Growth and Development

The Impacts of Sectoral Demand for Military Expenditure on Peace Dividend: A Case for Turkey and Greece

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This paper examines the effect of sectoral demand for military expenditure on the peace dividend between Greece and Turkey by employing a multi region dynamic CGE model. A general purpose of the study is to examine the prospect for conflict resolution if Turkey become a member state for the EU. This would expected to create a peace between the two countriesin, hence a possible cut back on military expenditure. The model allows to analyse several scenarios; a positive scenario is a certain amount of reduction on Military Expenditure/GDP (ME/GDP) ratios. This may cause a decrease in sectoral demand for military expenditures. This re-allocation scenarios may effect the sectoral distributıon and a higher GDP growth, higher private consumption, lower unemployment, lower interst rates, economic stability and increased FDI for Turkey and improved BoP in both countries in a different level. The economic stability and some spillover effects are some other economic benefits to the EU.

Introduction

One of the driving forces behind the formation of the EU was the established peace in Continental Europe. History tells us that Europe, with a spectacular record of wars, had not been a safe, stable place and two world wars were started there. As stated in the treaty of Rome Europe would work to"… pooling their resources to preserve and strengthen peace and liberty". It is now almost impossible to imagine a war between the member countries. The simple fact is that Europe became a single community with common economic goals, which virtually eliminated the possibility of wars among or between European states. Analogously, the possibility of war between Turkey and Greece will be all but eliminated after Turkish EU membership. Thus, there very likely is a significant peace dividend effect of Turkish membership for all EU members and for the rest of the world.

There is a fair amount of defence-economics literature regarding Turkey and Greece. As Brauer (2001) indicates, these studies can be broadly summarized under five major topics. The first topic is concerned with the issue of an arms race between Greece and Turkey. The second is about the demand-determinants of military expenditure. The third is about the impact of military expenditure on economic growth in Turkey and in Greece. The fourth covers the nature, extent, and impact of indigenous arms production in these countries. The fifth topic deals with the possible peace dividend from reduced military expenditure in Greece and in Turkey. Arms race studies show that (at least for certain periods of time) Turkey and Greece's military expenditures are co-integrated, which indicates that there is an arms race between the two. Hence one country's increased military expenditure affects the other country's military expenditure. A very likely outcome of Turkish EU membership is a sharing of the peace dividend by both countries. Most of the studies on the determinants of the demand for military expenditure show that there is a clear negative link between economic growth and military expenditures. Although Turkey's military expenditure demand is not only driven by its rivalry with Greece, one of the main driving forces is this rivalry. A number of studies have addressed additional factors, such as Islamic fundamentalism, terror, suppression of Kurdish militants and NATO commitments. The impact of these factors tends to be reduced in a more stable, democratic, wealthy country.

A third topic of research focuses on the economic impact of military expenditures. This area of research is concerned with the military sector's total effect on the economy (i.e. on investment, labour, human capital and economic growth), the externality effects of the military sector on the other sectors and the factor productivity differentials among other sectors. This research area differentiates the arms import and the indigenous arms production. The latter appears to effect economic indicators in a more positive way; but the overall effect of military expenditure on economic growth is still negative. Another set of studies concerns the peace dividend from reduced military expenditure in Turkey and in Greece. The disarmament and reallocation scenarios result in lower unemployment, higher economic growth and private consumption and an improved balance of payments[1].

In an analysis of the macroeconomic implications of a reduction in military expenditures by Greece and Turkey, this study examines the potential peace dividend between Greece and Turkey by employing a multi region dynamic CGE model. A general purpose of the study is to examine the prospect for conflict resolution if Turkey becomes a member state of the European Union. This would be expected to create "peace" between the two countries, particularly in the Agean area and in Cyprus; which in turn should lead to a cut back on military expenditure by both sides. The employed model analyzes several scenarios: A positive scenario is a certain amount of reduction on Military Expenditure/GDP (ME/GDP) ratios. This may result in more public consumption, greater public investment savings and tax reductions, relative to a baseline scenario (which involves no change in ME/GDP). The

membership prospect for Turkey should create cooperation and disarmament between the two countries. These re-allocation scenarios may result in higher GDP growth, higher private consumption, lower unemployment, lower interest rates, economic stability and increased FDI for Turkey and improved balance of payments (BoP) in both countries. Economic stability and various spillover effects are other possible economic benefits to the EU as a result of Turkish EU membership.

Section 2 considers the present state and the last decade of the defence expenditure data in Turkey and Greece. Section 3 develops the model. Section 4 examines the potential peace dividend between Greece and Turkey by employing a multi region dynamic CGE model. The simulation results are presented in this section. Finally, section 5 offers some conclusions.

Defence Expenditures of Turkey and Greece

Due to the lack of transparency in national data on military expenditures for both Turkey and Greece, the reliability and mesurement problems cause more serious problems than any other empirical studies may have in economics. This issue becomes one of the research area in defence economics. There apeared to be the difference between the actual and official figures. Günlük-Şenesen(2002, 2004) has excellent clarifications for the Turkish and Greek ME measurement problems. Although our study will not focus on these issues, it is wort to be aware of this problem.

We begin with observations on the military spending of NATO countries to see how serious this issue of expenditures between Greece and Turkey, using NATO's own data source.

Despite the difference in defence requirements due to the size of army, land, population etc., the level of Greek defence expenditures are nearly high as Turkish defence expenditures. Both countries military expenditure are the highest among the NATO countries. Turkish Military expenditures, however, significantly increases in the 1990's compared to Greece.

Focusing only Greece and Turkey may prowide clearer picture about the problem. In order to avoid the problem of other factors such as size, economic power ect. It might be better to look at in terms of the share of ME in public expenditures of Greece and Turkey. Table 2 provids these ratios for the last decade.

Military spending described as the spending on personnel, maintanence and equipment. Brauer (2002)'s survey concludes that there is no support for an arms race between Greece and Turkey in the 1990's but during the 1980's there is some support for an arms race. Thus a moderate expenditure pattern are expected for 1990's. Obvious problem in these studies is about the data, some data only include the expenditure of the defence ministries but avoid military equipment purchasing from other sources. There is a good clarification in Günlük-Şenesen (2002) for this issue. The data on the military expenditure is the same data as it was used in Günlük-Şenesen (2004). It is taken from the Stockholm International Peace Research Institute (SIPRI) data in 1990 constant USD prices. The total budget expenditures in Greece and in Turkey are in domestic currencies in the OECD data source. Using OECD exchange rate for Drachma, Euro and Turkish Lira in current dollar prices will allow us to be able to have comparative ME/Budget Expenditure ratios. Table 2 below and Figure 2 indicate these expenditure patterns.

(GRBE /ME = Greek Budget Expenditure /Military Expenditure)
(TRBE/ME = Turkish Budget Expenditure / Military Expenditure)

Table 1: Defence expenditures as % of gross domestic product

Country	Avera.1980 - 1984	Av. 1985 - 1989	Av. 1990 - 1994	Av. 1995 - 1999	1999	2000	2001	2002	2003 e
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Based on current prices									
Belgium	3,2	2,8	2,0	1,5	1,4	1,4	1,3	1,3	1,3
Czech Republic	//	//	//	//	2,2	2,2	2,1	2,1	2,2
Denmark	2,4	2,0	1,9	1,7	1,6	1,5	1,6	1,6	1,6
France	4,0	3,8	3,4	2,9	2,7	2,6	2,5	2,5	2,6
Germany	3,3	3,0	2,1	1,6	1,5	1,5	1,5	1,5	1,4
Greece	**5,4**	**5,1**	**4,4**	**4,6**	**4,8**	**4,9**	**4,6**	**4,3**	**4,2**
Hungary	//	//	//	//	1,6	1,7	1,8	1,9	1,9
Italy	2,1	2,3	2,1	1,9	2,0	2,1	2,0	2,1	1,9
Luxembourg	1,0	1,0	0,9	0,8	0,7	0,7	0,8	0,9	0,9
Netherlands	3,0	2,8	2,3	1,8	1,8	1,6	1,6	1,6	1,6
Norway	2,7	2,9	2,8	2,2	2,1	1,8	1,7	2,1	2,0
Poland	//	//	//	//	2,0	1,9	1,9	1,9	2,0
Portugal	2,9	2,6	2,6	2,2	2,1	2,1	2,1	2,1	2,1
Spain	2,3	2,1	1,6	1,4	1,3	1,2	1,2	1,2	1,2
Turkey	**4,0**	**3,3**	**3,8**	**4,4**	**5,4**	**5,0**	**5,0**	**4,9**	**4,8**
United Kingdom	5,2	4,5	3,7	2,7	2,5	2,5	2,5	2,4	2,4
NATO - Europe	***3,5***	***3,2***	***2,6***	***2,2***	***2,1***	***2,1***	***2,0***	***2,0***	***2,0***
Canada	2,0	2,1	1,8	1,3	1,3	1,2	1,2	1,2	1,2
United States	5,6	6,0	4,7	3,3	3,0	3,1	3,1	3,4	3,5
North America	***5,3***	***5,6***	***4,4***	***3,2***	***2,9***	***2,9***	***3,0***	***3,3***	***3,4***
NATO - Total	***4,5***	***4,6***	***3,5***	***2,7***	***2,5***	***2,6***	***2,6***	***2,7***	***2,7***

Figure 1: Military expenditures as % of GDP in NATO.

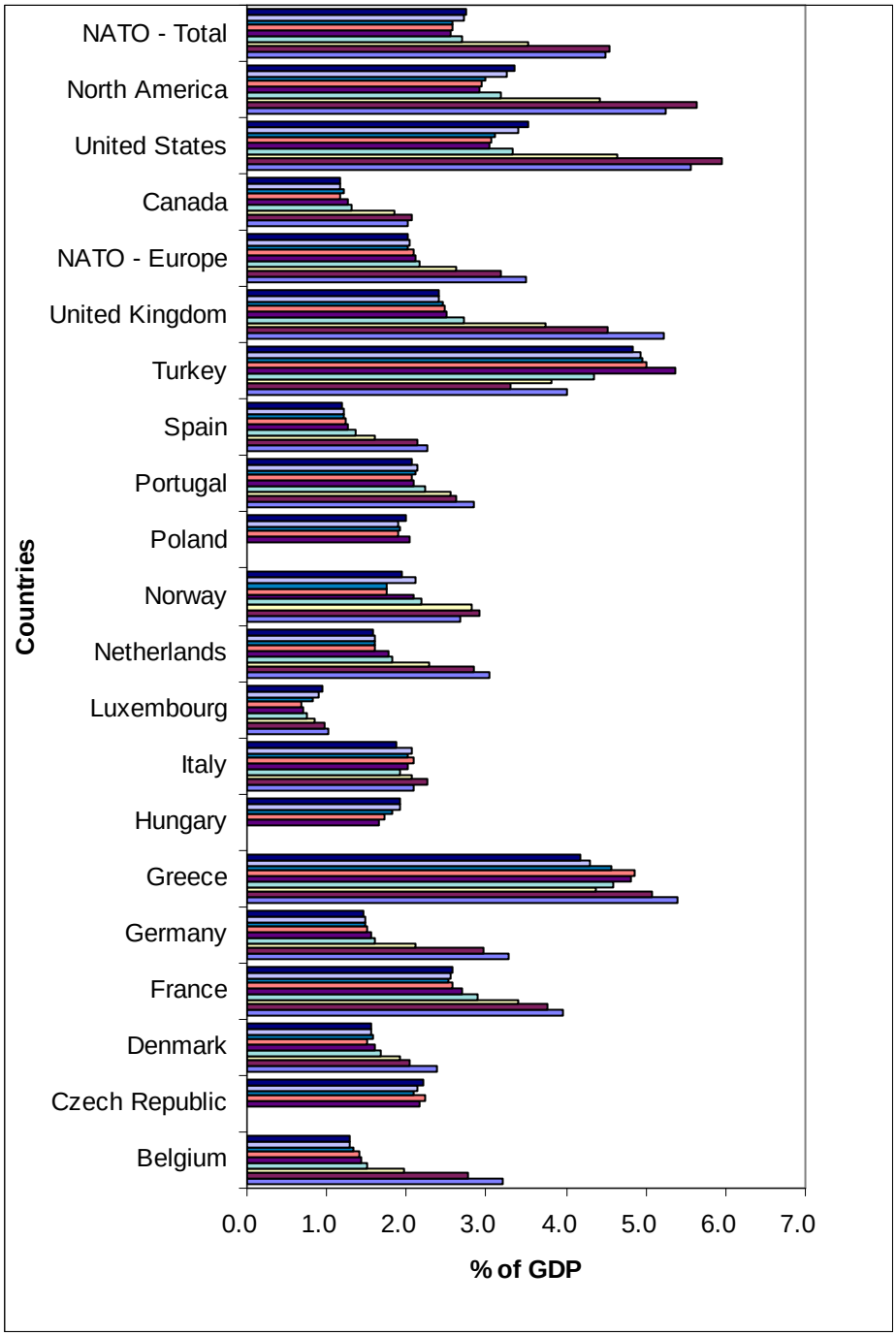
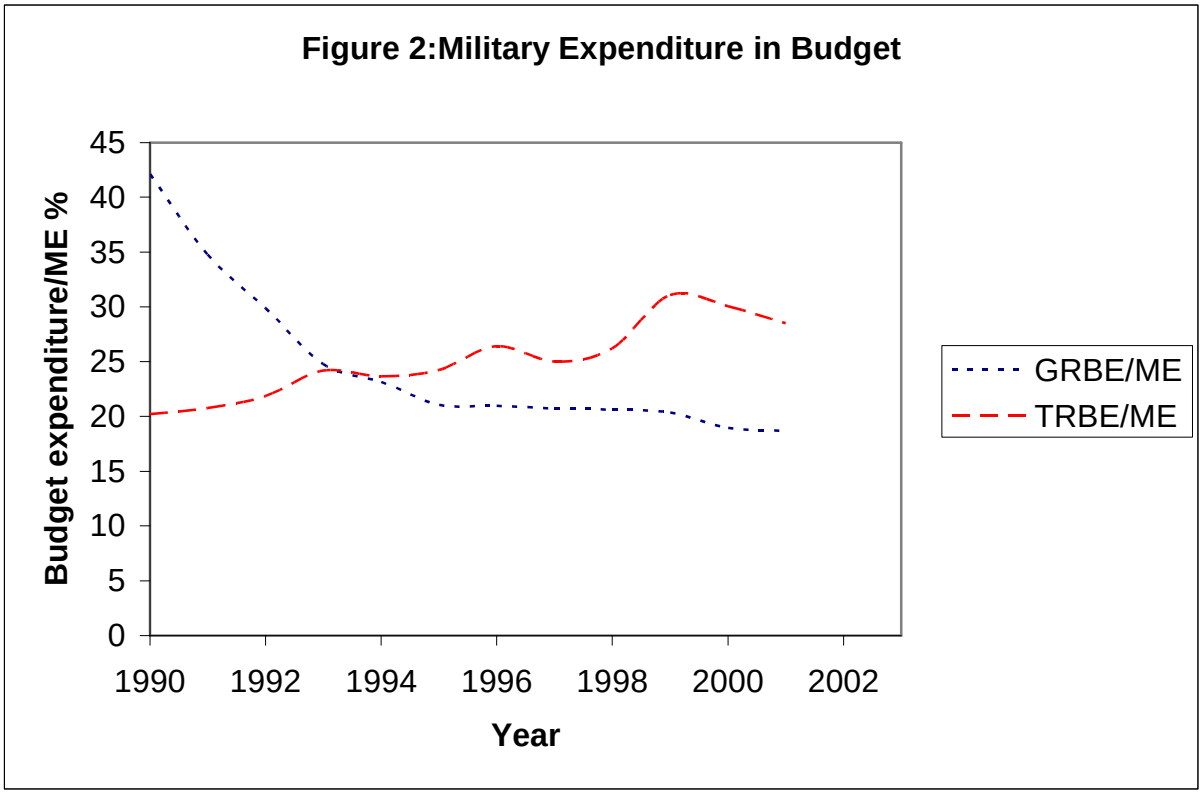


Table2: Share of military expenditure in Budget in Greece (GR) and in Turkey(TR).

Budget and Military Expenditure in Greece and Turkey					%	%
Year	TR-Budget	TR-ME	GR-Budget	GR-ME	GRBE/ME	TRBE/ME
1990	26,266	**5308**	9179	**3863**	**42**	**20**
1991	31,167	**6474**	12130	**4215**	**35**	**21**
1992	32,213	**7039**	15338	**4585**	**30**	**22**
1993	43,926	**10614**	21723	**5381**	**25**	**24**
1994	30,092	**7120**	25022	**5788**	**23**	**24**
1995	37,313	**9039**	26850	**5650**	**21**	**24**
1996	48,292	**12745**	29601	**6205**	**21**	**26**
1997	52,42	**13095**	36167	**7487**	**21**	**25**
1998	59,56	**15590**	42707	**8809**	**21**	**26**
1999	66,539	**20683**	47112	**9591**	**20**	**31**
2000	74,539	**22421**	63540	**12046**	**19**	**30**
2001	65,436	**18638**	68708	**12837**	**19**	**28**

Billion USD in Current prices



The ME's share in budget expenditures are very high in both countries and ranges from 20% to 40% . For example the amount spent in education is about 3%. It appered to be a very clear argument for the reallocation of public revenues.

We have attempted to clarify the Military expenditure trend but we also need to know tha factors determining the demand for military expenditure in Greece and in Turkey. Greece's militay expenditure follow Turkish military expenditure in general and there are some other factors such as problems in the Balkans and NATO commitments but the biggest factor effecting Greek military expenditure is the Turkish ME. Although the highest factor

affecting Turkish ME demand was the desire to suppress Kurdish militants in the 1980's, the disagreements with Greece and the other factors such as, fear of islamic fundamentalism, NATO commitments are also quite significant for Turkish demand for Military expenditure (Brauer, 2002 and Günlük-Şenesen(2004).

Thus the expected peace divident effect for Greece could be higher than Turkey if Turkey becomes EU member and both countries should sustain the current peace initiative.

Sectoral Demand of Military Expenditure

Due to lack of available data on sectoral demand of military expenditures, we have looked into two possibilities. The first data is provided by Turkish Ministry of Defence (TMD). They provided a sectoral data, based on TMD budget allocation as an official data. Since the official data is always under scepticism in any countrys military expenditure data, we also looked into other sources. Unfortunately there arent very many options that we could look into. One possible source is that; all sectoral demand is done according to the adjudication method used in these expenditures. Any sectoral demand first advirtised in official Gazette and than in an auktion they buy the goods or service. We have skimmed thousands of advertisments and realization notices in the official paper. This was a painstakin process which formed our second data source. Tha official sectoral data is provided on the table 3 below.

Table 3: Ministry of Defence Sectoral Expenditures (Official)

New TL

	2003	2004 (*)
General Defence Expenditures	3.429.250.000	2.719.675.353
PERSONNEL	3.580.098.294	4.265.558.000
ENERGY	672.957.473	683.499.070
FOOD	646.936.755	693.946.110
TEKSTILE AND LEADHER	316.201.370	308.490.020
HEALTH	217.981.159	243.020.500
MATCHINARY AND EQUIPMENTS	9.175.529	4.707.000
STATIONARY AND OFFICE EQUIPMANTS	37.206.979	36.664.000
WATER AND SANITATION	71.542.571	70.767.700
CHEMICAL SUBSTANCES	206.957.644	135.563.067
CONSTRUCTION, MAINTANENCE OF BUILDINGS AND RENT EXPENDITURES.	354.251.876	224.960.000
COMMUNICATION	28.161.675	28.807.000
SERVICES	227.164.997	213.531.000
VEHICLE	5.445.000	4.642.407
THE OTHER (sleeping bags and some other goods)	405.918.678	378.016.000
Grand Total	10.209.250.000	10.011.847.227

Note : (*) In 2004, TMD(Turkish Ministry of defence budget cut introduced with the 5103 low(%13 Reduction included)

The second data source which is presented in table 4 did not appeared to look very reliable. There fore we will be using the official sectoral data distribution for our modelling and simulation purposes. It is clear that not all expenditures are advirtised in the official news paper.

Table 4: Sectoral Expenditures, Ministry of Defence-adjudication results New TL		
Year	2002	2003
General Defence Expenditures	10.366.569	
PERSONNEL	0	158.139
ENERGY	3.995.370	20.450
FOOD	116.527.479	240.647.028
TEKSTILE AND LEADHER	267.558.835	49.235.954
HEALTH	9.578.283	2.564.225
MATCHINARY AND EQUIPMENTS	37.881.223	3.224.683
STATIONARY AND OFFICE EQUIPMANTS	3.257.790	0
WATER AND SANITATION	1.340.615	0
CHEMICAL SUBSTANCES	11.536.510	809.920
CONSTRUCTION, MAINTANENCE OF BUILDINGS AND RENT EXPENDITURES.	26.861.770	39.415.000
COMMUNICATION	2.553.769	0
SERVICES	13.925.339	83.658.164
VEHICLE	10.926.465	0
THE OTHER (sleeping bags and some other goods)	35.228.530	
sport bags, laboratory exp., natural rubber	0	
Grand Totals	551.538.547	419.733.564

CGE Modelling Assesment

CGE models are useful for analzing the economic effects of various types of ME and related changes since they can incorporate economy-wide relationships both with in and between countries and provide numerical estimates of the aggregate effects of different policies as well as details on how individual sectors may respond. Although the results can not be compared with actual numbers, the results provide a reasonably good indication of the likely comparative effects on the different policy options.

Our analysis is quantitative and draws from the results of a multi-sector, multi region computable general equilibrium model. Attention is focused on the effect that the peace dividend has on a multitide of variables related to economic performance such as economic growth, employment and welfare. Alternative scenarios related to variations of the Military Expenditure/GDP ratio are examined in order to increase the credence of the analysis.

Changes in GDP growth, production, unemployment, Investment, Capital stock conceived as deviations from the reference case entailing losses or gains for the economic agents, signify the overall costs and benefis to the EU, Turkey, Greece and the ROW.

Firstly, we have constructed a standard static CGE model. The model has endogenous labour productivity and depends on expenditures on education. The total factor productivity depends on investment in infrastructure. There are three preliminary scenarios; Cut military expenditures by 50%, and use the money to:

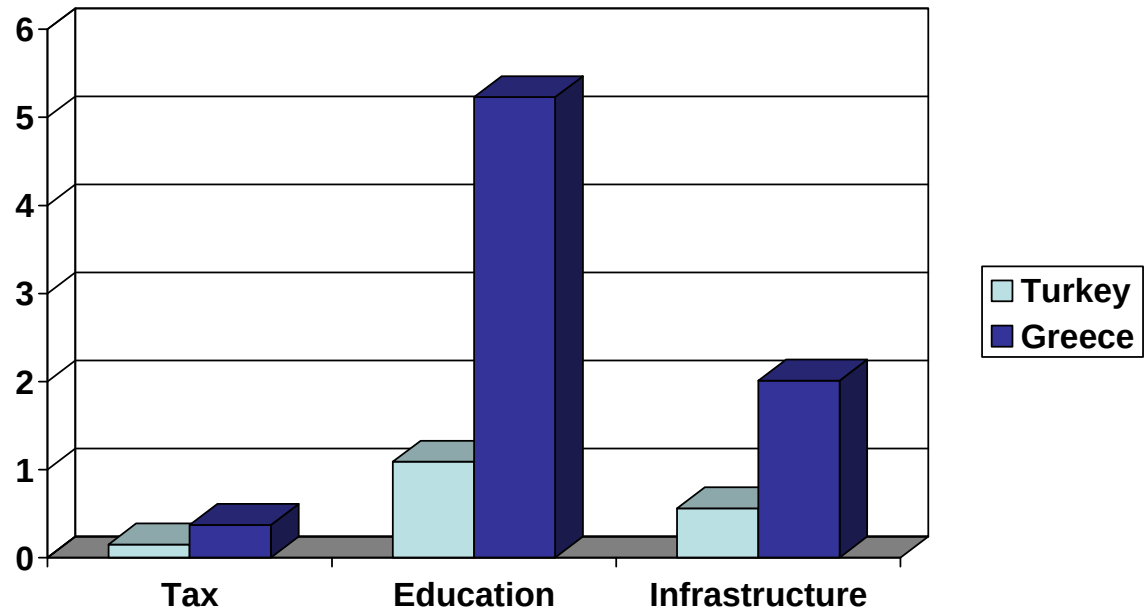
- Reduce taxes
- Improve education (=>L productivity)
- Improve infrastructure (=> TFP increase)

Table5 provide results of the static effect on GDP growth of a 50% cut in military expenditures which spent on reduced taxes, improve education and improve infrastructure. Improved education increases the labour productivity and improved infrastructure increases the total factor productivity as it was suggested in endogenous growth literature. If the cut spent in education, both countries gain is the highest this followed by Infrastructure and than the tax reduction.

Table 5: Real GDP growth

	Tax	Education	Infrastructure
Turkey	**0.15**	**1.09**	**0.56**
Greece	**0.37**	**5.23**	**2.01**

Figure 3 : Real GDP growth



expenditures which spent on reduced taxes, improve education and improve infrastructure. Here the infrastructure and Education expenditures have closer impact for investment in Turkey but the gain for education in Greece is much greater.

Table 6: Investment:

	Tax	Education	Infrastructure
Turkey	**2.18**	**3.04**	**3.05**
Greece	**2.57**	**14.86**	**8.89**

Table 7 gives detailed sectoral production impacts of the three scenarios for Turkey and Greece. Overall impact of a 50% cut in military expenditures which spent on reduced taxes, improve education and improve infrastructure on production in Greece is higher than Turkey and all three scenarios create positive effect. The lowest impact is on clothing and textile in three scenarios in Turkey. The highest impact is on construction for the tax reduction case, on motor vehicle for education expenditure increase and on Transport for Infrastructure expenditure increase case in Turkey. For Greece, the lowest impact is on agriculture for the tax reduction scenarios, on textile for the education and infrastructure expenditure increase. The highest impact is on construction for tax reduction and infrastructure expenditure increase, on electrical machinery for education expenditure increase scenarios.

Table 8 provides detailed sectoral employment effects of the three scenarios for Turkey and Greece. The highest employment impact is on trade for all three scenarios in Turkey.

Table 7: Production

	Tax		**Education**		**Infrastructure**	
	Turkey	**Greece**	**Turkey**	**Greece**	**Turkey**	**Greece**
Agriculture	**1.89**	**0.41**	**0.95**	**1.66**	**0.52**	**1.02**
Processed Food	**1.10**	**0.60**	**0.98**	**2.18**	**0.73**	**0.77**
Textile	**1.05**	**0.76**	**0.85**	**0.58**	**0.39**	**0.08**
Clothing	**0.55**	**0.79**	**0.44**	**1.25**	**1.16**	**0.61**
Motor Vehicle	**3.16**	**1.61**	**3.18**	**7.36**	**3.72**	**6.98**
Elect Machinery	**1.38**	**1.33**	**1.62**	**10.75**	**0.88**	**3.74**
Metal	**2.24**	**1.35**	**2.21**	**5.82**	**1.43**	**2.22**
Energy	**1.85**	**0.93**	**2.02**	**6.14**	**0.60**	**2.51**
Other Manufact	**1.87**	**1.28**	**1.96**	**7.60**	**1.43**	**3.08**
Construction	**2.14**	**2.12**	**2.01**	**13.37**	**2.68**	**9.69**
Transport	**1.23**	**0.97**	**2.49**	**6.71**	**3.92**	**4.67**
Trade	**2.20**	**1.60**	**2.13**	**8.60**	**2.05**	**4.90**
Finance	**2.32**	**1.38**	**2.87**	**6.65**	**1.71**	**2.94**
Other Services	**1.13**	**1.27**	**1.69**	**6.96**	**0.84**	**3.42**

The negative employment impact is understandably, for the public administration except for increased education expenditures for both Greece and in Turkey. The positive employment impact is on construction for all three scenarios in Greece.

Table 8: Labour

	Tax		Education		Infrastructure	
	Turkey	Greece	Turkey	Greece	Turkey	Greece
Agriculture	1.17	0.55	-4.81	-10.77	1.9	1.47
Processed Food	2.71	1.64	7.36	2.74	8.11	4.06
Textile	2.69	1.35	8.92	1.63	8.42	2.77
Clothing	2.52	1.43	8.70	2.99	9.39	2.22
Motor Vehicles	3.23	2.11	10.27	6.81	9.12	0.35
Electronic & Machinery	2.76	1.73	9.27	7.97	8.70	5.84
Metal	2.85	1.78	9.64	5.42	9.04	4.53
Energy	2.18	1.66	3.50	0.51	5.53	4.78
Other Manufacturing	2.96	2.19	9.20	6.71	9.12	5.69
Construction	2.45	3.13	10.16	17.94	10.44	13.66
Transportation	3.49	2.00	13.70	11.34	10.85	8.51
Trade	4.45	2.81	17.49	17.48	13.66	9.55
Finance	2.57	2.22	7.16	4.18	7.89	5.64
Other Services	2.95	2.72	9.35	9.58	8.86	7.70
Public Administration	-7.02	-6.44	-1.45	-1.75	-0.91	-1.02

Table 9 indicates detailed sectoral capital stock effects of the three scenarios for Turkey and Greece. The highest capital increase is observed on construction for the three scenarios in Greece. The highest negative impact on capital is observed on public administration for tax reduction case in Greece and in Turkey. The textile and clothing has the other two highest negative impact with the education and infrastructure expenditure increase case in Greece and in Turkey. The highest impact is on construction for the infrastructure expenditure case, on finance for education expenditure increase case and on trade for tax reduction scenarios.

Table 9: Capital

	Tax		Education		Infrastructure	
	Turkey	Greece	Turkey	Greece	Turkey	Greece
Agriculture	0.61	0.16	0.70	1.62	0.02	0.23
Processed Food	0.04	-0.22	0.04	-1.24	-0.11	-1.25
Textile	-0.31	-0.73	-0.59	-4.99	-0.81	-3.10
Clothing	-0.47	-0.66	-0.79	-3.72	-0.08	-3.62
Motor Vehicles	0.21	0.01	0.65	1.14	0.16	0.39
Electronic & Machinery	-0.24	-0.36	0.27	0.94	0.54	0.21
Metal	-0.15	-0.31	0.07	1.44	0.23	1.45
Energy	0.27	0.32	0.68	2.32	0.47	0.79
Other Manufacturing	0.25	0.29	0.45	0.81	0.21	0.11
Construction	-0.87	0.77	1.52	7.24	4.05	10.46
Transportation	-0.52	-0.79	0.65	1.80	1.66	2.95
Trade	0.40	-0.01	0.77	1.06	0.96	1.28
Finance	-0.43	0.12	2.19	2.60	1.29	0.40
Other Services	-0.06	0.61	-0.20	2.45	0.40	1.54
Public Administration	-9.73	-8.37	0.53	0.49	3.83	5.11

Conclusions

In our CGE simulation experiment, we have examined three preliminary scenarios; Cut military expenditures by 50%, and use the money to, reduce taxes, improve education which increase labour productivity and improve infrastructure where the Total Factor Productivity (TFP) increases. Overall positive impact of this scenario analysis show that both countries growth rate raise. As a policy conclusion, growth maximizing outcome is to cut the ME and spent on education. Sectoral impact is also provides detailed effects.
For future research we need to finalize data and we are also going to use a new version of the updated model to see dynamics, Skilled & unskilled labor effects, Human capital accumulation.

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