Hatice Erkekoğlu[1], Halil Ariç Kivanç[2]

COMPETITIVENESS STRENGTH RESEARCH IN TURKEY AND EU COUNTRIES ACCORDING TO PORTER'S DIAMOND MODEL: PANEL DATA ANALYSIS (2007-2010)

This article deals with the competitiveness strength of Turkey and the EU 27 by using the Porter's Diamond model. 13 independent variables determined for 4 factors of the model and 4 independent variables determined with mean of these 13 variables were used in 2 separate models. These variables are the ones used in Global Competitiveness Strength Index by the WEF and can represent the factors of the diamond model. In the first model, a positive impact of local supplier quality and cooperation in labor-employer relations over foreign trade, while the variables of degree of customer orientation, buyer sophistication, state of cluster development and value chain breadth revealed a negative impact over foreign trade. In the second model, while a positive impact of factor conditions over trade performance, demand conditions and related and supporting industries revealed a negative effect over trade performance. Firm structure, strategy and competitiveness revealed insignificant impact over trade performance.

Keywords: *panel data analysis, foreign trade performance, Diamond Model, competitiveness.*

Хатіче Еркекоджлу, Халіль Аріч Ківанч

ДОСЛІДЖЕННЯ КОНКУРЕНТНОЇ СТІЙКОСТІ В ТУРЕЧЧИНІ І КРАЇНАХ ЄС З ВИКОРИСТАННЯМ РОМБОВОЇ МОДЕЛІ ПОРТЕРА: АНАЛІЗ ПАНЕЛЬНИХ ДАНИХ ЗА 2007-2010 РОКИ

У статті досліджено конкурентну стійкість Туреччини і 27 країн ЄС за допомогою ромбової моделі Портера. 13 незалежних змінних, визначених для 4 факторів моделі, і 4 незалежних змінних, визначених за допомогою цих 13 змінних, було використано у 2 окремих моделях. Ці змінні використовуються в Глобальному індексі конкурентоспроможності і можуть представляти фактори ромбової моделі. У першій моделі показано позитивний вплив якості продукції локальних постачальників і кооперації в стосунках "праця-наймач" на зовнішню торгівлю, тоді як змінні рівня споживчої орієнтації, досвіду покупця, стану розвитку кластерів і ширини ланцюга витрат продемонстрували негативний вплив на зовнішню торгівлю. У другій моделі виявлено позитивний вплив факторних умов на торгівлю, але умови попиту і супутнє виробництво продемонстрували негативний вплив на стан торгівлі. Структура фірми, стратегія і конкурентоспроможність на торгівлю впливають незначно.

Ключові слова: *аналіз панельних даних, рівень зовнішньої торгівлі, ромбова модель, конкурентоспроможність.*

Хатиче Эркекоджлу, Халиль Арич Киванч

ИССЛЕДОВАНИЕ КОНКУРЕНТНОЙ УСТОЙЧИВОСТИ В ТУРЦИИ И СТРАНАХ ЕС С ИСПОЛЬЗОВАНИЕМ РОМБОВОЙ МОДЕЛИ ПОРТЕРА: АНАЛИЗ ПАНЕЛЬНЫХ ДАННЫХ ЗА 2007-2010 ГОДЫ

[1] Assoc. Professor, Dr., Vocational High School of Social Sciences, Erciyes University, Turkey.
[2] Assistant Professor, Dr., Department of International Trade and Logistics, Faculty of Economics and Administrative Sciences, Cumhuriyet University, Turkey.

В статье исследована конкурентная устойчивость Турции и 27 стран ЕС с помощью ромбовой модели Портера. 13 независимых переменных, определенных для 4 факторов модели, и 4 независимых переменных, определенных с помощью этих 13 переменных, были использованы в 2 отдельных моделях. Эти переменные используются в Глобальном индексе конкурентоспособности и могут представлять факторы ромбовой модели. В первой модели показано положительное влияние качества продукции локальных поставщиков и кооперации в отношениях "труд-наниматель" на внешнюю торговлю, в то время как переменные уровня потребительской ориентации, опыта покупателя, состояния развития кластеров и ширины цепи издержек продемонстрировали негативное влияние на внешнюю торговлю. Во второй модели обнаружено положительное влияние факторных условий на торговлю, но условия спроса и сопутствующее производство продемонстрировали отрицательное влияние на состояние торговли. Структура фирмы, стратегия и конкурентоспособность на торговлю влияют незначительно.

Ключевые слова: *анализ панельных данных, уровень внешней торговли, ромбовая модель, конкурентоспособность.*

Introduction. According to Porter, differences among countries in terms of their economic structures, cultures, institutional structures and historical backgrounds have impact on competitiveness of countries. Contrary to the opinion that country factor has been unimportant in the world where competition globalized, specific values of country and ultimately country factors have importance. Therefore, country factor comes into prominence in terms of impact on competitiveness (Porter, 1998: 19).

Although many studies were performed to measure competitiveness, the studies performed by using Porter's diamond model to determine dynamics which have impact on competitiveness are limited and these studies analyze the determinants of competitiveness at the sector level. This study differs from others by aiming to measure competitiveness revealing which dynamics are effective on competitiveness. In addition, this study differs from similar studies in terms of examination of a country group to reveal the determinants of competitiveness.

The purpose of this study is to investigate to what extent country dynamics are effective on competitiveness in the EU countries and Turkey due to its being a candidate country for the EU membership. Commercial performance measurements of countries were used for this investigation. 13 data were chosen in such a way that these data include 4 factors of the Diamond Model. The analysis was made for 4 years between 2007 and 2010.

This study is important in terms of empirical application of Porter's diamond model to 28 countries. 4 variables were used in the analysis and these variables are related to "factor conditions", "demand conditions", "related and supporting industries", "company structure, strategy and competition" in Diamond Model. 13 independent variables determined for 4 factors of the model and 4 independent variables determined with mean of these 13 variables were used in 2 separate models. Competitiveness of a country can be measured by various methods. One of these is the commercial performance criterion and the other reveales the comparative advantage index. In this study the commercial performance criterion, calculated as the ratio of total exports and total imports, was taken in consideration in terms of taking into account the change over time. The subject was limited in terms of using only the com-

mercial performance factor as competitiveness indicator. This study covers the years 2007-2010 and this limitation was made due to the lack of data.

The factors used in the calculation of the Global Competitiveness Index calculated by the WEF and which create Porter's Diamond Model were used for the analysis. Therefore, the index values of 28 countries participating in this analysis are given in Table1. The situation in Greece reveals that the EU is not a homogeneously structured and its members show differences in competitive advantages. The Global Competitiveness Index is a useful tool for understanding the strengths and weaknesses of competitiveness of the EU countries. In Table 1 the competitiveness rankings of the EU members are shown. All Scandinavian countries, Germany, England, France and the Benelux countries are at the top of the list. At the same time these countries are among the most competitive 20 countries in the world. However, competitive resources of these countries differ from each other. The Benelux and Scandinavian countries have insufficient market size. These countries overcome these deficiencies by means of their skilled labor forces, powerful institutions and enhanced innovation capacities (WEF, 2011: 25).

Table 1. **2010-2011 Global Competitiveness Index Ranking of EU-27 and Turkey**

Country	Rank	Score	Country	Rank	Score	Country	Rank	Score
Sweden	2	5,56	*Ireland*	29	4,74	*Italy*	48	4,37
Germany	5	5,39	*Estonia*	33	4,61	*Malta*	50	4,34
Finland	7	5,37	*Czech Republic*	36	4,57	*Hungary*	52	4,33
Netherlands	8	5,33	*Poland*	39	4,51	*Slovak Republic*	60	4,25
Denmark	9	5,32	*Italy*	48	4,37	*Romania*	67	4,16
England	12	5,25	*Cyprus*	40	4,50	*Latvia*	70	4,14
France	15	5,13	*Spain*	42	4,49	*Bulgaria*	71	4,13
Austria	18	5,09	*Slovenia*	45	4,42	*Greece*	83	3,99
Belgium	19	5,07	*Portugal*	46	4,38	*Turkey*	61	4,25
Luxembourg	20	5,05	*Lithuania*	47	4,38			

Source: WEF (2011), The Global Competitiveness Index 2010–2011, https://members.weforum.org/pdf/GCR10/Report/Part1/Chapter%201.1_The%20Global%20Competitiveness%20Index%202010-2011.pdf, p. 15 - 27.

Turkey keeps its position at the world competitiveness ranking (as the 61st). Turkey benefits from its wide market conditions. Market structure in Turkey has an outlook in which local competition is experienced intensively (15th) and multi-faceted commercial experiences (52nd) take part. At the same time Turkey benefits from advanced infrastructure facilities (56th). Highways and airways infrastructure, ports and electricity supply come into prominence. Turkey should focus on human capital so as to improve its competitiveness (WEF, 2011: 27).

In the study the analysis was made with 2 models by using the panel data analysis method. The total of 112 data were used in such a way that these data cover 4 years of each of 28 countries. Hausman test which is decisive for the fixed effects model against the random effects model and Wooldridge test which deals with whether there is autocorrelation between the variables in panel data were made before the panel data analysis. Against the problem of heteroscedasticity, the white cross-section correction

was applied and the AR (1) was adjusted to solve the autocorrelation problem. As a beginning, the studies previously conducted on this issue were summarized by the literature review and then Porter's Diamond Model and theoretical framework of the study are presented. In addition, data set and methodology are proposed. And the results of autocorrelation and Hausman test and panel data regression results are given. After then the result section is given.

Literature review. Chhean (2009), Markus (2008), Jakobsen (2007), Kumar and Chadee (2002) examined the Porter's Diamond Model at the firm level and mostly on the basis of the survey method. They attempted to identify the factors having impact on firms competitiveness. Drescher and Maurer (1999) calculated the Balassa index of the revealed comparative advantage for dairy industry of the EU countries. They determined that Germany is internationally competitive in the dairy industry and Italy, the Netherlands and Denmark are internationally competitive in cheese production. Radosevic (2009) examined the relationship between R&D and competitiveness in the South East European countries in terms of integration of these countries to the EU. He used the index values published by the WEF. It was concluded that inadequacy of R&D activities due to insufficient demand for innovation and lack of mechanisms for supporting innovation has impact on competitiveness of countries.

Yilmaz (2003) examined competitiveness of Turkey as a EU candidate as well as for the countries as Bulgaria, Czech Republic, Hungary, Poland, Romania and 15 EU members. Other candidate countries including Turkey have comparative advantages in export of labor-intensive goods. At the same time the other 5 candidate countries except the Czech Republic have comparative advantages in export of raw material intensive goods. In another study conducted by Coban and Coban (2004), they measured the competitiveness of Turkey against the EU countries in the period 1970-2001 with the help of globalization index. In accordance with this study they concluded that competitiveness of Turkey against the EU countries increased significantly. As a result of comparative analysis of the competitiveness of the textile industry in Turkey with the EU countries, Kok and Coban (2005) determined that competitiveness of the textile industry in Turkey is very high and has a worldwide competitive structure in terms of Standard International Trade Classification (SITC) two-and three-digit product groups used by the United Nations.

Kosekahyaoglu and Ozdamar (2009) applied the comparative advantage method of Balassa and comparative export performance (CEP) method of Donges in the study conducted on the change of competitiveness of Turkish manufacturing industry at the EU market. As the result of the study Turkey got a competitive advantage against the EU countries according to SITC 6 and SITC 8 (textile and wearing apparel group). According to the regression analysis, wage and the domestic market size variables emerge as the main determinants of Turkey competitiveness is both in labor and technology intensive sectors. In another study conducted by Yalcinkaya et al. (2009) on competitiveness of foreign trade of Turkish manufacturing in the period 1989-2009, the VAR analysis was used. The exchange rate policy became prominent in competitiveness. Eraslan et al. (2008) analyzed the marble sector of Bilecik, Bulu and Eraslan (2008) analyzed tourism sector of Bolu, Eraslan et al. (2008) analyzed Turkish textile and apparel sector, Bulu and et al. (2008) analyzed Turkish food sector in terms of their international competitiveness by using Diamond Model. Sector

information were collected by using the survey method and screening written and visual media and then these data were evaluated by taking into consideration the factors contained in the Diamond Model and using a measurement interval in the low (-1), medium (0), high (1) form.

At the beginning of the 90s Porter conducted a study which took 4 years in 10 countries with the purpose of determination how countries acquire their competitive advantages in certain industries. These countries are Denmark, Germany, Italy, Japan, Korea, Singapore, Sweden, Switzerland, England, the USA. The USA, Japan and Germany are leading industrialized countries of the world. Other selected countries exhibit very different properties from each other in respect of government policies toward industries, social, geographic and regional structures. Asian countries are included in the study because of their remarkable industry moves. Sweden and Switzerland being European countries were used in the study because they have an important role in international trade. The reason why Porter's study was limited by 10 countries are time and resource constraints. At the same time these countries possess competitive advantages in many industries (Porter, 1998: 21).

After mentioning country and sector-based studies and their results made on the basis of Porter's Diamond Model, we will focused on the theoretical framework below.

Theoretical Framework[3]**.** Porter indicates that some important questions have not been answered when it is looked at the theory of comparative advantage and technology gap theory. Why do productivity differences and technology gaps arise? Which countries' firms have these advantages? In contrast to technology gap theory, how some companies in some countries can have these advantages (new technology) for many years? (Porter, 1998: 17).

According to Diamond Model, competitiveness of a country in a particular industry or industries at the international level depends on 4 basic dynamics of country which provide achieving or not achieving competitive advantages by shaping the environment of local firm (Porter, 1998: 70-71):

- factor conditions;
- demand conditions;
- related and supporting industries;
- firm structure, strategy and competition.

When an industry of a country has a large number of intermediate goods producer (supplier) and if these producers are competitive, this situation will provide firms with inputs in efficient production conditions (Erkekoglu, 2008: 29). At the same time he points out that government policy and chance factor may affect competitive advantages positively or negatively. Additionally index value (variable) regarding this factor could not be found.

Government and chance factors cannot be a part of diamond separately. They can be involved in Diamond Model by having impact on the 4 basic factors of the diamond. Government factors express the impact of government policy implementations. And the chance factors include unexpected developments, technological innovations, wars and similar cases (Davies et al., 2000: 1193).

[3] The research on this theory and model includes Porter (1998) (pp. 17-30 and pp. 70-127).

Within the framework of the ultimate aim to achieve political unity of the studied country group, there are harmonization efforts in terms of government policies. When the effects of chance factor on competitiveness are examined, researchers face difficulties in quantification. At the same time it does not take place in the WEF indices. Government and chance factors impact competitiveness by affecting 4 factors of Diamond Model. For this reason these two variables are left out of the analysis.

Data Set And Methodology. This section will focus on the data set and the methodology.

Data Set. In this study 13 independent variables calculated by the World Economic Forum and external trade performance data calculated from EUROSTAT. As it can be seen in Table 2, because the factors of Diamond Model are indicated with different factors in model, 4 different factors are acquired by averaging variables in relation to each factor. Variables under these factors are the data obtained from the WEF questionnaires. External trade performance variable is found by the division of export data of the countries to their import data. As mentioned earlier, improvements in countries trade performance are accepted as an indicator of competitiveness improvements. In this respect, the relation between trade performance dependent variable and other 13 independent variables were examined empirically. To do this, Eviews 5.1 and Stata 9.1 programs were used. The data covered 2007-2010 for 28 countries which include 27 EU members and Turkey because of its candidate status. Panel data analysis was performed with the total of 112 observations. The data contained in Table 3 were used in such a way that they contain 4 factors of Diamond Model: factor conditions, demand conditions, related and supporting industries and "irm structure, strategy and competition.

Methodology. In this study the analysis was made with the balanced panel data set. In this set, the number of data set and years are equal for each country. It was not studied with any deficient data or data belonging to a different time. Panel data set consists of 28 horizontal section units. *i* symbolizes country and *t* symbolizes time; *i*=1-28 countries and *t*=2007-2010 (4 years). The total number of observations in data set (i x t =) is 112.

In this study the analysis was made with 2 different models. In the first model, the analysis was made with 13 independent variables. In the second model 4 different factors were obtained by taking the average of 13 independent variables in terms of representing 4 factors in Diamond Model. The second analysis was made between these 4 factors and dependent variable. Variables placing under each of factor to obtain these 4 factors are seen in Table 2. By taking average of these variables, the values of the related factors were calculated. The variables whose averages were taken for the first factor are Infr, Savr, Fms and Resc. The variables whose averages were taken for the second factor are Cust, Buy and Dom. The variables which create the third factor are Lsup, Socd and Valb. The variables involved in the fourth factor are Ler, Pps and Inov. The effects of these 4 factors on trade performance were predicted in Model 2.

Table 2. **Variables used in the analysis**

Independent variables	
1. Variables About Factor Conditions	Factor1
Quality of Overall-Infrastructure	Infr
National Savings Rate	Savr
Financial Market Sophistication	Fms
Quality of Scientific Research Institutions	Resc
2. Variables About Demand Conditions	Factor 2
Degree of Customer Orientation	Cust
Buyer Sophistication	Buy
Domestic Market Size	Dom
3. Variables About Related and Supporting Industries	Factor 3
Local Supplier Quality	Lsup
State of Cluster Development	Socd
Value Chain Breadth	Valb
4. Variables About Firm Structure, Strategy and Competition	Factor 4
Cooperation in Labor-Employer Relations	Ler
Production Process Sophistication	Pps
Capacity for Innovation	Inov
Dependent variable	
Trade Performance	TrdPerf

Two models were used in this study. They are as following:

$$Perfo_{it} = (Infr_{it}, Savr_{it}, Fms_{it}, Resc_{it}, Cust_{it}, Buy_{it}, Dom_{it}, Lsup_{it}, Socd_{it}, Valb_{it}, Ler_{it}, Pps_{it}, Inov_{it}, AR(1)) \quad (1)$$

$$Perfo\ it = (Factor1\ it,\ Factor2\ it, Factor3\ it, Factor4\ it, AR(1)) \quad (2)$$

The time dimension of the data set was limited to 4 years. The reason of this is that competitiveness indices are given by the World Economic Forum (WEF) since 2007 in such a way that it fits the data set used in the analysis. It was determined that a large part of the data used in the analysis were not included in the years before 2007. Because the time dimension of the data set was limited, unit root tests were not needed.

Analysis results. The results of the study on which the panel data analysis was applied will be discussed in this section. At the beginning autocorrelation and the Hausman test results will be given. Then the panel data regression results will be evaluated.

Autocorrelation and Hausman test results. Hausman test which is decisive for the fixed effect model can be used against random effect model. Hausman test is used to test the null hypothesis of non-correlated random effects with regression model in GLS theory. This null hypothesis shows that both fixed and random effects forecasters are consistent, however it shows that fixed effects model is not efficient. The test is based on the difference between the two models (Ioannides, 2002: 159).

As it is known, Hausman test is used to test the null hypothesis which shows that the coefficients obtained from efficient random effects model and consistent fixed effects model are equal (Saatci and Aslan, 2007: 8). When test statistic is greater than table value, the hypothesis (H0) that there is no correlation between specific effects belonging to the group and explanatory variables is rejected. That is, when the ran-

dom effect is rejected, the fixed effect is accepted (Wooldridge, 2002: 289; Yalcin, 2005: 47-48).

Table 3. **Panel Data Random Effects Hausman Test with 13 Explanatory Variables**

Hausman Test related to Random Effects			
Test cross-section random effects			
Test Summary	Chi-square statistics	Chi-square d.f.	Prob.
Random cross-section	74.162976	13	0.0000

Note: Dependent variable is trade performance variable.

Table 4. **Panel Data Random Effects Hausman Test for 4 Factors**

Hausman Test related to Random Effects			
Test cross-section random effects			
Test Summary	Chi-square statistics	Chi-square d.f.	Prob.
Random cross-section	37.379765	4	0.0000

Dependent variable is trade performance variable.

Hausman test results are presented in Table 3 and 4. According to this test, at the 0,05 significance level the fixed effects model was accepted. In other words, Hausman test has given the result that supports the fixed effects model at the 5% significance level and according to the test the null hypothesis was rejected for 2 models used in this study.

It can be tested with Wooldridge test whether there is autocorrelation between the variables in the panel data (Wooldridge 2002, pp. 282-283). As noted below, null hypothesis indicates there is no first order autocorrelation.

H0: There is no first order autocorrelation.

H1: There is first order autocorrelation.

Table 5. **Wooldridge Test for Autocorrelation in Panel Data with 13 Explanatory Variables**

Ho: There is no first order autocorrelation		
Wooldridge Test	Statistic Value	Prob.
F(1,27)	16.445	0.0004[a]

Note: Dependent variable is trade performance variable.
[a] H_0 hypothesis was rejected at the 1% significance level.

Table 6. **Panel Data Wooldridge Test for 4 Factors**

Ho: There is no first order autocorrelation		
Wooldridge Test	Statistic Value	Prob.
F (1,27)	21.986	0.0001[a]

Note: Dependent variable is trade performance variable.
[a] H_0 hypothesis was rejected at the 1% significance level.

The results of this test are presented in Tables 5 and 6. Accordingly, the null hypothesis that there is no autocorrelation in the panel data could be rejected for both models. AR (1) correction was made in the fixed effects model in order to solve the autocorrelation problem. On the other hand, white cross-section correction was made in both models against the heteroscedasticity problem.

Panel data regression results. The fixed effect model has been decided in panel data, then as it is mentioned previously AR(1) correction was made in order to solve

the autocorrelation problem and white cross-section correction was made against heteroscedasticity problem. The estimation results made for the first model according to the fixed effect model are in Table 7. According to F-test, the model is significant at the 1% significance level. 6 of 13 variables and constant coefficient are significant according to t-test and coefficients of 7 variables are insignificant. Insignificant variables are quality of overall infrastructure (Infr), national savings rate (Savr), financial market sophistication (Fms), quality of scientific research institutions (Resc), domestic market size (Dom), production process sophistication (Pps), and capacity for innovation (Inov) independent variables. Degree of customer orientation (Cust), buyer sophistication (Buy), local supplier quality (Lsup), cluster development condition (Socd), value chain breadth (Valb), and cooperation in labor-employer relations (Ler) are statistically significant. The signs of significant variables and cooperation in labor-employer relations (Ler) variable are positive and the signs of degree of customer orientation (Cust), buyer sophistication (Buy), cluster development condition (Socd) and value chain breadth (Valb) variables are negative.

Table 7. **Regression Results for 13 Explanatory Variables Fixed Effects Model (2007-2010): Trade Performance Variable**

Variables	Coefficients	t-statistic
C	1.781777	2.444892**
INFR	0.041956	0.937169
SAVR	0.001923	1.179985
FMS	0.013173	0.358399
RESC	0.020696	0.742879
CUST	-0.071837	-3.341872***
BUY	-0.042805	-2.202625**
DOM	-0.169119	-1.488332
LSUP	0.087890	4.382446***
SOCD	-0.105924	-4.561042***
VALB	-0.040553	-2.059068**
LER	0.044746	2.700330***
PPS	0.014733	0.489073
INOV	-0.024418	-0.449475
AR(1)	0.000468	0.002415
R^2	0.95	
Adjusted R^2	0.90	
F statistic	19.36796[a]	

[a] The model was significant at 1%.

Note: ***, **, * show significance levels at 1%, 5% and 10% respectively.The regression model contains 112 observations. The dependent variable is trade performance.

The estimation results made for the second model according to the fixed effect model are in Table 8. According to F-test, the model is statistically significant at the 1% significance level. It is seen that 3 of 4 factors taking part as independent variables and constant coefficient of the model are statistically significant according to t-test and one factor coefficient is statistically insignificant. Statistically insignificant variable is firm structure, strategy and competition (Factor 4). Factor conditions (Factor 1), demand conditions (Factor 2) and related and supporting industries (Factor 3) are statistically significant at the 1% significance level. The sign of Factor 1 is positive and the signs of Factor 2 and Factor 3 are negative.

Table 8. **Regression Results According to 4 Explanatory Variables Fixed Effects Model (2007-2010): Trade Performance Variable**

Variables	Coefficients	t-statistic
C	1.693218	6.269812***
Factor1	0.012322	3.137803***
Factor2	-0.167784	-3.979568***
Factor3	-0.120733	-2.112421**
Factor4	0.108383	1.200381
AR(1)	0.257536	1.337749
R^2	0.94	
Adjusted R^2	0.91	
F statistic	25.82582 [a]	

[a] The model was significant at the 1% significance level.

Note: ***, **, * show significance levels at 1%, 5% and 10% respectively. The regression model contains 112 observations. The dependent variable is trade performance.

Results. According to Porter, country factor has impact on competitiveness of firms and industries. Porter formulates this effect in his Diamond Model. Accordingly, the fact that a country is competitive in a certain industry at international level depends on 4 basic dynamics in the country that provide companies with access to competitive advantages by shaping their environment (Porter, 1998: 70-71). In this context, 13 data were used in such a way that covers 4 factors of Diamond Model. International competitiveness of the countries is represented by foreign trade performance variable.

The fixed effect model has been decided in panel data, then as it is mentioned previously AR(1) correction was made in order to solve the autocorrelation problem and white cross-section correction was made against heteroscedasticity problem.

Model is significant at the 1% significance level according to F-test depending on the results of estimation that are made for the first model according to fixed effect model. 6 of 13 variables and constant coefficient are significant according to t-test and coefficients of 7 variables are insignificant. When statistically significant local supplier quality and cooperation in labor-employer relations variables affect foreign trade performance positively, degree of customer orientation, buyer sophistication, cluster development condition and value chain breadth variables affect it negatively.

It was determined that quality of overall-infrastructure, national savings rate, financial market sophistication, quality of scientific research institutions, domestic market size, production process sophistication and capacity for innovation variables are statistically insignificant in terms of effects of foreign trade performance for the period 2007-2010.

When the estimation results for the second model according to the fixed effect model are analyzed, it is seen that the model is significant at the 1% significance level according to F-test. It is seen that 3 of 4 factors taking part as independent variables and constant coefficient of the model are significant according to the t-test and 1 coefficient is insignificant. Statistically insignificant variable is firm structure, strategy and competition (Factor 4). Factor conditions (Factor 1), demand conditions (Factor 2) and related and supporting industries (Factor 3) are statistically significant at the 1% level. When factor conditions variable affects foreign trade performance positively, demand conditions and related and supporting industries affect it negatively.

According to the obtained results, only factor conditions affect competitiveness of the EU and Turkey positively and demand conditions and related and supporting industries dynamics affect competitiveness of the EU (and Turkey) negatively. Firm structure, strategy and competition dynamic was determined insignificant in terms of its effect on the competitiveness of the EU countries.

Incompatible with Porter's theory, it was concluded that factor conditions affect competitiveness of the EU (and Turkey) countries positively. According to this result, quality of overall infrastructure, national savings rate, domestic market size, quality of scientific research institutions in the EU (and Turkey) as a whole affect international competitiveness of the EU (and Turkey) positively.

The analysis results obtained in the opposite direction of Porter's theory can take place on the basis of it is stated in global competitiveness report of the WEF that the EU members state don't have a homogeneous competitiveness structure. In order to increase the competitiveness of the EU as a whole at the international level differences between countries about local supplier quality, cluster development condition, value chain breadth, firms' degree of customer orientation, quality product demand of customers should be determined and policies should be developed and implemented in order to eliminate these differences.

References:

Bulu, M., Eraslan, I. H. (2008). The International Competitiveness Analysis of Tourism Industry of Bolu Region. The Journal of Travel and Hotel Business, 5(1): 1-33

Bulu, M., Eraslan, I. H., Barca, M. (2007). The International Competitiveness Analysis of Turkish Food Industry. Afyon Kocatepe University Journal of Economics and Administrative Sciences, 9(1): 311-335.

Chhean, P. (2009). Competitiveness Analysis of the Garment Industry in Cambodia. International Conference on the Role of Universities in Hands-On Education, Rajamangala University of Technology Lanna, Thailand: 677-695.

Coban, O., Coban, S. (2004). Measurement of Turkey's Competitiveness by Globalization Index: A Comparison with EU Countries. Manas University Journal of Social Sciences, 10: 163-175.

Davies, H., Ellis, P. D. (2000). Porter's Competitive Advantage of Nations: Time for a final judgement?. Journal of Management Studies. 37(8):1189-1213.

Drescher, Klaus ve Oswin Maurer, (1999). "Competitiveness in the European Dairy Industries", Agribusiness, Vol. 15, No. 2, ss.163-177.

Drescher, K., Oswin, M. (1999). Competitiveness in the European Dairy Industries. Agribusiness, 15(2): 163-177.

Eraslan, H., Ipcioglu, I., Hasit G., Ersahan B. (2008). An Analysis of the International Competitiveness of the Marble Industry in Bilecik Region: Problems and Recommendations. Mustafa Kemal University Journal of Social Sciences Institute, 5(10): 193-217.

Eraslan, I. H., Bakan, I., Helvacioglu Kuyucu A. D. (2008). The Analysis of Competitiveness Level of Turkish Textile and Apparel Industry. Istanbul Commerce University Journal of Social Sciences, 7(13): 265-300.

Erkekoglu, H. (2007). In the Process of EU Full-Membership a Comparison of Development Levels of Turkey an EU Member Countries: A Multi-Variate Statistical Analysis. Kocaeli University Journal of Social Sciences. (14) 2007/2: 28-50.

Grupp, H. (1995). Science, High Technology and the Competitiveness of EU Countries. Cambridge Journal of Economics, 19: 209-223.

Ioannides, Y. M. (2002). Residential neighborhood effects. www.elsevier.com/ locate /econbase, Regional Science and Urban Economics, 32: 145-165, , (Access date: 05.05.2011).

Jakobsen, K. (2007). First Mover Advantages in Central and Eastern Europe. Journal of East-West Business, 13(1): 35-61.

Kok, R., Coban, O. (2005). The Turkish Textile Industry and its Competitiveness: A Comparative Analysis with EU Countries During the Period 1989-2001. Journal of IIF, 20(228): 68-81.

Kosekahyaoglu, L., Ozdamar, G. (2009). Changes in Competitiveness of Turkish Manufacturing Industry Over Membership Process Towards European Union. Suleyman Demirel University The Journal of Faculty of Economics and Administrative Sciences, 14(1):17-30.

Kumar, R., Chadee, D. (2002). International Competitiveness of Asian Firms: An Analytical Framework. ERD Working Paper No. 4: 1-39.

Markus, G. (2008). Measuring Company Level Competitiveness in Porter's Diamond Model Framework. http://kgk.uni-obuda.hu/sites/default/files/MarkusGabor.pdf, Symposium for Young Researchers: Proceedings: 149-158.

Radpsevic, S. (2009). Research and Development, Competitiveness and European Integration of South Eastern Europe, Europe-Asia Studies, 61(4), June: 621-650.

Porter, M. E. (1998). The Competitive Advantage of Nations. New Edition, Published by Palgrave, 855p.

Saatci, M., Aslan, A. (2007). Testing the Imports as Market Disipline Hypothesis in Turkish Manufacturing Industry: Panel Data Approach. Erciyes University Journal of Economics and Administrative Sciences, 29(8): 1-15

Wooldridge, J. (2002). Econometric Analysis of Cross Section and Panel Data. Cambridge, The Massachusets Institute of Technology Press, 740p.

Yalcin, E. (2005). Economic Growth and Foreign Credits: An Empirical Study. Specialty Acceptability Thesis, Turkish Central Bank Foreign Relations Department Ankara, http://www.tcmb.gov.tr/kutuphane/ TURKCE/tezler/ebruyalcin.pdf

Yalcinkaya, M.H., Cilbant, C., Ozcalik, M. (2009). Turkish Manufacturing Industry's Foreign Trade Competitive Power in the EU Accession Process: A VAR Analysis of 1989-2009 Period. Journal of Management and Economics, 16(1): 115-137.

Yilmaz, S. (2003). Turkey's Competitiveness in the European Union: A Comparison with Five Candidate Countries - Bulgaria, the Czech Republic, Hungary, Poland, Romania - and the EU 15. Ezoneplus Working Paper No. 12, February: 1-20.

Стаття надійшла до редакції 27.07.2012.