Competition power of Turkey's tomato export and comparison with Balkan countries

Adem Aksoy and Haluk Caglar Kaymak[*]

Atatürk University, Faculty of Agriculture, Department of Horticulture, 25240 Erzurum, Turkey
[*]*Corresponding author:* hckaymak@atauni.edu.tr

Abstract

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Turkey is one of the most important tomato producers in the world. Turkey has delivered 7.0% of world's entire tomato production in 2017. Determining the level of export competitiveness of tomato in Turkey and comparing it with that of Balkan Countries (Albania, Bosnia, Bulgaria, Croatia, Greece, Moldavia, Montenegro, Macedonia, Romania, Serbia, and Slovenia) for 2001-2017 periods, is the major aim of this study. The competitiveness level of tomato export was calculated using Revealed Comparative Advantage (RCA) index and Trade Balance Index (TBI). The data of this study was provided from International Trade Centre (INTRACEN) database. The results revealed that the average RCA and TBI scores for Turkey were 4.87 and 1.00, respectively. These findings demonstrated that despite strong comparative advantage, Turkey is still a net exporter country in tomato export. According to the average RCA scores, Albania and Macedonia have strong, Moldavia medium, and Bosnia, Bulgaria, Croatia, Greece, Hungary, Romania, Serbia and Slovenia have no comparative advantage in tomato export.

Keywords: tomato export; Revealed Comparative Advantage Index; Trade Balance Index; Balkan countries; Turkey

Introduction

The total vegetable production of the world is over 1600 million tons and the production of tomato, potato, garlic, onion and watermelon accounted for over 51.2% of the total vegetable production of the world. With worldwide production reaching near 182 million tons, moreover, tomato is the second most important vegetable species with numerous cultivars after potato, before onion. On the other hand, when the potatoes are evaluated in industrial crops such as sugar beet, tobacco, and cotton, the total vegetable production of the world is over 1094 million tons and the production of tomato accounted for over 17% of the total vegetable production of the world. In addition, tomato is one of the most produced and consumed vegetables throughout the world. China, India, USA and Turkey are the biggest produce countries in the world and they deliver 57% of total world production of tomato. Thus tomato production in Turkey consists of one fourth of total fresh fruit and vegetable production (Aksoy & Kaymak, 2016). Besides, compared to the EU, with combined production of 28 EU countries is considered as 100, Turkey can make the 71% of the total production of the Union. Looking at the world tomato exportation, the greatest share is of Mexico with a share of 22.3% which is followed by Netherland with 12% and Spain with 11.6%. As for Turkey, it comes in fifth place with a share of 6.7% (FAOSTAT, 2019).

Tomato comes first in terms of its value in production, consumption and economy among vegetables in Turkey. Also, tomato is an important crop and income source for both the greenhouse and field tomato growers throughout the Turkey with a production area near 170.000 ha (Çelik & Özbay, 2015). This popularity of tomato as a crop not only applies to Balkan countries but also other major tomato producers in the world because of the fact that tomato is regarded as one of the important and indispensable agricultural prod-

uct in human nutrition. While fresh tomatoes are preferred in daily use, the main importance of tomatoes comes from the fact that they are widely used in the processing industry. Due to its numerous uses such as frozen, tomato paste, sauce, ketchup, pickle, tomato juice, tomato puree, peeled tomato, canned tomato increases its importance in processing industry (Kaymak et al., 2010; Ertürk & Çirka, 2015).

Turkey has a significant advantage in terms of production of tomatoes. However, it cannot benefit from the increasing foreign market opportunities and cannot use its potential despite being a net exporter. In general, a number of studies have been made about competitiveness in international trade and comparative advantages of Turkish agriculture. However, there is limited data on on competitiveness of Turkey's tomato production sector in global market. Specifically, no studies of the competitiveness of international tomato trade were not found between Turkey and neighbours such as Balkan countries in the literature.

Therefore, the purpose of the study is to quantify the competitiveness level of Turkey and Balkan countries (Albania, Bosnia, Bulgaria, Croatia, Greece, Moldova, Montenegro, Republic of Macedonia, Romania, Serbia, and Slovenia) in terms of tomato export and to compare them with each other's.

Material and Method

Main material of the study consists of data obtained from International Trade Center (INTRACEN) database. Dataset between 2001-2017 years was used in the paper. Because of inconvenient data of the year 2018, the most complete and consistent dataset is from the 2001-2017 period. Along with the dataset, national and international literatures as well as some reports were among the resources benefited from as inputs. There are various techniques to determine strong and weak sectors of countries. Doubtless, one of the most common one is Revealed Comparative Advantage (RCA) index that was improved by Bela Balassa (Suntharalingam et al., 2011; Ahmad & Kalim, 2013). In determination of competitiveness level of Turkey and Balkan countries on tomato trade, Revealed Comparative Advantage Index and Trade Balance Index were used. Revealed Comparative Advantage Index was first found by Liesner (1958) and redefined and improved by Balassa (1965). Afterwards, it was named as Balassa Index. Revealed Comparative Advantage Index is commonly accepted in literature and used to scale specialization in international trade (Akgüngör et al., 2002; Kanaka & Chinadurai, 2012; Pilinkiene, 2014; Torok & Jambor, 2016; Çicek & Bashimov, 2016; Terin & Yavuz, 2019; Aksoy et al., 2020). RCA index is used to determine weak and strong

export sectors of countries (Aiginger, 2000; Bojnec & Fertö, 2007). Balassa formulates RCA index as below:

$$RCA_{ij} = \left[\left(\frac{x_{ij}}{x_i} \right) \middle/ \left(\frac{x_{wj}}{x_w} \right) \right]. \tag{1}$$

In formula, we define RCA_{ij}, as Revealed Comparative Advantage Index of sector 'j' of 'i' country, X_{ij} as export, X_i as total export, X_{wj} as total World export of sector 'j' and X_w as total World export. RCA index is a value within 0 and ∞. If index score is greater than or equal to 1, it means that country has comparative advantage of that sector. In other words, the share of that sector in total export is greater than the share of World trade. If index score is less than 1, the sector does not have comparative advantage (Mushanyuri & Mzumara, 2013; Peker, 2015). Moreover, to indicate the strength of comparative advantage, RCA coefficient of Balassa is classified as below (Hinloopen & Marrewijk, 2000):

*Class 1: $0 < RCA \le 1$: No comparative advantage
*Class 2: $1 < RCA \le 2$: Weak comparative advantage
*Class 3: $2 < RCA \le 4$: Medium comparative advantage
*Class 4: $4 < RCA$: Strong comparative advantage

Competitiveness of various sectors and sub-sectors in domestic and international literature were determined, using RCA index. Textile industry in USA (Lyford & Welch, 2004), textile and readymade industry in Turkey (Çakmak, 2005), textile industry in China (Tao & Fu, 2007), furniture industry in Turkey (Altay & Gürpınar, 2008), industry of Lithuanian (Startiene and Remeikiene, 2014), tomatoes in Turkey (Bashimov, 2016), wine industry in Turkey (Uysal et al., 2016), honey and wheat in Turkey (Terin et al., 2018; Terin, 2018). Another index that is used to determine competitiveness level of countries is Trade Balance Index. Trade Balance Index (TBI) is used to analysis whether a country is a net exporter or importer of a product and it is formulated as below (Lafay, 1992; Widodo, 2008).

$$TBI_{ij} = \frac{x_{ij} - M_{wj}}{x_i + M_w}. \tag{2}$$

TBI_{ij} is the trade balance indicator of j goods of country 'i'. X_{ij} and M_{ij} represent the export and import of 'j' product of 'i' country, respectively. This index value varies between -1 and +1. If $TBI_{ij} > 0$, the country is net exporter. If $TBI_{ij} < 0$, the country is net importer (Ullah & Kazuo, 2013; Altay Topcu & Sürmeli Sarıgül, 2015; Terin & Yavuz, 2018).

Results and Discussion

While tomato production in Turkey was 8.4 million tons in 2001, it raised to 12.1 million tons in 2018 by %44 increase (Table 1). As the research period was examined, 4.1 tons yield

Table 1. Tomato production, tomato yield and trade statistics in Turkey

Years	Tomato production (1000 ton)	Tomato yield, ton/da	Tomato export value, $	Tomato import value, $	Trade balance, $
2001	8425	4.2	48914	8	48906
2002	9450	4.5	69956	29	69927
2003	9820	4.6	88693	9	88684
2004	9440	4.6	109563	16	109547
2005	10050	5.0	145773	31	145742
2006	9855	5.1	174284	0	174284
2007	9937	5.4	297176	24	297152
2008	10985	5.6	389030	89	388941
2009	10746	5.7	406412	11	406401
2010	10052	5.6	476487	467	476020
2011	11003	6.1	432462	616	431846
2012	11350	6.0	400691	101	400590
2013	11820	6.2	391218	45	391173
2014	11850	6.5	426490	61	426429
2015	12615	6.7	365279	426	364853
2016	12600	7.0	239875	570	239305
2017	12750	6.8	290138	450	289688
2018	12150	7.2	289975	845	289130
Variability, %	44	71	493	10463	491

Source: FAOSTAT, 2019; TSI, 2019; INTRACEN, 2019

in 2001 reached to 7.2 tons in 2018 which is equal to % 71 increases. Moreover, as shown in Table 1, we could conclude that Turkey was an important tomato exporter. At the same time, the increase in export income variability of Turkey can be shown as evidence for this situation. Indeed, Turkey's export income variability in 2018 compared to 2001 increased by 493%.

Producer prices of tomato in Turkey and Balkan countries between 2001-2017 years are given in Figure 1. In the 17 years period of the review, an increase trend of tomato producer price draws attention. Hungary has the least tomato price, while Slovenia and Romania have highest prices among Balkan countries in 2017.
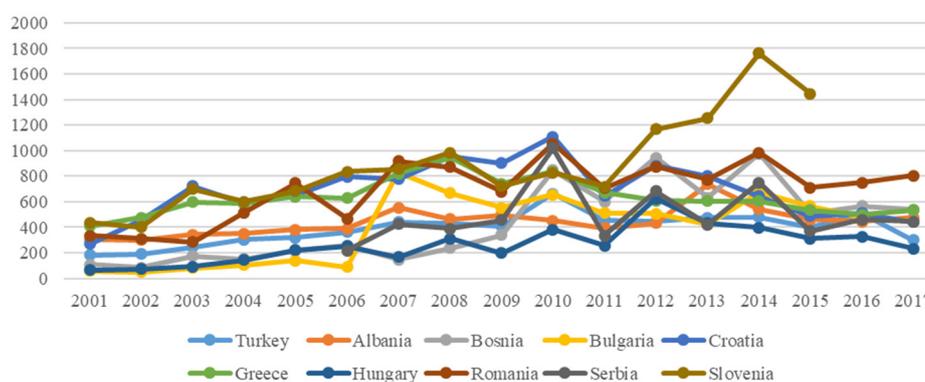

Fig. 1. Producer price tomato in Turkey and Balkan countries (FAOSTAT, 2019)

Revealed Comparative Advantage (RCA) index scores of Turkey and Balkan countries are given on Table 2. RCA score of Turkey during 2001-2017 periods was mean 4.87. According to the result, Turkey can be thought to have strong comparative advantage at tomato trade. However, in examined 2001-2017 period, it is seen that medium competitive advantage of Turkey at tomato trade 2001-2004 and 2016-2017 years.

Balkan countries, while Albania, Macedonia and Moldavia had a competitive advantage of tomato trade. But Bosnia, Bulgaria, Croatia, Greece, Montenegro, Romania, Serbia, and Slovenia were non-competitive ones. The results of RCA revealed that while Albania (6.18), Macedonia (10.38) and Moldavia (3.75) had high competitive power of tomato trade, Bosnia (0.14), Bulgaria (0.27), Croatia (0.21), Greece (0.51), Hungary (0.07), Romania (0.04), Serbia (0.42) and Slovenia (0.10) hadn't competitive advantage. The comparative of RCA index score of tomato trade of Turkey with Balkan countries during 2001-2017 period indicated that while Turkey was less competitive than that of Albania and Macedonia, But It was more competitive than that of other Balkan countries (Table 2). As for RCA index score calculation, high share of tomato export in total export leads country to become more competitive. Turkey's tomato exports competitive position in relation to the Balkan countries. However, in recent years, it has tendency to lose its advantage. In some other studies, it is concluded that competition power of Turkey has started to fall since 2010 (Bashimov, 2016; Güvenç, 2019).

Another index used to determine the competition level of tomato trade between Turkey and Balkan countries was Trade Balance Index (TBI). TBI score is given at Table 3. TBI index of Turkey has been +1for all years of examined period (2001-2017 years). It can be said that Turkey is net exporter country during the period examined. TBI index of Albania has been positive for all years of examined period (2001-2017 years) excluding the year of 2001-2010. It can be said that Albania is net exporter country during the period (2011-2017) examined. While Albania, Bosnia, Bulgaria, Croatia, Greece, Hungary, Moldavia, Romania, Serbia and Slovenia had negative values of TBI scores, Only Macedonia had positive value. Briefly Albania, Bosnia, Bulgaria, Croatia, Greece, Hungary, Moldavia, Romania, Serbia and Slovenia are net importer countries, Macedonia is net exporter country. According to Bashimow (2016), Turkey is thought to be competitive in tomato export.

Table 2. Revealed comparative advantage index score for Turkey and Balkan Countries*

Years	Turkey	Albania	Bosnia	Bulgaria	Croatia	Greece	Hungary	Macedonia	Moldavia	Romania	Serbia	Slovenia
2001	2.99	0.07		0.13	0.03	0.37	0.04	6.33	2.38	0.01	----	0.00
2002	3.44	0.41		0.12	0.02	0.33	0.03	6.66	1.20	0.01	----	0.00
2003	3.09	0.15	0.11	0.07	0.01	0.14	0.02	7.81	1.44	0.04	----	0.00
2004	3.44	0.31	0.06	0.03	0.04	0.19	0.02	10.84	1.94	0.03	-----	0.03
2005	4.03	0.11	0.20	0.05	0.02	0.17	0.01	14.85	1.65	0.02	-----	0.02
2006	4.28	0.14	0.23	0.08	0.03	0.16	0.03	15.81	2.85	0.01	0.21	0.07
2007	5.67	0.37	0.19	0.13	0.04	0.22	0.05	14.10	1.45	0.03	0.26	0.13
2008	6.35	0.66	0.12	0.57	0.08	0.23	0.06	17.10	2.38	0.02	0.45	0.23
2009	6.90	1.21	0.24	1.45	0.02	0.19	0.08	16.00	3.36	0.06	0.10	0.06
2010	7.68	2.29	0.18	0.48	0.03	0.40	0.13	15.44	3.15	0.08	0.46	0.10
2011	6.68	5.82	0.21	0.19	0.07	0.61	0.11	11.57	11.83	0.06	0.39	0.07
2012	5.79	6.35	0.09	0.11	0.07	0.64	0.11	9.77	11.03	0.11	0.48	0.11
2013	5.44	7.58	0.07	0.12	0.11	0.90	0.10	7.72	6.94	0.09	0.59	0.16
2014	5.44	10.97	0.04	0.08	0.57	1.26	0.09	6.59	7.20	0.04	0.33	0.17
2015	4.91	22.32	0.07	0.16	0.56	1.02	0.10	5.08	3.09	0.03	0.50	0.18
2016	3.07	24.53	0.17	0.25	0.86	1.01	0.10	4.97	1.45	0.01	0.65	0.22
2017	3.59	21.74	0.11	0.53	0.98	0.86	0.09	5.87	0.35	0.01	0.60	0.19
Mean	4.87	6.18	0.14	0.27	0.21	0.51	0.07	10.38	3.75	0.04	0.42	0.10

*Calculated by author

Table 3. Trade balance index score for Turkey and Balkan Countries[*]

Years	Turkey	Albania	Bosnia	Bulgaria	Croatia	Greece	Hungary	Macedo-nia	Molda-via	Romania	Serbia	Slovenia
2001	1.00	-0.99	-----	0.32	-0.97	-0.40	-0.68	0.87	-0.15	-0.98	-----	-1.00
2002	1.00	-0.95	-----	-0.68	-0.98	-0.69	-0.77	0.88	-0.53	-0.98	-----	-0.99
2003	1.00	-0.97	-0.93	-0.86	-0.99	-0.89	-0.84	0.83	-0.41	-0.84	-----	-0.99
2004	1.00	-0.94	-0.97	-0.88	-0.95	-0.86	-0.93	0.87	-0.37	-0.90	-----	-0.96
2005	1.00	-0.98	-0.94	-0.84	-0.98	-0.83	-0.98	0.91	-0.58	-0.97	-----	-0.97
2006	1.00	-0.97	-0.91	-0.73	-0.97	-0.83	-0.92	0.92	-0.54	-0.99	-0.88	-0.91
2007	1.00	-0.89	-0.90	-0.92	-0.96	-0.82	-0.83	0.94	-0.71	-0.98	-0.85	-0.85
2008	1.00	-0.76	-0.93	-0.77	-0.93	-0.77	-0.79	0.94	-0.60	-0.98	-0.81	-0.77
2009	1.00	-0.59	-0.86	-0.71	-0.98	-0.77	-0.65	0.94	-0.38	-0.94	-0.95	-0.92
2010	1.00	-0.19	-0.86	-0.73	-0.97	-0.58	-0.52	0.95	-0.43	-0.93	-0.74	-0.89
2011	1.00	0.41	-0.83	-0.82	-0.92	-0.26	-0.54	0.89	-0.13	-0.91	-0.78	-0.89
2012	1.00	0.46	-0.93	-0.88	-0.94	-0.22	-0.48	0.91	-0.09	-0.86	-0.73	-0.85
2013	1.00	0.63	-0.94	-0.87	-0.90	0.42	-0.64	0.87	-0.19	-0.88	-0.60	-0.77
2014	1.00	0.75	-0.98	-0.92	-0.59	0.45	-0.64	0.81	-0.17	-0.95	-0.76	-0.75
2015	1.00	0.85	-0.95	-0.85	-0.56	0.26	-0.64	0.74	-0.37	-0.97	-0.64	-0.73
2016	1.00	0.87	-0.88	-0.80	-0.32	0.03	-0.65	0.73	-0.64	-0.99	-0.51	-0.63
2017	1.00	0.89	-0.91	-0.66	-0.28	-0.01	-0.68	0.71	-0.90	-0.99	-0.55	-0.70
Mean	1.00	-0.20	-0.92	-0.74	-0.84	-0.40	-0.72	0.87	-0.42	-0.94	-0.73	-0.86

[*]Calculated by author

Conclusion

The results of the study clearly indicated that Turkey is a major tomato exporter country and has a strong comparative advantage at tomato trade. Regarding the tomato trade competition, Turkey is more competitive than the other Balkan countries except for Albania and Macedonia. In addition, Turkey is both net tomato exporter country and has a strong comparative advantage at tomato trade. Producer price of tomato is lower than Balkan countries due to high tomato production of Turkey. Despite the production quantity of tomato in Hungary is less than Turkey; domestic tomato price in Hungary is lower than both Turkey and other Balkan countries.

While the competitive power of a country in foreign trade has a positive correlation with productivity and production, it has a negative correlation with domestic price. In the Balkan countries, Albania and Macedonia are competitive in tomato trade. Balkan countries except for Macedonia and Albania are also net importers.

Turkey has a great advantage in tomato export owing to production potential and its location which is very close to major importer countries. Therefore, the export based government supports should be applied in Turkey for the increase of competition power in the global market.

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