Uluslararası Yönetim İktisat ve İşletme Dergisi, Cilt 16, Sayı 4, 2020
International Journal of Management Economics and Business, Vol. 16, No. 4, 2020

Research Article / *Araştırma Makalesi*

ANALYSIS OF TURKEY'S IRON -STEEL INDUSTRY IN THE WORLD TRADE*

Assoc. Prof. Hayrettin KESGİNGÖZ
Kahramanmaraş Sütçü İmam University, FEAS, Kahramanmaraş, Turkey, *(hayrettinkeskingoz@gmail.com)*

Muharrem YELDAN
Karabük University, Karabük, Turkey, *(muharremyeldan@gmail.com)*

Umut GÜÇLÜ
Karabük University, Karabük, Turkey, *(umut.guclu.06@gmail.com)*

ABSTRACT

The industrial sector is a locomotive sector that provides the development of countries. One of the most important sectors of the industrial sector is the iron and steel sector. World trade has been developing due to the developments in the iron - steel industry. The demand that is growing and affected by the iron - steel sector increases the importance of the iron - steel sector with every passing day in the world conjuncture. Turkey always wants to have a say in the iron - steel industry. The idea did not want to meet the increasing world demand is caused Turkey to give more importance to the iron and steel industry. In this study, analysis of Turkey's iron - steel industry of world trade is carried out with revealed comparative advantages in the method. The result of analysis described in chapters steel Comparative Advantage (AKU) according to the index number of foreign trade in Turkey chapters 72 and 73 has been found to be superior. According to the Revealed Symmetrical Comparative Advantages (ASKU) index, the iron and steel industry has competitive power. Trade Balance Index (TDI) based in Turkey while net importer of foreign trade in chapter 73. In chapter 72, is a net exporter position. In the product map created with index values, section 72 is generally Group B, but in a competitive situation, it could not reach the desired level of foreign trade. 73. In both chapters if Turkey is a net exporter and has the competitive edge. Turkey wants to take part as an important actor in world trade in iron and steel industry and always maintain the continuity should increase their investments in this area. Sectors associated with the industrial sector should feed towards high-tech products.

Keywords: *World Trade, Iron- Steel Sector, Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Trade Balance Index (TDI).*

DÜNYA TİCARETİNDE TÜRKİYE'NİN DEMİR-ÇELİK SEKTÖRÜNÜN ANALİZİ

ÖZET

Sanayi sektörü ülkelerin gelişmişliklerini sağlayan lokomotif bir sektördür. Sanayi sektörünün en önemli sektörlerinden biri demir-çelik sektörüdür. Demir-çelik sektöründeki gelişmelere bağlı olarak dünya ticareti gelişmektedir. Demir-çelik sektörüne bağlı olarak gelişen ve etkilenen talep dünya konjonktüründe her geçen gün demir-çelik sektörünün önemini arttırmaktadır. Türkiye demir-çelik sektöründe söz sahibi olmayı her zaman istemektedir. Artan dünya talebini karşılamak isteme düşüncesi Türkiye'nin demir-çelik sektörüne daha da önem vermesine neden olmaktadır. Bu çalışmada dünya ticaretinde Türkiye'nin demir-çelik sektörünün analizi açıklanmış karşılaştırmalı üstünlükler yöntemiyle yapılmıştır. Analiz sonucunda, demir-çelik fasıllarında Açıklanmış Karşılaştırmalı Üstünlükler (AKÜ) endeksine göre Türkiye'nin 72 ve 73 numaralı fasıllarda dış ticarette üstün olduğu tespit edilmiştir.

* *Fourth International Iron- Steel Symposium (UDCS'19) April 4-6, 2019, is an extended version of the paper presented.*

www.ijmeb.org ISSN:2147-9208 E-ISSN:2147-9194
http://dx.doi.org/10.17130/ijmeb.811175
Received: 15.10.2020, Accepted: 01.12.2020

Açıklanmış Simetrik Karşılaştırmalı Üstünlükler (ASKÜ) endeksine göre demir-çelik sektörü rekabet gücüne sahiptir. Ticaret Dengesi Endeksi'ne (TDİ) göre de Türkiye 72 numaralı fasılda dış ticarette net ithalatçı konumda iken 73 numaralı fasılda ise net ihracatçı konumdadır. Endeks değerleriyle oluşturulan ürün haritasında ise 72 numaralı fasıl genelde B grubu iken rekabetçi durumda istenilen seviyede dış ticaret seviyesine ulaşamamıştır. 73 numaralı fasılda ise Türkiye hem rekabet üstünlüğüne sahip hem de net ihracatçı durumdadır. Türkiye demir-çelik sektöründe dünya ticaretinde önemli bir aktör olarak yer almak ve devamlılığını sürdürmek istiyorsa bu alandaki yatırımlarını daima arttırmalıdır. Yüksek teknolojik ürünlere doğru yönelerek sanayi sektörü ile ilişkili sektörler beslemelidir.

Anahtar Kelimeler: *Dünya Ticareti, Demir-Çelik Sektörü, Karşılaştırmalı Üstünlükler Yöntemi, Açıklanmış Simetrik Karşılaştırmalı Üstünlükler Yöntemi, Ticaret Dengesi Endeksi.*

1. Introduction

The Iron- Steel sector, which is an important sector for Turkey and the World, is one of the most important chapter when it comes to the forward and backward linkages of the industrial sector, which is an important sector in the growth, development and development of countries. The iron- steel sector is of great importance for the country's economy due to its qualities such as increasing the usage area of steel products every day, increased consumption tendency, production of intermediate goods in the manufacturing industry and export potential (2012: Iron- Steel Sector Report). The iron - steel sector is a sector in which iron ore is extracted from the underground, concentrated, poured, beaten, rolled, pulled and similar methods are produced (TOBB:2010). When we look at the diversity of the products produced in the iron - steel sector, it is seen that the importance of this sector has increased in the technological fields as well as in the traditional industries. As a result of the rapid developments in the production of iron - steel, especially in the history of the world, the industrial revolution took place and the developments in the field of technology were experienced. The iron - Steel sector is always one of the sectors most affected by the developments in the world. As a reflection of the growth in the country's economies with the increase in total economic activities worldwide, the increasing demand for Industry 4.0, automobile and white goods and other Iron- Steel products has increased and continued to increase World Steel production (Iron- Steel Report, 2011). Due to all these developments, it is always important to have a say in the iron - steel industry in the world.

In this study, the location of Turkey's iron - steel sector will be analysed. Turkey is a country which is one of the countries wishing to meet increasing world demand. In this analysis, the iron -steel export and import values of Turkey will be looked first. Then the place in world trade will be examined with production values. Then the method of analysis of comparative advantage which a sectoral analysis will determine Turkey's place in world trade.

2. Iron- Steel Industry in World Trade

Statistics of the major producers of the world steel industry are given in the table below. The top three countries in world steel production are China, Japan and the USA, respectively. According to 2002-2018 data: Turkey ranks 13th in world steel production considering production volumes.

Table 1: Major Steel Producing Countries (million tons of crude steel production)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	182.2	220.1	272.5	349.4	422.7	489.2	500.5	567.8	626.7
Japon	107.7	110.5	112.7	112.5	116.2	120.2	118.7	87.5	109.6
USA	916	90.4	98.9	94.9	98.6	98.2	91.4	58.2	80.5
Russia	59.8	62.7	65.6	66.1	70.8	72.4	68.5	60.0	66.9
Germany	45.4	45.0	44.8	46.4	47.2	48.6	45.8	32.7	43.8
S. Korea	45.0	46.3	46.3	47.5	48.5	51.5	53.6	48.6	58.4
Ukraine	34.1	34.1	36.9	38.7	38.6	48.2	37.1	29.9	33.4
India	28.8	28.8	31.8	38.1	40.9	53.1	55.2	62.8	68.3
Brasil	29.6	29.6	31.1	32.9	31.9	33.8	33.7	26.5	32.9
Italy	26.1	26.1	26.8	28.5	29.3	31.5	30.6	19.8	25.8
France	20.3	20.3	19.8	20.8	19.5	19.2	17.9	12.8	15.4
Taiwan	18.2	18.2	18.8	19.6	18.9	20.9	19.9	15.9	19.8
Turkey	16.5	16.5	18.3	20.5	21.0	25.8	26.8	25.3	29.1
Total	903.6	946.8	1.056.7	1,131.8	1,244.2	1,344.2	1,326.5	1,226.5	1,413.5

Source: World Steel Assocation (www.worldsteel.org)

According to the data of 2002-2010: steel production increased by 56%. Again, China, Japan and USA are in the top three in production. The production in Turkey increased over much of the world capacity increased by 76%.

Continuation of Table 1: Major Steel Producing Countries (million tons of crude steel production)

Country	2011	2012	2013	2014	2015	2016	2017	2018
China	683.9	716.5	822.0	822.7	803.8	808.4	831.7	928.3
Japon	107.6	107.2	110.6	110.7	105.2	104.8	104.7	104.3
USA	86.4	88.7	86.9	88.2	78.8	78.5	81.6	86.6
Russia	68.9	70.4	69.0	42.9	70.9	70.8	71.3	71.7
Germany	44.3	42.7	42.6	71.5	42.7	42.1	43.4	42.4
S. Korea	68.5	69.1	66.1	27.2	69.7	68.6	71.0	72.5
Ukraine	35.3	33.0	32.8	27.2	23.0	24.2	21.3	21.1
India	71.3	77.6	81.3	86.5	89.4	95.6	101.4	106.5
Brasil	35.2	34.5	34.2	33.9	33.3	31.3	34.4	34.9
Italy	28.7	27.3	24.1	23.7	22.0	23.4	24.1	24.5
France	15.8	15.6	15.7	16.1	15.0	14.4	15.5	15.4
Taiwan	22.9	20.7	22.3	23.1	21.4	21.8	22.4	23.2
Turkey	34.1	35.9	34.7	34.0	31.5	33.2	37.5	37.3
Total	1,517.9	1,546.8	1,649.0	1,665.0	1,620.9	1,629.6	1,689.4	1,808.4

Source: World Steel Assocation (www.worldsteel.org)

According to the data of 2011-2018: steel production increased by 19%. again, china, japan and usa are in the top three in production. The much lower production in Turkey increased by 9% of the world capacity increase.

The iron- steel sector have the capability to become a locomotive sector in the country's economy and industrialization. When the relationship between the developments in the iron - steel industry and the development process is examined, iron - steel products play an important role in the development of the iron -steel sub-sectors of the economy. The importance of this sector is primarily due to the fact that it gives input to all industrial branches. The iron- steel industry has contributed to the production of all vehicles and all machinery, equipment and goods such as automotive, ship, aircraft, railway and wagon, mainly construction materials. Iron- Steel (72) and Iron -Steel Goods (73) are considered as the number of the chapter. Turkish foundry steel sector has an important place both in Europe and in the world. 2023 as the target is within the scope of Turkey Export Strategy identified $ 500 billion in exports, 11% of steel industry with $ 55 billion is expected to have a share (Ministry of Trade, Iron- Steel Report, 2018).

To understand the importance of Turkey in the iron - steel sector in the world trade, firstly we need to assess the exports and imports of the relevant chapters in the sector. Then we need to look at production in the relevant chapters in the world. These values will help us to understand its place in Turkey's iron - steel industry. First we look at Turkey's export value in Table 2;

Table 2: Exports of Turkey According to Chapters 2019-2001 (Thousand Dollars)

Years	72. Chapters	73. Chapters
2001	2 069 932	975 727
2002	2 269 813	1 243 852
2003	2 969 012	1 391 047
2004	5 359 512	2 226 923
2005	4 973 475	2 731 357
2006	6 273 353	3 336 371
2007	8 372 266	4 129 749
2008	14 946 358	5 742 363
2009	7 641 010	4 545 275
2010	8 740 067	4 850 216
2011	11 225 329	5 748 004
2012	11 332 482	6 093 117
2013	9 918 794	6 148 046
2014	9 244 173	6 356 117
2015	6 556 416	5 465 334
2016	6 180 353	4 964 336
2017	8 230 403	5 598 990
2018	11 547 161	6 534 643
2019 (first 2 months)	1 818 762	988 623

Source: Turkey's Statistical Institute (www.tuik.gov.tr)

Table 2 shows an upward trend in Chapter 72 from 2001 to 2008. Although the value of Turkey's exports decreased with 2008 global financial crisis, it increased in 2010, 2011 and 2012. The depression in 2015 was replaced by a rising trend in the following years. 2008 is the year of the Summit. After the global financial crisis, this value has not yet been reached. 73. chapter also follows similar trend like the 72 chapter. The only difference was the year 2018 of the peak. According to the chapters, if we look at the import figures;

Table 3: Imports of Turkey According to Chapters 2019-2001 (Thousand Dollars)

Years	72. Chapters	73. Chapters
2001	1 797 367	844 630
2002	2 904 980	709 226
2003	4 747 844	827 360
2004	8 031 522	928 097
2005	9 457 831	1 184 644
2006	11 525 251	1 488 786
2007	16 182 379	1 836 715
2008	23 160 241	2 227 429
2009	11 351 640	1 526 071
2010	16 120 796	1 966 864
2011	20 424 235	2 521 135
2012	19 642 041	2 367 176
2013	18 690 888	2 757 735
2014	17 575 890	2 617 511
2015	14 775 094	2 742 274
2016	12 575 460	2 982 520
2017	16 761 929	2 957 422
2018	18 401 466	2 825 007
2019 (first 2 months)	2 076 232	375 581

Source: Turkey's Statistical Institute (www.tuik.gov.tr)

In Table 3, the import value for Chapter 72 tends to increase from 2001 to 2008 to the global financial crisis. The peak value was realized in 2008. The following years have followed a wavy cruise. For Chapter 73, the trend shows a trend in the same trend as export figures.

After examining the movements of the iron - steel sector in Turkey's foreign trade, we need to look at the annual production quantities to see the location of Turkey in the world trade for the iron - steel industry. If we look at the annual share of the raw steel producing countries in the world;

Table 4: Countries Producing Annual Raw Steel in the World (Million Tons)

Rank	Countries	2011	2012	2013	2014	2015	2016 (first 8 month)	2015 Share in World Production (%)
1.	China	701.9	731	785.9	822.6	803.8	536.3	62.8
2.	Japan	107.6	107.2	110.8	110.6	105.1	69.9	8.2
3.	USA	86.3	88.6	87	88.1	78.9	53.4	6.2
4.	Indıa	73.4	77.5	79.4	87.2	-	-	-
5.	Russia	68.8	70.4	69.4	71.6	71.1	47	5.6
6.	Korea R.	68.5	69.1	66	71.5	69.6	45.2	5.4
7.	Germany	44.2	42.6	42.6	42.9	42.6	28.7	3.3
8.	**TURKEY**	34.1	35.8	34.6	34	31.5	22	2.5
9.	Brazil	35.2	34.5	34.4	33.8	33.2	20.3	2.6
10.	Ukraine	35.3	32.9	32.8	27.1	22.9	16.3	1.8
11.	Italy	28.7	27.5	24	23.7	22	15.3	1.7
	Total	1284	1317	1366	1413	1280	1065	100

Source: World Steel Association (www.worldsteel.org)

In Table 4 when viewed years from 2011 to 2016, Turkey ranks 8th in the world in steel production. Although there is a total increase in steel production as of years, China is striking as the country that meets this increase. Turkey only meets 2.5% of the world's steel production.

Table 5: Countries Producing Annual Raw Steel in the World 2017-2019 (Million Tons)

Rank	Countries	2017 (11 months)	2018 (11 months)	2019 (2 months)	Variation (18/19-2 months) %
1.	China	764.802	857.372	149.581	9.2
2.	Japan	95.941	96.86	15.885	-8.3
3.	USA	74.949	79.156	14.414	6.9
4.	India	92.473	96.923	17.921	0.1
5.	Russia	66.453	65.812	11.02	-4.5
6.	Korea R.	64.478	66.29	11.849	1.1
7.	Germany	39.961	38.969	6.575	-7.6
8.	**TURKEY**	34.163	34.43	5.203	-16.1
9.	Brazil	31.542	32.09	5.595	0.5
10.	Ukraine	19.898	19.214	3.539	-0.4
11.	Italy	22.259	22.812	4.005	-3.1
	Total	1,306.919	1,409.928	245.587	-22.2

Source: World Steel Association (www.worldsteel.org)

In Table 5, years from 2017 to 2019, if we look at steel production in the world, Turkey is again 8. Rank. Moreover, for Turkey, after US president Trump's aggressive economic stance in the world trade in 2018, this situation has become more difficult to say in the world trade. US President Donald Trump, in August 2018, after announced that it has approved the doubling of purchased steel and aluminium in customs duties from Turkey, the importance of the iron - steel industry in the world conjuncture with increases in customs duties that the US applies has emerged once again. Turkey has succeeded in increasing its exports with the right policies it has implemented during this period. The increase in exports in the iron - steel sector in 2018 has reached a remarkable dimension. However, this was not reflected in the first two months of 2019. There was a 16% contraction in the first 2 months. In this process, the fluctuation of the dollar rate has been effective.

3. Literature Review

There are many studies in the literature about the competitiveness of the sectors. The revealed comparative advantage method is used to analyse which countries are competitiviness in which sectors. Table 6 show that the studies in the literature both the iron - steel sector and the revealed comparative advantage method.

Table 6: Literature Review

Yeats (1985)	47 selected countries (1976-1978) Revealed Comparative Advantage Method	the developing countries in the sample had positive comparative advantage over other countries.
Lim (1997)	North Korea (1970-1992) Revealed Comparative Advantage Method	North Korea had no comparative advantage in both crude steel and finished iron - steel products.
Richardson & Zhang (2001)	US and foreign trade partners (1980-1995) Revealed Comparative Advantage Method	the US had no comparative advantage in the iron - steel industry.
James & Movshuk (2003)	Japan-Korea-Taiwan (1980-1999) Revealed Comparative Advantage Method	Taiwan's comparative advantage in the Korean market was directed towards Japan.
Erlat & Erlat (2005)	Turkey - European Union (1990-2000) Revealed Comparative Advantage Method	According to Turkey's European Union countries during the period 1990-2000, in the last 3 years, labor-intensive products in the iron - steel industry have identified that the comparative advantage.
Kaya (2006)	Turkey-EU (1991-2003) Revealed Comparative Advantage Method	Turkey's iron - steel industry by the EU has determined that the comparative advantage.

Table 6 continued

Veeramani (2006)	China - India (1980-2003) Revealed Comparative Advantage Method	India has no comparative advantage over China in the iron - steel industry.
Khatibi (2008)	Kazakhstan-European Union (199-2006) Revealed Comparative Advantage Method	Kazakhstan has a comparative advantage in the manufacture of ferrous and non-ferrous metals compared to European Union countries.
Abidin & Loke (2008)	Malaysia-China-Japan (1995-2000-2005) Revealed Comparative Advantage Method	Malaysia has no comparative advantage over other countries in the iron - steel industry.
Loke (2008)	Malaysia-China (2001-2005) Revealed Comparative Advantage Method	China has a comparative advantage over the Malaysian metal industry.
Yunus et al. (2010)	Malaysia-Singapore (2000-2009) Revealed Comparative Advantage Method	Malaysia had a comparative advantage over Singapore in the iron - steel industry.
Oelgemöller (2013)	Greece-Ireland-Portugal and Spain (1995-2011) Revealed Comparative Advantage Method	Greece has increased its comparative advantage over the years in the iron - steel sector compared to other countries.
Kocourek (2015)	BRICS countries (1995-2013) Revealed Comparative Advantage Method	China has a comparative advantage in iron - steel and iron - steel related sectors compared to Brazil, Russia, India and South Africa.
Erkan & Batbaylı (2017)	Black Sea Economic Cooperation Organization (BSEC) (2000-2014) Revealed Comparative Advantage Method	The Black Sea Economic Cooperation Organization had a strong comparative advantage in the iron - steel sector.
Kaplan & Tur (2017)	Turkey (1995-2013) Revealed Comparative Advantage Method	Turkey's iron - steel industry has stated that the comparative advantage compared to other sectors.
Erkan & Alakbarov (2018)	Turkey-Azerbaijan (2000-2008) Revealed Comparative Advantage Method	Iron- steel industry in Turkey, moderately According to Azerbaijan stated that the comparative advantage.

Table 6 continued

Çeştepe & Tunçel (2018)	Turkey (2007-2016) Revealed Comparative Advantage Method	The added value in Turkey's iron - steel industry have found that weak comparative advantage in high product groups. They concluded that the product groups with low added value had a comparative advantage.
Kesgingöz et al. (2019)	Turkey-US-China-Britain and Russia (2015-2018) Grubel-Lloyd, Volrath and CEP Statistics Explained Comparative Advantage Method	Turkey's iron - steel industry have identified that the comparative advantage compared to other countries.
Kuşat (2019)	Turkey-EU candidate countries 28 (2006-2016) Revealed Comparative Advantage Method	Macedonia and Albania in the iron - steel sector in Turkey has reached the conclusion that their comparative advantage.
Çelik (2019)	Turkey-BRICS countries (1995-2017) Revealed Comparative Advantage Method	Turkey, India and China in the iron - steel industry in which labor compared to other countries in the intensive group reached the findings in the form of product has a comparative advantage.

Source: Created by authors

Table 6 provides a literature review. According to the literature survey, developing countries have a comparative advantage in iron - steel sector compared to developed countries. For example, China has always had a comparative advantage in the iron - steel industry compared to other countries. The studies about Turkey, Turkey's iron - steel sector has been determined that the comparative advantage. The revealed comparative advantages method explained in the following chapter was continued with the explained analyses.

4. Revealed Comparative Analysis Method

Revealed Comparative Advantage is firstly studied by Liesner (1958) to benchmark competitiveness of United Kingdom towards common market countries. After this research Ballassa (1965) developed and made this index more functional. Balassa index which shows comparative advantages of countries by using trade data aims to explain whether there are advantage differences between countries (Erkan, 2012:198). Balassa index compares specialization of country in a certain good with the specialization of the world (Beningo, 2005:6).

The method used in the study is Balassa's revealed comparative advantage. It is shown as RCA. Looking at whether the trade has an advantage for the country, this method continues to be used for the countries that currently trade. RCA is shown as follows:

$$RCA_{bc} = (X_{bc} / X_c) / (X_{bd} / X_d) \quad (1)$$

RCA_{bc}: The index shows that: revealed comparative advantage for B-property of C country.

X_{bc}: B-Property exports of C country

X_c: Total exports of country C

X_{bd}: B-Goods world exports

X_d: Total World Exports

If the index value is greater than 1, the country has a comparative advantage in the export of goods. If the index value is less than 1, the country does not have a comparative advantage in the export of goods and is in a disadvantaged position (Balassa, 1965).

To provide more detail on comparative advantage, Hinloopen & Marrewijk (2001) divided the index into four categories:

$0 < RCA \leq 1$ comparative disadvantage,

$1 < RCA \leq 2$ weak comparative advantage,

$2 < RCA \leq 4$ moderate comparative advantage,

$4 < RCA$ strong comparative advantage

The second most common method of determining competitiveness is the Revealed Symmetric Comparative Advantage (RSC_A) index, which is developed by the RCA method. The RSC_A index is expressed as follows.

$$RSC_A = (RCA_{-1}) / (RCA_{+1}) \quad (2)$$

The RSC_A index is between -1 and + 1. If the index value is positive, the relevant chapter, sector or country has competitiveness and the index value is negative, the relevant chapter, sector or country has a comparative disadvantage (Laursen, 1998). The last method used in the determination of competitiveness is Trade Balance Index (TDI). This index, developed by Lafay, is used to determine whether the country is a net exporter/NET importer in the relevant product or chapter (Widodo, 2008; Ishchukova & Smutka, 2013). TDI is expressed as follows.

$$TDI = (X_{ij} - ij) / (X_{ij} + M_{ij}) \quad (3)$$

I indicates Country, J Product, X Exports, M Imports. The TDI index value is between -1 and + 1. If the value of TDI is positive, the country is net exporter, negative if the country is net importer, the country's export and import values are said to be equal to each other TDI index value is zero (Amighini, 2005; Özçalık & Okur, 2013; Ma, 2013; Altay Topçu & Sümerli Sarıgül, 2015).

In addition, RSCA and TDI, which are the second and third methods used in the measurement of competitiveness, produce a production map of the industrial sector. The Production map consists of four groups as A, B, C, D. The meanings of these groups are;

If A: ($RSC_A > 0$, $TDI > 0$) Comparative Advantage and Net Exporters

If B: ($RSC_A > 0$, $TDI < 0$) Comparative Advantage and Net Importer

If C: ($RSC_A < 0$, $TDI > 0$) Comparative Disadvantage and Net Exporter

If D: ($RSC_A < 0$, $TDI < 0$) Comparative Disadvantage and Net Importer There are situations (Widodo, 2008).

5. Analysis Results

The RCA index of the Turkish Iron- Steel sector in the world, can be seen in Table 7.

Table 7: RCA Values Calculated for the Iron -Steel Sector

Years	72. Chapters	Competition Status	73. Chapters	Competition Status
2001	**3.600522**	Medium	**2.119246**	Medium
2002	**3.200495**	Medium	**2.314747**	Medium
2003	**2.885498**	Medium	1.981947	Low
2004	**3.058946**	Medium	**2.236645**	Medium
2005	**2.476518**	Medium	**2.240603**	Medium
2006	**2.653541**	Medium	**2.224584**	Medium
2007	**2.543904**	Medium	**2.075825**	Medium
2008	**3.481179**	Medium	**2.257984**	Medium
2009	**3.317115**	Medium	**2.412988**	Medium
2010	**2.990786**	Medium	**2.604641**	Medium
2011	**3.158370**	Medium	**2.562405**	Medium
2012	**3.210091**	Medium	**2.398248**	Medium
2013	**3.113622**	Medium	**2.456180**	Medium
2014	**2.686677**	Medium	**2.390993**	Medium
2015	**2.297042**	Medium	**2.232668**	Medium
2016	**2.287557**	Medium	**2.143397**	Medium
2017	**8.128162**	High	**6.902345**	High

Source: Calculated by the authors.

As shown in Table 7, the chapter values are given in dark colour. These values indicate that Turkey has a comparative advantage. The sectors 72 and 73, representing the iron - steel industry, were in the middle of the world competition between the years of 2001-2016. With the breakthrough in 2017, they strengthened their position in the world competition. In international competition, Turkey has an international competition for 72 and 73 sectors. This means a comparative advantage in world trade. The second most common method used to determine competitiveness is the Revealed Symmetric Comparative Advantage-RSCA index, which was developed and obtained by the RCA. The calculated RSCA values for the Iron- Steel sector are calculated in Table 8.

Table 8: RSCA Values Calculated for Turkey Iron -Steel Sector

Years	72. Chapters	Competition Power	73. Chapters	Competition Power
2001	0.565267	Capable to Compete	0.358819	Capable to Compete
2002	0.523866	Capable to Compete	0.396636	Capable to Compete
2003	0.485266	Capable to Compete	0.329297	Capable to Compete
2004	0.507261	Capable to Compete	0.382076	Capable to Compete
2005	0.424712	Capable to Compete	0.382831	Capable to Compete
2006	0.452586	Capable to Compete	0.379765	Capable to Compete
2007	0.435651	Capable to Compete	0.349768	Capable to Compete
2008	0.553689	Capable to Compete	0.386123	Capable to Compete
2009	0.536728	Capable to Compete	0.414003	Capable to Compete
2010	0.498846	Capable to Compete	0.445160	Capable to Compete
2011	0.519042	Capable to Compete	0.438582	Capable to Compete
2012	0.524951	Capable to Compete	0.411461	Capable to Compete
2013	0.513810	Capable to Compete	0.421326	Capable to Compete
2014	0.457506	Capable to Compete	0.410202	Capable to Compete
2015	0.393396	Capable to Compete	0.381316	Capable to Compete
2016	0.391646	Capable to Compete	0.363746	Capable to Compete
2017	0.780898	Capable to Compete	0.746911	Capable to Compete

Source: Calculated by the authors.

In Table 8, for Turkey's iron - steel sector, including from 2001 to 2017, it is seen, as having a structure in world trade can be competitive. The last method used in the determination of competitiveness in this study is the Trade Balance Index (TDI). It is used to determine whether the country is a net exporter or net importer in the sector. TDI values are calculated and given in Table 9 to determine whether Turkey's iron - steel sector is a net exporter or net importer.

Table 9: TDI Values Calculated for the Iron -Steel Sector

Years	72. Chapters	Competition Status	73. Chapters	Competition Status
2001	0.070479	Net Exporter	0.072017	Net Exporter
2002	-0.131542	Net importer	0.290340	Net Exporter
2003	-0.230513	Net importer	0.254095	Net Exporter
2004	-0.203690	Net importer	0.411670	Net Exporter
2005	-0.310738	Net importer	0.394973	Net Exporter
2006	-0.295074	Net importer	0.382907	Net Exporter

Table 9 continued

2007	-0.318071	Net importer	0.384320	Net Exporter
2008	-0.215550	Net importer	0.441032	Net Exporter
2009	-0.195372	Net importer	0.497287	Net Exporter
2010	-0.296881	Net importer	0.422960	Net Exporter
2011	-0.290649	Net importer	0.390230	Net Exporter
2012	-0.268271	Net importer	0.440403	Net Exporter
2013	-0.306613	Net importer	0.380687	Net Exporter
2014	-0.310652	Net importer	0.416621	Net Exporter
2015	-0.385262	Net importer	0.331818	Net Exporter
2016	-0.340967	Net importer	0.249384	Net Exporter
2017	-0.340946	Net importer	0.308960	Net Exporter

Source: Calculated by the authors.

TDI values in Table 9; Iron- steel sector to No. 72 in this chapter, Turkey has fallen to a net importer since 2002, while net exporter in 2001. For the chapter 73, it was always a net exporter from 2001 to 2017. After seeing the RCA, RSCA and TDI indices, a product map has been created for demi-steel sector by using the RSCA and TDI index values in the grouping method which visually expresses the comparative advantages. In Table 9, the product map of the iron - steel sector was given. While the most desired group "A" group in the product map shows the comparative advantage, competitiveness and net exporter status, the least desired group is the "D" group shows the comparative disadvantage, there is no competitiveness and the country is the net importer in that product.

Table 10: Iron- Steel Sector Product Map

72 Chapter	RSCA	TDI	Result	73 Chapter	RSCA	TDI	Result
2001	0.565267	0.070479	**A**	2001	0.358819	0.072017	**A**
2002	0.523866	-0.131542	**B**	2002	0.396636	0.290340	**A**
2003	0.485266	-0.230513	**B**	2003	0.329297	0.254095	**A**
2004	0.507261	-0.203690	**B**	2004	0.382076	0.411670	**A**
2005	0.424712	-0.310738	**B**	2005	0.382831	0.394973	**A**
2006	0.452586	-0.295074	**B**	2006	0.379765	0.382907	**A**
2007	0.435651	-0.318071	**B**	2007	0.349768	0.384320	**A**
2008	0.553689	-0.215550	**B**	2008	0.386123	0.441032	**A**
2009	0.536728	-0.195372	**B**	2009	0.414003	0.497287	**A**
2010	0.498846	-0.296881	**B**	2010	0.445160	0.422960	**A**
2011	0.519042	-0.290649	**B**	2011	0.438582	0.390230	**A**

Table 10 continued

2012	0.524951	-0.268271	**B**	2012	0.411461	0.440403	**A**
2013	0.513810	-0.306613	**B**	2013	0.421326	0.380687	**A**
2014	0.457506	-0.310652	**B**	2014	0.410202	0.416621	**A**
2015	0.393396	-0.385262	B	2015	0.381316	0.331818	A
2016	0.391646	-0.340967	B	2016	0.363746	0.249384	A
2017	0.780898	-0.340946	B	2017	0.746911	0.308960	A

Source: Calculated by the authors.

Looking at the product map for the Iron- Steel sector in Table 10, Turkey has both comparative advantage and net exporter in 2001 in the number 72 chapter. Beginning in 2002, including the 2017 Turkey has a comparative advantage in the iron - steel sector, but is a net importer position. The number of Chapter 73, starting from 2001 until 2017, Turkey's iron - steel industry is always in Chapter 73, has a comparative advantage. It is also a net exporter.

6. Results

In this study, it has been investigated whether Turkey has a competitiveness in global foreign trade in the 72 and 73 chapters for the iron - steel sector. For this purpose, RSC, RSCA and TDI values were calculated. In addition, the product map for the iron - steel sector has been obtained from the RSCA and TDI index values. According to the RCA index of the iron - steel sector consisting of Turkey's 72 and 73 chapters, the two chapters are competitiveness in foreign trade. According to the RSCA Index, the iron - steel sector has competitiveness. According to the TDI index, Turkey is the net importer in Chapter 72, while it is the net exporter in the number 73. In the product map generated by the index values, chapter 72 was generally the "B" group, but has not reached the desired level of foreign trade at a competitive level. In chapter 73, Turkey is both competitiveness and net exporter. Turkey should always increase its investments in this area if it wants to take place in the world trade and continue its continuity in the iron - steel sector. It should be directed towards high-tech products and feed the chapters in the industry sector adequately. In order to move from the net importing chapter to the net exporter chapters, it is of utmost importance that the incentives are used effectively and the necessary works and investments related to R and D, innovation and design are made by the private sector initiative. Turkey needs to increase the competitiveness enough to get a share of world trade in iron - steel industry. In order to increase competitiveness, problems must be solved first. In order to increase the competitiveness in the international market, it is necessary to establish brand value and combat unregistered production with the investments to be realized and will take place.

References

Abidin, M. Z., & Loke, W. H. (2008). Revealed comparative advantage of Malaysian exports: The case for changing export composition. Asian Economic Papers, 7(3), 130-147.

Altay, Topçu, B., & Sümerli Sarıgül, S. (2015). Comparative advantage and the products mapping of exporting sectors in Turkey. The Journal of Academic Social Sciences, 3(18), 330-348.

Amighini, A. (2005). China in the international fragmentation of production: Evidence from the ICT industry. The European Journal of Comparative Economics, 2(2), 203-219.

Balassa, B. (1965). Trade liberalisation and revealed comparative advantage. The Manchester School of Economics and Social Science, 33, 99-123.

Beningo, S. (2005). Trade and Transportation Between the United States and China,and Between the United States and India, 2006 Conference of the Society of Government Economists, Washington.

Çelik, A. (2019). Ülkelerin faktör yoğunlukları bakımından rekabet gücünün ölçümü: BRICS-T özelinde karşılaştırmalı bir analiz. Journal of Yasar University, 14(55).

Çeştepe, H., & Tunçel, A. (2018). Türkiye demir çelik sektörünün uluslararası rekabet gücü analizi. Electronic Turkish Studies, 13(15).

Erkan, B. (2012). Ülkelerin karşılaştırmalı ihracat performanslarının açıklanmış karşılaştırmalı üstünlük katsayıları ile belirlenmesi: Türkiye-Suriye örneği. ZKU Journal of Social Sciences, 8(15), 195-218.

Erkan, B., & Alakbarov, N. (2018). Azerbaycan'ın ihracatında uzmanlaşma ve rekabet yapısı: Türkiye ile karşılaştırmalı analiz. Yönetim ve Ekonomi, 25(1), 55-73.

Erkan, B., & Batbaylı, Ş. (2017). Karadeniz Ekonomik İşbirliği Örgütü (KEİ) üyesi ülkelerin küresel pazarlardaki karşılaştırmalı üstünlükleri. Journal of Political Science, 5(Special Issue April 2017), 47-65.

Erlat, G., & Erlat, H. (2005). Do Turkish exports have a comparative advantage with respect to the European Union market, 1999-2000. Topics in Middle Eastern and North African Economies, 7.

Hinloopen, J., & Marrewijk, C. (2001). On the empirical distribution of the Balassa In-dex. Review of World Economics - Weltwirtschaftliches Archiv, 137(1), 1 -20.

International Trade Center. http://www.intracen.org/country/turkey/sector-trade-performance/

Ishchukova, N., & Smutka, L. (2013). Comparative advantage: Products mapping of the Russian Agricultural exports. Agris on-line Papers in Economics and Informatics, 5(3), 13-24.

James, W. E., & Movshuk, O. (2003). Comparative advantage in Japan, Korea, and Taiwan Between 1980 and 1999: Testing for convergence and implications for closer economic relations. The Developing Economies, 41(3), 287-308.

Kaplan, H., & Tur, F., (2017). The structural transformation of Turkey's exports in terms of product and market diversification. Journal of Ege Academic View, 17(1), 59-74.

Kaya, A. A. (2006). İmalat sanayi ihracatında uzmanlaşma: Türkiye-Avrupa Birliği analizi (1991-2003). Journal of Ege Academic View, 2(6), 73-82.

Kesgingöz, H., Dilek, S., & Yeldan, M. (2019). Comparative analysis of the competitiveness of Turkey's iron -steel industry. Journal of Human and Social Sciences Researchs, 8(3), 2256-2271.

Khatibi, A. (2008). Kazakhstan's revealed comparative advantage Vis-A-Vis the EU-27 (No. 03/2008). ECIPE Working Paper.

Kocourek, A. (2015). Structural changes in comparative advantages of the BRICS. Procedia-Social and Behavioral Sciences, 172, 10-17.

Kuşat, N. (2019). Karşılaştırmalı ihracat performansı (Cep) indeksine göre Türkiye'nin Ab28 aday ülkeleri karşısındaki rekabet gücü (2006-2016). Hacettepe University Journal of Economics and Administrative Sciences, 37(1).

Laursen, K. (1998). Revealed comparative advantage and the alternatives as measures of international specialization. Danish Research Unit for Industrial Dynamics (DRUID) Working Paper No: 98-30.

Liesner, H. H. (1958). The European common market and British industry. Economic Journal, 68(270), 302–316.

Lim, K. T. (1997). Analysis of North Korea's foreign trade by revealed comparative advantage'. Journal of Economic Development, 22(2), 97-117.

Loke, W. H. (2008, May). Malaysia and China: comparative advantages in selected manufacturing goods. In Globalisation and Economic Policy (GEP) Workshop.

Ma, A. S. (2013). Revealed comparative advantage measure: ASEAN-China trade flows. Journal of Economics and Sustainable Development, 4(7), 136-145.

Ministry of Industry. (2011). Industry and Trade Ministry iron- steel sector report, 7. https://www.sanayi.gov.tr/?lang=tr/

Ministry of Industry. (2012). Science, Industry and Trade Ministry iron- steel sector report, 4. https://www.sanayi.gov.tr/?lang=tr/

Oelgemöller, J. (2013). Revealed comparative advantages in Greece, Ireland, Portugal and Spain. Intereconomics, 48(4), 243-253.

Özçalık, M., & Okur, A. (2013). Türk tekstil ve hazır giyim sektörlerinin gümrük birliği sonrası AB-15 ülkeleri karşısındaki rekabet gücü. Celal Bayar University Journal of Social Sciences, 11(1), 205-223.

Republic of Turkey Ministry of Trade. https://ticaret.gov.tr/data/5b87000813b8761450e18d7b/Demi_Celik_Demir_Celikten_Esya.pdf.

Richardson, J. D., & Zhang, C. (2001). Revealing comparative advantage: chaotic or coherent patterns across time and sector and US trading partner?. In topics in empirical international economics: A festschrift in honor of Robert E. Lipsey (pp. 195-232). University of Chicago Press.

TOBB. (2010). Türkiye Demir ve Demir Dışı Metaller Meclisi Sektör Raporu. ISBN: 978, Ankara.

Turkish Statistical Institute. http://tuik.gov.tr/PreTablo.do?alt_id=1046

Veeramani, C. (2006). India and China: Changing patterns of comparative advantage?. Georgia Institute of Technology, Indira Gandhi Institute of Development Research, Mumbai.

World Steel Association. https://www.worldsteel.org/ / World Steel Association.

Yeats, A. J. (1985). On the appropriate interpretation of the revealed comparative advantage index: Implications of a methodology based on industry sector analysis. Weltwirtschaftliches Archiv, 121(1), 61-73.

Yunus, M. M., Mohamed, Z., Mahyideen, J. M., & Saidon, R. (2010). Revealed comparative advantage of malaysian manufacturing: Malaysia and Singapore. In Proceedings of Fifth Malaysian National Economic Conference, Perkem V, Jilid 1, 278-288.