Defence and Peace Economics
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713640174

DOES NEUTRALITY MAKE A DIFFERENCE? EXPLAINING PATTERNS OF SWISS DEFENSE SPENDING IN 1975-2001
Thomas Bernauer a; Vally Koubi a,b; Fabio Ernst c
a Center for Comparative and International Studies (CIS), ETH Zurich, Zurich, Switzerland
b Oeschger Institute and Department of Economics, University of Bern, Switzerland
c Swiss Armed Forces Planning Staff, Ittigen, Switzerland

To cite this Article Bernauer, Thomas, Koubi, Vally and Ernst, Fabio (2009) 'DOES NEUTRALITY MAKE A DIFFERENCE? EXPLAINING PATTERNS OF SWISS DEFENSE SPENDING IN 1975-2001', Defence and Peace Economics, 20: 5, 413 — 422
To link to this Article DOI: 10.1080/10242690802051537
URL: http://dx.doi.org/10.1080/10242690802051537

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.informaworld.com/terms-and-conditions-of-access.pdf

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.
 DOES NEUTRALITY MAKE A DIFFERENCE? 
EXPLAINING PATTERNS OF SWISS DEFENSE SPENDING IN 1975–2001  

THOMAS BERNAUER, VALLY KOUBI AND FABIO ERNST  

\( ^{a, b, \dagger} \)Center for Comparative and International Studies (CIS), ETH Zurich, Zurich, Switzerland; \( ^{b} \)Oeschger Institute and Department of Economics, University of Bern, Switzerland; \( ^{c} \)Swiss Armed Forces Planning Staff, Ittigen, Switzerland  

(Received 25 October 2007; in final form 25 February 2008)  

We study the behavior of defense spending in Switzerland over 1975–2001. Our main interest is in determining how neutrality in international affairs (non-membership in military alliances) affects defense spending. We find that neutrality is associated with a perception of lower levels of external threat; hence it confers economic benefits in the form of a smaller defense burden. However, neutrality does not fully insulate a country from variations in the level of external threat in the global system as perceived by members of military alliances. Swiss defense spending has tracked very closely the spending trends – but at a lower average level – of the United States and other NATO countries. To the extent that post-Cold War threats, such as international terrorism, materialize primarily in the context of existing security alliances, Swiss military spending patterns observed in 1975–2001 are likely to remain the same in the future.  

Keywords: Defense spending; Neutrality; Alliances; Threat; Security; Switzerland  

INTRODUCTION  

One of the main duties of a sovereign country is to protect its territory and people from violence emanating from other countries or from non-state actors such as terrorist groups. This duty can mainly be performed by means of military power. The cost of supporting military capabilities depends on both exogenous (such as geography, history and so on) and endogenous factors. An important factor from the latter group is a country’s participation or non-participation in security or military alliances. Switzerland, a neutral country and therefore not a member of any security or military alliance, must to a great extent be self-reliant for its defense. Moreover, it does not have any formal obligation to take sides in international conflicts involving other parties. Swiss policy-makers must then perceive that the country is, relative to other countries, subject to a lower level of external threat.  

In this paper we examine standard political and economic determinants of military spending in Switzerland. In addition, we seek to infer whether Switzerland’s status as a neutral country...
makes it behave differently from other countries that belong to military alliances. We use the behavior of the defense budget to examine whether neutrality insulates a country from changes in the level of external threat in the global system.

We find that neutrality does alter defense spending but does not fully insulate a country from developments in the level of external threat in the global system as perceived by non-neutral countries. Switzerland’s (and Austria’s, a neighboring and also neutral country of similar size) average level of defense spending has remained systematically below that of Western European NATO members. However, at the same time, Swiss defense spending has followed the trend of spending in NATO countries. These two findings imply that the level of external threat perceived by neutral countries is indeed lower than that perceived by allied countries; that is, neutrality does confer savings in defense spending. Moreover, variation in the level of external threat to alliance members, as expressed by their defense spending, is strongly positively correlated with variation in the level of external threats to neutral countries (again measured by their defense spending). Hence, neutrality does not fully insulate a country from global, alliance-related risks. We also find that the level of external threat matters for the ‘budget’ dividend of neutrality. That is, the difference in the average defense-to-GDP ratio between neutral and aligned countries shrinks with a decrease in the level of external threat.

The remainder of the paper is structured as follows. The next section offers a literature review. The empirical analysis is carried out in the third section, which is followed by a concluding section.

**REVIEW OF LITERATURE**

**Theoretical Research**

There is a substantial body of theoretical and empirical literature in political science and economics that seeks to explain defense spending. The theoretical explanations can be classified in three categories: (1) arms races; (2) organizational and bureaucratic politics; and (3) economic welfare maximization. The arms race literature, following Richardson (1960), explains time-series patterns of military expenditure in terms of action-reaction behavior between two rivals. It identifies three major influences: (a) the military spending of the other nation (rival) in the threat system (the ‘reaction’, ‘defense’ coefficient); (b) the economic burden of defense (the ‘fatigue coefficient’); and (c) the underlying grievances held by one nation against the other (the ‘grievance’ coefficient).

The arms-race model of military expenditure seems more suitable for countries involved in conflict or engaged in an enduring rivalry, such as the US–USSR Cold War rivalry (Majeski, 1985), the Indian–Pakistani (Deger and Sen, 1990), the Arab–Israeli (Mintz et al., 1990), and the Greek–Turkish relationships (Kollias and Makrydakis, 1997. In these cases the military preparedness of the other represents the overwhelming security issue/consideration.

The organizational and bureaucratic politics explanation emphasizes ‘incrementalism’ and bargaining over the defense budget, starting from the status quo. It implies that the best predictor of new increments to military spending is simply the increments of the immediate past; that is, the main determinant of this year’s defense budget is last year’s budget (Correa and Kim, 1992).

The economics literature tends to ignore bureaucratic or political processes. It uses a standard neo-classical model in which a nation-state is represented as a rational agent who maximizes a welfare function depending on security and economic variables subject to a
budget constraint. Defense spending balances the welfare benefits of extra security derived from military expenditure against its opportunity costs in terms of forgone civilian output (Dunne and Perlo-Freeman, 2001; Avramides, 1997; Smith, 1995). Within this optimization framework, a wide variety of forms for the welfare function, budget constraint, and security function have been employed.

**Empirical Research**

The standard approach in the empirical literature is to estimate an equation where the demand for military spending is a function of economic resources, threats to security as well as various domestic political factors and international contingencies. Economic resources are usually proxied by GDP; external threat by military spending in the nation’s rival(s) as well as in country’s allies; domestic economic factors by variables such as the budget deficit, inflation, unemployment; political variables, by variables such as the ideology of the political party in power and the electoral cycle. Finally, various dummy variables are included that capture the presence of war, the structure of the international system (hegemonic, bipolar, multipolar), and changes in strategic doctrine (e.g. Mutual Assured Destruction (MAD) and Flexible Response).

Most studies on the demand for military spending employ time-series analysis for individual countries but there are also a few cross-sectional studies (for instance, Dunne and Perlo-Freeman, 2001). Country studies have produced mixed results for the main determinants of defense spending, making it difficult to come up with useful generalizations. Studying the determinants of defense spending in a neutral country like Switzerland is valuable in complementing the aforementioned research because it can help shed light on the issue of whether neutrality materially alters military spending and in what ways.

**DATA AND EMPIRICAL ANALYSIS**

Our statistical estimation follows closely the procedures used in the existing literature. In particular, the demand for defense spending in Switzerland is assumed to take the form:

\[
M = h_1 + h_2 \times Y + h_3 \times E + u
\]

Defense spending \((M)\) depends on domestic economic conditions \((Y)\) – such as real GDP growth, the unemployment rate, and the federal budget deficit to GDP ratio – and the external threat \((E)\). \(u\) is the error term. We also include lagged values of defense spending \((M)\) to capture ‘inertia’ in defense outlays. The data for Swiss defense spending were provided by the Swiss Defense Ministry. They cover the time-period 1975–2001. We limit the dataset to this time-period because the terrorist attacks in the United States in September 2001 as well as the subsequent wars in Iraq and Afghanistan have led to the decoupling between defense spending in the USA and other countries. This is probably because these events have been perceived as representing US specific developments and may not carry implications for the defense situation of other countries. We present information on post-2001 developments in defense budgets.

---

1 See, for example, Looney and Mehay (1990) for the USA; Correa and Kim (1992) for the USA and Soviet Union; Smith (1990) for the United Kingdom; Deger and Sen (1990) for India and Pakistan; Avramides (1997) in Greece; and so on.

2 See Bernauer et al. (2007) for a simple theoretical framework, which can be used to justify the estimated equation.
later on. The data on the other variables were compiled by the authors from open sources (see the Appendix).

Switzerland is a neutral country. An important question is, therefore, whether perceptions of threats emanating from the international system and the type of relations among major powers in this system influence Swiss defense spending decisions in the same way they influence such decisions in countries that are not neutral. If they do, then one can argue that neutrality does not by itself fundamentally alter the defense spending process.

Results

We examine three types of potential driving forces:

(a) path-dependence (inertia)
(b) the external security environment
(c) domestic economic factors

Path-dependence (inertia)

We begin by examining the degree of inertia in Swiss defense spending by estimating the equation:

$$DS_t = a \times DS_{t-1} + \epsilon$$

Inertia (path dependence) means that national defense spending choices at time $t$ have a strong influence on the same type of choices at time $t+1$. Table I summarizes the results.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHDS$_{t-1}$</td>
<td>0.983</td>
<td>0.082</td>
<td>11.55</td>
<td>0.000</td>
</tr>
<tr>
<td>Cons</td>
<td>0.014</td>
<td>0.128</td>
<td>0.110</td>
<td>0.917</td>
</tr>
</tbody>
</table>

R-squared 0.854
Adjusted R-squared 0.848
Durbin–Watson stat 2.100
F-statistic 140.46
Prob(F-statistic) 0.0000

It indicates that the Swiss defense burden is highly persistent (autoregressive coefficient of 0.98). Moreover, this model has much explanatory power: 85% of the Swiss military burden in a given year is explained by the military burden in the previous year.

External security environment

If threats emanating from the international system affected mostly those countries that are directly involved in this system (through participation in rivaling alliances) one should expect that the defense burdens of alliance members would not matter for a neutral country like Switzerland. Yet, if external threats affected alliance members and neutral countries alike then one should expect to see a positive covariation of the defense budgets in allied and non-allied
countries. If the nature of external threats in the international system were of the latter variety, then one could not claim that neutrality is a means of achieving savings in military spending. In that case, defense spending in neutral countries would simply mimic such spending in non-neutral countries; in other words, one would not be able to argue that neutrality shelters a country from the cost of arms races in the international system.

To infer the type of perceptions regarding the nature of external threat (alliance specific or general) we examine the effects of defense expenditures in other countries on Swiss defense spending. Figure 1 depicts the time path of US and Swiss real defense spending 1975–2001 (as we mentioned above, we end with 2001 in order to abstract from the effects of 9/11 on US military spending). Both series have been normalized by dividing them with their 1975 levels (so they both have the same initial value, which makes it easier to detect divergence in spending across countries).

The similarity of the two paths is quite remarkable. Swiss defense spending has tracked very closely that of the United States. Our interpretation of this finding is that there exists a global threat of conflict, to which the US responds and/or contributes. This global threat is not fully alliance specific. That is, Switzerland must have expected that if there were a conflict between NATO and the Eastern Block, there would be spillover effects: hence, it let its military spending vary with the perceived level of that external threat. Table II confirms this interpretation in the context of standard regression analysis. It also provides information on the short-term reaction of Swiss defense spending to changes in the perception of the external threat as captured by changes in defense spending in the US. In particular, the estimated elasticity is 0.51.

---

3 The estimated coefficient represents the elasticity because we have used the logs of defense spending in the regression.
Figure 2 and Table III offer additional information on how neutrality matters for defense spending. Figure 2 depicts the paths of defense burdens (military spending as a percentage of GDP) of the four largest NATO countries and two neutral countries (Austria, Switzerland). Table III shows the correlation coefficients for defense spending of the four largest NATO countries and two neutral countries (Austria and Switzerland) in 1975–2001.

Two important patterns are evident. First, the covariation of the Swiss defense burden with the defense burdens of other countries is very high. The defense burden over 1975–2001 of
Switzerland, four key NATO countries (USA, UK, France, Germany), and another neutral European country (Austria) have all moved in tandem. They reached a peak in the early-to-mid-1980s and have declined since. The second important pattern is that, as shown in Figure 2, the four listed NATO countries exhibit consistently higher defense burdens than Switzerland (and also Austria).

What conclusion can be drawn from these two findings? As argued above, it seems that perceptions of external threats to European countries do not seem to be a function of a country’s international alliance membership exclusively. That is, neutrality does not fully spare a country from external threats in a world of major alliance rivalry. However, the level of such threats seems to be lower for neutral countries; that is, there appear to be cost savings associated with neutrality. The fact that this finding applies equally to Austria (which has borders with two alliance groups, see Table IV) and Switzerland (which is surrounded by countries belonging to a single alliance) indicates that the critical issue is indeed international status (neutrality) rather than location.

How large are the direct economic benefits of neutrality and how do they vary? Figure 2 reveals two interesting patterns. First, the difference in the average defense spending to GDP share is substantial across neutral and aligned countries. In particular, the defense to GDP ratio is 1.3% in the neutral group and 3.7% in the NATO group. While this 2.4 percentage points difference (what we call the ‘budget’ neutrality dividend) represents the upper bound of the benefits of neutrality as measured by the resources devoted to defense spending (because of the possible existence of externalities associated with defense spending; for instance, indirect benefits arising from military R&D), it does suggest that the economic benefits from neutrality can be substantial. This statement, of course, is conditional on the existence of an alliance that makes neutrality by countries such as Switzerland feasible. The second interesting pattern is that the benefits from neutrality (again as captured by differences in defense budgets across neutral and aligned countries) vary with the level of the external threat. Following the collapse of the Soviet Union, the direct economic benefits from neutrality have remained substantial.

### TABLE III  Cross-Country Correlations of Defense Spending (% of GDP), 1975–2001

<table>
<thead>
<tr>
<th></th>
<th>Switzerland</th>
<th>USA</th>
<th>Germany</th>
<th>France</th>
<th>UK</th>
<th>Austria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>0.9038</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>0.8205</td>
<td>0.7992</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>0.8665</td>
<td>0.7761</td>
<td>0.8649</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>0.9106</td>
<td>0.8504</td>
<td>0.9663</td>
<td>0.8947</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>0.8603</td>
<td>0.8079</td>
<td>0.8554</td>
<td>0.8307</td>
<td>0.8734</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

### TABLE IV  Austria’s Defense Spending, 1975–2001

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>USADS</td>
<td>0.132</td>
<td>0.031</td>
<td>4.275</td>
<td>0.000</td>
</tr>
<tr>
<td>Constant</td>
<td>0.453</td>
<td>0.146</td>
<td>3.102</td>
<td>0.005</td>
</tr>
<tr>
<td>AR(1)</td>
<td>0.448</td>
<td>0.180</td>
<td>2.480</td>
<td>0.020</td>
</tr>
</tbody>
</table>

R-squared 0.72591
Adjusted R-squared 0.70208
Durbin–Watson stat 1.82470
F-statistic 30.4583
Prob(F-statistic) 0.00000
but have also decreased significantly. Namely, over the period 1992–2001, the average defense to GDP ratio was 1.1% in the neutral countries and 2.8% in the four NATO countries, a difference of 1.7 percentage points. With a reduced external threat, it is not as costly to be a member of an alliance, or equivalently, it does not pay as much to be neutral.

Can our analysis be used to speculate about future developments in defense spending of neutral countries? In order to do so we need to determine the likely future security threats to Switzerland (and other neutral countries). The most likely threat, given developments in the past few years, seems to be international terrorism. To the extent that this threat materializes primarily in the context of existing security alliances (for instance, the United States and its allies versus Islamic fundamentalists), the Swiss military spending patterns observed in 1975–2001 are likely to remain the same in the future. To the extent that new threats (whether they emanate from terrorism or other sources) become more diffused (that is, less alliance specific) there will be a greater need for Switzerland to look after itself. In the latter case, neutrality may no longer carry the advantages it did in the past. This would result in higher defense spending. However, there is no evidence so far that policymakers outside the US (and the UK) perceive terrorism-related threats as becoming more diffused. This is confirmed from inspection of Figure 3, which reports defense spending (as a percentage of GDP) following the 2001 terrorist attack in the US.

FIGURE 3 Defense to GDP ratio in Switzerland, Austria, France, Germany, UK, USA, 2000–2005
As can be seen, the growth of defense spending in the US has increased considerably since 2001 (and to a significant but smaller degree in the UK) while that in the other countries has remained flat. Of course, the period is too short to allow inferences about the future. However, the observed defense patterns seem to support the view that the perception outside the US and the UK regarding the Islamic terrorist threat is that it remains – at least for the time being – a US–UK affair.

**Domestic economic conditions**

We have also examined the effects of a wide range of domestic economic conditions on year-to-year Swiss defense allocations, most notably, economic growth, unemployment, and federal government deficit. Table V shows our key results (identical results were obtained when we used data from 1975 to 2005).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHDS(_{t-1})</td>
<td>0.844</td>
<td>0.142</td>
<td>5.930</td>
<td>0.000</td>
</tr>
<tr>
<td>GDP(<em>{GR</em>{t-1}})</td>
<td>−0.007</td>
<td>0.012</td>
<td>−0.592</td>
<td>0.560</td>
</tr>
<tr>
<td>UNEMPL(_{t-1})</td>
<td>−0.030</td>
<td>0.017</td>
<td>−1.765</td>
<td>0.092</td>
</tr>
<tr>
<td>DEBT(_{t-1})</td>
<td>0.000</td>
<td>0.007</td>
<td>0.107</td>
<td>0.915</td>
</tr>
<tr>
<td>Constant</td>
<td>0.273</td>
<td>0.3193</td>
<td>0.857</td>
<td>0.401</td>
</tr>
</tbody>
</table>

Neither economic growth nor the unemployment and budget outlook have had a significant effect on Swiss defense spending. More generally, we have experimented with additional variables representing domestic economic conditions without altering this result. We conclude that Swiss policy-makers do not use defense spending for short run macro-economic purposes.

**CONCLUSION**

Our analysis shows that defense spending in Switzerland responds to the level of external threat as perceived by the large NATO countries. In the recent past, the main external threat was the Soviet Union. It appears that the distribution of this threat across NATO and non-NATO countries must have had alliance-specific as well as global components. The alliance-specific component can be seen in the fact that Switzerland was able to keep defense spending substantially lower than the NATO countries. While one could argue that lower defense spending by Switzerland reflected free-riding on the containment policies of the United States and NATO, an alternative plausible explanation is that neutrality is indeed associated with a lower level of external threat. This explanation has the advantage that it accounts for participation in alliances in an endogenous fashion. Countries that face a lower level of external threat chose both a lower level of defense spending and non-participation in a military alliance.
**References**


**APPENDIX**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTDS</td>
<td>Defense spending of Austria as % of GDP</td>
<td>Military Balance and SIPRI</td>
</tr>
<tr>
<td>FRDS</td>
<td>Defense spending of France as % of GDP</td>
<td>Military Balance and SIPRI</td>
</tr>
<tr>
<td>GERDS</td>
<td>Defense spending of Germany as % of GDP</td>
<td>Military Balance and SIPRI</td>
</tr>
<tr>
<td>CHDS</td>
<td>Defense spending of Switzerland as % of GDP</td>
<td>Swiss Defense Ministry</td>
</tr>
<tr>
<td>DEBT</td>
<td>Swiss federal government debt, current CHF</td>
<td>Swiss Finance Ministry</td>
</tr>
<tr>
<td>GDP_GR</td>
<td>Real GDP growth in Switzerland</td>
<td>Swiss Statistical Office</td>
</tr>
<tr>
<td>UNEMPL</td>
<td>Unemployment rate in Switzerland</td>
<td>Swiss Statistical Office; Comparative Political Data Set (<a href="http://www.ipw.unibe.ch/mitarbeiter/armingeon/default.asp?inhalt=CPD_Set.htm">http://www.ipw.unibe.ch/mitarbeiter/armingeon/default.asp?inhalt=CPD_Set.htm</a>)</td>
</tr>
<tr>
<td>UKDS</td>
<td>Defense spending of United Kingdom as % of GDP</td>
<td>Military Balance and SIPRI</td>
</tr>
<tr>
<td>USADS</td>
<td>Defense spending of the USA as % of GDP</td>
<td>Military Balance and SIPRI</td>
</tr>
</tbody>
</table>