

## AN ANALYSIS OF THE EXPORT AND ECONOMIC GROWTH IN TURKEY OVER THE PERIOD OF 1950-2009

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### ABSTRACT

This empirical research investigates the relationship of real export with economic growth (represented by real GDP) by using annual time series data for the Turkish economy over the period 1950-2006. The study applies a number of econometric techniques: ADF unit root test, Johansen cointegration test, vector error correction model (VECM), and Granger causality test.

The results of this dissertation show that all the variables are stationary in the first difference. Moreover, the Johansen cointegration test confirms the existence of the long run relationship among the two variables. The Granger test shows one way causality from economic growth to real net exports. The causality results are consistent with the results reported by the Vector Error Correction Model (VECM). There is a long run and also short run causality relationship between the real export and the economic growth. The direction of this causality is from economic growth (real GDP) to real export.

**Keywords:** Economic Growth, Granger Causality, Johansen Cointegration Test, Export, Vector Error Correction Model (VECM)

**JEL Classification:** F43, O11

## TÜRKİYE'DE 1950-2009 DÖNEMİNDE İHRACAT VE EKONOMİK BÜYÜME'NİN ANALİZİ

### ÖZET

Bu ampirik çalışma, Türk ekonomisinde 1950-2009 dönemindeki reel ihracat ve reel GSYİH ile ifade edilen büyüme arasındaki ilişkiyi, senelik zaman serisi verileri kullanarak incelemektedir. Çalışmanın çözümlemesinde bir dizi ekonometrik yöntem kullanılmaktadır: ADF birim kök sınaması, Johansen eşbütünlük sınaması, vektör hata düzeltme modeli (VECM) ve Granger nedensellik sınaması.

Bu çalışmanın sonuçları bütün değişkenlerin ilk farklarında durağan olduğunu göstermektedir. Buna ek olarak Johansen eşbütünlük sınaması iki değişken arasında uzun dönemde ilişki olduğunu göstermektedir. Granger nedensellik sınaması, ekonomik büyümeden reel ihracata doğru tek yönlü nedenselliği göstermektedir. Nedensellik sonuçları, vektör hata düzeltme modelinin (VECM) gösterdiği sonuçlarla uyumludur. Reel ihracat ve ekonomik büyüme arasında hem uzun dönemde, hem de kısa dönemde nedensellik ilişkisi vardır. Bu nedenselliğin yönü ise ekonomik büyümeden (reel GSYİH) ihracata doğrudur.

**Anahtar Kelimeler:** Ekonomik Büyüme, Granger Nedensellik, Johansen Eşbütünlük Sınaması, İhracat, Vektör Hata Düzeltme Modeli (VECM).

**JEL Sınıflandırması:** F43, O11

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## 1. Introduction

The relationship between exports and economic growth occupies a central place in the literature on economic development and is a issue of major policy concern for government planners and policy makers.

An increase in exports helps to finance the import of necessary capital goods which, in turn, gives rise to more rapid rate of capital formation and hence higher rate of economic growth. Furthermore, export growth leads to the exposure of countries to increased competition as well as to international new ideas, new methods of production and technology. This may lead to improved scale economies, efficient resource re-allocation, improved factor productivities, expansion of domestic market etc.

Empirically, the causal relationship between exports and economic growth has been a primary topic of research in the openness growth issue and, till now, is an ongoing debate in the economic development literature. Exports have been considered the main channel through which openness increases the economic growth performance. The main question in the export-growth issue is whether causality goes from exports to economic growth, labeled Export-led Growth (ELG) hypothesis or, contrary, causality flows from economic growth to exports, namely Growth-led Exports (GLE) hypothesis. The establishment of the direction of this causal relationship has important implications for economic policy strategies. If causality flows from exports to growth then the implementation of export promotion policies is a proper strategy for a country to grow. But if causality goes on the reverse direction then a certain degree of development may be a prerequisite for a country to increase its exports and, therefore, economic growth policies are necessary to expand exports. A bi-directional causality would imply that both strategies are necessary as long as one reinforcing in the other one.

Hence, the main objective of this study is to examine the causal relationship between exports and economic growth in Turkey for the period 1950-2009 by using cointegration and error correction techniques. The study is structured into six chapters. Following this introduction, Chapter 2 provides some background of the growth strategy of Turkey. This chapter also includes the concepts about the Turkish foreign trade, the factors of economic growth and export in Turkey. Chapter 3 provides a literature review of related theoretical and empirical studies. Chapter 4 outlines the methodology used to examine the above-mentioned relationship. Chapter 5 provides data and empirical findings. Chapter 6 contains some conclusions.

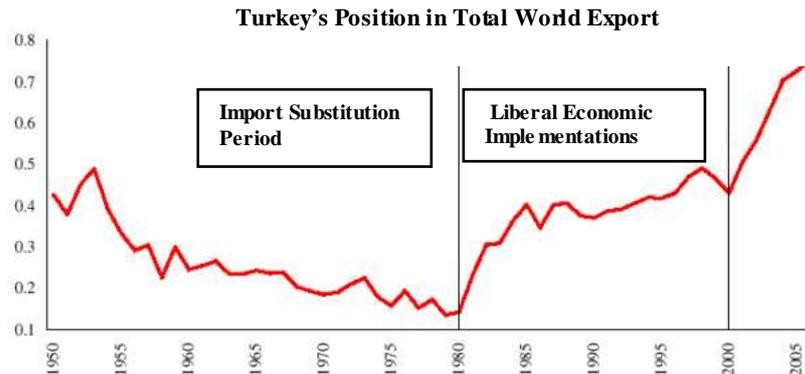
## 2. The Background Of The Growth Strategy Of Turkey

The economic background of Turkey has been full of difficult periods and hardships since the inception of the Republic in 1923. With the beginning of the new republic era, the Country adopted protectionist policies that were executed by the Government. However it took a considerable of time to widen the horizons of the Turkish economy and enable the implementation of foreign trade which would prompt the economic growth (Tekin, 2006).

The economic policies of Turkey were mostly developed with a protectionist view during the 1930s as it was implemented similarly in the rest of the world. Nonetheless, protectionism began to lose its grave importance after the II World War, thus international trade started to become the leading factor of growth in the world economic arena. With regards to this issue, Turkey, similar to other states, was to pursue a development strategy, targeting to industrialize with adopting protective measures initially, namely tariffs and import quotas, then economic policies that highly depended on liberal policies at the end of 20<sup>th</sup> century (Yılmaz, 2002).

Early periods of the Turkish economy was implemented with an import substitution strategy to protect the infant industries as it was in other developing countries of the time, the State assumed the prime role stimulate economic growth. Especially in 1930s, until the World War II, Turkey had to cope with the lack of entrepreneurs and businessmen to galvanize the private sector. Therefore, the State had to run the key industries such as textiles, manufactured products, telecommunication and energy primarily, not giving the relative significance to exportation. Many of the State Economic Enterprises established by the government aimed to manufacture products which were previously imported. Therefore it was just natural for Turkey to pursue protectionist policies to secure the infant industries. Over the years the significance of the State Economic Enterprises grew, however it was not enough to foster the exportation and create employment. This trend remained unchanged until 1980s adopted by all of the governments (Yılmaz, 2002; Tekin, 2006).

During the protectionist and import substitution period until 1980s the economic development acquired, yet bearing high costs and low quality products thus making no additional value to foreign trade. However this trend was not questioned by neither the statesmen, nor by the academia notwithstanding to its inefficiency of its resource allocation, less skilled labor force and price distortion in the economy with its barriers to exports and imports by means of tariffs, quotas, license etc (Yılmaz, 2002; Tekin, 2006).

**Figure 1: The Export Trend in Turkey**

Reference: Web Page of the Central Bank of Turkey

However after 1980s the policy deciders realized that the inward focused economic policies which had been executed for five decades created a loss of efficiency and economic crises thus had to be substituted with liberal economic policies if Turkey was to integrate the world. Therefore, the protectionist policies lowered and the implementation of the import substitution policy was abandoned, a radical shift from market intervention to market liberalization was experienced to stimulate trade liberalization and lift the barriers before exports and imports. The trade liberalization economic policies did not only champion the Turkish economy to unfold in the face of the world economy but also enable the improved allocation of resources, the spread of knowledge spillover, to access to technologies, to acquire new intermediary goods, to rise the employment rate, provided higher income, increased the level of openness, intensified the level of industrialization and the application of economies of scale and scope with rescuing Turkey from the sequence of one step forward and one step backwards. After 1990s, Turkey faced considerable economic crisis, but the rate of foreign trade, especially the exportation kept to rise as intended (Yılmaz, 2002; Tekin, 2006).

### **2.1. An Overview of the Turkish Foreign Trade and Export**

It was already stated that the Turkish economy and its trade policies were based on import substitution and protectionist policies before 1980s. However, during last two decades, Turkey has experienced a firm economic transformation and began to make progress especially after the year of 2000. The overall economic policy of the Government was consisted of accomplishing sustainable growth, creating a stable macro – economic balance, establishing employment opportunities, reformation of the financial sector, ensuring fiscal and monetary discipline, and

stimulating the export growth. As a result of the economic development attempts, Turkey has achieved to become as one of the largest economies in the world with a Gross National Product of 440 billion dollars in 2007. The growth rate of the Turkish economy was 6.9 % in 2006, 4.5 % in 2007, 0.9 % in 2008 and -4.7% in 2009. Interest rates that are still high in comparison to western countries keep decreasing, the policy of fiscal expansion and monetary loosening are implemented to restore the economic balances, galvanize economic growth, boost foreign trade and increase exports respectively. However, as a result of the overvalued Turkish currency, the volume of the imports have risen at the same thus creating a negative trade balance, and creating disadvantage for the Turkish economy. In order to simplify the situation, the issue is depicted in Table 1<sup>1</sup>. When the figures in Table 1 examined, it is easily observed that the export of Turkey has risen steadily since 1990 except for the 1999 and 2009. The import of Turkey has also increased except for the economic crisis periods. In addition, the trade deficit during two decades was realized as a negative 9.3 billion USD of net export in 1990, negative 14,07 billion USD of net export in 1995, negative 26.7 billion USD of net export in 2000, negative 43.2 billion USD of net export in 2005 and as of 2009 realized as negative 38.6 billion USD.

If we are to state the primary exportation commodities of Turkish businesses; vehicles, garments, machine and components, electrical devices, iron and steel, minerals, iron and steel commodities, fruits, manufactured plastic items, metal items, vessels, cotton, aluminum, rubber and related products, cement and furniture could be enumerated in primary rankings. On the other hand, with regards to imports primary ranking is composed of minerals, crude oil, machines and components, iron and steel, vehicles, electrical devices, manufactured plastic items, chemicals, pharmaceuticals, medical instruments, copper, cotton, cellulose and paper, aluminum, rubber and related products , air vehicles and diverse chemical products<sup>2</sup>.

From the point of view of exportation in European total, in 1995, Turkey had a 21.6 billion USD of export out of 2.335 trillion USD; in 2000, 27.7 billion USD of export out of 2.633 trillion USD, in 2005 and 73.4 billion USD of exportation out of 4.371 trillion USD. In the world and European total, the volume of Turkish exports was %0.70 and %1.60 respectively in 2005. With regards to imports in European total, in 1995, Turkey had a 35.7 billion USD of export out of 2.334 trillion USD; in 2000, 54.5 billion USD of export out of 2.774 trillion USD, in 2005 and 116.5 billion USD of exportation out of 4.542 trillion USD. In the world and European total, the volume of Turkish imports was %1.08 and %5.57 respectively in 2005.

<sup>1</sup> <http://www.mfa.gov.tr/MFA/ForeignPolicy/Synopsis/economy.htm>  
<http://www.treasury.gov.tr/stat/egosterge/1-Uretim/Uretim.xls> (last visited on 30.11.2007).

<sup>2</sup> Web Page of Under Secretariat of Foreign Trade – [www.dtm.gov.tr](http://www.dtm.gov.tr) (last visited on 30.11.2007).

**Table 1: Main Foreign Trade Figure**

YEARS	FOREIGN TRADE ANNUAL (Million \$)				EXP/IMP	
	EXPORT	Change%	IMPORT	Change%	BALANCE	%
1990	12.959	11,5	22.302	41,2	-9.343	58,1
1991	13.593	4,9	21.047	-5,6	-7.454	64,6
1992	14.715	8,2	22.871	8,7	-8.156	64,3
1993	15.345	4,3	29.428	28,7	-14.083	52,1
1994	18.106	18,0	23.270	-20,9	-5.164	77,8
1995	21.637	19,5	35.709	53,5	-14.072	60,6
1996	23.224	7,3	43.627	22,2	-20.402	53,2
1997	26.261	13,1	48.559	11,3	-22.298	54,1
1998	26.974	2,7	45.921	-5,4	-18.947	58,7
1999	26.587	-1,4	40.671	-11,4	-14.084	65,4
2000	27.775	4,5	54.503	34,0	-26.728	51,0
2001	31.334	12,8	41.399	-24,0	-10.065	75,7
2002	36.059	15,1	51.554	24,5	-15.495	69,9
2003	47.253	31,0	69.340	34,5	-22.087	68,1
2004	63.167	33,7	97.540	40,7	-34.373	64,8
2005	73.476	16,3	116.774	19,7	-43.298	62,9
2006	85.535	16,4	139.576	19,5	-54.041	61,3
2007	107.272	25,4	170.062	21,8	-62.790	63,1
2008	132.027	23,1	201.963	18,8	-69.936	65,4
2009	102.128	-22,6	140.765	-30,3	-38.637	72,6

Reference: Web Page of the Undersecretariat of Foreign Trade,  
State Planning Organization

## 2.2. Effecting Factors of Economic Growth and Export in Turkey

In the previous section of this study, the figures related to Turkish foreign trade are presented. Yet, in this section the factors that effect economic growth, foreign trade and exports are discussed. First of all it should be restricted that the Turkish governments adopted protectionist economic policies before 1980s and after that period Turkey began struggling to integrate its economy with that of the world in order to benefit from the advantages of world trade.

According to a World Bank study factors effecting fast economic growth are (Çiftçioğlu, Karaaslan, 2005):

- High investment amount,

- High savings amount,
- Securing optimal allocation of capital,
- Benefiting from the latest technology,
- Presence of free market competition,
- High ratios of export to GNP and executing export oriented economic growth strategies.

With regards to this reality, these factors complement each other and bring about a high potential of economic growth by assuring intense amount of savings and investment levels, catching up high technology and acquiring knowledge spillover and managerial skills by means of increased positive foreign trade balance. On the other hand existence of a competitive market lowers costs and increases efficiency thus enables the increase of exports. Also, the degree of international openness is another considerable issue. The achievement of exporting businesses is highly rested on consistent adoption of high technology, managerial experiences and in-depth exploration of international markets (Çifçiöđlu, Karaaslan, 2005).

Another substantial factor that promotes exportation is to secure sufficient amount of capital accumulation a country. This could be provided by instigating capital inflows into to the country, providing new resources for production and increasing economic growth to galvanize export. Turkey has an economic structure that is open to world trade and is not subject to heavy government regulations. Yet, Turkey suffers from inflation rates which are still high in comparison to developed western countries. (Berumet, Dinçer, 2004; İsmihan, Özcan, Tansel, 2005).

Yet one other substantial factor effecting economic growth is rate of inflation. Turkey has an economic history that was affected by high inflation rates. As stated before, after 1980s profound economic precautions were introduced in order to stabilize economy; obstacles before foreign trade and foreign currency exchange is eliminated. The main aim was to lower the inflation, improve the balance of payments and develop foreign trade. In order to achieve this objective excessive government spending that resulted in budget deficits lowered to secure macroeconomic balances. As a result of these attempts the GNP and exports of Turkey have risen, but imports have also risen as well. As a result, this trend caused negative net export rates (for details see Table 1) (Nas, Perry, 2001).

Economic growth, backed by net foreign trade, is the basic indicator of robustness and welfare in an economic order. For, it is substantial for the governments to stimulate production and export. Yet, long term objectives are subject to economic fluctuations and business cycles that economic growth. Thus, in order to avoid negative changes in economic growth and foster exportation, governments should take into consideration variables such as (Atabek, Coşar, Şahingöz, 2005);

- Optimal utilization capacity and production possibilities,
- Inflation rates,
- Imports,
- Budget deficit (if exists) and government spending,
- Expectations of agencies,
- Fiscal and monetary policies,
- Exchange rates and interest rates.

### 3. Literature Review

Economic development is one of the main objectives of every society in the world and economic growth is fundamental to economic development. Neoclassical school of economists suggests that exports make major contributions to economic growth. There are usually four reasons mentioned for the support of this hypothesis: a) fostering specialization helps to benefit from the comparative advantages; b) utilizing the full capacity of the plant size, where domestic demand is less than the full capacity production; c) getting benefits of the greater economies of scale due to large market, and d) increasing the rate of investment and technological change (Krueger, 1978, Kavoussi, 1984, Ram, 1987).

While some economists (Krueger, 1978; Chenery, 1979; Tyler, 1981; Kavoussi, 1984; Balassa, 1985; Ram, 1985, 1987; Fosu, 1990 and Salvatore and Hacter, 1991) seem to generally agree that export benefit economic growth, others (Kwan and Cotsomitis, 1990; Ahmad and Kwan, 1991, Oxley, 1993; Yaghmaian, 1994) did not find much support to the export led economic growth hypothesis. (Arnade and Vasavada, 1995; Fosu, 1996; Thornton, 1997), some found contrasting evidence that export is Granger caused by the economic growth (Henriques and Sadorsky, 1996; Al-Yousif, 1999), while others demonstrated that there exists a bi-directional relationship between these variables (Dutt and Ghost, 1994; Thornton, 1997; Shan and Sun, 1998).

Concerning the causality between exports and economic growth, given that exports represent one of the main components of GDP, the direction of the causality may run from exports to growth and visa versa. Several empirical studies find no conclusive evidences on the causal relationship between exports and GDP growth. These studies cover developing and emerging economies including Hong Kong, Korea, Mexico, Singapore and Taiwan. Ruiz-Napoles (2001) argues that even in the cases where we have a positive of effect of increasing exports on production expansion, such effect may be limited and offset by increasing manufacturing imports displacing domestic production.

Abdulai and Jaquet (2002) examined the short and long run relationship between economic growth, exports, real investment and labour force for Code d'Ivoire for the period 1961-1997, using cointegration and error correction techniques. The results indicate that there is one long run equilibrium relationship among the four variables, and the causal relationship flows from the growth in exports to the growth in GDP both in the short and long run, providing support for the export-led growth hypothesis.

Alvarez-Ude, Galvez and Gomez (2005)' results show that the export led growth (ELG) hypothesis is not an appealing phenomenon. Causality proofs on the basis of error correction and augmented level VAR modeling show the imperious necessity to import for the Cuban development.

Abou-Stait (2005)' results support the hypothesis exports, imports and GDP are not cointegrated, and that exports Granger cause GDP growth, but they do not support the Granger causality between exports and capital formation.

Alıcı and Ucar (2003) investigated the developments in Turkish economy in relation to growth rate, exports and FDI in their paper. Using VAR methodology they analyzed the existence of causality between export, FDI and domestic performance of Turkey. Their results are in line with the ELG hypothesis.

Karagöz and Şen (2005) have found that there is a uni-directional causality from export growth to economic growth in Turkey. There is evidence for long-run Granger causality running from economic growth to export growth in Turkey. Error-correction analysis confirms bi-directional short-run relationship, that is, gives evidence for short-run Granger causality running from export growth to economic growth.

Halıcıoğlu (2007) seeks to validity of the export-led growth hypothesis using quarterly data from 1980 to 2005. The bounds testing approach to cointegration is employed to test the causal relationship between industrial production, exports and terms of trade. An augmented form of Granger causality analysis is implemented to identify the direction of relationship among the variables both in the short-run and the long-run. The empirical findings suggest uni-directional causation from exports to industrial production.

#### **4. Methodology**

This study employs the methods of time series econometrics, such as cointegration and error-correction models, to test the dynamic relationship between exports and economic growth. To be able to notify every selected variables effect in time, Vector Autoregression System (VAR) is used in this study. In the VAR systems every equation has the same right hand side variables, and those variables include lagged values of all of the endogenous variables. The aim of VAR analysis

is to determine the interrelationships among the variables, not the parameter estimates.

In the VAR system, cointegration analysis and Granger causality are used in order to test the relationship between variables. Granger causality indicates the power of explanation of variable to each other in the system. Granger (1969) developed a test to check whether or not the inclusion of past values of a variable  $X$  improves the prediction of present values of variable  $Y$ . If the prediction of  $Y$  is improved by including past values of  $X$  relative to only using the past values of  $Y$ , then  $X$  is said to Granger-cause  $Y$ . In the same manner, if the past values of  $Y$  improve the prediction of  $X$  relative to using only the past values of  $X$ , then  $Y$  is said to Granger-cause  $X$ . If both  $X$  is found to Granger-cause  $Y$  and  $Y$  is found to Granger-cause  $X$ , then there is said a feedback relationship. Yet there is a possibility of spurious causality. To avoid it, both series need to be stationary.

Cointegration analysis is normal interpretation of long-run equilibrium relationship between variables. Johansen (1988), and Johansen and Juselius (1990) have developed a maximum likelihood testing procedure on the number of cointegrating vectors which also include testing procedures for linear restrictions on the cointegrating parameters, for any set of variables. Two test statistics that are used to identify the number of cointegrating vectors, namely the trace test statistic and the maximum eigenvalue test statistic, are given here. For the null hypothesis that there are at most  $r$  distinct cointegrating vectors, the test statistics

$$\lambda_{\text{trace}}(r) = T \sum_{j=r+1}^p \ln(1 - \lambda_j) \quad (1)$$

where  $\lambda_j$ 's are the  $p-r$  smallest squared canonical correlations between  $Y_{t-k}$  and  $\Delta Y_t$  (where  $Y_t = (Y_{1t}, Y_{2t})$ ) and where all variables entering are assumed to be  $I(1)$ , corrected for the effects of the lagged differences of the  $Y_t$  process. The maximum likelihood ratio or put another way, the maximum eigenvalue statistic, for testing the null hypothesis of at most  $r$  cointegrating vectors against the alternative hypothesis of  $r+1$  cointegrating vectors, is given by

$$\lambda_{\text{max}}(r) = -T \ln(1 - \lambda_{r+1}) \quad (2)$$

Some econometric software may not produce this last statistics, but it can be calculated by the first one as follows,

$$\lambda_{\text{max}}(r) = \lambda_{\text{trace}}(r) - \lambda_{\text{trace}}(r+1) \quad (3)$$

Johansen (1988) argues that,  $\lambda_{\text{trace}}$  and  $\lambda_{\text{max}}$  statistics have non-standard distributions under the null hypothesis, and provides approximate critical values for the statistic, generated by Monte Carlo methods. In this study Eviews program is used for the econometric analysis.

### 5. Data And Empirical Findings

Annually data for the period 1950-2009 were used for estimation. The data on exports and gross national product (GDP) for Turkey are obtained from CBRT and SPO website.

Firstly, stationary of the variables has been investigated. As already known, stationary time series tend to return its mean value and fluctuate around it within a more-or-less constant range. On the other hand, a non-stationary variable becomes stationary after it is differenced where; first order differencing is enough in general. Stationary of a variable depends on whether it has a unit root or not. In Table 2 we present the results of unit root tests obtained using the Augmented Dickey-Fuller (ADF) test. The results are based on annually series of real exports and real GDP for Turkey.

**Table 2: Augmented Dickey-Fuller Unit Root Tests**

Variables	ADF Test Statistics	Prob.	Deterministic Regressors	Results
LREXP	-2.335198(0)	0.4089	intercept+trend	Non-stationary
LRGDP	-2.585576(0)	0.1016	intercept	Non-stationary
DLREXP	-7.789079(0)	0.0000	intercept	stationary
DLRGDP	-8.027461(0)	0.0000	intercept+trend	stationary

Notes: All the first difference ADF regressions have a significant unit root coefficient at the 5% levels, D\* refers to the first difference

The results points to the presence of unit roots in both series. More specifically, the null hypothesis that the series are non-stationary is not rejected at the levels of both variables. However, when the first differences of the variables are considered, the null hypothesis is rejected in favor of alternative hypothesis which state that the series are stationary. Thus, their first difference is found to be stationary and hence LREXP and LRGDP are both integrated of order one, I(1).

The next step involves applying Johansen cointegration test to check whether the two variables are cointegrated. The optimum lag lengths are determined using the Akaike and Schwarz information criterion.

The Johansen cointegration test has been performed for this two series and the results of this test which has been presented in Table 3 below, also provide evidence for the existence of one cointegration vector implying that the two variables are cointegrated.

**Table 3: Results of the Johansen Cointegration Test**

Sample (adjusted): 1953 2009				
Trend assumption: Linear deterministic trend				
Series: LREXP LRGDP Exogenous series: DUMMY				
Lags interval (in first differences): 1 to 2				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.263771	26.30458	20.26184	0.0065
At most 1	0.143816	8.850368	9.164546	0.0573
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.263771	17.45422	15.89210	0.0282
At most 1	0.143816	8.850368	9.164546	0.0573
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Normalized cointegrating coefficients (standard error in parentheses)				
LREXP	LRGDP	C		
1.000000	-2.706420	12.98034		
	(0.29177)	(3.11112)		

From Table 3 above, we see that test statistics indicate 1 cointegrating equation at 5 % significance level. Thus, the results of Johansen cointegration test imply a long-run association between real exports and real GDP series for Turkey.

With respect to the selected variables, results of the cointegration test can be concluded as the long run equilibrium between variables which is;

$$\text{LREXP} = 2.706420 \text{ LRGDP} - 12.98034$$

(t-values)                      (9.2759)                      (4.1722)

In this study constant dummy was applied. Dummy variables are the ones that reflect qualitative changes and take the values such as 0 and 1. It can be used as to take the crisis periods into consideration in the models constituted. Within the equation, the dummy variable takes the value of 1 in the crisis period and 0 in the non – crisis period.

Using constant dummy means to reflect a qualitative change by means of a constant term. Within the study, it was decided to use a constant dummy for the reason that the analyzed period involves years with substantial policy changes. First, the Chow Breakpoint test was applied in order to analyze whether there were real structural differentiations or not within the years that the structural differentiations were thought to exist. Upon this, it was decided that constant dummy is supposed to be used for the years of 1980, 1994 and 2001. In addition, the use of dummy variables usually increases model fit (coefficient of determination).

The empirical results of the estimated error-correction models are presented in Table 4.

**Table 4: Estimation Results of Error Correction Model**

Sample (adjusted): 1953 2009		
t-statistics in [ ]		
	(1)	(2)
Dependent Variables	D(LREXP)	D(LRGDP)
EC(-1)	-0.088855	0.006729
	[-3.20190]	[ 0.45800]
D(LREXP(-1))	-0.123126	-0.030545
	[-0.92336]	[-0.43265]
D(LREXP(-2))	0.078142	-0.003983
	[ 0.59376]	[-0.05716]
D(LRGDP(-1))	1.043115	-0.336694
	[2.43183]	[-1.43625]
D(LRGDP(-2))	0.269076	0.090623
	[ 1.06003]	[ 0.67431]
C	0.100907	0.046459
	[ 2.90860]	[ 2.52933]
DUMMY	0.041165	-0.099536
	[ 0.50367]	[-2.30025]

EC denotes the error correction term.

The results show that one way directional causality exists between real export growth and real GDP growth from real GDP growth to real export growth. This is based on the statistical significance of the error-correction coefficients of the error-correction (EC(-1)) term in equation 1. The error-correction terms represents the long-run impact of one variable on the other while the changes of the lagged independent variable describe the short-run causal impact. Error-correction results of Table 4 shows that in equation (1) the error correction term has correct sign and it is statistically significant. This provides evidence on long-run impact from economic growth to export growth.

The short-run dynamics of the error-correction processes can be identified by examining the statistical significance of the values given in these columns. The optimum lag lengths for autoregressive terms in equations (1) and (2) were identified using the Akaike and Schwarz information criteria. The statistically significant non-zero coefficients show that the short-run Granger causality runs from GDP growth to export growth.

All these results confirm that, beside of long-term, there is a significant short term relationship as well between export growth and economic growth.

In Table 5, we present Granger causality test result. As it is obvious from the table, there is a significant Granger causality from economic growth to export growth, but the reverse is not significant. This result confirms that there is no feedback relationship between these two variables.

**Table 5: Pairwise Granger Causality Tests Results**

Null Hypothesis ( $H_0$ )	F-statistics	Probability
D(LRGDP) does not Granger cause D(LREXP)	4.27195	0.00922*
D(LREXP) does not Granger cause D(LRGDP)	0.30349	0.82272

\* means reject  $H_0$  at the 5% level.

As we mention previously that the main question in the export-growth issue is whether causality goes from exports to economic growth, labeled Export-led Growth (ELG) hypothesis or, contrary, causality flows from economic growth to exports, namely Growth-led Exports (GLE) hypothesis. Vector error correction model and Granger causality test results show that the causality flows from growth to exports then a certain degree of development may be a prerequisite for a country to increase its exports and, therefore, economic growth policies are necessary to expand exports. Therefore, the export-growth issue is labeled Growth-led Exports (GLE) hypothesis in the period of 1950-2009 in Turkey.

## 6. Conclusion

This empirical research investigates the relationship of real export with economic growth (represented by real GDP) by using annual time series data for the Turkish economy over the period 1950-2009.

This study uses time series econometric tools such as unit root test, Granger causality, Johansen cointegration and vector error correction models to investigate the dynamic relationship between export growth and economic growth in Turkish economy.

The results of ADF unit root test show that all the variables are stationary in the first difference. The Johansen cointegration modeling techniques used in this paper have revealed that there is a long run relationship between real export and real GDP in Turkey.

It would be beneficial to state that the period to be analyzed involves the year of 1980. The year of 1980 could be accepted as a milestone. For, as we have before stated in chapter 2, while the import substitution policy was implemented before 1980, export oriented industrialization strategy was implemented in the post 1980 period. Furthermore, a structural differentiation was determined for the year of 1980 with the Chow Breakpoint test. That is why, it was convenient to use a dummy variable for the year of 1980 in the model. However, the Cointegration test, VECM and Granger causality test comprise the general period of 1950–2009 and the results obtained involve this 59-year of period. With respect to this, when the result of the analysis is interpreted, the interpretation was made for the general period.

Error-correction analysis and Granger causality tests confirm uni-directional causality running from economic growth to export growth in Turkey. Therefore, we can say that the export-growth issue is labeled Growth-led Exports (GLE) hypothesis in the period of 1950-2009 in Turkey. In other words, this results also support for GLE hypothesis based on the assumption that economic growth leads to enhancement of abilities to produce, to use and develop new technologies, and so on, that increase productivity creating that comparative advantage necessary to export (Krugman, 1984).

There is also evidence for long-run and short run causality running from economic growth to export growth in Turkey in this paper. Error correction model and Granger causality test results show that the causality flows from economic growth to exports growth then a certain degree of development may be a prerequisite for a country to increase its exports and, therefore, economic growth policies are necessary to expand exports.

### References

ABDULAI, A and JAQUET, P. (2002), "Exports and Economic Growth: Cointegration and Causality Evidence for Cote d'Ivoire", *African Development Review*, Vol. 14, No 1, pp. 1-17.

ABOU-SAIT, F. (2005), "Are Exports the Engine of Economic Growth? An Application of Cointegration and Causality Analysis for Egypt, 1977-2003, Economic Research Working Paper No 76.

AHMAD, J. and KWAN, A. C. C. (1991) "Causality between exports and economic growth: Empirical evidence from Africa", *Economics Letters*, 37, pp. 243-48.

ALICI, A. A. and UCAL, M. Ş. (2003), "Foreign Direct Investment Exports and Output Growth of Turkey: Causality Analysis", Paper to be presented at the European Trade Study Group (ETSG) Fifth Annual Conference Universidad Carlos III de Madrid.

ÁLVAREZ-UDE, F. and GALVEZ, M. G., I. (2008), "Empirical Evidence Of The Balance Of Payments Constrained Growth In Cuba. The Effects Of Comercial Regimes Since 1960", <http://mpr.ub.uni-muenchen.de/6993>.

AL-YOUSIF, Y. K. (1999), "On the role of exports in the economic growth of Malaysia: A multivariate analysis", *International Economic Journal* 13: 67 – 75.

AMADE. C; VASAVADA, U.; "Causality between productivity and exports in agriculture: Evidence from Asia and Latin America", *Journal of Agricultural Economics* 46:174-186.

ATABEK, A, COSAR, E. and SAHINGOZ, S. (2005), "A New Composite Leading Indicator for Turkish Economic Activity", *Emerging Markets Finance and Trade*, Vol. 40, No.1, pp. 45 – 64.

BALASSA, B. (1978), "Exports and economic growth: further evidence", *Journal of Development Economics*, 5, pp. 181-189.

BALASSA, B., (1985), "Exports, Policy Choices, and Economic Growth in developing Countries After the 1973 oil Shock", *Journal of Development Economics*, vol. 18, pp. 23-35.

BERUMET, H. and DİNÇER, N. (2004), "Do Capital Flows Improve Macroeconomic Performance in Emerging Markets?", *Emerging Markets Finance and Trade*, Vol. 40, No.4, pp.20 – 32.

CENERRY, H. B., (1979), *Structural Change and Development Policy*, New York, Oxford University Press.

CİFTÇİOĞLU, S. and KARAASLAN, C. (2005), "Comparison of Macroeconomic Performance of Turkey and East Asian Countries, and Econometric Analysis of Economic Growth in Turkey", Problems and Perspectives in Management, Volume 2, pp. 17 – 24.

DICKEY, D. and FULLER, W. (1981), "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root", *Econometrica*, Vol. 49, 1057-1072.

DUTT, S. D. and GHOSH, D. (1994), "An empirical investigation of the export growth – economic growth relationship", *Applied Economics Letters*, 1: 44-48.

ENDERS, W. (2004), *Applied Econometric Time Series*, Wiley, New York.

ENGLE, R.F. and GRANGER, C.W.J. (1987); "Cointegration and Error-Correction: Representation, Estimation and Testing", *Econometrica*, Vol. 55, 251-276.

FOSU, A. K. (1990), "Export Composition and the Impact of Export on Economic Growth of Developing Economies", *Economic Letters*, vol. 34, pp. 67-71.

FOSU, A. K. (1996), "Primary exports and economic growth in developing countries", *World Economy*, 19: 465 – 475.

GRANGER, C.W.J. (1969), "Investigating Causal Relations by Econometric and Cross-Spectral Method," *Econometrica*, Vol. 37, No. 3, 424-438.

\_\_\_\_\_ (1986), "Development in the Study of Cointegrated Economic Variables," *Oxford Bulletin of Economics and Statistics*, Vol. 48, 213-228.

GRANGER, C.W.J. (1988), "Some Recent Developments in a Concept of Causality," *Journal of Econometrics*, Vol. 39, 199-211.

HALICIOĞLU, F. (2007); "A Multivariate Causality Analysis of Export and Growth for Turkey", MPRA Paper 3565, University Library of Munich, Germany, revised .

HENRIQUES, I. and SADORSKY, P. (1996), "Export-led growth or growth-driven export?", *Canadian Journal of Economics*, 3: 440-555.

ISMIHAN, M., OZCAN, K. and TANSEL, A. (2005), "The role of macroeconomic instability in public and private capital accumulation and growth: the case of Turkey 1963 – 1999", *Applied Economics*, Vol. 37, pp. 239 – 251.

JOANSEN, S. and JUSELIUS, K. (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money," *Oxford Bulletin of Economic and Statistics*, Vol. 52, 169-210.

KARAGÖZ, M. and ŞEN, A. (2005), “Exports and Economic Growth of Turkey: Co-integration and Error-Correction Analysis” *Elektronik Sosyal Bilimler Dergisi* www.e-sosder.com ISSN:1304-0278 Yaz 2005 C.4 S. 13 (1-15)

KAVOUSSI, R. M. (1984), “Export Expansion and Economic Growth: Further Empirical Evidence”, *Journal of Development Economics*, vol.14, pp. 241-250.

KAWAN, A. C. C and COTSOMITIS, J. (1990), “Economic growth and the Expanding Export Sector: China 1952-1985, *International Economic Review*, vol. 5, pp. 105-117.

KRUEGER, A. (1978), *Foreign Trade Regimes and Economic Development: Liberalization attempts and Consequences*, National Bureau of Economic Research, New York.

KRUGMAN, P.R. (1984), “Import protection as export promotion, in: H. Kierzkowski (ed) *Monopolistic competition in international trade*, Oxford: Oxford University Press.

NAS, T. and PERRY, M. (2001), “Turkish Inflation and Real Output Growth, 1963 – 2000”, *Russian and East European Finance and Trade*, Vol. 37, No. 6, pp. 31 – 46.

OXLEY, L. (1993), “Cointegration, Causality and Export-led growth in Portugal, 1865- 1985”, *Economic Letters*, vol. 43, pp. 163-166.

RAM, R. (1985), “Exports and economic growth: some additional evidence”, *Economic Development and Cultural Change*, 33, pp. 415-425.

RAM, R. (1987), “Exports and Economic growth in Developing Countries: Evidence from Time Series and Cross-Section Data”, *Economic Development and Cultural Change*, vol.36, pp.51-72.

RUIZ-NAPOLES, P. (2001), “Liberalization, Exports and Growth in Mexico 1978-94: A Structural Analysis”, *International Review of Applied Economics*, Vol. 15: 163-180.

SALVATORE, D. and ATCER, T. (1991), “Inward Oriented and Outward Oriented Trade Strategies”, *The Journal of Development Studies*, vol. 27, pp. 7-25.

SAN, J. and SUN, F. (1998), “Export-led growth hypothesis for Australia: An empirical reinvestigation”, *Applied Economics Letters* 5: 423-428.

TEKIN, A. (2006), “Turkey’s Aborted Attempt at Export – Led Growth Strategy: Anatomy of the 1970 Economic Reform”, *Middle Eastern Studies*, Vol. 42, No: 1, pp. 33 – 163.

THOMTON, J. (1997), "Export and economic growth: Evidence from 19th century Europe", *Economics Letters*, 55: 235-240.

TOSUN, M. and ABIZADE, S (2005), "Economic growth and tax components: an analysis of tax changes in OECD", *Applied Economics*, Vol. 37, pp. 2251 – 2263.

TYLER, W. G. (1981), "Growth and Export Expansion in Developing Countries: Some Empirical Evidence", *Journal of Development Economics*, vol. 9, pp. 121-130.

YAGHMAIAN, B. (1994), "An Empirical Investigation of Exports, Development and Growth in Developing Countries: Challenging the Neoclassical Theory of Export- Led Growth", *World Development*, vol. 22.

YILMAZ, B. (2002), "The Role of Trade Strategies for Economic Development", *Russian and East European Finance and Trade*, Vol.38, No.2, pp. 59 – 78.

Web Page of the Central Bank of Turkey; web page: [www.tcmb.gov.tr](http://www.tcmb.gov.tr) (last visit on 30.11.2007)

Web Page of the Ministry of Foreign Affairs (2008), A Synopsis of the Turkish Foreign Policy; web page <http://www.mfa.gov.tr/MFA/ForeignPolicy/Synopsis/economy.htm>, [last visited on 30.11.2007].

Web Page of the Undersecretariat of Treasury; web page: <http://www.treasury.gov.tr/stat/egosterge/I-Uretim/Uretim.xls>, [last visited on 30.11.2007].

Web Page of Under Secretariat of Foreign Trade; web page: [www.dtm.gov.tr](http://www.dtm.gov.tr), [last visited on 30.11.2007].

Web Page of Turkish Statistical Institute; web page: [www.tuik.gov.tr](http://www.tuik.gov.tr), The Foreign Statistics Bulletin, No: 190, 30.11.2007, [last visited on 30.11.2007].

