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Turkey's Competitive Power in the International Wheat Market

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ABSTRACT

The aim of this study is to analyse the competitive power of wheat and wheat originated commodities produced in Turkey in export markets. A well-recognized measure of Revealed Comparative Advantage (RCA), Balassa's Index, was adopted in the study in order to analyse competitiveness. The study covers the period of between 2001 and 2018. The results indicate that Turkey had a comparative advantage for wheat in 2001, but this was later lost, although the RCA was comparatively high in wheat products exports from 2001 to 2018. This shows that Turkey has significant potential for specialization in the production and export of wheat originated commodities to generate more foreign trade revenues for the country.

1. Introduction

Wheat has been considered a blessed product for societies since the beginning of its cultivation, not only for its role in nutrition but also because of its social, cultural and historical value. Currently, it also maintains its importance in human nutrition despite all the negative arguments about it, and the effects of the debates against wheat remain marginal. Wheat is still one of the most produced grains in the world after maize and rice (Özberk et al., 2016) because of its significant contribution to agriculture, animal feeding, human nutrition, and its strategic importance through economic and socio-cultural aspects. Wheat is an important calorie source that can be grown over a wide geographical area. It has high nutritional value and a good amino acid balance, and it can be easily stored, transported and processed.

Wheat is an annual plant of the Gramineae family and belongs to the genus Triticum. Wheat grain consists of three parts, which are the pericarp, the germ (embryo) and the endosperm. Bran is obtained from the pericarp part of the grain and is generally used in the feed industry, while the germ, which is used in nutrition and wheat oil production, remains with the bran or is separated from it. The endosperm constitutes 85% of the grain, and flour is obtained from this part (Geçit, 2011).

Özberk et al. (2016) reports that Turkey is in the first place in terms of the number of wild relatives of wheat. There are 28 taxa of wheat and hundreds of local races. This was the gene pool which formed modern wheat, which currently includes 198 bread wheats and 61 durum wheat varieties.

The aim of this study is to analyse the international competitive power of wheat, which is historically and socio-economically important for Turkey. In order to achieve this, first, the structure of the wheat market in Turkey is discussed in the framework of statistical data and agricultural policies, then Revealed Comparative Advantage (RCA), Balassa's Index, was calculated for the period of 2001-2018. Wheat is the most important agricultural product in Turkey in terms of production area and quantity, and affects many sectors directly or indirectly. It is an income source for the rural population, an input for industry, a food, and an important item for foreign trade. Investigating supply, demand, actors and policies which are drivers for the wheat market, and analysing foreign trade and competitive power are crucial for future forecasts and developing policy recommendations.

2. Material and Methodology

The data used in the research was determined by following the scientific literature compiled from the relevant statistical sources. The main data sources were the Turkish Statistical Institute (TURKSTAT), the United Nations Food and Agriculture Organization (UN FAO) and the International Trade Centre (INTRACEN). The data used covers the years 2001-2018. In accordance with the purpose and the method of analysis, wheat production, consumption and foreign trade data were obtained from the online databases of the sources specified for the period 2001-2018 in order to analyse the current status and calculate the RCA to reveal the international competitiveness of Turkey's wheat sector.

In comparing the countries, labour productivity, capital structure, raw material costs and labour costs are used as criteria (Gündüz et al. 2004). In this study, the well-recognized measure of Revealed Comparative Advantage was selected to analyse

competitiveness in the study. In measuring the competitiveness of countries at the international level, Balassa's RCA index (1965) is conventionally used. The RCA index, which is used to measure the export performance of a product, can be shown as follows (Aktan and Vural, 2004):

RCAij = (Xij / Xit) / (Xwj / Xwt)

Xij: Total export value of item j in country i.

Xit: Total export value of country i.

Xwj: World export value of item j.

Xwt: World export value.

According to Coxhead (2007), if an RCA coefficient for a product of a country is bigger than 1, it indicates that the export share of that product of the country in the year t is greater than its share in total world exports. In other words, the country has specialized in this product and has competitive power in its export. (Erkan et al., 2015)

3. Findings and Discussion

3.1. World Wheat Market

The world cultivation area, production and yield statistics of wheat are presented in Table 1. It can be seen that there was a significant increase in total world wheat production between 2001 and 2018. Production was 588 million tonnes in 2001, and reached 734 million tonnes in 2018. In other words, world wheat production increased by approximately 25% in the last two decades. This increase in production despite the cultivation areas remaining almost the same in that period, indicates a yield increase. Indeed, the data in Table 1 show that wheat yield per hectare increased from 2742 kg in 2001 to 3425 kg in 2018, an increase of 25%, and wheat production has increased significantly over the years even though the cultivation areas have not changed.

Table 1. World wheat cultivation area, production and yield statistics

	Cultivation Area		Production		Yield	
Years	Million ha	Index (2001=100)	Million tonnes	Index (2001=100)	kg/ha	Index (2001=100)
2001	214.6	100.0	588.2	100.0	2742	100.0
2002	214.9	100.1	592	100.6	2755	100.5
2003	207.4	96.6	550.1	93.5	2652	96.7
2004	215.7	100.5	634.9	107.9	2943	107.3
2005	221.6	103.3	626.9	106.6	2829	103.2
2006	212.6	99.1	614.5	104.5	2891	105.4
2007	215.5	100.4	606.7	103.1	2815	102.7
2008	222.4	103.6	681	115.8	3062	111.7
2009	225.3	105.0	684.1	116.3	3037	110.8
2010	215.5	100.4	640.3	108.9	2972	108.4
2011	220.5	102.7	697.6	118.6	3165	115.4
2012	217.8	101.5	672.7	114.4	3089	112.7
2013	218.9	102.0	710.9	120.9	3248	118.5
2014	219.9	102.5	726.3	123.5	3303	120.5
2015	223.9	104.3	751.9	127.8	3358	122.5
2016	220.3	102.7	749	127.3	3401	124.0
2017	218.5	101.8	771.7	131.2	3531	128.8
2018	214.3	99.9	734	124.8	3425	124.9

Source: (FAO, 2020a)

The amounts and shares of production of the countries which are in the top ranks in world wheat production are given in Table 2. The biggest wheat producer in the world is China with 131 million tonnes. This amounts to 17.9% of world wheat production, and is followed by India (13.5%), Russia (9.8%), the USA (6.9%) and France (4.8%). These top five countries together produce more than half of the total wheat traded in world markets. Turkey ranks eleventh in world wheat production, with 20 million tonnes of production and 2.7% of the share.

Table 2. Top wheat producing countries (2018)

Rank	County	Production	
		Tonnes	%
1	China	131 440 500	17.91
2	India	99 700 000	13.58
3	Russia	72 136 149	9.83
4	USA	51 286 540	6.99
5	France	35 798 234	4.88
6	Canada	31 769 200	4.33
7	Pakistan	25 076 149	3.42
8	Ukraine	24 652 840	3.36
9	Australia	20 941 134	2.85
10	Germany	20 263 500	2.76
11	Turkey	20 000 000	2.72
12	Argentina	18 518 045	2.52
	Other countries	182 462 883	24.86
	Total	734 045 174	100

Source: (FAO, 2020b)

3.2.World Wheat Foreign Trade

Changes in the world wheat production are given in Table 3. When the values in the table are analysed, it can be seen that the exports of all countries decreased between 2014 and 2016. In countries other than Russia, Canada and the USA, this decline also continued in 2017. The biggest wheat exporters at the beginning of the period were Canada and the USA, but the situation changed in favour of Russia at the end of the period because of these declines. In 2018, the total value of world wheat exports was $41 billion, and the largest wheat exporting country was Russia, with $8.4 billion in export revenue. Thus, Russia realized one fifth of total world wheat exports. Russia was followed by Canada, the USA and France in that order, and these four countries together realized 58% of world wheat exports in 2018.

Table 3. Wheat exporting countries

Rank	Countries	Expert value (000 $)				
		2014	2015	2016	2017	2018
1	Russia	5 423 131	3 948 719	4 215 803	5 791 013	8 432 493
2	Canada	7 189 829	6 220 979	4 504 561	5 089 422	5 700 484
3	USA	7 780 927	5 632 586	5 382 154	6 096 872	5 436 883
4	France	5 424 535	4 269 282	3 371 809	2 994 202	4 128 547
5	Australia	5 372 388	4 429 945	3 610 022	4 655 434	3 100 410
6	Ukraine	2 290 754	2 238 182	2 717 474	2 759 757	3 004 277
7	Argentina	603 676	1 032 845	1 867 745	2 361 855	2 489 495
8	Romania	1 275 029	769 185	1 265 113	1 122 751	1 226 375
9	Germany	3 074 909	2 427 199	1 933 068	1 614 791	1 162 955
Other countries		9 370 437	7 807 532	7 609 858	6 483 056	6 386 793
World		47 805 615	38 776 454	36 477 607	38 969 153	41 068 712

Source: (INTRACEN, 2019a)

Developments in world wheat import are presented in Table 4. Total world wheat import was approximately $43 billion in 2018. The biggest wheat importer was Egypt with $2.6 billion, followed by Indonesia, Algeria, Italy and the Philippines, in that order. Turkey was the ninth country, with an import value of approximately $1.3 billion in 2018.

Table 4. Wheat exporting countries

Rank	Countries	Import value (000 $)				
		2014	2015	2016	2017	2018
1	Egypt	3 066 217	2 536 044	1 537 611	2 624 361	2 636 468
2	Indonesia	2 387 262	2 082 768	2 408 210	2 647 825	2 570 952
3	Algeria	2 372 542	2 400 320	1 790 473	1 788 702	1 845 238
4	Italy	2 391 664	2 046 597	1 803 299	1 718 699	1 823 890
5	Philippines	922 529	982 107	1 040 762	1 303 522	1 682 640
6	Japan	1 971 103	1 652 510	1 361 701	1 528 644	1 639 761
7	Brazil	1 812 451	1 216 466	1 335 389	1 149 306	1 502 383
8	Spain	1 384 305	1 205 959	1 303 538	1 203 976	1 328 235
9	Turkey	1 545 853	1 103 420	892 409	1 043 327	1 289 386
Other countries		34 521 019	27 174 639	25 729 537	27 139 943	26 826 174
World		52 374 945	42 400 830	39 202 929	42 148 305	43 145 127

Source: (INTRACEN, 2019b)

Cultivation area, production and yield quantities of wheat in Turkey are given in Table 5. During 2001-2018, the cultivation area of wheat in Turkey showed a downward trend. The cultivation area was 9.3 million hectares in 2001, but decreased by 22% to 7.2 million hectares in 2018. No significant change in the amount of production was observed, and it remained around 20 million tonnes, which is the general long-term annual average of wheat production in the country. During this period, increasing yields in world wheat production were also seen in Turkey. The yield per decare was 203 kg in 2001; it increased by 35% by 2018, reaching 274 kg per

decare. The reason why wheat production did not decrease despite the decrease in cultivation area was this significant increase in yield. However, Turkey's wheat yield figure is still below the world average.

Table 5. Wheat cultivation area, production and yield in Turkey

	Cultivation area		Production		Yield	
Years	000 ha	Index (2001=100)	000 tonnes	Index (2001=100)	kg/da	Index (2001=100)
2001	9 350	100	19 000	100	203	100
2002	9 300	99	19 500	103	210	103
2003	9 100	97	19 000	100	209	103
2004	9 300	99	21 000	111	226	111
2005	9 250	99	21 500	113	232	114
2006	8 490	91	20 010	105	236	116
2007	8 098	87	17 234	91	213	105
2008	8 090	87	17 782	94	220	108
2009	8 100	87	20 600	108	254	125
2010	8 103	87	19 674	104	243	120
2011	8 096	87	21 800	115	269	133
2012	7 530	81	20 100	106	267	132
2013	7 773	83	22 050	116	284	140
2014	7 919	85	19 000	100	240	118
2015	7 867	84	22 600	119	287	141
2016	7 672	82	20 600	108	269	133
2017	7 669	82	21 500	113	280	138
2018	7 299	78	20 000	105	274	135

Source: (TUİK, 2019a)

3.3. Wheat Supply, Prices, Consumption and Self-sufficiency In Turkey

The data on wheat supply, consumption per capita, self-sufficiency and prices in Turkey are given in Table 6. During the period discussed in the study, wheat supply in the country increased by 29% from 20 million tonnes 26 million tonnes, while consumption per capita decreased from 225 kg in 2001 to 175 kg in 2018. The data show that wheat prices increased between 2001 and 2008. The highest price, $439/tonnes, occurred in 2008, when the supply was at its lowest level of the period investigated, but declined later. Although the supply, prices and consumption rose and fell, it is seen that the country was either self-sufficient or close to self-sufficiency.

Table 6. Wheat supply, consumption and self-sufficiency in Turkey

Years	Supply		Consumption per capita		Self sufficiency	Price*	
	000 tonnes	Index (2001=100)	kg	Index (2001=100)	%	$/tonne	Index (2001=100)
2001	20 474	100	225	100.0	107	127	100
2002	19 218	94	230	102.2	94	164	129
2003	19 539	95	227	100.9	96	222	175
2004	20 171	99	212	94.2	98	254	200
2005	22 549	110	214	95.1	106	268	211
2006	22 550	110	..	..	121	249	196
2007	21 548	105	..	..	100	322	254
2008	18 798	92	207	92.0	96	439	346
2009	20 432	100	216	96.0	95	328	258
2010	22 418	109	200	88.9	115	351	276
2011	22 766	111	214	95.1	102	351	276
2012	23 826	116	229	101.8	105	336	265
2013	23 024	112	225	100.0	98	348	274
2014	25 022	122	213	94.7	102	338	266
2015	23 736	116	201	89.3	89	285	224
2016	25 467	124	183	81.3	114	266	209
2017	24 053	117	182	80.9	104	242	191
2018	26 427	129	175	77.8	112	228	180

Source: (TEPGE, 2018, TUİK, 2019b); *(FAO, 2020c).

3.4. Turkey's Foreign Trade in Wheat and Wheat Products

Variation by years in the quantity and quality of Turkey's wheat exports and imports is given in Table 7. When the data in the table are analysed, it is seen that wheat exports fell from 1.1 million tonnes in 2001 to about 70 thousand tonnes in 2018, with an enormous decline rate of 94%, while the quantity and values of imports increased by 16 times and 25 times respectively over the same period.

Wheat production changes from one year to another according to the climate conditions. During years when production is low, wheat imports increase in order to maintain the supply, whereas in high production years, the state is involved in the market as a buyer. In fact, Turkey regularly imports wheat in order to provide higher quality raw material and/or maintain a reasonable price to meet the wheat products industries' needs and to be able to compete with other countries. Even in years when the domestic production is adequate, quality wheat imports take place.

Table 7. Turkey's wheat export and import by years

	Export quantity		Export value		Import quantity		Import value	
	tonnes	Index (2001=100)	000 $	Index (2001=100)	tonnes	Index (2001=100)	000 $	Index (2001=100)
2001	1 117 969	100	136 225	100	346 827	100	49 621	100
2002	55 317	4.9	9 780	7.2	1 097 766	317	148 010	298.3
2003	938	0.1	401	0.3	1 846 284	532	277 543	559.3
2004	864	0.1	359	0.3	1 065 389	307	221 868	447.1
2005	327 931	29.3	52 155	38.3	135 596	39	25 031	50.4
2006	685 673	61.3	100 853	74	239 874	69	52 624	106.1
2007	33 921	3.0	9 132	6.7	2 147 107	619	570 390	1 149.50
2008	8 005	0.7	5 569	4.1	3 708 003	1 069	1 483 190	2 989.00
2009	301 457	27	60 692	44.6	3 392 692	978	901 858	1 817.50
2010	1 171 002	104.7	200 848	147.4	2 554 189	736	655 044	1 320.10
2011	5 233	0.5	2 580	1.9	4 754 682	1 371	1 623 089	3 271.00
2012	116 079	10.4	34 248	25.1	3 719 174	1 072	1 125 977	2 269.20
2013	275 132	24.6	79 317	58.2	4 053 001	1 169	1 289 235	2 598.20
2014	68 572	6.1	35 356	26	5 285 243	1 524	1 545 853	3 115.30
2015	68 798	6.2	32 394	23.8	4 349 820	1 254	1 103 420	2 223.70
2016	26 503	2.4	11 439	8.4	4 225 784	1 218	892 409	1 798.50
2017	42 014	3.8	14 828	10.9	4 990 867	1 439	1 043 327	2 102.60
2018	69 989	6.3	24 034	17.6	5 781 704	1 667	1 289 386	2 598.50

Source: (INTRACEN, 2019c)

Turkey imports wheat, but wheat related exports from the country are mostly based on processed products (Mızrak, 2018). In fact, this is the main reason behind Turkey's progressively increasing wheat imports.

Variation in the total export value of wheat products for the period of 2001-2018 is given in Table 8. The data in the table show that the export of wheat products increased by 13 times between 2001 and 2018, rising from $131 million to $1.7 billion. The wheat products exported are mostly wheat flour, pasta, biscuits, semolina and bulgur (TMO, 2017).For example, the composition of total wheat and wheat products exports in 2016/2017 was as follows: wheat flour, 72%; pasta, 18%; biscuits, 9%; bulgur-semolina, 1%; and wheat 1%. The most important importer countries for Turkey's wheat flour are Iraq, Syria, Sudan, Angola, the Philippines, Benin, Madagascar, Israel and Indonesia; the main importers of pasta from Turkey are Benin, Angola, Iraq, Somali, Japan, Djibouti, Syria, Libya, Niger and Cameroon; for biscuits, Iraq, Syria, Yemen, Saudi Arabia, Libya, Germany, Israel and Lebanon are the top importer countries from Turkey; bulgur and semolina are mostly imported by Saudi Arabia, Senegal, the USA, Ghana, Tanzania, Kuwait, Yemen, Jordan, Syria, Ukraine, Cameroon and Iraq (TEPGE, 2018).

Table 8. Turkey's wheat products export values by years

Years	Wheat products exports	
	Total value (000 $)	Index (2001=100)
2001	131 114	100
2002	164 044	125
2003	239 009	182
2004	304 125	232
2005	348 444	266
2006	401 959	307
2007	532 908	406
2008	711 939	543
2009	678 128	517
2010	804 479	614
2011	1 037 190	791
2012	1 234 702	942
2013	1 544 821	1 178
2014	1 656 090	1 263
2015	1 505 591	1 148
2016	1 500 485	1 144
2017	1 618 271	1 234
2018	1 740 502	1 327

Source: (INTRACEN, 2019d)

3.5. Turkey's Competitive Advantage for Wheat and Wheat Products in Export

The concept of competitive advantage was first introduced by the famous economic theorist Adam Smith. At the time, it was considered a very proper tool for increasing the foreign trade, welfare and competitiveness of countries through the studies of classical economists such as David Ricardo, J.S. Mill and A. Marshall (Demir, 2004; Peker, 2014). The first international trade theory, Absolute Advantage, was introduced by Adam Smith (1766). The theory argues that countries should export products that they can produce at a low cost and import products that they produce at a high cost. Later, the Comparative Advantages Theory was proposed by David Ricardo (1817). Unlike Adam Smith, Ricardo emphasizes that a country needs to specialize in the export of a particular product or service, and to import the other goods (Erkan, 2012; Peker, 2014).

The RCA index values of Turkey and the top wheat producing countries were calculated for wheat, and are presented in Table 9. It was found that RCA values were below 1 except in 2001. Although the RCA in 2001 was bigger than 1 (1.83), this was only one year during the period 2001-2018, and it can be concluded that Turkey has no competitive power for wheat in general.

On the other side, Russia, which is one of the most important producers on the world wheat market, is the country with the highest competitive power, with an RCA value of 8.79. It is followed by Canada with an RCA coefficient of 5.93.

Table 9. Wheat RCA Index values by countries and years*

Years	Turkey	Russia	Canada	Australia	France	USA
2001	1.83	0.61	4.05	14.87	2.6	1.95
2002	0.11	2.96	3.16	14.11	2.2	2.14
2003	0.00	2.7	3.44	10.37	2.98	2.52
2004	0.00	1.36	3.89	16.37	2.82	2.91
2005	0.41	2.73	3.61	12.49	3.22	2.85
2006	0.68	2.63	4.8	11.9	3.26	2.36
2007	0.04	4.64	4.73	5.29	2.96	3.25
2008	0.02	2.18	5.17	6.1	3.38	3.1
2009	0.23	3.51	6.46	9.34	3.12	1.96
2010	0.81	2.39	5.39	8.32	4.18	2.43
2011	0.01	2.71	4.86	8.89	4.4	2.87
2012	0.08	3.24	5.1	9.74	3.4	1.99
2013	0.20	2.54	5.46	8.98	4.17	2.56
2014	0.09	4.33	6.01	8.45	3.8	1.91
2015	0.10	4.9	6.5	9.89	3.69	1.6
2016	0.04	6.49	5.08	8.37	3.03	1.63
2017	0.04	7.33	5.5	9.22	2.6	1.79
2018	0.07	8.79	5.93	5.72	3.4	1.53

*Calculated from INTRACEN data

The RCA Index values of wheat products are given in Table 10. According to the finding, the RCA index was always bigger than 1 between 2001 and 2018, increasing from 1.48 in 2001 to 2.64 in 2018. In 2001, Turkey was behind Italy, Belgium, France and Netherlands in this regard until 2018. The country with the highest RCA index value in all years was Italy. However, it is seen from the index values that Turkey underwent the most development, and caught up with Italy over those years.

Table 10. RCA Index values of wheat products by countries and years*

Years	Turkey	Italy	Belgium	France	Canada	Netherlands	Germany	USA
2001	1.48	2.74	2.54	1.7	1.36	1.58	1.13	0.72
2002	1.52	2.73	2.35	1.69	1.53	1.67	1.17	0.7
2003	1.63	2.66	2.34	1.82	1.64	1.64	1.16	0.71
2004	1.6	2.74	2.29	1.97	1.62	1.6	1.19	0.72
2005	1.63	2.86	2.24	2.09	1.63	1.52	1.25	0.75
2006	1.70	2.88	2.18	2.06	1.73	1.57	1.27	0.72
2007	1.77	2.66	2.08	2.18	1.74	1.5	1.21	0.71
2008	1.83	3.04	2.15	2.12	1.62	1.51	1.31	0.73
2009	1.81	2.94	2.05	2.01	1.81	1.69	1.33	0.74
2010	2.22	3.00	2.14	2.17	1.91	1.81	1.37	0.76
2011	2.49	2.99	2.24	2.34	1.82	2.17	1.35	0.77
2012	2.56	3.03	2.34	2.41	1.82	2.16	1.37	0.79
2013	2.95	2.88	2.23	2.37	1.74	2.24	1.33	0.77
2014	2.91	2.80	2.2	2.26	1.67	2.19	1.27	0.73
2015	2.71	2.75	2.14	2.13	1.89	2.06	1.21	0.74
2016	2.54	2.57	2.19	2.08	1.97	2.04	1.18	0.67
2017	2.55	2.57	2.21	2.25	1.96	1.86	1.21	0.65
2018	2.64	2.65	2.29	2.26	2.13	2.01	1.26	0.63

* Calculated from INTRACEN data

4. Results

Between 2001 and 2018, world wheat production significantly increased even though the cultivation areas remained the same, thanks to increases in yield. The wheat yield was 2742 kg / ha in 2001, and reached 3425 kg / ha in 2018. Similar developments were also observed in Turkey.

In the study, the competitiveness of Turkey for wheat and wheat products was analysed by calculation of Balassa's RCA Index values for the period 2001-2018. The results show that Turkey has no competitive power for unprocessed wheat, but has a strong position in wheat products, particularly wheat flour and pasta. That is to say that Turkey has an advantage in wheat flour and pasta export markets and import progressively increasing amount of wheat in order to meet quality wheat deficit in the country. Although it is good to export value added products for the economy of the country, considering the strategic importance of wheat, it is suggested that emphasis be put on increasing quality wheat production domestically and maintaining competitive power in the world market of wheat products.

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