An analytical approach on defense expenditure and economic growth: the case of Turkey and Greece

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Introduction

Benoit (1973, 1978) who found a positive effect of defense expenditure on economic growth, was initiating the investigation of the defense-growth relationship. After that, the relationship between defense expenditure and economic growth has been frequently explored analytically in the defense economics literature by Smith (1980), Frederiksen and Looney (1982), Deger and Smith (1983), Lim (1983), Biswas and Ram (1986), Deger (1986), Grobar and Porter, (1989), Chen (1993), Kollias (1994), Chletsos and Kollias (1995), Lipow and Antinori (1995), DeRouen, (1995), Landau (1996), Sezgin (1996), Murdoch, Pi and Sandler (1997), Antonakis (1997), Masih et al (1997), DeRouen and Heo (2001), (Rufael 2001), Gerace (2002), Atesoglu (2002), Galvin (2003), Mehanna (2004), Karagol and Palaz (2004), Klein (2004), Kollias et al (2004), Dunne et al (2005), Heo and Eger (2005), Lai et al (2005), Reitschuler and Loening (2005).

In the literature, there is much controversy over whether this defense expenditure is associated with higher or lower growth rates (Chang et al., 2001); *First group* argue that the net effect of defense expenditure on economic growth is positive (Benoit, 1973). *Second group* argue that some combination of reduced savings and investment will ultimately lead to reduced growth (Deger, 1986; Grobar and Porter, 1989; Lipow and Antinori, 1995). *Third group* tends to give

context-specific explanations that vary from positive to negative effects (Frederiksen and Looney, 1982; DeRouen, 1995; Landau, 1996).

Although military expenditure may affect growth through several channels such as the Keynesian-type aggregate demand effect, Joerding (1986) states that economic growth may be causally previous to defense expenditures. For instance, a country with high growth rates may wish to strengthen itself against foreign or domestic threats by increased defense spending. The important thing is to assess whether defence spending initiates economic growth or, conversely, is affected by changes in the economy.

Heo (1996 and 1999) has used two approaches to investigate relationship between defense expenditure and economic growth. In the first approach, he used one link for this relationship called direct effect. In the second approach, he investigated the effects of defense expenditure on growth via investment or export. These effects are called indirect effects (see Figure 1).

"take in Figure 1"

In this study we focus on direct effects of defense expenditure on growth for Turkey and Greece. Furthermore we investigate the direction of causality between the growth of GNP and defense expenditures. In our future research, we will investigate the indirect effects of defense expenditure on growth via investment or exports.

Conflicts between Turkey and Greece

The trouble between Greece and Turkey is not recent but is rather a continuation of older enmities that have resurfaced after the Cold War. Both countries have a history of invading the other. Turkey's predecessor state, the Ottoman Empire, ruled Greece until the first half of the 19th century when the bloody Greek War of Independence led to the creation of the Greek state. After World War I, Greece invaded the remnants of the Ottoman Empire hoping to annex Anatolia (now

Turkey) and began a war which led to the defeat of Greece and the creation of modern Turkey. Echoes of these conflicts still roil the waters in Greek-Turkish relations (Cadena, 1998).

Turkey and Greece have been allies in NATO since 1952. They have also been associate members of the European Community since 1961 and 1963; Greece became a full member in 1981, and Turkey became a candidate of the European Union in 2005. Despite their joint participation in and/or close association with these institutions, Turkey and Greece have continued to maintain antagonistic relations. In addition to armed conflict over Cyprus in 1974, Turkey and Greece have been in numerous near-war situations in 1964, 1967, 1976 and 1996 over Cyprus and the continental shelf, airspace and small islets in the Aegean (Rumelili, 2003).

In July 1974, an attempted coup d'état lasting eight days was mounted against the government of Archbishop Makarios, then president of Cyprus, by a group of extremist Greek Cypriots. Turkey responded by intervening militarily, using its rights as a guarantor of the republic, and Turkish armed forces have maintained troops on the northern part of the island ever since. In 1976, two years after the coup attempt and the subsequent Turkish intervention, the Turkish-controlled north was named the Turkish Cypriot Federal State. This was followed by the establishment of the Turkish Republic of Northern Cyprus (TRNC) in 1983. Until now, Turkey has been the only country that has recognized the breakaway state, and it has concluded a number of agreements with the country. The Greek part of the island is recognized as the Republic of Cyprus (RoC) in the international arena and continues to act in the name of the entire island. Since 1974, several attempts at mediation by the UN and the USA to achieve a reunified state on the island have failed (Guney, 2004; Fisher, 2001, Eralp and Beriker, 2005).

If Greece were to extend its territorial waters from the current six nautical miles to the twelve-mile limit permitted under the 1982 Law of the Sea Convention. Turkey has repeatedly stated that it would consider such an act a *casus belli*. (Tsakonas and Tournikiotis, 2003)

Furthermore, In January 1996 the simmering conflict nearly exploded into war over the uninhabited Imia/Kardak islets of Turkey. These small Turkish islets, which are claimed by both

countries, became a catalyst for crisis when Greek and Turkish nationalists engaged in a highly publicized competition to enforce sovereignty over Kardak. Both nations adamantly defended their positions in the dispute and threatened the use of force. Only intense diplomatic pressure from the United States averted an armed encounter between the two NATO allies.

In addition, the January 1997 purchase of a Russian S-300 air defense system by RoC has heightened tensions in the region. Turkey has vowed not to allow deployment of the system on the island, but RoC has committed it self to purchasing the system and receiving it by 1998. The S-300 purchase has created a deadline after which a conflict could occur because of the aggressive and unyielding stance of both parties. Additionally, the governments in both Greece and Turkey are not as receptive to peace initiatives as in they have been in the past; in Turkey's case because of the need to protect nationalist principles in the face of an internal Islamist challenge to the nationalist-secular order and in Greece because of the loss of face the government suffered after the Kardak crisis. Turkey's coalition government is faced with internal turmoil which further decreases the possibility of an accord and increases the likelihood of an escalation. Such a government cannot hope to remain in power by compromising on what are popularly perceived to be vital interests such as sovereignty over Kardak and must therefore adopt rigid nationalistic positions. These factors have given the crisis between Greece and Turkey an urgency which it did not possess earlier in the decade (Cadena, 1998).

Empirical results

Data

The empirical analysis employs annual data on GDP and defense expenditure for Turkey and Greece over the period of 1956-2003. The data for Turkey are obtained from The Central Bank of The Republic of Turkey and SIPRI[1] (various issues) and data for Greece are obtained

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[1] *Stockholm International Peace Research Institute*

from the IFS[2] online database and SIPRI (various issues). All the data series are transformed to logarithmic form. tds and ty (gds and gy) are denoted as defense expenditure and GDP, respectively, for Turkey (Greece).

Unit root tests

A priori, many economic time series will be non-stationary integrated processes. Thus, if a non-stationary time series (X) needs to be differenced (d) times until reaching stationarity, then the time series is said to be integrated of order (d). For testing stationary of series we use Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests.

"take in Table I"

"take in Table II"

Table I reports the results of non-stationary test for tds, ty, gds, gy using ADF tests. We reported a constant but no time trend result of ADF test. Tests results indicate that the hypothesis of a unit root in tds, ty, gds and gy can not be rejected while the hypothesis of a unit root in dtds, dty, dgds and dgy is rejected at least at the 5 percent level of confidence, indicating that all the variables in question are integrated of order one I(1). Table II reports the PP results. The results from the PP tests further confirm the ADF tests indicating all the data series are integrated of order one I(1).

Cointegration test

Having established that defense expenditures and incomes are I(1), we test for cointegration between ds and y, using the residual-based test of Engle and Granger (E-G; 1987). The null hypothesis of the E-G cointegration test is that the two variables I(1) are not cointegrated. If the variables are not cointegrated, then the OLS residuals are not stationary. Therefore, the

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[2] *International Financial Statistics*

cointegration test is the test of a unit root of the residual series[3].

"take in Table III"

Table III present the results from EG cointegration test. These results indicate that long-run equilibrium exists between defense expenditure and income for Turkey and Greece. We also find a long-run equilibrium between Turkey's defense expenditure and Greece's defense expenditure. The paper further examines the hypothesis of a cointegration between triad case ([tds, gds and ty] and [gds, tds and gy]). This means that we can incorporate the defense expenditure variable of Turkey (Greece) into the model of defense expenditure and economic growth of Greece (Turkey).

The hypothesis of no cointegration is rejected in triad case, tds, gds and ty. These results show that long-run equilibrium exist among these variables. However, in the last model of triad case, gds, tds and gy, the hypothesis of no cointegration is not rejected. This results indicate no long-run equilibrium exist among these variables.

Causality test

The Granger Test for causality is such a technique searching the direction of causality between variables. As Granger (1988) points out, if there exists a cointegration vector between defense spending and economic growth, there is causality among these variables at least in one direction. Thus, Granger causality test are employed to determine the causal relationships between defense spending and economic growth. There are four possible outcomes regarding causal relationships between economic growth and military expenditures: unidirectional causality from

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[3] Cointegartion test has been used in many empirical works such as Bahmani-Oskoe et al (2005), Love and Chandra (2005), Narayan and Narayan (2005), Agbola and Damoense (2005), Kalyoncu (2005), Bahmani-Oskoe and Miteza (2004), Masih et al (1997), Chen (1993.

economic growth to military expenditures or vice versa; bidirectional causality between the two variables; and, finally, lack of any causal relationship.

Table IV reports the causality test result for both Turkey and Greece. Lag lenght is selected by using the AIC criterion. The probability values for F statistics are given on the right side of Table IV. If these probability values are less than any α level, then the hypothesis would be rejected at that level. We found unidirectional causality running from economic growth to defense expenditure for Turkey. On the other hand, we found no causality between other variables

"take in Table IV"

Conclusion

In this study, we examined the relationship between defense expenditure and economic growth for Turkey and Greece. For analysis, we used to yearly data in the period of 1956-2003. According to EG cointegration test results, we found that long-run equilibrium exist between defense expenditure and income for Turkey and Greece and, also, a long-run equilibrium between Turkey's defense expenditure and Greece's defense expenditure. The hypothesis of no cointegration is rejected in triad case, tds, gds and ty. These results show that long-run equilibrium exists among these variables. However, second triad case, gds, tds and gy, the hypothesis of no cointegration is not rejected. This results indicate no long-run equilibrium exist among these variables. The causality test results show that there is an unidirectional causality running from economic growth to defense expenditure only for Turkey.

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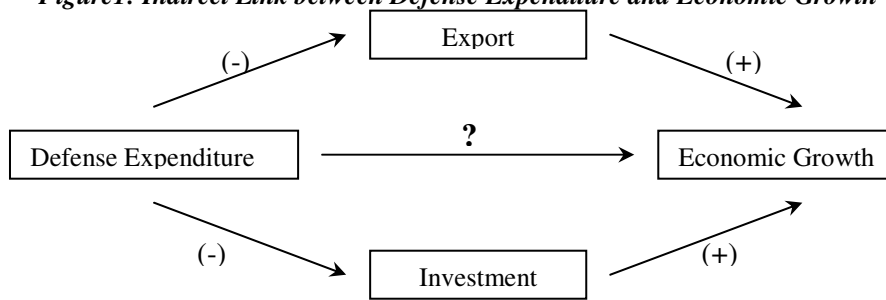***Figure1: Indirect Link between Defense Expenditure and Economic Growth***

Table I: ADF unit roots test results

	Level	AIC(lag)	First Difference	AIC(lag)
Turkey:				
ty	-1.239	-0.350 (2)	-4.015*	-0.295 (2)
tds	-1.336	-1.801 (2)	-3.957*	-1.751 (2)
Greece:				
gy	-0.535	-1.967 (1)	-3.766*	-1.961 (1)
gds	-1.608	-1.666 (1)	-4.536*	-1.587 (1)

Notes: * denote significiantly at the 5% level.

Table II: PP unit roots test results

	Level (lag 3)		First Difference (lag 3)	
	Trend & constant	**constant**	**Trend & constant**	**constant**
Turkey:				
ty	-0.271	-2.699	-7.456*	-7.369*
tds	-1.065	-2.410	-5.153*	-5.166*
Greece:				
gy	-0.719	-2.040	-3.867*	-3.785*
gds	-1.165	-1.115	-6.248*	-6.376*

Notes: * denote significiantly at the 5% level.

Table III: Results for EG Cointegration Tests.

Dependent Variable	Model	R^2	DW	ADF
tds	-6.23 + 0.57*ty	0.95	0.79	-4.69*
gds	-3.97 + 0.47*gy	0.86	0.23	-1.78**
tds	0.28 + 1.01*gds	0.88	0.18	-1.62**
tds	-5.42 + 0.14*gds + 0.49*ty	0.95	0.65	-4.14*
gds	-0.06 + 0.76*tds + 0.06*gy	0.89	0.18	-1.59

Notes: * and ** denote significantly at the 5% and 10% level respectively in ADF column.

Table IV: Results for Granger CausalityTests

Null Hypothesis:	Lag	F-Statistic	Prob.
ty does not Granger Cause **tds**	2	4.36927	0.01905
tds does not Granger Cause **ty**		2.78868	0.07320
gy does not Granger Cause **gds**	2	0.55449	0.57861
gds does not Granger Cause **gy**		1.55868	0.22262
tds does not Granger Cause **gds**	1	0.30694	0.58237
gds does not Granger Cause **tds**		0.22512	0.63751