

Growth and Development

Competitiveness of Turkish Automotive Industry: A Comparison with European Union Countries

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Economic relations and competition process between the EU and Turkey has been increasingly accelerated with the customs union agreement in 1996. Consequently, this acceleration process has affected the industrial sector generally, as well as automotive sector, specifically. Since Turkey's joining to the EU will create even more crucial results in international markets for specific sector, the impacts of the process should carefully be evaluated beforehand so that the necessary precautions must be taken by the sector representatives. Even though above statement is true for every individual sector, this study covers only Turkish automotive sector and its competitiveness within the EU process. Also, automotive sector has its own special characteristics, because it can be considered a locomotive for most of the remaining sectors in Turkey.

Within this context, this study measures the competitiveness of Turkish automotive industry and compares the results with those of the EU member countries from 1995 to 2004. As measurement tool, we use Revealed Comparative Advantage Indexes of all the countries. In addition, a simple Least Square Regression technique has been used to show how and in what ratio exports are affected from several variables. In order for our analysis become more meaningful and applicable to the real sector, a small survey has been done to some of the automotive producers in Turkey. Even though the sampling of the survey was not statistically enough to reach certain conclusions, the results obtained from the survey helped us to construct the econometric model on more concrete bases.

Results of the study showed that Turkish automotive sector has competitiveness problem with the EU. However, the medium and big size producers have more power to compete with the EU countries. Also, even though Turkey has the highest tax on automobile industry in the Europe, the sector showed very high productivity level after the customs union agreement in 1996.

Introduction

Liberalization efforts in trade and production, increased capital mobility, rapid developments in technology, and tendency of globalization in the world created inevitable competitiveness among the sectors. This competitiveness is not just in price level, however. It includes all kinds of competitions such as quality competition, on time delivery competition, and widespread service center competition, etc. In order for a firm or sector to be competitive in the world, it has to compete with the world within all the above mentioned areas.

Such developments in the world economies affected the Turkish economy as well. Since January 24, 1980 liberalization and stabilization decisions of the government started gradual but crucial effects on Turkish economy. These basic, but gradual impacts became even more powerful with the financial liberalizations and capital mobility decisions made in August 1989. Finally, customs union with the EU signed in January 01, 1996 created very serious and distractive competition effects on the sectors in both national and international bases. As a result some of the sectors in Turkey become more delicate and faced uncertain and unwanted results. Firms started investing more in information technology and making projections for future.

Within this context, competition power defined as the comparative or absolute advantage of a firm or sector in production level, profit rate, design, credibility, on time delivery and price and/or quality. Competition power can be expressed as nationally as well as internationally. If it is considered internationally it may be deducted into the following items:

1. Selling goods and service to foreign countries and achieving to the foreign trade balance
2. Increasing income and employment level as well as creating acceptable and continuous improvements in living standards
3. improving the ability to receive more shares from international markets(Aktan, 2003)

Importance of Automotive Sector in the Turkish Economy

Automotive sector is one of the leading sectors in all developed and developing countries, because the sector has very important relations with all the other sectors of the economy. For instance, automotive sector is the main buyer of iron-steel sector, non-heavy materials sector, petroleum and chemical products sector. As a result, the technological developments in automotive sector force other sectors to show parallel technological developments. In addition, some sectors such as tourism, infrastructure and construction, agriculture, and transportation sectors depend on automotive sector for their transportation related needs. Moreover, automotive sector also creates employment for even unrelated sectors such as marketing, services, finance and insurance companies, and raw material suppliers, because these supporting sectors play a major role in transferring the goods and services to the consumers. So, considering all these interconnectedness of the automotive sector and all the other sectors, it is very obvious that any change in the sector will automatically affect the whole economy (Yurdakul and Ic, 2002).

As it is the case for all the countries of the world, the automotive sector has very dynamic process in regards to changes in market and competition conditions in Turkey as well. The sector entered this dynamic process with customs union agreement by passing through several hardships and high technological developments. Overcoming these hardships and adopting newer technologies, the Turkish automotive sector found itself a place and became a part of the global world. Thus, Turkish automotive sector created a new destiny for

itself and became exporter rather than importer. Is this enough, however? As it will be discussed in the following chapters, the sector has a long way to go in order to become really a competitive in the EU and also in global world.

If we look at the dynamic effects of customs union agreement, the Turkish industrial sector has been generally opened to the world competition. As a result of this liberalization process, Turkish automotive sector increased the productivity and quality in order to become competitive in the global world. Within the context briefly discussed above, this study will analyze “the goods” and “the bads” of the Turkish automotive sector, and its place in the competitive world in general; and the sectors’ comparative advantages in the Europe. In order to do such an analysis, we discussed the competitiveness of automotive sector of the EU countries first; and then competitiveness of Turkish automotive sector. We used two ways to measure the competitiveness of Turkish automotive sectors: Revealed Comparative Advantages Index and Basic Regression Model. As discussion, results produced by each analysis have been compared within the national and international bases.

Automotive Industry in the European Union

European Union has the largest automotive sector in the world both in terms of production and consumption level. Half of the world exports of the automotive industry are done by the EU alone. Besides, the union is the largest market automotives market for the world. The union makes approximately 40% of the worlds automotive imports. Germany is the biggest automotive producer in the union. France, UK, and Spain follow the Germany in this sector. If foreign investments are also included, Spain produces more in automotive sector. However, most of its production is assembling only.

Cyclical structure of the sector creates above average growth levels during busy times, while well-below average growth rates during recession times of the economy and thus faces very serious financial crises.

Table 1: Place of the EU in the World Trade (Million \$)

Years	World		World		Exports (%)	Imports (%)
	Exports	EU Exports	Imports	EU Imports		
1995	456.420	235.523	460.780	194.029	0,52	0,42
1996	475.360	250.630	485.929	206.526	0,53	0,43
1997	497.910	247.388	506.197	204.568	0,50	0,40
1998	520.900	271.959	536.102	233.859	0,52	0,44
1999	556.460	274.110	565.907	243.793	0,49	0,43
2000	576.750	270.108	589.235	231.410	0,47	0,39
2001	564.560	275.857	583.151	233.693	0,49	0,40
2002	627.930	308.454	638.203	257.307	0,49	0,40
2003	723.572	371.114	734.646	312.664	0,51	0,43
2004	847.240	470.792	860.017	397.437	0,55	0,46

Source: Calculated by the authors using WTO statistics

Even though it is not shown in Table 1 above, the sector started slowing down during early 1990s. All the countries in Europe except Germany showed dramatic decreases in automotive industry. These countries waited until 1994 to restructure the industry (Tokathoglu, 1997). Actually, the period between 1994 and 2000 can be considered a reconstruction period of the automotive industry in the Europe. Considerably big amount of encouragement funds (about 180 billion dollars) have been supplied to the sector during this period of time. Besides this, voluntary quantity restrictions have been applied for non-customs

union member countries. With these kinds of policies, the union aimed to control imports for certain period of time, create more competition power and increase the market efficiency and human capital in the industry as a whole¹.

Customs Union With the EU and Turkey

Customs union constitutes Turkey's formal partnership relations with the EU. Thus, customs union with the EU is not considered just an economic aspect of the relations, but also, as indicated in Partnership Documents, is considered as one of the steps for full membership. As customs union agreement became affective with Ankara Treaty signed in January 1st, 1996, the new era has started as indicated item five in the Ankara Treaty. As a matter of fact, the item 28 of the Ankara Treaty indicates that the final aim of customs union is a full membership of Turkey to the European Union.

Customs union can be defined as a type of agreement that includes the removal of all the tariffs and equal effective custom taxes and quantity restrictions, and also applying the same level of external tariff rates for the non-member countries, which is called Common External Tariff (CET). Under customs union, it is essential that goods and services considered in the agreement must easily circulate among the member countries. For this reason, customs union guarantees the free circulation of the goods and services in order to prevent trade diversion. In order to achieve aimed results, all the common policis must be applied by the member countires.

Effects of Customs Union Agreement on Automotive Industry Trade Creation Effect

Trade creation effect occurs when a higher cost producer is replaced with a relatively lower cost producer due to customs union. In other words, due to custom related tax and CET a country considered as a high cost producer before the customs union, it becomes a lower cost after the customs union. As a result of such a process, the prices of tradable goods decrease. Also, due to removal of tariffs and quotas among the member countries, consumers and producers obtain their needs with lower costs. When prices (costs) decrease, both producers and consumers demand more goods and services, and thus, the trade among the member countries increases. This process is called trade creation effect of an economic intigration.

Some numbers regarding exports and imports between Turkey and the EU are given in the Table 2 below. As it can be seen from the table, trede cereation effect of the customs union started after 1999, even though the agreement has been signed in 1996. This late stimulation of the exports and imports may be due to adaptation process of the industry, or slow changes in the tax laws.

Table 2: Automotive Exports and Imports between Turkey and the EU (Million \$)

Years	Export (EX)	Imprort (IM)	(EX-IM)	(EX+IM)	(EX/IM)
1996	680.229	3410.013	-2729.784	4090.242	0.20
1997	675.361	4639.206	-3963.845	5314.568	0.15
1998	823.214	4641.578	-3818.364	5464.793	0.18
1999	1289.829	3876.449	-2586.619	5166.279	0.33
2000	2146.318	6546.106	-4399.788	8692.425	0.33
2001	2395.204	2156.035	239.169	4551.240	1.11
2002	2772.056	3258.762	-486.705	6030.819	0.85
2003	4019.637	6043.551	-2023.913	10063.188	0.67
2004	6771.411	10023.869	-3252.458	16795.281	0.68

Source: Authors' calculations from the OSD ve WTO statistics

Trade Diversion Effect

Trade diversion effect is also one result of economic integration. Unlike trade creation effect, trade diversion effect results a cost or price increases due to economics integration. In other words, member countries cannot import certain goods and services from a lower cost country, because of high custom tariffs. Instead, however, member countries are obliged to buy form a member county. As a result, member countries must trade with a member country even though it is more expensive. Due to this shift in trade from a non-member country to a member country, the volume of trade within the union increases and also, the volume of trade with non-member countries decrease. Since the customs union diverted the direction of the trade, this process is called “trade diversion effect” of the customs union.

Turkey’s most of foreign trade in automotive industry was with the EU even before the customs union agreement. The customs union has affected this trend in some extent. As it is shown in Table 3, Turkey’s import from the EU was \$3.41billion before the agreement. This amount reached to over \$10 billion in 2004. The export side of the table also gives a similar scene. While Turkey’s automotive exports to the EU was \$680 million before the customs union, this amount reached to over \$6.7 billion in 2004. As the remaning parts of the Table 3 indicated, however, imports from and exports to the rest of the world did not increase that much. The table clearly shows that there is a trade diversion from the rest of the world to the EU countries.

Table 3: Foreign Trade Indicators of Turkey with the Rest of the World (Milyon \$)

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004
IMPORTS									
EU	3410	4639	4642	3876	6546	2156	3259	6044	10024
Far-East	648	1270	1270	726	1126	226	327	708	1698
NAFTA	143	165	165	100	105	36	86	106	156
Eastern Europe	62	66	66	78	19	45	70	179	83
EXPORTS									
EU	680	675	823	1290	2146	2395	2772	4020	6771
Far East	5	5	7	4	8	7	5	11	17
NAFTA	51	35	68	57	107	82	109	112	252
Eastern Europe	62	97	72	64	173	215	348	584	472

Source: Authors’ calculations from the OSD and WTO statistics

Competition Effect

After the customs union agreement, Turkish producers had more chance to acces into the EU countries. This acces has created even more competition for Turkish automotive industry as well as other industries. In order to prevent monopolistic tendencies in some sectors, the Competition Authority has been formed in Turkey. This authority aims to prevent any kind of monopolistic behaviors in the Turkish economy. Also, with the customs uion and more competitiveness, some firms without cost or price advantage left the market. As a result of this high competition, firms started to produce the goods in which they have comperative advange.

As the Table 4 indicates, medium and big size firms in Turkish automotive industry have more competition power with respect to smaller size firms. Also, efficiency and

production level in Turkish automotive industry has increased after the customs union agreement.

Table 4: Competing Power of Turkish Automotive Industry after the Customs Union

	Small Size	Midium Size	Bigger Size
	Competition Power (%)	Competition Level	Competition Level
Automotive	32.4	R*	47.5

Source: Demir, 1998 * Equal level of competition power

Techniques to Measure Competition Power

Even though, competition power in a sector can be measured with several ways, and all have different meanings, this study will focus on two methods to measure the competition power of Turkish automotive industry: i) Revealed Comparative Advantages (RCA) and ii) Least Square Regression (LSR) Approach. Even though both methods measure similar things, the first method provides information about competition power specifically, while the latter technique determines internal and external variables affecting the competition power. In the second approach, the competition power is measured with export level as dependent variable, which is the most suitable variable to measure competitive power of the industry.

In addition, a survey on some automotive firms has been done in order to give us some idea about the independent variables of our econometric model. We are aware that the number of firms is not sufficient to produce statistical results, but at least, the results gave us some idea in determining the dependent variables of the model. We tried several models to find the best fitted model though.

Application of RCA Approach into Turkish Automotive Industry

This part of the study aims to measure the competition power of Turkish automotive industry and compares it with fifteen EU countries first, and the EU as a whole. The index can be calculated as follow:

$$RCA\ index = \ln \left[\frac{(XI / XT)}{(MI / MT)} \right]$$

where,

XI: export of country i in good a

XT: total exports made by country i

MI: imports of country i in good a

MT: total imports made by country i

Interpretation of RCA is very important in determining the competition power. So, one must be very careful in interpreting and discussing the results obtained from the RCA index.

If $RCA > 0$, it refers that export of automotive industry is greater than that of imports. Also, the bigger is the RCA index level, the greater the competition power is. If $RCA > 50$, it indicates that competition power in that sector is very high; and if $-50 < RCA < 50$, it refers that the industry is in the border. In other words, it has very low level of competition with the world (marginal competition power); if $RCA < -50$, it refers that the competition power of that industry is very low¹

A Comparison between Turkish and the EU Automotive Sector

Table 5 gives RCA competitiveness power of the Turkish economy with respect to fifteen EU countries and the EU as a whole. As the table indicates, Turkey is net exporter between 1995 and 2004 when compared with Australia, Ireland, Portugal and Greece. For instance, since there is not much automotive production in Ireland, Turkey's RCA index is very high. However, in 1999, due to economic crisis in Turkey, our RCA index in marginal levels. Denmark and Finland became net automotive exporters after 2001. Remaining countries of the EU are net automotive exporters. Turkey's competition power compared to Belgium-Luxemburg has improved after 2001. The RCA index was in marginal level before, however, after 2001 this index showed some improvements.

When the RCA index of Turkish automotive industry is compared to whole EU, Turkey is net importer, but the situation shows considerable improvements. The index is positive for year 2001 and 2002, but last two years turns to negative. The competition power of Turkey's automotive industry compared to whole EU is not that bad though. It is still in marginal levels.

With the customs union agreement, Turkey has caught an increasing trend for some years, however, for the last two years this trend cannot be continued. For instance, Turkey had 30.71 RCA index in 2001 and 6.41 RCA level in 2002 when compared to Germany. Last two years these numbers decreased to -38.49 in 2002 and -40.77 in 2004, respectively.

Table 5 : Competitiveness Measurements of the EU and Turkish Automotive Industry

Countries	1995	1996	1999	2000	2001	2002	2003	2004
Holland	-73,06	-199,52	-222,56	-168,74	-11,91	-43,87	-33,11	-2,69
Belgium - Luxemburg ¹	-22	-51,34	-148,76	-148,73	73,08	15,33	35,48	23,02
Italy	-374,99	-372,1	-371,18	-335,05	-240,64	-250,76	-174,12	-139,38
Spain	-75,39	-177,32	-200,16	-191,44	14,06	-50,71	-39,15	-84,26
United Kingdom	-117,29	-120,67	-121,22	-100,71	-8,37	-46,91	-62,87	-11,62
Germany	-93,58	-127,01	-36,07	-38,94	30,71	6,41	-38,49	-40,77
France	-127,88	-61,64	-73,03	-27,18	1,4	-6,41	-27,33	-35,77
Australia	51,47	67,81	36,38	27,21	153,79	93,21	75,94	103,17
Danmark	-45,74	-51,08	-39,45	-3,64	227,18	38,43	219,68	306,92
Finland	-64,08	-59,77	-140,38	-130,44	153,29	183,79	294,17	184,12
Sweden	-215,98	-140,14	-76,35	-113,98	-31,56	-13,77	-6,27	7,43
Portugal	173,16	162,63	186,03	153,3	354,14	272,55	305,29	244,19
Greece	466,35	276,66	302,13	435,03	564,56	501,51	592,65	615,42
Ireland	426,18	258,87	-53,09	164,86	482,44	463,9	444,03	294,41
EU	-82,24	-91,78	-70,09	-50,87	23,11	7,21	-14,14	-12,88

Source: Authors' calculations from the OSD and WTO statistics

If the individual EU countries are compared to the whole world, only Germany's competition index is in good standing. The remaining countries are either in bad condition or in marginal RCA levels. Table 6 shows these facts in detailed way.

Tablo 6: Competition Power of Turkish and the EU Automotive Industries within the World

Countries	1995	1996	1997	1998	1999	2000	2001	2002	2003
Turkey	-42,5	-52,6	-100,1	-84,7	-49,1	-25,3	57,9	45,7	19,7
EU	17,8	16,8	16,6	14,1	12,8	19,2	18,4	18	17,8
Holland	-49,7	-51	-46,8	-45,7	-45,7	-42,4	-47,6	-41,5	-47,1
Belgium-Luxemburg	29,7	25,5	13,6	7	3,4	8	16,5	25,4	27,2
Italy	-15,1	-25,3	-37,2	-39,9	-43,8	-32,6	-41,3	-48,5	-45
Spain	49,7	46,6	43,9	36,9	27,7	35,9	34,6	32,6	32,1
United Kingdom	-23,8	-20,4	-23,2	-22,5	-23,1	-15,5	-36,5	-27,9	-27,7
Germany	52,6	49,1	53,2	57,7	55,8	66,4	63,3	58,8	58
France	14,9	15,6	32,7	26,4	23,3	29,5	29,8	30,8	32,1

Least Squares Regression Approach

This part of the study aims to find various factors that effect sustainable competitiveness power of Turkish automotive industry. Data is collected from Central Bank of Republic of Turkey (CBRT), WTO, Turkish Institute of Statistics and Automotive Industry Association. In order to find better results we used quarterly data from 1989 to 2004. The LIMDEP software has been used as statistical package.

The variables of the model can be chosen from the followings:

Exports: Export of Turkish automotive industry has been considered as dependent variable of the model, since it measures the competitiveness power of the sector. The magnitudes are not in quantity, but it is terms of dollar value of Turkish automotive sector.

Real Exchange Rate: In international trade, the cost of a good or services is very important in order for that country to become an importer and/or exporter. Also, when it comes to competitiveness power calculations this factor becomes very essential for the econometric models, since it affects relative purchasing power for both producers and consumers.

Productivity: Productivity is also very important for the model since it affects real profits. Profits increases with an increase productivity.

Imports: Expected sign of imports is negative. Since the more a country imports, the lower its competitiveness power will be. The survey results done for this study also show that domestic pressures create negative effects on Turkish automotive industry

Capacity Use Ratio (CUR): Due to unsatisfactory domestic demand, the capacity use ratio is low in Turkish automotive industry. For that reasons, in some periods, sudden increases in demand cannot be satisfied. This fact, however, has changed in some degree in last years. Capacity use ratio is increasing for almost all automotive producers. We expect the relationship between exports and capacity use ratio is negative. This seems to have theoretically reverse affects on exports, but it is a very good policy instrument for the firms in competitiveness.

$$X = f(RDK, V, RK, M)$$

$$X = 0,185324943 RDK - 0,104544127 V + 0,469211481 RK + 0,456713477 M$$

where,

X: Exports

RK: Real Profits

RDK: Real Exchange Rate

V: Productivity

M: Imports

As shown in the Tables below R^2 value is (% 94) and independent variable explains the exports very well. Durbin Watson value is 2.36, which indicate that there is no autocorrelation among independent variables. F value is 365.9. The probability statistics show that the results are significant in 0.05% level.

Table 8: Least Squares Regression Results - 1

Variables	Coefficient	Standart hata	t value	P[T >t]
Real Profits	0,469211481	0,19323026	2,428	0,0182
Real Exchange Rate	-0,185324943	0,1921773	0,964	0,3387

Table 7: Least Squares Regression Results - 2

Dependent Variable	Export Mean			94,78
Mean Squares				33,48
Sum of Error Squares				67217,05
R^2				0,94
F statistics	[3, 60]			365,9
Durbin Watson				2,36
Productivity	0,104544127	0,15459249	-0,676	0,5015
Imports	0,456713477	0,11052929	4,132	0,0001

Results

The study aimed to compare the competitiveness of Turkish automotive sector within the EU and whole world. In order to make this comparison we used RCA index. The results showed that RCA index of Turkish automotive industry shows very high improvements even though last two years the index is lessend in some extent. With this good improvement however, the sector still has some problems to be dealt with. For instance, the government should take long lasting macroeconomic policy precautions and apply them in a stable way.

The results of the study show that even though the customs union brought considerable improvements to Turkish automotive sector, the sector still needs long way to go. Also, the sector needs more efficient production and cost related precautions in order to compete with the EU countries and the whole world.

The results of our study might include some biasness due to the survey with insufficient number of firms. Thus, one must be very cautious when using the results obtained.

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