

## **AN EMPIRICAL EXAMINATION OF THE EXPORT-LED GROWTH HYPOTHESIS IN TURKEY<sup>1</sup>**

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### **ABSTRACT**

The export-led growth [ELG] hypothesis postulates a causal connection between export and growth. This study investigates ELG hypothesis using quarterly time series data for the period 1980:1-2007:2 in Turkey. The hypothesis is tested by applying the cointegration and error correction procedures. We find an evidence to support the hypothesis that there is a long-run and short-run bidirectional causality relationship between export growth and real GDP growth in Turkey.

**Key Words:** Export-Led Growth Hypothesis, coingration, Turkey.

### **1. INTRODUCTION**

The economic policy implemented immediately after the independence of Republic of Turkey in 1923 was based on a liberal economic policy which emphasizes the role of private sector. During the early periods, main emphasis was given to the establishment of an economic base on the grounds of self-sufficiency. In order to achieve this goal, in fact, liberal economic policies accepted in the first Turkish economic conference which was held in 1923 in Izmir. Turkey, however, did not have the proper environment to succeed with such a development policy based on private enterprises in the 1920s. The reason was that there were a lot of problems such as shortage of national capital, underdeveloped financial institutions, inadequate policies for introducing foreign capital, a shortage of entrepreneurs and an underdeveloped infrastructure.

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For half a century, from the 1930s to the beginning of the 1980s, except for the short period of liberalization experience between 1950-1953, Turkey followed a strategy of growth through inward-oriented import substitution policies coupled with intensive government intervention. Main features of this period are that the economic policies characterized as interventionist and protectionist were carried out within the development plans. Accordingly, policies were mainly designed to protect domestic industry from foreign competition and increase the government controls over the allocation of resources and production of goods. (Taş and Kar, 2002:41)

The 24th January 1980 Decisions were announced in order to prevent inflation, to fill in the foreign financing gap, and to reach a more outward-oriented and market-based economic system. Within the framework of these decisions, the government accepted export-led growth strategy and sustained the external competitiveness of the Turkish economy through exchange rate policy and export subsidies. These initial moves also proved to be helpful in regaining the confidence of international creditors. The IMF Stand-by and World Bank adjustment loans were rapidly arranged and disbursed in conjunction with additional debt relief operations. On the other hand, the 1980s witnessed a deliberate contraction in real wages, which aimed at producing an exportable surplus and enhancing export competitiveness through lower labor costs. These export-oriented policies succeeded in raising exports considerably. Its 2 billion dollar worth of export in 1980 reached at about 100 billion dollars in 2007. The European Union (EU) candidacy in 2001 has particularly contributed to this progress.

In the developing countries, export is seen as favorable because of the following reasons. It uses more advanced technologies and better capacity utilization due to the larger market. It is also the source of the foreign exchanges that are very scarce in most developing countries throughout the world. With these foreign exchanges, it could import better quality inputs and more capitals. Of course, these entirely shift the country's production possibility curve further.

The remainder of the paper is organized as following. Section 2 briefly explains what export-led growth hypothesis is about. Section 3 deals with the empirical studies. Section 4

gives the details the methodological issues and about data set. Section 5 gives the concluding marks.

## **2. EXPORT-LED GROWTH [ELG] HYPOTHESIS**

Ricardo's theory of comparative advantage explains that countries should specialize in the production of commodities that they are most efficient at producing in relation to other countries, and trade those commodities with the rest of the world. It is possible to say that a country can export its commodities and consequently raise foreign currency, with which it can import the other commodities in need. The better a country is at producing its specialized commodities, the more revenue it will raise from its exports and the more it will be able to procure imports. This trade theory has given birth to a new direction for economic policy, namely the export-led growth [ELG] hypothesis (Zuniga, 2000).

The ELG hypothesis postulates that export expansion is a key factor in promoting long-run economic growth. Several arguments can be theoretically put forward to justify the ELG hypothesis. From a demand-side perspective, it can be argued that sustained demand growth cannot be maintained in small domestic markets, since any economic impulse based on the expansion of domestic demand is bound to be exhausted quickly. Export markets, in contrast, are almost limitless and hence do not involve growth restrictions on the demand side. Therefore, exports can be a catalyst for income growth as a component of aggregate demand (Herzer et. al., 2004).

The main notion of the ELG hypothesis is that producing for export markets increases efficiency, which in turn increases productivity, hence raising more revenue leading to economic growth. In addition, microeconomic theory on production possibility frontiers is directly related to the export-led growth model. In synthesis, a production function is specified with exports as an explanatory variable, and this produces a tie between aggregate output and exports which constitutes the basis of a vast amount of empirical studies available in the trade and development literature (Zuniga et. al., 2000).

The theoretical model, which incorporates exports into the Cobb-Douglas function, is shown as follows:

$$Y = f(K, L, X)$$

Where Y is output, K is capital, L is labor and X is exports of goods and services. The expected signs in the model would be positive for all three variables because they are all expected to have a positive effect on overall output. The expectation of positive signs comes from the premise that the more capital and labor used, the higher the output. The positive sign expected for the export variable is derived from the assumption that the export sector yields externalities that result in higher output by the non-export sector.

According to Abdulnasser and Manuchehr (2000), the export-oriented policies contribute to economic growth from the different ways summarized as follows:

- Keynesian argument is that an increase in exports leads through the foreign trade multiplier to output expansion.
- Export relaxes the binding foreign exchange constraint to allow increases in imports of capital and intermediate goods which lead, in turn, to economic growth.
- Exports increase efficiency via competition.
- Competition gives rise to the economies of scale and diffusion of the technical knowledge in production, which is a potentially important source of growth.

The ELG hypothesis is also explained by a large number of authors' different point of views. For instance, Sharma and Panagiotidis (2003) argue that an increase in export could cause an output growth through better management styles, some positive externalities, increasing the scale economies, dynamic competitiveness and efficient allocation. If these factors occur in export sector, there will be reallocation of resources in favor of the export oriented businesses. This could even adversely affect the other sectors, due to the positive net effect and the improvement that could happen in foreign exchange market will have a positive impact on the output level. Myint (1954-55) and Rana and Dowling (1990) saw the export as a beneficial to the balance of payment since the developing countries always are in shortage of foreign currencies rather than reallocation of resources. Esfahani (1991) draw attention to the external effects of the export orientation that more skilled managers and labors would move to import competing sectors allowing the productivity to increase. Thus, the ELG

hypothesis implies that export growth lead to economy-wide productivity growth. Zuniga (2000) explains that the ELG strategy leading to development through economic growth has become a central part of free market economic doctrine in such a way that international financial institutions like the World Bank, the IMF and official government aid agencies have been favor of export (i.e. export promoting policies) as a condition for providing loans or development aid. As well as promoting economic growth, export-oriented policies are also proposed as a way to pay off debts.

The ELG hypothesis also accepts that the causality may run from output to export. Lancaster (1980) and Krugman (1984) maintain a one-way causality from output to exports. They argue that output growth has a positive effect on productivity growth and improve productivity, while cost reduction in labor and capital are expected to promote exports. Clearly, these arguments lead us to hypothesize that a causal relationship exists from export growth to output growth.

### **3. PREVIOUS EMPIRICAL STUDIES**

The ELG hypothesis has been analyzed by a large number of empirical researches. The first group of studies including Michaely (1977), Feder (1982), Kavoussi (1984) employed cross-country data sets and concluded that the positive correlation between export growth and GDP growth was seen as an evidence of ELG hypothesis. However, Medina and Smith (2000) and Abu-Quarn and Abu Bader (2005) state that this does not imply anything about the causality running from export growth to GDP growth or vice versa. More importantly, some studies, Shan and Sun (1998) and Herzer (et. al., 2004) emphasize that utilizing cross-country data sets implicitly assumes that countries have similar economic structure and similar production technologies that might give us misleading results.

After all these criticisms, the recent studies began to employ Granger causality tests using individual country time series data sets. Since causality tests are very sensitive to the omitted variables, the empirical results are mixed and conflicting. Moreover, due to the national income accounting identity, export is a component of GDP. Therefore, this means

that there is biasness in favor of correlation. ELG hypothesis could be held for the certain export categories. Ghatak (et. al., 1997) stresses that certain types of export could cause GDP growth yet this may not be found at the aggregate level of export for Malaysia. Thus mixed results may be found in the empirical literature.

Since the mid-1980s, Granger causality tests frequently have been used to find the relationship between export and economic growth. (Gübe, 1997:22) The first study, using this methodology, was conducted by Jung and Marshall (1985). They investigated the causal relationship between export and growth for 37 countries and found that export promotion policies just supported in 4 countries. Darrat (1987) investigated the ELG hypothesis for South Korea, Singapore, Hong Kong and Taiwan for the period 1955-1982. Although his findings indicated a positive relationship between export growth and economic growth under the investigated period, Granger causality test results did not support the ELG hypothesis for the three countries except for Korea.

There are some studies done about the recent Indian economic development whether this is caused by an increase in export. Nidugala (1991) attempted to find an answer whether the Indian economy is moving in the right direction as far as economic growth is concerned. He found that export growth played a significant role in the shift in the GDP growth in 1980s, not in the period 1961-62 and 1979-80. There is also a positive relationship between the GDP growth and the manufactured goods growth. In a recent study, Sharma and Panagiotidis (2003) investigated the export rise in India for the period 1971-2001. They obtained the data set from Reserve Bank of India. They employed Engle-Granger causality and Johansen methodologies to test whether export and GDP are cointegrated and export growth leads to the GDP growth. The authors utilized real GDP, real net GDP (subtracted from export) real export, real import and real investment, population and employment in the formal sector. They failed to find the cointegration between both types of GDP and export. They also could not show that exports Granger causes for both GDP with exports and GDP without exports.

The ELG hypothesis is also tested for Asian developing countries. Rahman and Mustafa (1997) selected 13 Asian developing countries for different time periods due to the data availability. They included real GDP and real exports in their equation. They applied Granger causality test, and cointegration and error-correction models. They found

cointegration between the real GDP and the real export for all countries. Yet, their findings about the direction are mixed in short run and long run for the different countries. Ekanayake (1999) tested the ELG hypothesis for eight Asian developing countries for different time periods. He employed cointegration and error-correction modeling techniques to investigate whether ELG hypothesis holds for these countries in concerned time period. He found that there exists bidirectional causality between export growth and GDP growth for all eight Asian countries except for Malaysia. The evidence supports short run Granger causality running from economic growth to export in all cases except for Sri Lanka. Yet, the strong evidence for long run Granger causality running from export growth to economic growth in all cases also exists.

The ELG hypothesis has also been tested by a number of studies in Turkey. One of these studies carried out by Özmen vd. (1999) using the quarterly data during the period 1983:1- 1997:2. They have tested the causality issue between export and output by applying the standard Granger (1969) causality method. The results show uni-directional causality from export to output under the consideration period. The ELG hypothesis is also tested by Alıcı and Ucal (2003) using quarterly data 1987:1-2002:4. They employed Toda and Yamamoto (1995) causality technique to test the hypothesis. The results indicate uni-directional causality running from export growth to output growth. Another study supporting the ELG hypothesis, using Johansen's methodology, is carried out by Doğanlar and Fisunoğlu (1999). This study investigates the causal relationship between export and economic growth for seven Asian countries including Turkey for the period 1951-1995. They find that there is a bidirectional causality relationship between export and output growth for Turkey in long-run.

In the two recent studies, ELG hypothesis is investigated Latin American countries. (Herzer et. al., 2004), using Chilean time series data 1960-2001, employed single equation and system cointegration techniques to analyze the productivity effects of manufactured and primary exports. They found that exports of manufactured products are important for productivity and therefore for long-run economic growth. Zuniga investigated whether there exist the export-led growth for Honduras and five other Latin American countries. He employed the following variables real GDP, real gross capital formation, labor in numbers and real exports for the 1970-2000 period. His findings support ELG hypothesis only in El Salvador in short run and totality cases. ELG hypothesis is still valid in the long run for

Guatemala and for non agricultural sector of Honduras. Exports Granger causes economic growth in the long run and in totality for Nicaragua. For Costa Rica, Honduras and agricultural GDP sector of Honduras, the ELG hypothesis could not be supported.

#### 4. METHODOLOGY AND DATA

At first, we need to discern the stationary of the series in order to avoid spurious regression. Stationary could be achieved by appropriate differencing and this appropriate number of differencing is called order of integration. In this study, we use Augmented Dickey Fuller (ADF) (Dickey and Fuller, 1981) test whether the variables are stationary.

$$\Delta y_t = \alpha + \beta y_{t-1} + \sum_{i=1}^k \gamma \Delta y_{t-i} + u_t \quad (1)$$

where  $\Delta y$  is the first difference of  $y$  series,  $\alpha$  is a constant term,  $u$  is the residual term and  $k$  is the lagged values of  $\Delta y_t$  which are included to allow for serial correlation in the residuals. In the context of the ADF test, a test for nonstationary of the series,  $y$ , amounts to a  $t$ -test of  $\beta = 0$ . The alternative hypothesis of stationary requires that  $\beta$  be significantly negative. If the absolute value of the computed  $t$ -statistics for  $\beta$  exceeds the absolute critical value, then the null hypothesis that the log level of  $y$  series is not stationary must be rejected against its alternative. If, on the other hand, it is less than the critical value, it is concluded that the log level of  $y$  is nonstationary. In this case, the same regression must be repeated for the first difference of the logarithmic value of the series. The appropriate lag order of  $k$  in equation 1 was chosen on the basis of the criteria of Schwarz.

If all variables are found to be  $I(1)$ , the second step is to test for the existence of a cointegration relationship between them. We follow the Engle and Granger (1987) two step procedure to search for cointegration among the variables. In the first step, nonstationary series (For example,  $X$  and  $Y$ ) are estimated by using Ordinary Least Squares method:

$$Y_t = \alpha + \beta X_t + u_t \quad (2)$$

After the estimation, again the ADF unit root process is applied for the residual of equation 3 to determine whether the residual term ( $u$ ) is stationary.

$$\Delta u_t = \gamma + \theta u_{t-1} + \sum_{i=1}^k \rho_i \Delta u_{t-i} + \varepsilon_t \quad (3)$$

If the residual term is found stationary, this case, in equation 3, indicates that time series are cointegrated in the long term. Otherwise, it is understood that these series are not cointegrated, in other words, we conclude that time series do not share the same stochastic trend in the long-run. However, the Engle-Granger approach is criticized for several shortcomings, which include the following: (a) the arbitrary normalization of the cointegration vector, (b) the assumption of one cointegrating vector in systems with more than two variables and (c) biased OLS estimators.<sup>2</sup> Furthermore, due to non-normality of the distribution of the estimators, no final judgement can be passed on the significance of the estimated coefficient (Herzer et. al., 2004).

Therefore, we use the maximum likelihood approach of Johansen (1988) and Johansen and Juselius (1990) in addition to the Engle-Granger method. Johansen's system-based procedure treats all variables as potentially endogenous and thus avoids the problem of normalising the cointegrating vector on one of the variables. Moreover, it allows the empirical determination of the number of cointegrating relations and produces maximum likelihood estimators of the parameters of these relations (Herzer et. al., 2004).

To carry out the Johansen and Juselius methodology, we first formulate the VAR model:

$$y_t = \mu + \sum_{k=1}^p \Pi_k y_{t-k} + \varepsilon_t \quad (4)$$

Where  $y_t$  is an  $(n \times 1)$  column vector of  $n$   $I(1)$  variables,  $\Pi_k$  is a coefficient matrix,  $\mu$  presents a  $(1 \times n)$  vector of constants,  $p$  denotes the lag length, and  $\varepsilon_t$  is a disturbance term independently and identically distributed with zero mean and constant variance. This procedure uses two test statistics to determine the cointegration rank. The first of these is known as the trace statistic:

$$\lambda_{\text{trace}} = -N \sum_{i=r+1}^m \ln \left[ 1 - (r_i^*)^2 \right] \quad (5)$$

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<sup>2</sup> Biased OLS estimators may be due to the exclusion of short run dynamics and the presence of endogenous explanatory variables.

where  $N$  is the total number of observations,  $m$  is the number of variables and  $r_i^*$  is the  $i$  correlation between  $i$ -th pair of variables.  $\lambda$  trace has a chi-square distribution with  $m - r$  degrees of freedom. Large values of  $\lambda$  trace give evidence against the hypothesis of  $r$  or fewer cointegration vectors.

The second test statistic is the maximal eigenvalue test:

$$\lambda_{\max} = -T \ln(1 - \lambda_{r+1}) \quad (6)$$

In this test, the null hypothesis of  $r$  cointegrating vectors is tested against the alternative of  $r+1$  cointegrating vectors. Nevertheless, Johansen and Juselius (1990) suggest that the maximal eigenvalue test is more powerful than the trace test.

If the series are found cointegrated by either Engle-Granger approach or Johansen-Juselius approach or both, there will exist an error correction model (ECM) (Rahman and Mustafa, 1997:84) including an error correction term (ECT) obtained from the relevant cointegration regressions. ECT is used for correcting disequilibrium and testing for long run and short run causality among cointegrated variables. The error correction models are defined as in equations (7) and (8).

$$\Delta Y_t = \alpha_1 + \sum_{i=1}^m \beta_{1i} \Delta Y_{t-i} + \sum_{i=1}^n \gamma_{1i} \Delta X_{t-i} + \sum_{i=1}^r \delta_{1i} ECT_{t-1} + e_t \quad (7)$$

$$\Delta X_t = \alpha_2 + \sum_{i=1}^m \beta_{2i} \Delta X_{t-i} + \sum_{i=1}^n \gamma_{2i} \Delta Y_{t-i} + \sum_{i=1}^r \delta_{2i} ECT_{t-1} + e_t \quad (8)$$

Where  $\Delta$  indicates the differenced stationary form of the variables. The sources of causality in ECM could be exposed through the statistical significance of: a) a joint test applied to the sum of the lags of each explanatory variable in turn by an F or Wald  $\chi^2$  test; b) the lagged ECTs by a t-test which is the weak exogeneity test, which is considered by Asafu-Adjaye (2000) as short-run causality since the dependent variable responds only to short term shocks to the stochastic environment c) a joint test applied to the sum of each explanatory variable and the lagged ECTs by an F or Wald  $\chi^2$  test which is a strong exogeneity test, which gives us the long-run causality. (Charemza and Deadman, 1997; Masih and Masih, 1995, 1998) For instance, the null hypothesis that "Y does not cause X in the Granger sense" is rejected if the lagged values of  $\Delta Y$  are jointly significant from zero in equation (5). The same hypothesis is also rejected if the lagged value of  $ECT_{t-1}$  is significant or lagged values of  $\Delta Y$  and the lagged value of  $ECT_{t-1}$  are jointly significantly different from the zero. If the estimated values

of lag variables in equation (5) are statistically significant, then we can conclude that Y Granger causes X in the short run. In addition, if the coefficient of the  $ECT_{t-1}$  term is significant, then we can say that Y Granger causes X in the long-run.

For this study we use quarterly real GDP (1987 base year) and export data for the 1980:1-2007:2 period of Turkey. All data come from Electronic Data Delivery System of the Central Bank of the Republic of Turkey via internet, various issues of the quarterly Statistical Bulletin of the Central Bank and Statistical Indicators (1923-1998) published by the State Institute of Statistics. Export data were in million US\$. We then converted to current Turkish Liras using the US\$ exchange rate. All variables are also transformed to natural logs denoted as LY (real GDP) and LX (export).

## 5. EMPIRICAL RESULTS

The unit root test results are reported as follows:

Variable	Constant No Trend	Critical Value		Constant Trend	Critical Value	
		1%	5%		1%	5%
LY	1.654 (3)	-3.493	-2.888	0.386 (3)	-4.046	-3.452
LX	-1.212 (4)	-3.493	-2.888	-1.240 (8)	-4.051	-3.454
$\Delta LY$	-7.618** (2)	-3.493	-2.888	-7.692** (2)	-4.046	-3.452
$\Delta LX$	-3.641** (3)	-3.493	-2.888	-3.817* (3)	-4.047	-3.453

The number inside brackets denotes the appropriate lag lengths which are chosen using Schwarz Criterion.

\* Denotes for 5% significance level.

\*\* Denotes for 1% significance level.

Table 1 reports the results of the ADF test on the integration properties of real GDP and export for Turkey. Results of the ADF test indicate that the two series are found to be non-stationary. But the stationary of these series at first differences lead to stationary. These indicate that the integration of real GDP and export for Turkey is of order one (1), namely I(1).

Given that integration of the two series is of the same order, we continued to test whether the two series are cointegrated over the sample period. At first, Engle-Granger cointegration test procedure is applied. The cointegration results based on this procedure are presented as follows:

**Table 2: Engle-Granger Cointegration Test**

Dependent Variable	Independent Variable	ADF Statistics	Critical Value		Result
			1%	5%	
LY	LX	0.610 (3)	-3.493	-2.888	Not-Cointegrated
LX	LY	-1.191 (4)	-3.493	-2.889	Not-Cointegrated

The optimum lag-lengths are indicated within parentheses and they are determined by the Schwarz criterion.

As seen from the Table 2, the entire ADF test statistics are below the critical values. This shows that the variables are not cointegrated. This expresses that there is not any long-run relationship between real GDP and export series over the period 1980-2007 in terms of Engle-Granger approach.

To overcome any confusions about the cointegration relation, the Johansen-Juselius Procedure is applied next. Table 3 shows the results of Johansen test.

**Table 3: Johansen Cointegration Test**

Series: LY, LX		Eigenvalue	Trace Statistic	Critical Value 5%	Max-Eigen Statistic	Critical Value 5%	Result
r=0	0.217	28.341*(3)	20.261	26.004*(3)	15.892		
r=1	0.021	2.336 (3)	9.164	2.336 (3)	9.164		Cointegrated

Normalized cointegration equation: LY = 8.2655 + 0.0786LX

\* Denotes for 5% significance level.

The optimum lag-lengths are indicated within parentheses and they are determined by the Schwarz criterion.

Trace and maximum eigenvalue tests indicate one cointegrating equation at the 5% level of significance. In other words, the hypothesis of no cointegrating vector is rejected by both trace and maximum eigenvalue tests. Finding a cointegrating vector between real GDP and export series indicate that there is a long-run equilibrium relationship between these series for Turkey.

The normalized cointegrating coefficients are shown in the last row of Table 3, and the signs of the variables conform to the theory in the literature (i.e. there is positive relationship between economic growth and export).

Following the detection of the cointegrating relationship between real GDP and export in terms of the Johansen method, the error correction models (7) and (8) were set up to investigate short and long-run causality. The results are reported as follows:

**Table 4: Granger Causality Test**

Dependent Variable	Causal Variable	Lag Orders	Short-run causality			Long run-causality	
			$\Sigma \Delta LY$	$\Sigma \Delta LX$	t statistics of the coefficient of $ECT_{t-1}$	$(ECT_{t-1}, \Sigma \Delta LY)$	$(ECT_{t-1}, \Sigma \Delta LX)$
$\Delta LY$	$\Delta LX$	$n = 2, m = 2$	-	3.184**	-2.208**	-	5.437***
$\Delta LX$	$\Delta LY$	$n = 4, m = 2$	12.450***	-	-1.802*	8.394***	-

Lag orders are selected based on the Schwarz criterion, m = lag length of dependent variable, n= lag length of "causal variable".  $\Sigma$  shows the lagged coefficients of the concerned variable are all jointly tested.

\*Denotes for 10% significance level

\*\*Denotes for 5% significance level

\*\*\* Denotes for 1% significance level

As can be seen from the table 4, F statistics, which are applied the lagged coefficients of  $\Delta X$  and  $\Delta Y$  are all jointly significant at the 5% and 1% levels, respectively. We conclude that there is a bidirectional short run causal relationship between the variables. The significance of a long-run relation is usually determined by the t-value associated with the respective numerical coefficient of the error-correction term. As seen from the table, t statistics of these terms are appeared to be significant. In addition, using F test, we find bidirectional long-run causality between real GDP growth and export growth because we cannot reject the null hypotheses that lagged ECT coefficients and the interaction terms are jointly zero. The interaction terms ( $ECT_{t-1}, \Sigma \Delta LY$  and  $ECT_{t-1}, \Sigma \Delta LX$ ) in equations are found to be significant at the 1% levels.

In summary, Granger causality test results indicate that there is a bidirectional causality relationship between export growth and real GDP growth in both short run and long run in Turkey for the period 1980-2007.

When we compare our results with those of studies on Turkey mentioned in section 3, we have obtained similar results with Doğanlar and Fisunoğlu (1999) which just found bidirectional causality in the long-run. On the other hand, the other studies conducted by Özmen et. al., (1999), Alıcı and Ucal (2003) have showed uni-directional causality from export to growth which are different from our study results. This study differs from these on the grounds of estimation method and for the concerned time period. These elements might be the source of the differences in the findings of these two studies.

## 6. CONCLUSION

This paper investigated the export-led growth hypothesis using the quarterly time series data running from 1980:1 to 2007:2 for Turkey. This study has applied the error correction model to investigate the causality between the export growth and real GDP growth. Before testing causality, both Engle-Granger and Johansen approaches were used to investigate the cointegration. Even though Engle-Granger test results indicated that there is no long-run relationship between the export and real GDP series, a long-run relationship between these series was found by applying Johansen's cointegration method. Following the detection of the cointegrating relationship between export and real GDP in terms of Johansen approach, an error correction model was set up to investigate short and long-run causality. The export-led growth hypothesis suggests a causal relation between export and economic growth. We have found an evidence to support the hypothesis that there is a long-run and short-run bidirectional causality relationship between export growth and real GDP growth in Turkey. From these results, we can comfortably say that the export-led growth policies will contribute to economic growth and economic growth will also contribute to growth in export in Turkey.

## REFERENCES

- Abu-Quarn, A. S and S. Abu-Bader. 2004. "The Validity of the ELG Hypothesis in the MENA Region: Cointegration and Error Correction Model Analysis," *Applied Economics*, 36:685-1695.
- Abdulnasser, H and I. Manuchehr. 2000. "Time Series Evidence for Balassa's Export-Led Growth Hypothesis," *Journal of International Trade and Economic Development*, 9:355-365.
- Alicı, A.A and M. Ş. Ucal. 2003. "Foreign Direct Investment, Exports and Output Growth of Turkey: Causality Analysis," *European Trade Study Group (ETSG) Fifth Annual Conference*, (September), Madrid.
- Asafu-Adjaye, J. 2000. "The Relationship between Energy Consumption, Energy Prices and Economic Growth: Time Series Evidence from Asian Developing Countries," *Energy Economics*, 2:615-625.
- Charemza, W.W and D.F. Deadman. 1997. *New Directions in Econometric Practise*, Cheltenham: Edvard Elgar.
- Darrat, A. 1987. "Are Exports and Engine of Growth? Another Look at the Evidence," *Applied Economics*, 19:277-283.
- Dickey, D.A and W.A. Fuller. 1979. "Distribution of the Estimators for Autoregressive Time Series with a Unit Root," *Journal of the American Statistical Association*, 74:427-431.
- Doğanlar, M and M. Fisunoglu. 1999. "Causality Between Exports and Economic Growth in Asian Countries," *Yapi Kredi Economic Review*, 10(11):3-11.
- Ekanayake, E. M. 1999. "Exports and Economic Growth in Asian Developing Countries: Cointegration and Error-Correction Models," *Journal of Economic Development*, 24(2):43-56.
- Engle, R.F and C.W.J. Granger. 1987. "Cointegration and Error Correction: Representation, Estimation and Testing," *Econometrica*, 55:251-76.
- Esfahani, H.S. 1991. "Exports, Imports, and Economic Growth in Semi-Industrialized Countries," *Journal of Development Economics*, 35(1):93-116.
- Feder, G. 1982. "On Exports and Economic Growth," *Journal of Development Economics*, 12:59-73.
- Ghatak, S, C. Milner and U. Utkulu. 1997. "Exports, Export Composition and Growth: Cointegration and Causality Evidence for Malaysia," *Applied Economics*, 29:213-223.

- Granger, C.W.J. 1969. "Investigating Causal Relations by Econometric Models and Cross Spectral Methods," *Econometrica*, 37(3):424-435.
- Gübe, Y. 1997. "İktisadi Büyüme ve İhracat Performansı," *Hazine Dergisi*, 6:17-28.
- Herzer, D., F. N. Lehmann and B. Siliverstovs. 2004. "Export-Led Growth in Chile: Assessing the Role of Export Composition in Productivity Growth," *Ibero-America Institute for Economic Research Discussion Papers*.
- Johansen, S. 1988. "Statistical Analysis of Cointegration Vectors," *Journal of Economic Dynamics and Control*, 12:231-254.
- Johansen, S and K. Juselius. 1990. "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money," *Oxford Bulletin of Economics and Statistics*, 52:169-211.
- Jung, W and P.J. Marshall. 1985. "Exports, Growth and Causality in Developing Countries," *Journal of Development Economics*, 18:1-12.
- Kavoussi, R. 1984. "Export Expansion and Economic Growth: Further Empirical Evidence," *Journal of Development Economics*, 14:241-250.
- Krugman, P.R. 1984. Import Protection as Export Promotion, in Kierzkowski, H. (ed.), *Monopolistic Competition in International Trade*, Oxford University Press, Oxford UK.
- Lanchaster, K. 1980. "Intra-industry Trade under Perfect Monopolistic Competition," *Journal of International Economics*, 10:151-175.
- Masih, A.M.M and R. Masih. 1995. "Temporal Causality and The Dynamic Interactions Among Macroeconomic Activity Within A Multivariate Cointegrated System: Evidence From Singapore and Korea," *Weltwirtschaftliches Archiv*, 131(2):265-285.
- Masih, A.M.M and R. Masih. 1998. "A Multy Cointegrated Modelling Approach Intesting Temporal Causality Between Energy Consumption, Real Income And Prices with an Appliccation to Two Asian LDCs", *Applied Economics*, 30, pp.1287-1298.
- Medina-Smith, E. J. 2000. "Is the Export Led Growth Hypothesis Valid for the Developing Countries? A Case Study for Costa Rica," *Policy Issues in International Trade and Commodities*, Study Series Number 7, United Nations Conference on Trade and Development.
- Michaely, M. 1977. "Export and Growth: An Empirical Investigation," *Journal of Development Economics*, 4:49-53.
- Myint, M. 1954-55. "Gains in International Trade and Backward Countries" *Review of Economic Studies*, 22:219-242.

- Nidugala, G. K. 1991. "Exports and Economic Growth in India: An Empirical Investigation," *The Indian Economic Journal*, 47(3):67-78.
- Özmen, A, M. Özer and S. Türkyılmaz. 1999. "Türkiye'de İhracat ve Ekonomik Büyüme Arasındaki Nedenselliğe İlişkin Bir Uygulama Denemesi," *Orhan Oğuz'a Armağan*, Marmara Üniversitesi Yayıni, No. 640:379-392.
- Rahman, M and M. Mustafa. 1997. "Dynamics of Real Exports and Real Economic Growths in 13 Selected Asian Countries," *Journal of Economic Development*, 22(2):81-95.
- Rana, P.B and J.M. Dowling. 1990. "Foreign Capital and Asian Economic Growth," *Asian Development Review*, 8(2):77-102.
- Shan, J and F. Sun. 1998. "On the Export-Led Growth Hypothesis: The Econometric Evidence from China," *Applied Economics*, 30:1055-1065.
- Sharma, A and T. Panagiotidis. 2003. "An Analysis of Exports and Growth in India: Some Empirical Evidence (1971-2001)," *Sheffield Economic Research Paper Series SERP* No: 2003004.
- State Institute of Statistics (SIS). Statistics Yearbook (1923-1998).
- Taş, S and M. Kar. 2002. "A Critical Survey of the Empirical Studies on Financial Liberalization in Turkey", *Gaziantep Üniversitesi Sosyal Bilimler Dergisi*, 5(1):29-45.
- Toda, H.Y and T. Yamamoto. 1995. "Statistical Inference in Vector Autoregressions with Possibly Integrated Processes," *Journal of Econometrics*, 66:225–250.
- Turkish Republic Central Bank, Electronic Data Delivery System  
<http://www.tcmb.gov.tr>, [Accessed 30.12.2007].
- Zuniga H. C. 2000. "Export-Led Growth in Honduras and the Central American Region," *Master Thesis*, The Department of Agricultural Economics and Agribusiness, Louisiana State University. [http://etd.lsu.edu/docs/available/etd-12032004-070104/unrestricted/Final\\_Thesis\\_Document.pdf](http://etd.lsu.edu/docs/available/etd-12032004-070104/unrestricted/Final_Thesis_Document.pdf)  
[Accessed 25.01.2005].