The Demand for Military Spending in the Peripheral Economies of Europe*

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Abstract

Research on the factors that determine the level of military expenditure or military burden in countries, suggest that the dynamics of the determinants of military spending will be best understood by case studies of individual countries and studies of groups of relatively homogeneous countries. This paper provides a comparative analysis of three of the EU's peripheral economies - Greece, Portugal and Spain. A simple model based on a general theory of the demand for military spending, provides the basis for an investigation of the relative importance of strategic and other social and economic factors for the three countries.

Keywords: Military expenditure; demand; peripheral economies; time series

JEL Code : H56, D74

1. Introduction

This paper examines the determinants of Greek, Spanish and Portuguese military expenditure over the period 1960-2000. Several reasons single out these countries as particularly interesting cases for such a study. In the first place, the three Mediterranean countries share many common features and have been characterised as the peripheral EU economies and, throughout the period examined, they have followed quite similar patterns of development. The recession of the mid-70s coincided with the collapse of the dictatorships in these countries and the transition towards parliamentary democracy with the inevitable internal political and economic changes. Starting with Greece, the countries came to see membership of the European Community in the 1980s as a means of strengthening their economic and political situation. When they did join, their relative economic backwardness made them the poorest countries in the EU.

As far as their military expenditure is concerned, it is rather the differences than the similarities that make them interesting cases. Spain maintained a low military burden throughout the period examined, mainly because it lost its colonies at an early stage. Portugal was a big defence spender up until the mid-70s, mainly because of the need to keep its colonies. But after the colonial wars ended, Portugal reduced its military burden which is kept at relatively low levels since then. Greece, on the other hand, started to be a big defence spender after 1974, the year of the Turkish invasion of Cyprus. Since then, the continuous disagreements and conflicts with Turkey over Cyprus and the Aegean Sea have left Greece with no alternative but to keep a high military burden. Apart from the Turkish threat, the instability of the Balkans (the disintegration and civil war in Yugoslavia and the subsequent disputes of Greece with Albania and the former Yugoslavic Federal state of Macedonia (FYROM)) added some extra security concerns for Greece in the late 1980s and early 1990s.

This paper adds to the literature by providing a simple aggregate model for the demand of military expenditure in the three countries within an Autoregressive Distributed Lag framework (ARDL) where the data are allowed to determine the particular short-run dynamics. Knowledge of the specific economic, political and strategic features of each country will be taken into account when the empirical estimation takes place. In this way, the empirical analysis can be particularly valuable and informative, as it does not miss out

important structural changes, as is usually the case with cross-sectional studies of large groups of countries.

The next section provides a brief background analysis of the three economies, their politics and their security considerations, followed by a discussion of the way demand for military expenditure can be modelled and the specification of a general model for the demand of military expenditure for the three countries. The fourth section then presents the data and the empirical results to end up with the final section presenting some conclusions.

GREECE, SPAIN, PORTUGAL

The 1960s and early 1970s was a period of uninterrupted growth and economic prosperity for the entire industrialised West. Greece, Portugal and Spain experienced high rates of GDP growth over the 1960s, averaging to 7.6% per annum for Greece, 6.4% for Portugal and 7.3% for Spain (see Figure 1). The 1970s brought developments on the economic, political and defence fronts. The world energy crisis and the subsequent international recession coincided with the collapse of the dictatorships in the three countries and in the case of Greece, with the Turkish invasion in Cyprus (1974). The high growth rates of the previous decade started to decline, as the structural weaknesses of the three economies became apparent.

The depression of the early 1970s is reflected in the negative growth of GDP, reaching at around -4% for Greece and Portugal in 1974 and 1975, respectively, while Spain managed to avoid the "below zero" rate. The Greek economy was in crisis more often than the two other countries (in 1981-83, 1987 and 1990) while all three countries reached a crisis in 1993. Among the three economies, Spain seems to have performed better.

<Figure1 here >

Table 1 presents average figures per decade for some main economic indicators in all three countries. In terms of social indicators, the GDP per capita (in constant 1990 US $) was consistently higher in Spain throughout the period examined, followed by Greece and Portugal. As far as inflation is concerned, the pattern is similar for the three economies

which all faced low inflation rates until the early 1970s, but high rates since then, with Spain having the lowest inflation rate among the three after the early 1980s. But this is not the case as far as the unemployment rate is concerned with Spain having the highest rates of unemployment from the beginning of the 1980s. Looking at the pattern of real growth rates of investment (in constant 1998 US $) one can observe similarities and differences between the countries. Specifically, the high growth rates in the 1960s were significantly lower in the 1970s for all three countries. There was some recovery in the 1980s for Spain and Portugal, but continued decline for Greece. The recovery for Greece started in the 1990s, with the recovery continuing for Portugal, but Spanish growth rates of investment experiencing a severe downturn. Another important economic characteristic to be considered is the gross national debt of the three countries. Up to the 1970s it was quite low for all three countries at around 20% of GDP. In the 1980s and 1990s, significant increases are observed for all three countries, with Greece reaching a level well above 100% of its GDP.

<Table 1 here >

Although these economic indicators seem to move fairly closely in all three countries, this is not the case for their military expenditure. Spain had, throughout the period, the lowest military burden of all the three countries, and it remained stable at around 2% of GDP, with a slight increase in the 1980s (due to the development of the arms industry and the expansion of production). But when it comes to Portugal and Greece, things are quite different. 1974 was the critical year for both countries, as can be seen from Figure 2. Portugal had a high military burden (higher than Greece) for the years prior to 1974 and after that a dramatically decreased one. The reduction of the Portuguese military burden after 1974 is attributed to the end of the dictatorship but most importantly to the end of the Colonial Empire. Exactly the opposite pattern is observed for Greece. The Turkish invasion of Cyprus in 1974 marked a huge increase in military burden which has remained high since then due to continuous disagreements and conflicts with the neighbouring country.

<Figure 2 here>

SECURITY CONCERNS

Greece is a small, newly industrialised country, with many economic problems and security concerns, that even after the end of the Cold War has continued spending a significant share of its GDP on defence. Greece's strategic position at the junction of three continents (Europe, Asia and Africa), and nearly totally surrounded by sea, has made continuous involvement with close neighbours and constant attention from great powers with vested interests in the eastern Mediterranean inevitable. Its national security concerns can be divided into a pre-1974 and a post-1974 period. The pre-1974 period was characterised by instability and conflicts between royalists and republicans, communists and nationalists. The collapse of the last Greek military dictatorship in 1974 signalled the beginning of a new era for Greece. Since 1974, the Hellenic forces' primary mission has been to maintain a balance of power with Turkey, specifically deterring the infringement of Greek national interests and sovereignty and preventing a Turkish attack on the Greek-Cypriot part of Cyprus. In the 1990s there was a deep concern over the events in the Balkans (Yugoslavia's disintegration, the treatment of the Greek minority in Albania, etc). Initially these events seemed to add to the security concerns for Greece, but since none of these countries possessed large military establishments Greek defence policy and military planning was not affected.

Greece is a net importer[1] of military equipment, mainly from the US, France and Germany. During the 1950s, under a military aid programme that aimed to integrate smaller NATO countries in the allied structure of armed forces and production capabilities, equipment from World War II and the Korean War was transferred to Greece. In the mid-1960s the transfer of used military equipment from US and other NATO countries was eliminated, as were military grants towards countries with developing defence industries (DDI countries). In the mid-late 1970s, the development of an indigenous military industry was seen as necessary because of weapons embargoes during the seven-year military government, but also because of the need to reduce balance of payments deficit on current account via import substitution (Bartzokas, 1992).

The creation of the Defence Industries Directorate within the Ministry of National Defence in 1977, was the first step towards organising Greece's defence industry. By the end of the

1990s, the Greek military industry consisted of four large state-owned companies and a significant number of small / medium-size companies allocating part of their capacity to military production. Nevertheless, the defence industrial infrastructure remained inadequate, and hence Greece continued to rely on military imports mainly from the USA. The latter led to a foreign trade deficit, shortages of foreign currency and devaluation of the Greek drachma against the US dollar.

Historically, Portugal has had two essential security objectives, the protection of its colonial empire and the maintenance of its status as a distinctive national entity on the Iberian Peninsula. Although a founding member of NATO in 1949, its material contribution to the alliance was only marginal for more than two decades. The main reason for this was that the armed forces were preoccupied with the fighting in Africa and the efforts to maintain the colonial empire alienated the country from the other members of the alliance. After 1974, Portugal showed more activity in NATO and the defence of the West in response to the perceived threat represented by the Soviet Union and the Warsaw Pact.

Portugal's defence industry is small, similar in size to that of Greece. Its expansion started during the 1960s to meet the specialised requirements of the anti-guerrilla operations in Africa. However, since the end of the fighting in 1974 and the scaling back of the armed forces that followed, production capabilities have exceeded the country's needs, (Solsten, 1993). A modest level of sales abroad have helped the Ministry of Defence to keep production lines open for artillery, mortar, and small arms ammunition. But, as in Greece, private companies in Portugal are not permitted to engage in research, planning, testing, manufacturing or overhaul of equipment exclusively intended for military purposes. Only state-owned enterprises are involved in the production of bombs, missiles, torpedoes, mines, hand grenades, propellant powders and other explosives. The construction of combat aircraft, helicopters and warships was also limited to nationally owned companies, although component manufacture could be sub-contracted to private firms.

Spain's transition from a long period of dictatorship (the Franco regime) to parliamentary democracy (monarchy) took place in 1975, after Franco's death. The international isolation, autarky and stagnation that characterised Spain during the dictatorship dramatically changed after Spain acceded to the EC in 1986. One of Spain's major foreign

policy objectives since the advent of democracy has been to increase its influence in Latin America. Spain has a special interest in this area because of historical ties and a common linguistic, cultural and religious heritage. In the post-Franco years, economic investment and diplomatic initiatives were added to the more nostalgic links between Spain and its former colonies (Solsten and Meditz, 1998).

When war broke out between Britain and Argentina over the Falkland islands (Malvinas) in the spring 1982, Spain supported Argentina's claim to the islands. Also, Spain took an active part in the Contadora group, an association of Latin American republics seeking peaceful solutions to the bloody struggles in El Salvador, Guatemala and Nicaragua. Spain's long-established policy of neutrality ended with its conditional accession to NATO in 1982 which was confirmed by referendum in 1986. Defence spending remained well below the average for the alliance since then.

As far as the Spanish defence industry is concerned it is of an average technological content, however, definitely more advanced and developed than the defence industries in Greece and Portugal. The Spanish military industry became progressively more open to foreign influence after the 1953 Spanish-US Treaty that broke the political isolation of the country. Breaking the isolation under the Franco regime meant that Spanish companies could absorb new foreign technology and eventually participate in international arms projects. But this 1953 Treaty, on the one hand, was beneficial to Spain, through the presence of foreign capital and the participation in transnational arms programmes, but, on the other hand, was harmful for the development of an indigenous arms industry as Spain relied on the large number of American military equipment given to Spain either as grants or as subsidised sales. Reliance on American equipment and lack of effort to develop a domestic defence industry continued throughout the 1960s and until the late 1970s after which the situation changed. Starting from the late 1970s until the first half of the 1980s, defence production in Spain was highly developed due to three important production programmes[2] that gave life to the almost dying firms.

As in the case of Greece and Portugal, the private sector plays a secondary role in military production, manufacturing mostly light weaponry, ammunition, sub-systems and components. In the early 1980s, Spanish defence industries were very successful in arms

exports mainly because of the relatively small scale of Spain's own military orders. By 1987, it had risen to eighth rank as a world exporter with a number of clients in the Middle East and Latin America. But this changed after the changes in Eastern Europe in the late 1980s. After 1988, Spain enforced sales embargoes against countries accused of human rights violations (S.Africa, Chile, Paraguay), Warsaw Pact and other communist countries as well as active belligerents (Iran, Iraq), (Mollas-Gallard, 1992).

MODELLING THE DEMAND FOR MILITARY EXPENDITURES

There are a wide variety of models of the demand for military expenditure based on different theories about the decision-making process and the influence of various military, political and economic factors (see Smith, 1980, 1989, 1995). Military factors (i.e. military spending of potential enemies, or of allies) are considered to be external influences on the demand for military expenditure, in which case it is represented by arms-race models or models of alliances. Internal influences include economic factors (e.g., income and prices), political factors (e.g., lobbying by the Military Industrial Complex and other interest groups) and bureaucratic factors (e.g., bargaining over the budget starting from the status quo). As such, the demand for military expenditure can be represented by public choice models, models of bureaucratic behaviour, or general models of aggregate defence spending, in which all the above can be either incorporated or seen as special cases (Dunne, 1996). The majority of empirical studies on the determinants of military expenditures focus on arms-race models and on general models of aggregate defence spending.

As far as the arms-race models are concerned, Richardson's (1960) action-reaction model constitutes one of the best known and one of the most influential formal models in international relations literature. Despite its extensive use, it is a descriptive model without an explicit objective or an assumption of maximizing behaviour and its results have been quite disappointing when applied to data as Hartley and Sandler (1995), Deger (1986), Mohammed (1992), Smith (1989), Dunne et al. (1999) note.

In the case of developing countries economic determinants may still be important but lack of aggregate demand is unlikely to be a problem. In contrast, constraints on the supply side are more likely to be a problem in less developed countries. As such, the usual thing

to claim for these economies is that the military competes for scarce resources leading to crowding-out of investment which in turn hinders economic growth. Since, there seems no logical economic reason to explain high military expenditures in LDCs, it is more likely to be strategic factors that influence these countries' high military burdens.

The second group of studies (the general models of aggregate defence spending) either focuses on the pure economic or political determinants of military expenditure or considers all possible influences of military expenditure (economic, political and strategic factors) and tries to operationalise them in empirical analysis. By combining all possible influences, these studies provide a more complete picture of the determinants of military expenditure (Dunne, 1996).

These studies usually start by defining a welfare function which is maximised subject to resource and security constraints. There is a wide variety of forms used for the welfare function as well as for the security and budget constraints. Smith (1980) assumed a constant elasticity of substitution utility function for the UK while McGuire (1987) used a Stone-Geary utility function for Israel, Dunne et al (1984) employed a Deaton-Muellbauer functional form to estimate the determinants of UK's defence and other government spending and Hewitt (1991) used a Cobb-Douglas welfare function for a cross section of countries.

THE DEMAND MODEL

The simple demand model developed in this section draws upon the neoclassical principle of maximising the social welfare function given security and budget constraints (see Smith (1980, 1989) for further details). It follows that the demand for a country's military expenditure can be modelled as:

$$\mathbf{M = D\ (Y, Z, P_m\ , P_c)}, \qquad \mathbf{(1)}$$

where M is the military expenditure of a country and is a function of economic variables (Y), political and strategic factors (Z), military price deflator (P_m) and civilian price deflator (P_c).

In common with most empirical applications prices are dropped from the equation since there is not a separate price deflator for military goods in the countries. Based on the above considerations, the equation that best describes the determinants of military expenditures should incorporate economic, political and strategic effects all of which need to be specified and quantified. This leads to the following specification:

$$\mathbf{M = M (Y, P, G, TB, N, Z),} \qquad \mathbf{(2)}$$

where:

M: military expenditure in constant 1998 mn US $;

Y: GDP in constant 1998 mn US $;

P: population (in '000s);

G: government expenditure (excluding military) in constant 1998 mn US $;

TB: share of trade balance (exports - imports of goods and services) in GDP;

N: average military burden of NATO's European member states;

Z: Country-specific dummies and variables.

Defence is considered a public good and conventional public finance theory suggests that the levels of military spending should be positively related to income. This should be captured by the positive coefficient of real GDP (Y).[3] Population (P) is also introduced as a proxy variable to capture any scale public good effect[4] of military spending. If security is a public good it is unlikely to increase as population increases, or at least not in the same proportion. The inclusion of non-military government expenditure (G) in the model represents the economic burden of defence and is expected to enter the equation with a negative sign to account for the opportunity cost of defence. The share of the trade balance in GDP (TB) reflects the openness of the economy and its sign is ambiguous. Since all three countries are members of the NATO alliance[5], the inclusion of the alliance's military burden seemed reasonable in order to account for the spill-in effect. If the sign on the NATO variable (N) is positive, this suggests the country is not a "free-rider"[6]. Finally, the lagged value of the dependent (M) is introduced to account for inertia, such as hangover from previous expenditures or commitments to programmes (Dunne and Mohammed, 1995).

To account for the strategic and political factors that played an important role in military spending during 1960-2000 for all three countries, a number of country specific dummies and variables are included. Specifically, two dummy variables are included for Greece; namely, one which accounts for the military government that was in power for the period 1967-1974, and another one which captures the perceived threat after the Turkish invasion in Cyprus in 1974. Although military governments tend to spend more on defence, this is not a general fact and as Dunne and Mohammed (1995) claimed:

"*… there is unlikely to be a simple dichotomy between military and non-military governments"* (Dunne & Mohammed, 1995, p.335).

As such, the sign of the first dummy variable cannot be predetermined. The shock dummy for the Turkish invasion of Cyprus is expected to be statistically significant with a positive sign, given the dramatic increase in the Greek military spending that year. Finally, Turkey's military expenditures are introduced to see whether Greece's military expenditure depends on the "enemy's" military spending. For Spain two dummies are incorporated; the first to account for the increase in its military expenditure due to the war over the Malvinas (in 1982) and the export-led growth of the Spanish defence industry since the early 1980s. The year 1982 also coincided with Spain's membership of the NATO alliance. A second shock dummy is introduced for the year 1993 that signifies the economic crisis and an increase in the country's defence spending. Finally, a single dummy was introduced for Portugal to encapsulate the dramatic decline in its military burden after the collapse of the dictatorship and the end of the colonial wars.

DATA AND EMPIRICAL ESTIMATION

Data on the military expenditures (both in levels and in shares of GDP) for Greece, Spain, Portugal, Turkey and NATO come from various SIPRI Yearbooks (1975, 1981, 1988, 1992, 2001), while the data on government expenditure, trade balance, population and GDP (in 1998 mn US $) are from the EUROSTAT database[7]. The non-military government expenditure variable was constructed by deducting the SIPRI military expenditure figure from the EUROSTAT general government expenditure figure.

The proposed equation of the demand for military expenditure for Greece over the period 1960-2000 is then:

M=M (M_{-t}, T, Y, P, G, N, TB, POL, CYP), (3)

where:
M_{-t} is the lagged value of military expenditure;
T is Turkish military expenditure;
Y is real GDP; P is population;
G is government expenditure excluding military;
N is the share of military expenditure in GDP for the European NATO countries;
TB is the share of trade balance in GDP;
POL the dummy for the military government in Greece (taking the value of 1 for the years 1967-1974 and 0 elsewhere);
CYP is the shock dummy for the year 1974 (Turkish invasion of Cyprus).

This model was estimated using the autoregressive distributed lag (ARDL) approach to cointegration over the period 1960-2000. This means estimating a model of the form:

$$q(L, p)y_t = a_1 + a_2 T_t + \sum_{i=1}^{k} b_i(L, q_i)x_{it} + e_t, \quad (4)$$

where:

x_{it} are exogeneous variables;

T_t is a deterministic time trend; and

$q(L, p)$ and $b_i(L, q_i)$ are polynomial lag operators, with maximum lag of p and q_i respectively, see Pesaran and Pesaran (1997). Given that lagged levels of variables can be written in terms of lagged levels and first differences this model can be rewritten in an error-correction form:

$$\Delta y_t = [\Delta a_1 + a_2 \Delta T_t] + \sum_{i=1}^{k} b_{i0}\Delta x_{it} - \sum_{j=1}^{\hat{p}-1} c_j \Delta y_{t-j} - \sum_{i=1}^{3}\sum_{j=1}^{\hat{q}_i-1} f_{ij}\Delta x_{i,t-j} - q(1, \hat{p})EC_{t-1} + e_t, \quad (5)$$

where:
$q(1, \hat{p}) = 1 - \hat{q}_1 - \ldots - \hat{q}_{\hat{p}}$;

c_j is such that ($c_1 = q_{\hat{p}} + q_{\hat{p}-1} + \ldots + q_2$) and ($c_{\hat{p}-1} = q_{\hat{p}}$);

f_j is such that ($f_1 = b_{\hat{p}} + b_{\hat{p}-1} + \ldots + b_2$) and ($f_{\hat{p}-1} = b_{\hat{p}}$);

and the error correction term is $EC_t = E_t - \sum_{i=0}^{3} d_i x_{it} - h_o - h_1 T_t$.

It is not clear whether one should use the levels, logarithms or shares of the variables (see Brauer (2003)) and, although it is true that the use of shares allows us to avoid conversion problems, the interpretation of such results is not always clear.[8] The present study estimated the model under three specifications, in levels, logarithms and shares of the

variables. Non-nested tests suggested that the logarithmic transformation of the variables was preferred over the levels and shares specifications for all three countries, and as such, these results are presented.

The estimated long-run coefficients for the three countries are presented in Table 2[9] and show some variation across the three countries. Clearly, despite being relatively similar they do differ in their determinants of military spending. For Greece there is no significant effect of income (Y) on military spending, suggesting income constraints have little impact in the long run, but there is a significant negative population effect (P), suggesting some cost sharing effect.[10] Non military government spending (G) has a significant negative coefficient, suggesting that military spending will tend to crowd out other government spending, while there is no significant trade balance effect (TB). Clearly, there are important strategic factors determining long run military spending. NATO military spending (NATO) has a positive impact, suggesting that Greece is as expected not a free rider and as might be expected Turkish military expenditure is significant and positive. When combined with the significant positive signs on the dummies for the military regime (1967-74) and the Turkish invasion of Cyprus (in 1974), this suggests that one of the major long-run determinants of Greek military spending has been the perceived threat of war. The political government that was in power for seven years (1967-74) and the Turkish invasion of Cyprus in 1974 both have a significant positive effect on the demand for Greek military spending.

<Table 2 here >

Spain shares with Greece an insignificant income effect (GDP), but has a significant positive sign for the coefficient on population. Non military government spending is negative, but not significant suggesting there is no clear crowding out effect, but the trade balance is significant and negative. The NATO military expenditure coefficient is positive and significant, indicating that Spain, like Greece, is not a free rider in the long run. Portugal has in contrast a positive and significant income coefficient, supporting our initial expectations, there is no significant effect of population, and there is a significant positive trade balance effect. In common with Greece, military government spending has a negative and significant effect on military spending, suggesting some crowding out. The NATO military expenditure coefficient is insignificant, in contrast to the other two

countries, with a negative significant coefficient on the dummy variable for the democracy period after 1975. While the countries share some similarities, there are clear differences in the long run determinants of military expenditure. What is clear is that both economic and strategic variables are important, but there are clear individual country specificities that are also important.

Considering the error correction representation of the demand, the ARDL model for Greece, in Table 3, has high explanatory power and successfully passes all tests for serial correlation, functional form, normality and heteroskedasticity. Furthermore, most of the variables are significant and have the expected sign. Specifically, the short-run estimates for Greece suggest that military expenditure is positively influenced by previous year spending (indicating inertia and commitment to programmes) and by GDP growth (indicating that increases in GDP lead to increases in military expenditure). Population growth has a negative impact on military expenditure growth.[11] The negative coefficient of the non-military government expenditure suggests some crowding out. Surprisingly, the coefficient of the lagged change in trade balance ($ÄTB_{-1}$) is positive and statistically significant, the NATO variable (ÄN) is positive and significant, and Turkish military expenditure variable has the expected significantly positive sign indicating the threat that comes from the perceived enemy country. The two dummies also have the expected signs. Specifically, the dummy variable for the military government in Greece has a significantly positive sign pointing to the commonly observed fact that military governments tend to spend more on defence. The second dummy that captures the Turkish invasion of Cyprus also has the expected significantly positive sign capturing the dramatic increase in Greek defence spending after that event. The error correction term enters the equation with the expected negative sign.

< Table 3 here >

Results from the ARDL model for Spain, presented in the third column of Table 3, do not point to any econometric problems, as the model successfully passes all diagnostic tests. As with Greece, Spanish GDP growth has a significantly positive influence on its military spending in the short-run. But in the case of Spain, the change in non-military government spending (ÄG) is insignificant, failing to prove the opportunity cost of defence. The coefficient on the trade balance has a significantly negative sign indicating the openness of

the Spanish economy while the coefficient on the NATO variable is insignificant. Finally, the two dummy variables have the expected positive and significant signs and the same applies for the error correction term (ECM) that has a significantly negative coefficient.

The results for Portugal in the fourth column of Table 3, show income to have significantly positive effect on the demand for Portuguese military expenditure, as for the other two countries, and there is a significant negative coefficient of the non-military government expenditure variable. NATO military spending has a significant positive effect in the short-run, while the population and trade balance variables are insignificant. The dummy for the democracy period is highly significant and has the expected negative sign. Similarly to the case of Greece and Portugal, the error correction term (ECM) enters the equation with a significantly negative sign.

Clearly, a simple demand model which attempts to take into consideration major institutional and strategic factors can be a surprisingly successful means of modelling the determinants of military spending. The ECMs are well defined and provide interesting results for each of the countries. Even when dealing with relatively similar countries, however, the specificities of the individual countries experience, both economic and strategic are important and make it difficult to draw common conclusions.

CONCLUSIONS

This paper has provided an empirical analysis of the determinants of military spending in three of the EU's peripheral economies - Greece, Portugal and Spain. The fact that all three have had military governments, with a remaining important role for the military in Greece given the perceived Turkish threat, that they all have had marked reductions in military spending after the end of the Cold War, and that they all have good time series data available make them an extremely interesting group of countries to study.

A relatively simple demand model provides a surprisingly useful basis for an investigation of the relative importance of strategic and other social and economic factors for the three countries. It also provides some interesting results. Despite the relative homogeneity of the countries there are clear differences in the processes determining their military spending, both the long run and short run. Military spending does appear to respond positively to

output changes in the short-run but in the long-run that only applies to Portugal. As far as population changes are concerned there is diversity among the three countries, while there is evidence of free riding on NATO military spending by Portugal in the long-run. There is some evidence that military spending crowds out other forms of government spending in Greece and Portugal, in the sense that other government expenditures have a negative impact on military spending. It is also important to take account of the particular historical and institutional feature of the countries in modelling the demand for military spending. Using simple year dummies takes the analysis a surprisingly long way, but future modelling efforts might benefit from finding more sophisticated ways of quantifying political and strategic factors.

FOOTNOTES

[1] According to SIPRI (various years) it ranked fifth among the major recipients for conventional weapons during 1990-1995 while Turkey ranked first, Spain twentieth and Portugal twenty-third.

[2] The three production programmes were: a) in aeronautics (the construction under licence of 70 Northrop's F-5 contracted to CASA in 1965), b) in shipbuilding (the construction of five frigates under American licence and two submarines under French licence) and c) in land weapons (the construction of 280 tanks under French licence), Mollas-Gallard, (1992)

[3] However, once a country attains a certain degree of security, further increases in income leave defence budgets relatively unchanged, thus, leading to reductions in military spending shares (Antonakis, 1997). If this were the case for Greece, then the coefficient of GDP would be negatively related to the share of military spending (M).

[4] Given the non-rivalness characteristic of defence, an increase in population need not lead to an increase in the quantity of defence supplied. There may nevertheless, be an increase in demand for a pure public good (like defence) if it has a high income elasticity of demand and if rising population reduces the tax cost faced by the median voter.

[5] Spain joined the alliance in 1982.

[6] Interpreting this coefficient is not straightforward. A positive coefficient does imply a lack of free riding and could be interpreted as 'leader follower' behaviour, but it could also be stem from complementary joint products as in Murdoch and Sandler (1984). Alternatively, the variable could be picking up unobserved threat from other countries.

[7] All the series in 1998 constant national currencies were converted to 1998 US $ by the relevant 1998 exchange rate.

[8] Sezgin and Yildirim (2002) followed the Dunne and Nikolaidou (2001) model to estimate the determinants of military expenditure in Turkey, but they used shares rather than levels of the variables. They do so in order to avoid conversion problems but as Hartley and Sandler (1995, p.213) argue, using the variables in levels provides a better explanation of the nature of the demand for military expenditure.

[9] All estimations from ARDL approach to cointegration, using Microfit 4.0 (Pesaran and Pesaran, 1997).

[10] The non-exclusiveness and non-rivalness features of a public good like defence would suggest that an increase in population should not lead to increases in military expenditure, at least not proportionate increases.

[11] The variables are in logarithmic form, so, the change in logs gives us growth rates.

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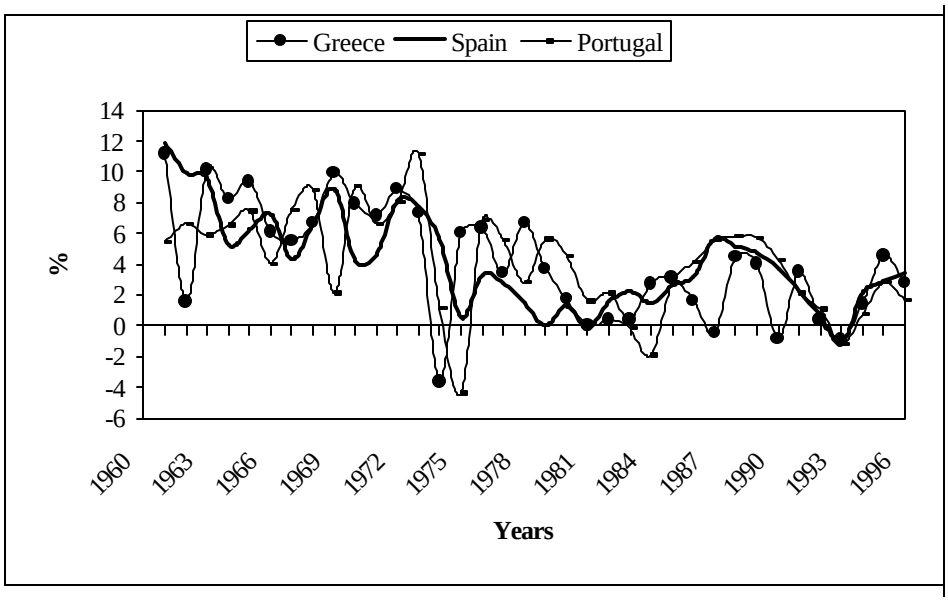
Figure 1. Real Growth of GDP for Greece, Portugal and Spain



*calculated from figures in 1990 mn US $

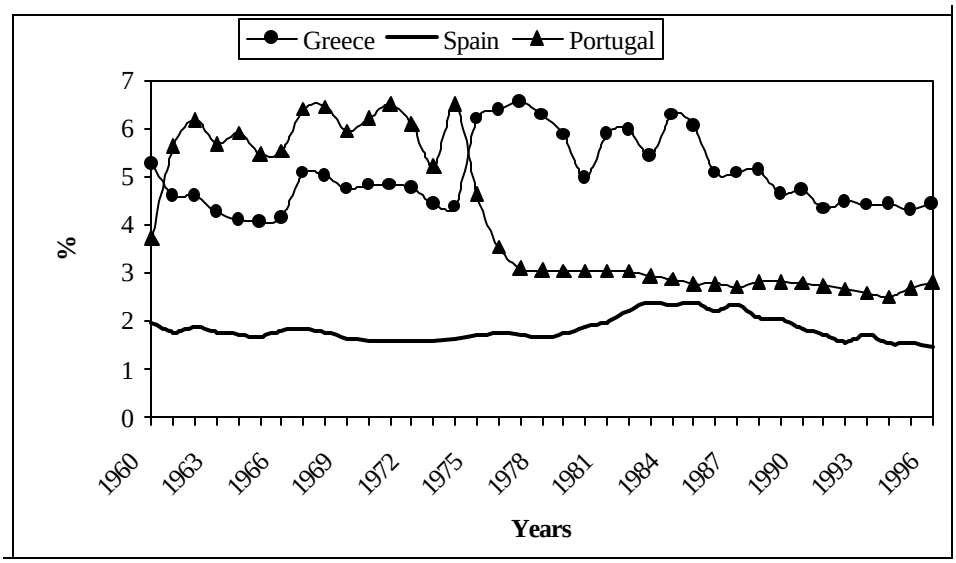
Source: EUROSTAT, http://europa.eu.int/comm/eurostat

Table 1: Main Economic Indicators (1961-2000)

	GREECE				SPAIN				PORTUGAL			
	1960s	**1970s**	**1980s**	**1990s**	**1960s**	**1970s**	**1980s**	**1990s**	**1960s**	**1970s**	**1980s**	**1990s**
GDP/ capita	3,769	6,453	7,609	8,316	6,132	9,310	10,804	13,172	2,764	4,575	5,682	7,093
Inflation rate (%)	3.1	13.7	18.4	11.7	6.5	15.1	9.4	5.3	2.9	16.1	17.5	7.1
Real Growth of Invest- ment (%)	9.3	2.8	-0.3	3.5	11.3	1.6	5.2	-0.4	6.9	4.1	2.6	2.4
Government Debt (% GDP)	16.1	20.2	53.1	106.2	13.1	14.3	38.3	58.9	15.4	26.2	58.3	65.4
Unemploy- ment (%)	5.1	2.2	6.4	8.4	2.5	5.4	18.5	21.2	2.5	5.1	7.0	5.9
Population (000,000s)	8.7	9.5	10.0	10.4	32.3	35.8	38.4	39.1	8.7	9.2	9.9	9.8

Source: EUROSTAT (various years)
Note: The GDP per capita and the real growth rates of investment are in constant 1998 US $.

Figure 2. Military Burden for Greece, Portugal and Spain



Source: SIPRI (1975, 1981, 1988, 1992, 2001)

Table 2. Estimated Long-Run Coefficients
Dependent variable M

Coefficients						
	Greece		Spain		Portugal	
Y	0.44	(1.08)	0.07	(0.43)	2.12*	(4.91)
P	-5.70*	(2.31)	6.14*	(3.83)	-2.08	(1.22)
G	-0.74*	(1.99)	-0.03	(0.19)	-0.65*	(2.29)
TB	0.01	(0.36)	-0.01*	(3.10)	0.02*	(2.36)
NATO	0.31*	(2.93)	0.17*	(1.97)	0.13	(1.48)
TM	0.60*	(3.87)	-----		-----	
CONSTANT	42.06	(1.87)	-57.00*	(4.14)	9.70	(0.59)
POL	0.35*	(3.75)	-----		-----	
CYPRUS	0.34*	(3.61)	-----		-----	
D8289	-----		0.13*	(3.46)	-----	
D93	-----		0.19*	(3.03)	-----	
D75	-----		-----		-0.48	(1.76)

Note: * indicates significance at the 5% level.
t-ratios in parentheses

Table 3. Error Correction Representation Results for Greece, Spain, Portugal

Dependent variable ÄM

	GREECE	**SPAIN**	**PORTUGAL**
$ÄM_{-1}$	0.25 (2.50)*	-----	------
ÄY	1.39 (3.60)*	1.17 (2.94)*	1.07 (4.48)*
ÄP	-8.94 (2.90)*	4.22 (3.70)*	-1.05 (1.03)
ÄG	-0.46 (2.46)*	-0.02 (0.19)	-0.33 (2.78)*
ÄTB	0.01 (1.67)	-0.01 (3.05)*	0.01 (0.67)
$ÄTB_{-1}$	0.02 (2.48)*	-----	-----
ÄNATO	0.19 (2.55)*	0.12 (1.94)	0.50 (5.05)*
ÄCONSTANT	26.24 (2.28)*	-39.19 (3.99)*	4.90 (0.54)
ECM_{-1}	-0.62 (5.66)*	-0.69 (8.25)*	-0.50 (3.85)*
ÄTM	0.38 (4.66)*	-----	-----
ÄPOL	0.22 (5.67)*	-----	-----
ÄCYP	0.22 (5.07)*	-----	-----
Ä8289	-----	0.09 (3.18)*	-----
Ä93	-----	0.13 (3.65)*	-----
Ä75	-----	-----	-0.24 (2.78)*
R^2	0.90	0.80	0.84
R^2adj.	0.84	0.74	0.78
S.E.	0.04	0.03	0.05
F-stat	F(11,27)=19.40	F(8,30)=14.80	F(7,31)=2.08
DW	2.40	2.36	2.22

t-ratios in parentheses, *denotes significance at 5% level.
Ä denotes the first difference of the variable,
$ÄM_{-1} = M_{-1}-M_{-2,}$
$ÄTB_{-1} = TB_{-1}-TB_{-2}$