDP. With this criterion, reducing the concentration (increasing the diversify) in foreign trade on the basis product and market plays an important role in helping countries achieve competitive advantage in the global economy. Turkey's foreign trade strategy in recent years, primarily has to reduce the trade deficit (and current account deficit) by increasing the export. However, increasing diversification in foreign trade on the basis both product and market has been revealed as an important goal by economy policy makers. In this study covering the years 1990-2012, the level of product and market diversification in Turkey's export and import was determined by using Concentration Ratio of Commerce, Gini-Hirschman Index, Entropy Index, Deviation Index and Penetration Index. In this connection, it has been found that Turkey is successful market diversification, on the other hand, unsuccessfull product diversification.

Keywords: *Foreign Trade, Product and Market Diversification, Gini-Hirschman Index, Entropy Index, Turkey.*

Introduction

Concantraten values are extremely important indicator in the analysis of foreign trade in terms of elucidating the product (sector) and market (country) diversification about foreign trade. In the country which is open to foreign trade and integrated into the world economy, if export revenues base on less number of products and/or market, fluctuations in the prices of this products and possible contraction in external demand may decrease export revenues and cause instability. However, if export is based on product diversification and is carried out in many countries, export revenues will not fall much despite the contraction in demand in certain countries and instability in prices [18].

In today's competitive environment, basic condition of minimally affected by the crisis of a developing country is a production and export structure which has high and sustainable competitiveness. In addition, foreign trade diversification in terms of products and countries will also lead to an increase in external competitiveness of countries and alleviation of external shocks.

Turkey who perform a significant part of foreign trade to the EU has a foreign trade strategy in the form of increase in export and ensure in diversification on the basis of product/country. In this context, economic and political relations with countries/group of countries outside the EU have intensified. In particular, the global financial crisis, recession and the crisis in the EU has made compulsory to perform of Turkey's export diversificatıon on the basis of market. At the same time, value-added problem in the foreign trade (relatively low value-added exports and high value-added imports of the products), as a result, deterioraten in foreign trade rates and increase in current account deficit has made Türkey's export diversification on the basis of product necessary.

The purpose of this study is to present the situation of product and market diversification of Turkey both in export and import as the years. In this perspective, in this study covering the years 1990-2012, whether Turkey dependents on curtain products and markets in the foreign trade was determined by using Gini-Hirschman Index, Trade Concentration Rate, Entropy Index, Deviation Index and Penetraten Index. In this study, in second section after introduction, information was given with reference to export diversification, indices used to measure diversificatıon (concentration), then literature examples were presented. In third section, scores obtained were interpreted about product and market diversification in Turkey's foreign trade by using indices in question.

Product and Market Diversification in Export

Nowadays, developed, developing and least developed 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 export, diversificaton of the product and market in the export is also important in terms of achieving the goals.

Export Diversification

Export diversification can be defined as the change in the mix of current export products of the country and composition of exporting country [27]. In short, export diversification is spreading to many sectors and countries of the country's export. The main objective of export diversification is to reduce risk by expanding portfolio on the basis of product and market [10]. To concentrate in exports of several products and in a few markets poses serious economic and political risks [27]. As economic risks, problems that may arise in macro economic indicators (economic growth, employment, investment planning, export and import capacity, inflation, debt repayment, capital outflows, etc.) can be shown as a result of volatility and instability in foreign exchange earnings. As political risks, management's worsening and instability in the country can be mentioned. In this context, together with increasing diversification of product and market in the export, reduction of political instability and risks that may arise in economic activity and foreign exchange in the country can be achieved [34].

For many developing countries, export diversification means transition to non-traditional exports of product from traditional exports of product and to non-traditional markets of exports from traditional markets of exports. This also manifests itself in the form of reduction of stagnation in export revenues and increase in foreign exchange revenues, value-added, rate of economic growth via technological advances, economies of scale and positive externalities [25].

Diversification that results from changes in the export structure of the country has two aspects in the form of products and markets. The increase in product diversification means reduction in the intensity of the country's export of certain products. However, the increase in market diversification means reduction in the commitment of the country's export of certain markets as well. Thus, economic development that will arise as a result of export diversification

will provide employment growth via multiplier effect and will improve the country's economic potential. This situation will lead to become more resilient to external shocks of the country economy [5].

The most important reasons of country's failed to diversify the exports are lack of government policies and export promotion measures, business environment, governance, corruption, failure of the tax system, inadequacy of regulations concerning property rights, low level of human capital, supply-side constraints (lack of physical and transport infrastructure), demand-side constraints (the excess of tariff and non-tariff barriers in partner countries) [25]. In this context, a country that aims to diversify exports (on the basis of product and market) should primarily follow policies for the solution of the problems mentioned.

Product and Market Diversification

Product diversification in exports of developed countries is more than least developed and developing countries'. So, the concentration in the product in export of developed countries is lower. However, it is seen that product diversification has been increasing in least developed and developing countries in recent years. It can be said that similar situation is valid in terms of country concentration [5].

The differences that is seen in the degrees of product diversification (concentration) in the foreign trade of countries may occur due to several reasons. These factors as follows [17]:

- *The degree of economic development*, Diversification in production occurs as economies of country develop. This will manifest as export diversification.
- *The degree of industrialization*, Product diversification increases as the level of industrialization advance and as the share of agriculture in national income decline in a country.
- *The country's geographical location*, if a country close to the world trade centers geographically, diversification of export is expected.
- *Economic size,* the bigger a country, the greater variety products that is exported and producted depending on the climate and human resorcues.

In terms of external competitiveness of countries, market diversification is as important as product diversification. Besides the increase in trade volume or value, countries to trade more balanced with external trading partners is also used as the

measure of a country's globalization in terms of foreign trade. It is expected to decline that the weight of a few countries or groups of countries will reduce in a globalized country's foreign trade. In this case, the country does business in a more balanced way with all of the foreign trade partners. Here, from the concept of globalization, it is understood that the level at which country's commercial interaction with other countries or groups of countries. If there is a globalized country in terms of foreign trade, this interaction must be more evenly distributed for all countries and country groups that doing trade over time. Accordingly, if we take the value of net foreign trade, a downward trend in concentration (upward trend in diversification) with time should arise [4].

Table 1: Literature survey

Author	Index	Country	Period	Result
Lüthje	Gini-Hirschman	EU-15	1996-2005	Ireland, Germany and Finland are relatively high concentration coefficients [21].
Akal	Export and Import Shares	Turkey, Russia, Ukraine	1995-2005	Product concentrations are higher in Turkey's trade with Ukraine and are lower in Turkey's trade with Ukraine [2].
Hamid	Gini-Hirschman	Malaysia	1970-2003	There is a decrease in product and market concentration factor [12].
Naude and Rossouw	Hirschmann, Herfindahl and Export Dispersion	South Africa	1962-2000	Export diversification is weak [23].
Osakwe	Trade Share	Africa	1985-2002	A strong causal relationship has been found among export diversification, quality of infrastructure, aids and resource allocation. There is no causal relationship with geography [24].
Çınar and Göksel	Entropy	Turkey	2000-2008	Diversification has also increased together with growth in export [8].
Secer	Hirschmann-Herfindahl	Turkey	1990-2007	Türkiye'nin fındık ihracatındaki pazar yoğunlaşması azalmıştır [28].
Seymen	Entropy, Bilateral Trade Concentration, Hirschmann-Herfindahl	Turkey -EU	1969-2008	Customs Union has not been very effective on the composition of country between Turkey and EU [29].
Ayrancı	Hirschmann-Herfindahl	Turkey	1996-2004	Turkey has decreased the concentration of foreign trade in the globalization process [4].
Carrere, Strauss-Kahn and Cadot	Herfindahl, Entropy, Gini	159 countries	1988-2004	There is an important link between per capita income and export diversification. Concentration is higher level in countries with per capita income over $24.000 [6].
World Bank	Hirschmann-Herfindahl	MENA Countries	1990-2004	Export diversification decrease less protectionism increase [35].
Taylor and Francis	Entropy	19 Latin American and Caribbean Countries	1961-2000	In general, exports of agriculture products in the countries has gone to diversify [31].

Arip, Yee, Karim	Cointegraten and Granger Causality	Malaysia	1980-2007	Export diversification is significant effect on economic growth [1].
Hesse	Herfindahl	Developing Countries	1961-2000	Per capita income rise less export diversification increase [13].
Abdmoullah, Laabas	Hirschmann	16 Arab Countries	2000-2006	Export diversification is very low in the oil-exporting Arab countries [38].
Goschin, Constantin, Roman, Ileanu	Herfindahl	Romania	1996-2007	Sectoral concentration has increased [11].
Saif, Barakat	Hirschmann	Jordan	1985-2002	Concentration has decreased in Jordan's export [26].
Xin and Liu	Hirschmann	China	1992-2003	Diversification has declined in live animals, foodstuffs, beverages and tobacco exports. Diversification has increased in animal, vegetable fats and oils [36].
Carrere, Strauss-Kahn, Cadot	Gini, Herfindahl, Entropy	156 Countries	1988-2006	Export diversification is lower in middle-income countries and higher in high-income countries [7].
Voinea	Hirschmann	Romania	2000-2001	Concentration in Romania's trade with EU countries is higher compared to other countries [33].
Küçükkiremitçi, Genç, Şimşek, Ekinci, Ersoy, Sekmen	Hirschmann-Herfindahl	Bosnia and Herzegovina	2005-2009	Concentration in import is lower than in export [18].

Gini-Hirschman Index

Most widely used concentration index for export is Gini-Hirschman Index (Coefficient) [32]. In particular, Gini-Hirschman Index is an important concentration measures used in comparisons between periods [16]. The index shows the rate of product (or country) distribution in a country's export (or import) [14].

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

In the Formula, GHI shows index value, X_{kt} shows the country's a certain merchandise export (import) in period t, X_t shows a country's total export (import) in period t [15]. According to this method, to calculate the concentration coefficient by merchandise of export of any year, addition operaten is performed by calculatıng the squares of shares in total exports of commodity groups. It is multiplied by 100 by finding the square root of the total. Concentration cofficientss are within a certain limit values. The maximum value of the cofficient is 100 and in this case, the export (import) consists of a single product. The minimum value of the cofficient is $100/\sqrt{n}$. "n" is the number of goods to be exported (imported) favorable [22]. If the concentration level is high, index value close to 100. In this case, it is likely that the country is affected by risks in international markets. Low degree of concentration (closer to 0), on the other hand, imply that product diversification is high level. In this situation, effect of risks in question decreases.

Gini-Hirschman Index shows the concentration in imports of goods too. In this case, the formula is as follows:

$$GHI = 100 \sqrt{\sum_{k=1}^{n} \left(\frac{M_{kt}}{M_t} \right)^2}$$

For analyzing concerning the market concentration (diversification) instead of product concentration (diversification), the same work can be performed by writing "a country" instead of "product k" in the formula. In this instance, together with the increasing number of exporting

countries, cofficient will decrease. However, if export is carried out only one country, cofficient will be 100. Gini-Hirschman Index expresses the multiplied by 100 of the square root of Herfindahl Index as well [9].

Trede Concentration Rate

Trade concentration rate (CR_m) is a measure commonly used concentration due to calculate simply. Trade concentration rate is a concept that expressed total shares of certain number of firms, products, industry or country. CR_m takes a value between 0 and 100 and, may be calculated by the following formula [19]:

$$CR_m = \sum_{i=1}^{m} P_i \text{ x } 100$$

In the formula, CR_m indicates trade concentration rate. On the other hand, P_i indicates share of certain number of firms, products, industry or country.

Entropy Index

Entropy index shows the state of the spread in trading partners of a country. An increase in entropy index indicates that the spread rate increases. In other words, it refers that integration level increases.

Entropy index may be calculated by the following formula:

$$E_m = \sum_{i=1}^{m} P_i \text{ x } ln(1/\ P_i)$$

In the formula, P_i shows trade share from partner country of country i. Low index value shows low diversification (high concentration), and vice versa [20]. In case of a country to trade at the same rate with all of its trading partners, integration (spread, diversification) would be perfectly level. In this case, the entropy index is the highest degree [30].

Deviation Index

Deviation index is obtained by dividing to export which is out of that country of a country's export of goods to another country.

$$DI_{jk} = \frac{X_{jk}^{m}}{X_{jk}^{w-m}} \times 100$$

$X_{jk}^{m} \rightarrow$ export value of product k to country m of country j

$X_{jk}^{w-m} \rightarrow$ export value of product k to out of country m of country j

When a certain year (base year) is called as 100, if the index value is greater than 100 in other years, it means that the export of product k of country j tends to development in favor of country m [37]. If the index value is less than 100, it indicates that the export of product k of country j moves out of country m.

Penetration Index

It is possible to obtain more meaningful results concerning developments in export carried out to other countries by analyzing the penetration index together with deviation index. The index exposes the role of other countries in the development in import demand of partner country.

$$PI_{mk} = \frac{M_{mk}^{j}}{M_{mk}^{w-j}} \times 100$$

$M_{mk}^{j} \rightarrow$ import value of product k from country j of country m

$M_{mk}^{w-j} \rightarrow$ import value of product k from out of country j of country m

When a certain year (base year) is called as 100, if the index value is greater than 100 in other years, tendency prefer to country j in the import of country m increases. If the index value is less than 100, it decreases.

Development of Turkey's Foreign Trade

The export, import and GDP of Turkey that adopted the export-oriented industrilization and growth strategy have been increasing as the years. However, in Turkey, the share of foreign trade volume has also been increasing in recent years.

As seen in the Table 2 and Figure 1, Turkey's openness index[1] increases in general from 1990 to the present. Turkey has performed to the EU-27 countries a significant portion of its export. However, dependence on export to the EU market

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[1] The share of foreign trade in GDP is called as foreign openness index. Rising in index shows that the country openes abroad more. Openness index is formulated as follows:

$$\frac{(X + M)}{GDP} \times 100$$

Table 2: Turkey's GDP, foreign trade figures ($ million) and openness index (1990-2012)

Years	GDP (at current prices)	Export	Import	Openness Index
1990	107.228	12.076	20.423	0,30
1991	150.598	12.667	19.269	0,21
1992	150.746	14.350	22.202	0,24
1993	159.151	14.909	29.031	0,28
1994	179.517	17.506	22.600	0,22
1995	129.857	20.996	35.350	0,43
1996	169.708	22.680	43.297	0,39
1997	181.498	25.256	47.694	0,40
1998	189.622	25.825	45.194	0,37
1999	269.009	25.588	39.541	0,24
2000	248.961	26.494	52.797	0,32
2001	267.209	29.538	40.348	0,26
2002	196.036	33.980	47.632	0,42
2003	232.745	45.137	65.306	0,47
2004	304.594	60.578	93.114	0,50
2005	393.038	70.415	111.122	0,46
2006	483.992	82.476	133.089	0,45
2007	530.900	103.689	164.378	0,50
2008	647.155	127.883	193.058	0,50
2009	730.337	99.736	135.125	0,32
2010	614.553	111.785	177.956	0,47
2011	735.263	132.347	231.009	0,49
2012	773.091	150.170	222.883	0,48

Source: It was calculated by us by using the data obtained [39] and[40]

is emerging as a risk at the same time. Likewise, it is obvious that especially the global crisis and the resulting recession in EU countries will be reflected to trading partners. In this context, the share of EU-27 countries in Turkey's total export has began to decline severely expecially since 2007 (Table 3).
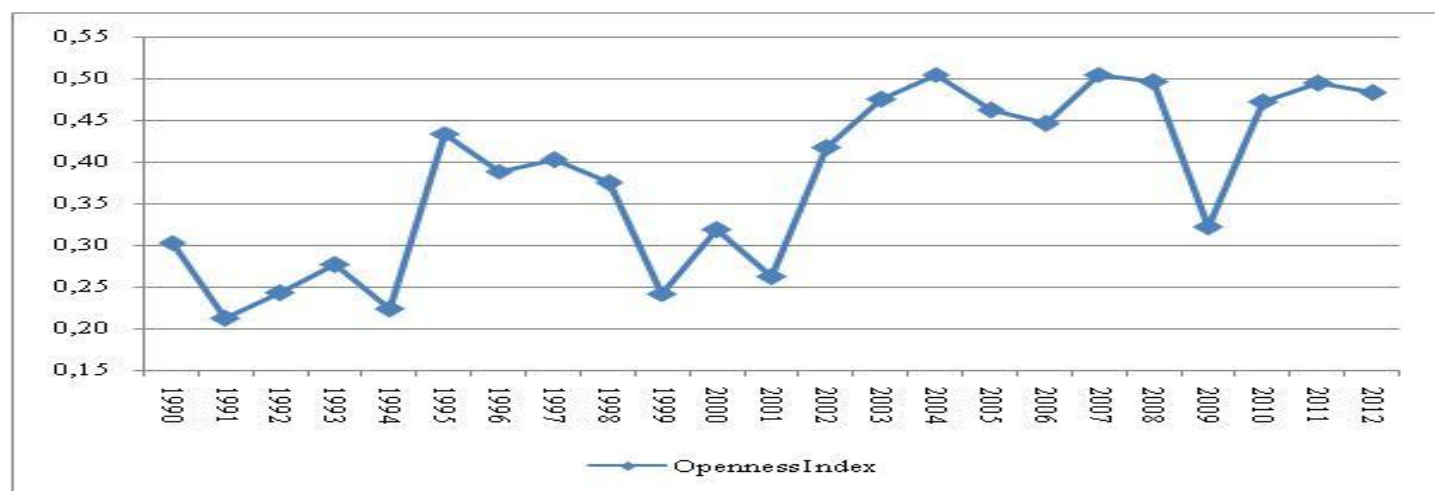

Fig. 1: Turkey's openness index

Turkey has been continuously increasing its export despite the global financial crisis and recession in the EU. This is because, Turkey's export has been shifted to countries less affected by the crisis.

Table 3: Turkey's export share according to country groups (%,1996-2012)

YEARS	EU-27	FZT	OE	AFR	AMER	ASIAN	AUS-NZ	OTH
1996	54,12	1,93	10,98	4,99	8,17	19,46	0,28	0,08
1997	51,16	2,33	12,55	4,70	9,05	18,21	0,30	1,70
1998	54,92	3,08	9,23	6,74	9,85	14,77	0,28	1,13
1999	58,01	2,94	6,54	6,22	10,79	14,35	0,33	0,81
2000	56,40	3,22	6,68	4,94	12,95	13,94	0,49	1,39
2001	56,00	2,98	6,68	4,85	11,76	14,66	0,31	2,76
2002	56,62	3,99	7,23	4,71	10,85	14,50	0,34	1,77
2003	57,97	4,08	7,11	4,51	9,04	16,53	0,33	0,42
2004	57,91	4,06	7,14	4,70	9,08	16,57	0,42	0,13
2005	56,30	4,05	7,97	4,94	8,11	17,98	0,37	0,28
2006	56,04	3,47	9,31	5,34	7,40	17,84	0,38	0,23
2007	56,30	2,74	10,11	5,57	5,22	18,93	0,32	0,80
2008	48,01	2,28	11,87	6,86	4,95	24,62	0,33	1,07
2009	45,99	1,92	11,12	9,97	4,73	25,37	0,35	0,55
2010	46,26	1,83	9,99	8,15	5,34	27,99	0,35	0,09
2011	46,22	1,89	9,62	7,66	5,88	28,27	0,36	0,12
2012	38,83	1,51	9,42	8,76	6,31	34,78	0,32	0,07

Source: It was calculated by us by using the data obtained [39].

EU-27: European Union Member Countries-27, FZT: Free Zones in Turkey, OE: Other European, AFR: African Continent, AMER: American Continent, ASIAN: Asian Continent, AUS-NZ: Australia and New Zealand, OTH: Others

Market Diversification in Turkey's Foreign Trade

In this study, market diversification in Turkey's foreign trade was discussed with the dimensions of export and import.

Market Diversification in Turkey's Export

In order to put forward the realization of market diversification in Turkey's export between 1990-2012, Gini-Hirschman Index, Trade Concentration Rate, Entropy Index and Deviation Index were calculated. However, Turkey's role was tried to expose in the developments in import demand in the EU-27 by calculating penetration index of the EU-27.

Table 4: Gini-Hirschman Index, Trade Concentration Rate, Entropy Index in Turkey's export (on the basis of market) (1990-2012)

	GHI	CR(1)	CR(2)	CR(4)	CR(8)	CR(12)	EI
1990	30,82	25,37	34,53	48,71	65,32	74,13	3,07
1991	31,40	26,94	34,61	47,26	64,01	72,80	3,08
1992	29,62	25,51	32,08	43,75	59,34	68,23	3,26
1993	27,95	23,75	30,37	40,78	56,82	66,18	3,38
1994	27,43	22,47	31,16	42,14	58,71	65,73	3,40
1995	28,60	23,99	31,20	44,03	60,11	66,70	3,36
1996	27,69	22,87	30,09	43,14	58,91	65,18	3,41
1997	26,55	20,80	28,94	42,97	58,39	65,24	3,45
1998	26,78	21,14	29,79	42,56	58,86	66,41	3,42
1999	27,36	21,40	30,92	44,64	59,84	67,85	3,39
2000	27,00	19,55	31,38	45,83	60,53	68,51	3,39
2001	25,90	18,17	28,75	44,04	59,83	68,19	3,43
2002	25,22	17,27	27,15	43,04	59,19	67,17	3,47
2003	24,12	16,58	24,89	40,10	56,74	65,07	3,53
2004	23,29	14,44	23,59	39,28	56,26	65,43	3,55
2005	22,25	13,43	21,83	36,78	53,88	64,25	3,62

2006	21,15	11,74	20,01	34,33	51,49	61,77	3,69
2007	20,53	11,57	19,89	32,86	49,37	60,34	3,74
2008	19,07	10,13	16,51	28,86	45,63	56,50	3,85
2009	18,56	9,82	16,05	27,90	43,43	53,98	3,88
2010	18,78	10,27	16,74	27,98	44,05	54,28	3,87
2011	18,99	10,54	16,82	28,91	45,01	55,14	3,88
2012	19,01	8,74	15,95	28,34	46,61	57,72	3,84

Source: It was calculated by us by using the data obtained [39].

Gini-Hirschman Index indicates that Turkey has diversified export markets (Table 4, Figure 2). So, Turkey has decreased the market concentration. Indeed, there is a decrease in the index in a stable manner. In this context, it is an important development that dependence on a few market of Turkey's export as the years has decreased. The increase in entropy index express that Turkey's export has spread to more countries (Table 4, Figure 3).
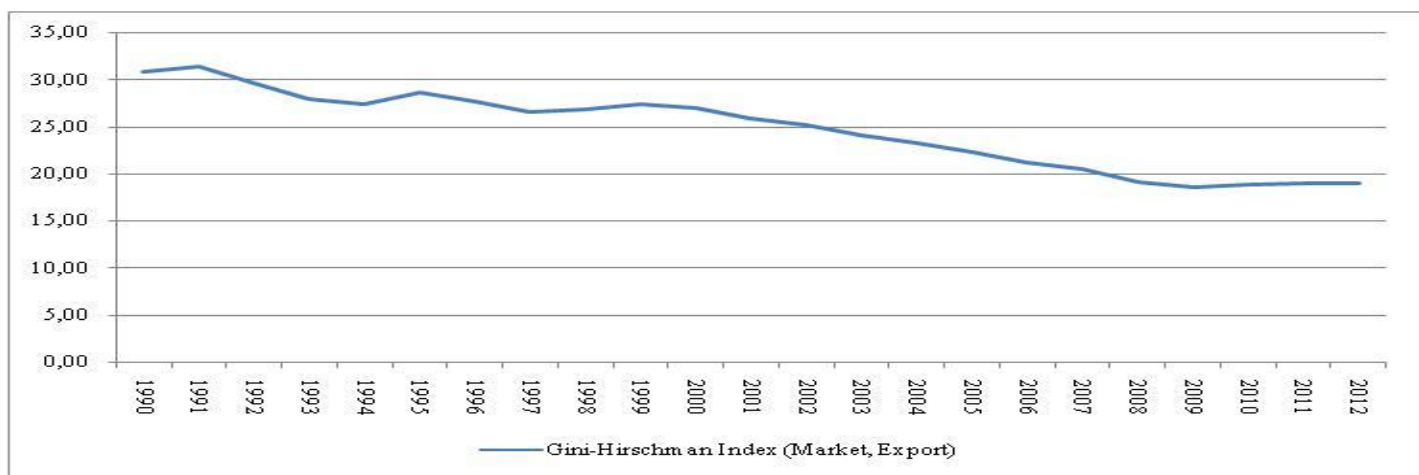

Fig. 2: Gini-Hirschman Index in Turkey's export (on the basis of market)

Trade concentration rates (CR) in Turkey's export indicate that the concentration has reduced significantly. So, there is an increase in the diversification. Indeed, while the share in total export of Turkey's top exporting country (CR(1)) was 25 percent in 1990, it dropped to 8 percent in 2012. The share of top exporting 2, 4, 8 and 12 countries (CR(1), CR(2), CR(4), CR(8), CR(12)) shows a similar situation as well.
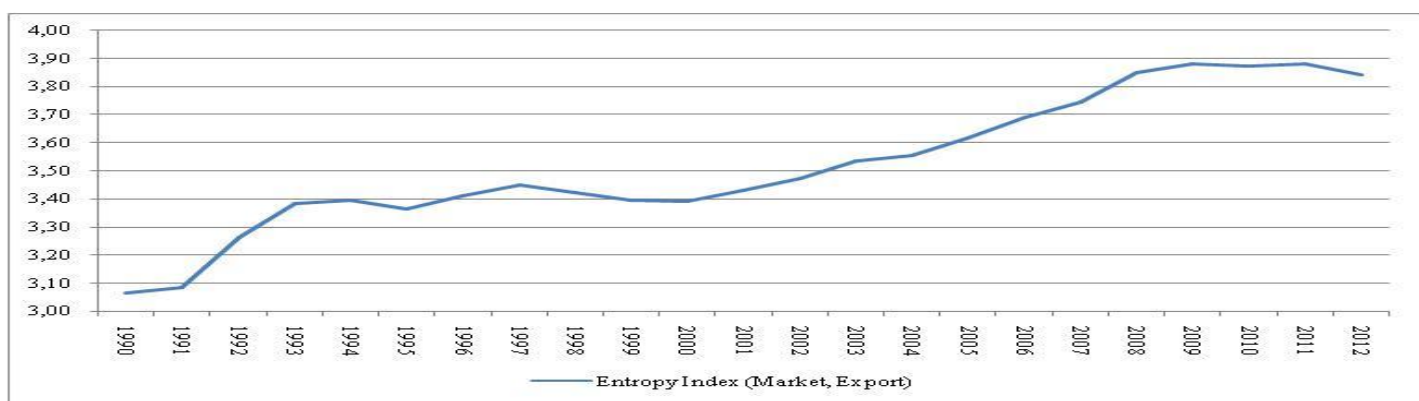

Fig. 3: Entropy Index in Turkey's export (on the basis of market)

The deviation index in Turkey's export between 1996-2012 indicates that the export has shifted outside the EU-27 countries by 2008 (Table 5). However, Turkey's export to the American Continent and OECD countries has deviated significantly in recent years. So, the export has begun to shift out of country groups in question. The most important reason for this deviation is the economic crisis and shriking demand in the respective countries (Arslan, 2010, p.4). Table 5 indicates that Turkey's export has deviated in

favor of African Continent, Asian Continent, Economic Cooperation Organization, Organization of the Islamic Conference.

Table 5: The Deviation Index according to country groups in Turkey's export (1996=100) (1996-2012)

	TR-AB-27	TR-AFR	TR-AMER	TR-ASIAN	TR-OECD	TR-EFTA	TR-BSEC	TR-ECO	TR-CIS	TR-TRR	TR-OIC
1996	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
1997	88,76	98,57	110,55	92,79	88,85	109,18	118,22	100,78	119,12	107,69	88,13
1998	103,22	144,57	121,40	72,21	103,41	91,28	96,34	85,15	84,64	96,07	89,57
1999	117,09	132,76	134,39	69,84	128,82	93,93	63,56	65,87	47,21	66,32	80,65
2000	109,60	103,98	165,27	67,47	131,43	80,46	67,59	63,54	48,69	63,29	68,00
2001	107,85	102,03	148,07	71,55	116,65	69,42	71,60	62,61	52,00	54,47	71,23
2002	110,59	98,75	135,28	70,68	114,19	78,16	76,89	58,22	52,05	52,56	69,46
2003	116,90	94,46	110,36	82,54	109,64	78,46	82,88	67,21	51,61	58,34	82,86
2004	116,61	98,61	110,91	82,74	108,49	72,65	83,37	70,81	51,63	57,96	88,85
2005	109,17	103,98	98,09	91,35	92,37	76,96	92,17	73,78	57,03	58,81	99,58
2006	108,04	112,78	88,78	90,46	106,39	96,05	108,63	79,53	68,70	71,33	98,01
2007	109,20	118,00	61,24	97,30	95,75	85,39	128,63	89,65	80,10	82,81	107,58
2008	78,27	147,40	57,83	136,09	69,43	172,55	130,18	97,19	91,07	87,91	151,01
2009	72,17	221,40	55,22	141,63	73,11	301,96	94,70	120,98	65,19	103,54	179,36
2010	72,96	177,50	62,64	161,96	71,18	147,67	100,83	140,25	76,63	107,24	183,70
2011	72,82	165,91	69,35	164,19	60,04	96,65	105,19	144,73	84,93	116,72	176,19
2012	53,79	192,02	74,86	222,21	46,65	118,22	97,47	238,45	84,66	119,81	261,53

Source: It was calculated by us by using the data obtained [39].

TR: Turkey, EU-27: European Union Member Countries-27, AFR: African Continent, AMER: American Continent, ASIAN: Asian Continent, OECD: Economic Cooperation for Organization and Development,EFTA: European Free Trade Association, BSEC: Organization of the Black See EconomicCooperation,ECO:Economic Cooperation Organization, CIS: Commonwealth of Indepentent States, TRR: Turkic Republics, OIC: Organization of the Islamic ConferenceThe results of Gini-Hirschman Index, Trade Concentration Rate, Entropy Index and Deviation Index calculated in the study are parallel and, they reveal that Turkey has provided market diversification in the export.

Table 6: The Penetration Index in the EU-27 import (2006-2012)

	AB-27-TÜR	AB-27-ABD	AB-27-ÇİN	AB-27-RUS	AB-27-JAP	AB-27-HİN	AB-27-BRE	AB-27-G.KOR
2006	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
2007	106,83	97,83	115,07	96,74	94,96	111,30	113,79	95,41
2008	94,90	91,22	111,38	110,10	83,15	112,71	114,04	82,99
2009	95,90	100,33	126,09	91,78	81,44	124,82	105,44	87,51
2010	90,32	89,24	135,74	101,66	75,61	131,98	108,94	85,67
2011	91,19	87,61	123,36	114,48	69,09	139,68	113,86	69,79
2012	86,94	90,63	115,85	117,18	60,74	126,22	103,93	70,03

Source: It was calculated by us by using the data obtained [39].

TUR: Turkey, USA: United Stade of America, CHN: China, RUS: Russia, JAP: Japan, IND: India, BRZ: Brazil, SKR: South KoreaThe penetration index in the EU-27 import indicates that the countries in question have preferred Turkey in their import less. Table 6 shows that EU-27 countries prefer BRIC countries (Brazil, Russia, India, China) more in their import. According to the results of the penetration index, the only reason for the decrease of the foreign trade between EU-27 and Turkey by years do not to prefer less to EU of Turkey in its export. Likewise, at the same time, EU also prefers Turkey in its import less.

Market Diversification in Turkey's Import

In order to put forward the realization of market diversification in Turkey's export between 1990-2012, Gini-Hirschman Index, Trade Concentration Rate and Entropy Index were calculated.

Table 7: Gini-Hirschman Index, Trade Concentration Rate, Entropy Index in Turkey's import (on the basis of market) (1990-2012)

	GHI	CR(1)	CR(2)	CR(4)	CR(8)	CR(12)	EI
1990	26,10	17,12	28,29	43,31	62,43	72,83	3,22
1991	27,56	16,77	28,48	47,55	68,96	77,93	3,08
1992	26,75	16,91	28,62	44,76	65,89	76,63	3,16
1993	25,72	15,61	27,16	42,69	64,08	73,97	3,25
1994	25,45	16,13	26,88	42,22	61,74	72,80	3,28
1995	24,86	15,69	26,23	41,15	59,85	70,23	3,34
1996	25,83	18,05	27,94	42,47	59,99	70,61	3,31
1997	25,09	16,82	26,18	41,48	59,22	69,04	3,35
1998	24,92	16,19	25,53	41,21	59,65	69,87	3,33
1999	23,87	14,87	22,94	38,64	57,36	69,01	3,38
2000	22,91	13,63	21,84	36,61	54,83	66,17	3,44
2001	22,99	13,22	21,86	38,46	55,14	65,44	3,44
2002	23,66	14,78	23,38	38,06	57,16	68,18	3,42
2003	23,41	14,47	22,85	37,58	56,83	68,24	3,44
2004	22,94	13,44	23,14	37,17	55,36	67,20	3,47
2005	22,92	12,27	23,88	36,89	54,90	67,15	3,46
2006	23,34	13,38	24,48	38,24	56,47	67,46	3,44
2007	23,60	14,30	24,97	38,96	56,06	67,31	3,45
2008	24,43	16,25	25,93	40,24	57,86	67,95	3,43
2009	23,87	14,39	24,83	40,55	56,79	66,01	3,47
2010	22,81	12,14	22,00	38,58	55,89	65,28	3,52
2011	22,12	10,37	20,32	36,65	54,68	64,79	3,55
2012	22,59	11,95	21,55	37,44	55,35	65,01	3,52

Source: It was calculated by us by using the data obtained [39].

Gini-Hirschman Index indicates that Turkey has diversified import markets (Table 7, Fig. 4). However, diversification in the export is more than diversification in import. The index indices that Turkey's dependence on a few markets in foreign trade has declined. At the same time, the increase in the entropy index states that Turkey's import has spread to more countries (Table 7, Fig. 5).
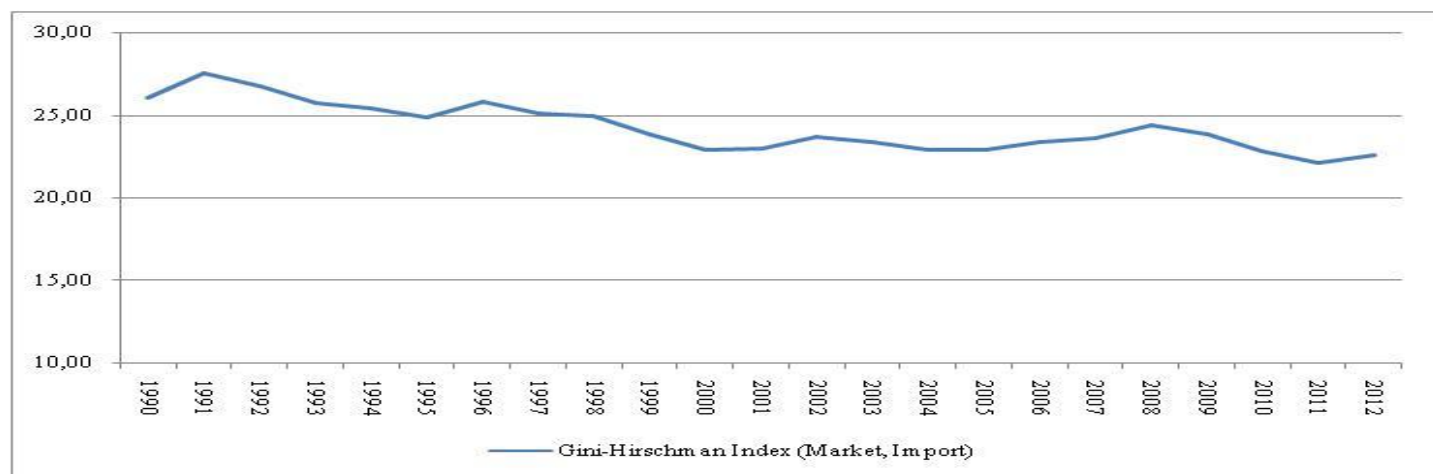

Fig. 4: Gini-Hirschman Index in Turkey's import (on the basis of market)

Trade concentration rates (CR) in Turkey's import also indicate that the diversification has increased (Tablo 7). While the share in total import of Turkey's top importing country (CR(1)) was 17 percent in 1990, it dropped to 12 percent in 2012. The share of top importing 2, 4, 8 and 12 countries (CR(1), CR(2), CR(4), CR(8), CR(12)) shows a similar situation as well.
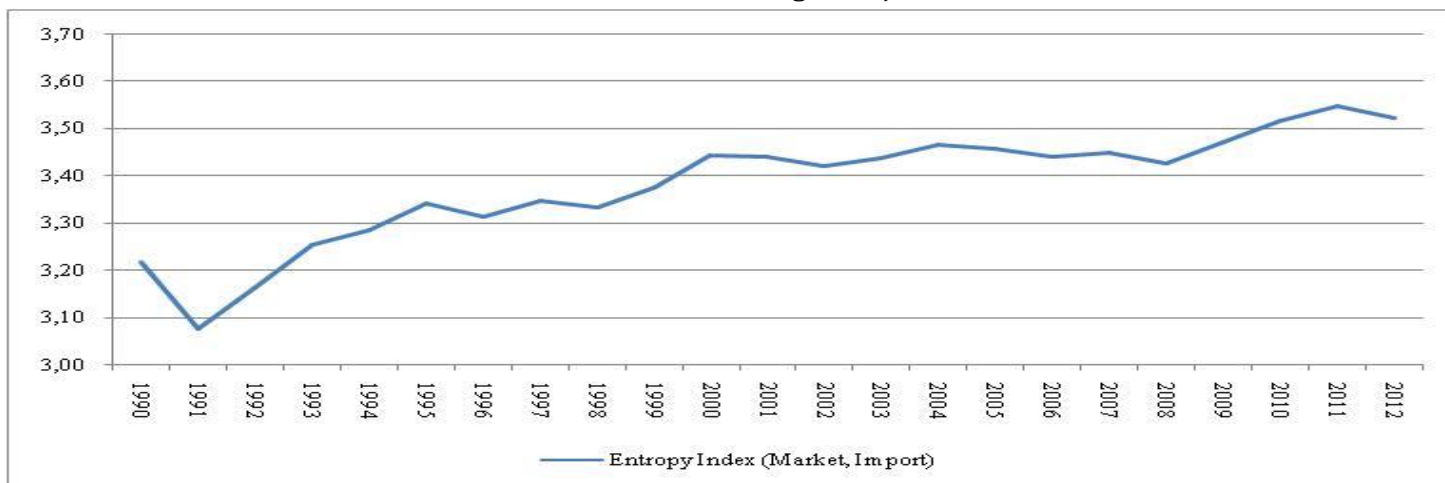
Fig. 5: Entropy Index in Turkey's import (on the basis of market)

Product Diversification in Turkey's Foreign Trade

In this study, product diversification in Turkey's foreign trade was discussed with the dimensions of export and import as well as in market diversification.

Product Diversification in Turkey's Export

In order to put forward the realization of market diversification in Turkey's export between 1990-2012, Gini-Hirschman Index and Trade Concentration Rate were calculated.

Gini-Hirschman Index indicates that Turkey has not diversified the product export. So, Turkey has not decreased the product concentration (Table 8, Figure 6). The results reveal that Turkey's export is still connected certain products (sectors). Trade concentration rates (CR) are also in line with Gini-Hirschman Index in Turkey's export (Tablo 8). Indeed, while the share in total export of Turkey's top exporting product (CR(1)) was 11 percent in 1990, it was approximately the same figure in 2012. The share of exporting 2, 4, 8 and 12 products (CR(1), CR(2), CR(4), CR(8), CR(12)) reveals a similar situation too.

Table 8: Gini-Hirschman Index and Trade Concentration Rate in Turkey's export (on the basis of product) (1990-2012)

	GHI	CR(1)	CR(2)	CR(4)	CR(8)	CR(12)
1990	22,62	11,14	21,39	38,24	55,07	65,21
1991	22,31	13,08	21,68	36,62	52,90	63,64
1992	23,73	16,44	25,10	39,17	52,11	61,58
1993	24,54	16,09	27,25	42,17	54,87	63,95
1994	23,32	14,25	25,41	39,99	53,20	62,53
1995	23,79	15,93	26,11	39,85	53,26	62,88
1996	23,10	15,37	24,64	37,95	52,61	62,99
1997	22,69	15,09	23,92	37,14	51,55	61,57
1998	23,16	15,70	24,88	37,65	53,23	63,38
1999	22,51	14,24	23,32	35,38	53,97	63,59
2000	22,25	13,42	22,45	35,51	53,76	63,44
2001	21,82	11,62	20,04	34,81	54,20	63,89
2002	23,09	12,32	21,48	38,46	57,63	66,99
2003	23,29	12,13	23,29	38,71	57,73	66,82
2004	23,77	13,12	23,03	39,10	59,35	68,58
2005	23,01	13,02	21,99	36,51	57,21	67,44
2006	23,26	13,90	22,01	37,02	57,94	67,70
2007	23,79	14,83	23,01	38,29	58,94	68,47
2008	24,05	13,88	25,20	39,01	59,07	69,97
2009	22,11	11,99	19,96	34,22	55,17	67,09
2010	21,94	12,13	20,39	34,86	53,72	65,55
2011	21,94	11,71	20,28	35,18	54,30	65,29
2012	22,34	10,71	20,64	35,95	56,67	67,64

Source: It was calculated by us by using the data obtained [39].

The diversification analysis in Turkey's product export indicate the opposite of diversification in the market export. This also shows that the export on the basis of product is risky.

Fig. 6: Gini-Hirschman Index in Turkey's export (on the basis of product)

Product Diversification in Turkey's Import

In order to present the realization of product diversification in Turkey's import between 1990-2012, Gini-Hirschman Index and Trade Concentration Rate were calculated.
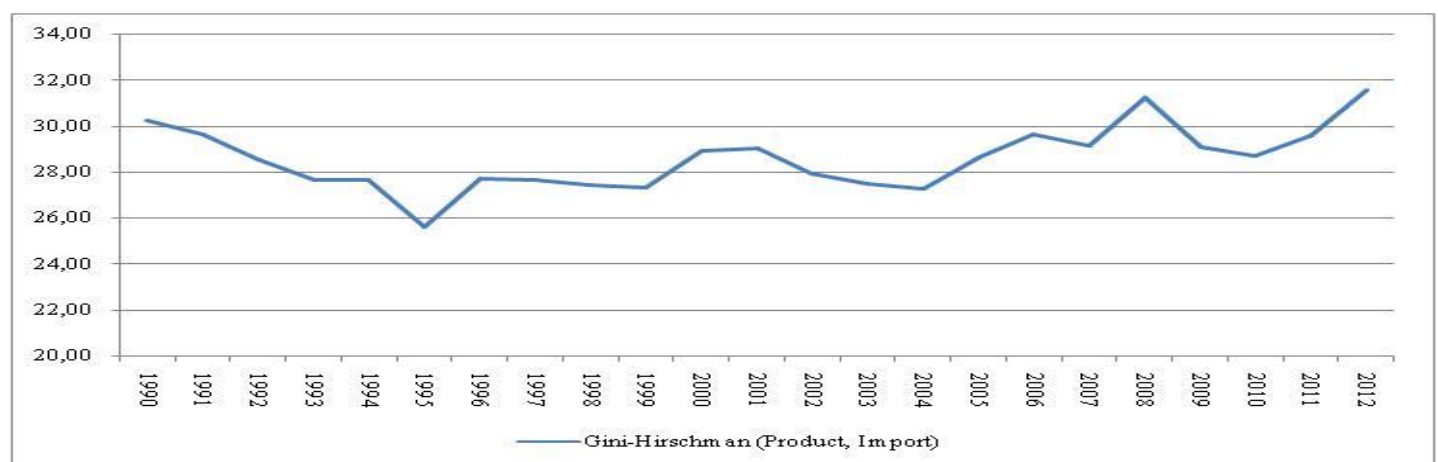

Fig. 7: Gini-Hirschman Index in Turkey's import (on the basis of product)

Gini-Hirschman Index indicates that Turkey has not diversified the product import as well as the product export (Table 9, Figure7). Turkey's import also depends on certain products (sectors). Trade concentration rates (CR) are also in line with Gini-Hirschman Index in Turkey's import.

Table 9: Gini-Hirschman Index and Trade Concentration Rate in Turkey's import (on the basis of product) (1990-2012)

	GHI	CR(1)	CR(2)	CR(4)	CR(8)	CR(12)
1990	30,22	20,73	37,67	52,36	66,31	73,32
1991	29,66	18,03	35,88	52,98	67,40	74,23
1992	28,55	17,84	34,28	49,84	65,76	73,26
1993	27,67	17,88	31,35	47,67	65,92	73,06
1994	27,67	16,41	32,59	48,93	64,14	72,74
1995	25,63	16,10	29,03	43,78	60,70	69,11
1996	27,71	19,62	33,18	46,59	62,19	69,82
1997	27,64	19,12	31,62	48,15	63,58	70,89
1998	27,43	19,71	29,53	47,37	63,27	70,45
1999	27,34	15,98	29,20	49,52	65,11	72,27
2000	28,93	17,50	32,11	53,47	68,22	75,54

2001	29,02	20,14	35,56	48,98	63,75	72,89
2002	27,92	17,85	33,71	47,79	63,57	72,65
2003	27,51	16,69	31,54	47,26	66,13	75,05
2004	27,24	14,77	28,57	47,65	67,71	76,07
2005	28,66	18,20	32,25	49,56	69,27	77,12
2006	29,65	20,68	34,29	50,72	69,24	76,63
2007	29,17	19,92	33,20	50,53	68,75	76,11
2008	31,25	23,91	35,37	53,41	69,38	76,16
2009	29,09	21,22	33,38	50,12	66,68	73,17
2010	28,70	20,75	32,21	48,79	66,01	73,17
2011	29,59	22,47	33,73	49,34	66,76	73,76
2012	31,55	25,41	36,54	51,73	68,90	75,27

Source: It was calculated by us by using the data obtained [39].

Conclusion

Turkey is in a major threat due to the global crisis, recession in the countries of European Union that Turkey's the most important partner, the progressive strengthening of its competitors (BRIC countries and other emerging economies) in international markets. In this case, Turkey has changed and diversifed the composition of the product and the market in the foreign trade (especially in the export) compulsory. Likewise, it is great likely that the fragility of the economy will decrease, the effects of the global crisis will fall, international competitiveness will increase by the realization of foreign trade diversification.

The purpose of this study covering the years 1990-2012 is to determine of the product and the market diversification level in Turkey's foreign trade by using Gini-Hirschman Index, Trade Concentration Rate, Entropy Index, Deviation Index and Penetraten Index. The obtained results indicate that Turkey has realized the diversification in the export and import. Turkey has achieved significant diversification in the export markets. So, Turkey's export has spread to more countries. As a result, dependence on certain markets has decreased.

In the study, the obtained scores by using the concentration measures show that Turkey's export has shifted outside of the EU countries by years. Turkey's export has deviated from the EU, the OECD and the United States and has turned to African, Middle-Eastern and Asian countries from year to year. As the reason fort his situation, it is said that the developed countries were significantly affected by the global economic crisis and the level of demand of the countries fell. However, African, Middle-Eastern and Asian countries, on the other hand, were less affected by the crisis relatively.

In the study, EU countries analysis results regarding import concentration state that EU is in favor of more BRIC countries (Brazil, Russia, India, China). This situation implies that the only reason for the decrease of the foreign trade between EU-27 and Turkey as the years do not to prefer less to EU of Turkey in its export. Likewise, EU prefers Turkey in its import less as well.

Turkey that managed to diversify on the basis of market in its foreign trade has not demonstrated the same success on the basis of product. It means that Turkey's export and import depend on more spesific products (traditional sector). Failure to achieve product diversification together with impairment of the value-added in the exporting products emerges as an major obstacle against the objectives of increasing the external competitiveness, closuring the foreign trade deficits and improving the terms of foreign trade.

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