

STATE BUDGET IN A CHANGING ECONOMIC AND SECURITY ENVIRONMENT

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Introduction: The Role of Budgets

Government budgets reflect its plans for taxation and spending. In turn, these plans are based on a set of government objectives comprising:

- Macro-economic objectives concerned with employment, price stability (inflation), growth, balance of payments and equity objectives, together with a commitment to balance the budget over the business cycle. It is recognised that there are potential conflicts between some of these objectives, requiring governments to make difficult choices and “trade-offs”.
- Micro-economic objectives which form the micro-economic foundations of macro-economic objectives (e.g. local employment measures and labour market policies). Micro-economic policy might also focus on measures to improve economic efficiency (e.g. supply-side policies aiming to correct market failure and improve the operation of markets).
- The general belief of a government as to the desirable size and “mix” of public and private sectors. The extremes range from complete state ownership which characterises command economies and market capitalism dominated by private ownership and a minimal state sector (e.g. concerned with defence, police and the judicial arrangements for enforcing contracts, so assisting the promotion of mutually-beneficial trade and exchange).

Budgets and the Size of Government: Does Economic Theory Offer any Guidance?

Budgets reflect a set of decisions about the size and functions of government. In democracies, these decisions are made in the political market place and reflect the choices of voters as principals and politicians as their agents elected to pursue the “will of the people”. On this **public choice** view, budgets will depend on the outcome of a complex “exchange” between voters, elected politicians, bureaucracies and producer interest groups, all seeking to influence policy in their favour (e.g. lobbies for education, health and road improvements; the military-industrial-political complex: see below). The public choice school,

which recognises the possibility of government failure, is in contrast to the orthodox economic view which focuses on government's role in correcting market failure, including the provision of public goods.

Governments concerned with efficiency in resource allocation will use a budget to remove substantial **market failures** caused by public goods, externalities and imperfections (e.g. monopolies, oligopolies and cartels). **Public goods** are those which cannot be provided by the normal market mechanism (they are characterised by non-rivalry, non-excludability and by free-riding): classic examples are defence, law and order, flood control and theories. Goods involving harmful or beneficial externalities provide a case for tax-subsidy policy (taxation to reduce the output of harmful externalities, such as pollution and road congestion; subsidies to expand the output of socially-beneficial activities, such as education, health and R&D). Budgets are also needed to finance a government's anti-monopoly and competition policy where the policy options range from funding a competition policing agency to state ownership as a means of controlling private monopoly power, including public utilities, such as electricity, gas, telecommunications and water supply. Interestingly, UK privatisation policy has shown that there are opportunities for privatising and introducing competition into the traditional public utilities. This illustrates a more general point, namely, the opportunities for introducing private market solutions into the traditional public sector. For example, the public good nature of defence does not mean that all aspects of defence output should be publicly provided. In fact, defence is an area where there are extensive opportunities for using markets or simulating market solutions (e.g. privatisation of defence industries; contractisation of in-house activities; competitive procurement policies: Hartley, 1997).

Government budgets can also be interpreted as **public procurement policy**, with taxation providing the funds (the price) for the purchase of goods and services provided by the public sector. Public procurement economics involves government in a complex set of choices involving what to buy, who to buy from and how to buy (i.e. the choices of product or service; of contractor; and of type of contract: Sandler and Hartley, 1995, chp. 5). For some products, government is the only buyer (monopsony - e.g. nuclear weapons; tanks; missiles; railway and mining equipment) or a major buyer which enables it to influence the size, structure, conduct and performance of an industry. Such sectors involve major efficiency issues reflecting the pressures for preferential purchasing and cost-plus contracts, so resulting in a "culture of dependency" rather than enterprise (e.g. as in state-owned industries, as well as defence industries).

In any analysis of budgets, the "**displacement effect**" cannot be ignored. This effect is the observed tendency of government expenditure and taxation to rise during wars and national emergencies and to remain at a higher than pre-war level following the end of the war and the emergency. Public choice models provide an explanation for the displacement effect in terms of the behaviour of agents in the political market place, namely, budget-maximisation

by bureaucracies, income-maximisation by producer groups, vote-maximisation by politicians and the desire of governments to be re-elected. Disarmament since the end of the Cold War should provide evidence of the displacement effect. As a result, it is predicted that public expenditure and taxation will not have fallen by the full extent of the disarmament, so that the public sector has “consumed” some of the Peace Dividend (Hartley, 1991, chps. 4 and 5).

Reductions in defence spending since the end of the Cold War raise three issues for defence budgets:

- How have different nations within NATO reduced their defence budgets? The observed behaviour and choices provide an indication of a nation’s preferences for the optimal size and composition of its defence spending.
- Can economics contribute to the formulation of defence policy in an era of reduced defence budgets? What are the range of choices and what are the implications for NATO in terms of burden-sharing and the opportunities for improving Alliance efficiency?
- What are the likely economic impacts of reduced defence budgets and the prospects of a Peace Dividend?

Defence Budgets in NATO

Table 1 shows defence burdens and changes in the levels of real defence spending for NATO countries over the period 1990 to 1997. It can be seen that members of the Alliance, when faced with the same change in the external threat, namely, the end of the Cold War, have adopted significantly different responses. Most member states have reduced their defence burdens and their levels of defence spending (the exceptions being Turkey, Greece, Portugal and Luxembourg), but there have been significant differences in the percentage cuts which have varied between some 4% and 30%. Compared with the NATO total, above average cuts were made in Germany, UK, USA and Belgium and relatively small cuts in France, Italy, Denmark and Norway, with implications for the available Peace Dividend in these countries. A possible hypothesis is that nations with the highest defence burdens in 1990 (i.e. D/Y) were the ones which made the largest percentage cuts in real defence spending over the period 1990-97; but a rank correlation analysis showed no significant correlation between these variables ($R=0.0286$). For NATO Europe and NATO Total, the percentage cuts in military personnel over the period 1990-97 were -17.2% and -21.7%, respectively, with both percentages similar to the percentage cuts in real defence spending for the same period. Public choice analysis can be applied to NATO during the Cold War and especially since the end of the Cold War.

Table 1 - NATO Defence Expenditure 1990-97

	Defence share of GDP (%)		Change in defence spending
	1990	1997	1990-1997 (%)
Belgium	2.4	1.6	-25.5
Denmark	2.1	1.7	-4.0
France	3.6	3.0	-8.6
Germany	2.8	1.6	-30.0
Greece	4.7	4.6	+13.8
Italy	2.1	1.9	-5.6
Luxembourg	1.1	0.8	+1.9
Netherlands	2.6	1.9	-14.0
Norway	2.9	2.2	-3.5
Portugal	2.8	2.6	+7.6
Spain	1.8	1.4	-14.6
Turkey	3.5	4.3	+22.6
UK	4.0	2.8	-27.0
NATO Europe	2.8	2.2	-16.2
Canada	2.0	1.3	-17.8
USA	5.5	3.6	-26.6
NATO Total	3.8	2.8	-22.8

Notes:

- Change in defence spending is based on the 1997 figure compared with the 1990 figure, in constant 1990 prices and exchange rates.
- Defence shares based on current prices.
- 1990 defence shares for NATO Europe and NATO Total are medians.

Sources: NATO, 1997; SIPRI, 1997.

NATO and Public Choice Analysis¹

The main agents in the NATO military-industrial-political complex are the NATO Headquarters and organizations, earmarked NATO forces, NATO-supported defence equipment programmes, together with national Defence Ministries, their armed forces, and defence contractors. The bureaucracies within this complex will aim to maximize their budgets and they will do so by over-estimating the demand for their preferred policies and under-estimating the costs of these policies. As a result, a budget-maximizing bureaucracy will be inefficient and provide “too large” an output which will be “justified” as an optimum by exaggerating demand and under-estimating costs.

During the Cold War, NATO organizations, national Defence Ministries, and their armed forces had every incentive to over-estimate the “threat” from the Warsaw Pact. They could point to the size of conventional forces and the range of nuclear forces deployed by the potential enemy; and they could focus on the numerical superiority of the Warsaw Pact forces compared with those in NATO. The alleged superiority of the Soviet forces was then used as a key

argument by NATO and the United States as alliance leader to maintain defence spending and armed forces in NATO member states. Often it was claimed that adequate NATO defence required equivalent matching of Soviet forces and that NATO needed to maintain a technical superiority to offset the numerical superiority of the Warsaw Pact forces. The threat of a massive surprise attack by Soviet forces in Central Europe was also used to justify keeping NATO forces at a high state of readiness - a posture which appealed to the armed forces who could then use the readiness argument for appropriate funding. Such arguments were supported by defence industries which benefited from the contracts awarded to maintain the technical superiority of NATO equipment, so resulting in a technological arms race between the two superpowers.

Defence contractors also had every incentive to under-estimate the costs of new equipment programmes. Once started, projects were difficult to stop: they attracted interest groups of scientists, managers and workers whose livelihood and votes depended on the continuation of the project. The inevitable cost escalation on high technology defence programmes (e.g. aerospace) was funded by cost-based contracts, but defence contractors could always “justify” such outcomes as the necessary price of maintaining democracy and providing national economic benefits in the form of jobs, technology and exports. Defence industries and central staffs in NATO could also point to the apparent cost advantages from standardisation and long production runs of one type of equipment by Warsaw Pact defence industries (e.g. 10,158 Mig-21 combat aircraft were built in three Soviet factories).

Not surprisingly, there was little critical appraisal of these arguments used by the military-industrial-political complex in NATO (similar arguments are likely to have been used in the Kremlin). The focus on the size of Warsaw Pact forces ignored their effectiveness and the economic principles of comparative advantage and substitution. A nation’s armed forces will reflect its resource endowment so that nations well-endowed with physical and human capital resources will be expected to have capital-intensive forces (e.g. compare the capital-intensive US forces and the labour-intensive forces of Turkey). Similarly, the economic principle of substitution suggests that there are alternative methods of achieving protection. For example, equipment can be substituted for personnel (e.g. as in the Gulf War, where capital and technology-intensive air power replaced ground forces), attack helicopters can replace tanks, nuclear forces can replace conventional forces, and reserves can replace professional soldiers. Such substitutions can have radical implications for the traditional monopoly property rights of each of the armed forces. The army, for example, operating surface-to-air missiles could replace manned combat aircraft operated by the air force in the air defence role; whilst maritime patrol aircraft operated by the air force could replace naval frigates in the anti-submarine role.

Nor was there much critical evaluation of the beliefs that the Warsaw Pact’s defence industries were achieving cost advantages from standardization and the

economies of scale from long production runs of each type of equipment. The former USSR preferred single producers of a given type of weapon which, in theory, were able to exploit fully scale economies and spread overheads and management costs over a large output. Within NATO such examples and arguments were used to promote standardization. However, no consideration was given to the efficiency with which the Warsaw Pact's defence industries were organized and operated. It was often assumed that the experience of capitalist industries with scale economies would apply equally to the command economies of the Warsaw Pact. Such an assumption ignored the role of incentives, profitability and rivalry in promoting efficiency in capitalist economies, with these features absent from centrally-planned socialist economies. NATO nations generally preferred to maintain some competition in defence equipment procurement. In contrast, defence firms in the former USSR were not subject to efficiency incentives and competitive pressures and their pursuit of large-scale output might also have pushed them into regions where they encountered diseconomies of scale. Experience since the end of the Cold War and the transition to a market economy has confirmed the failings and inefficiencies of Soviet industry under central planning.

Public choice models continue to provide an explanation of NATO since the end of the Cold War. Interest groups of Defence Ministries, the armed forces, and defence industries seeking to maintain their budgets, incomes, and rents have a continued incentive in identifying new threats and formulating new roles for NATO and its armed forces. So, the end of the Cold War now means that the world is regarded as "more dangerous" with a variety of regional instabilities (e.g. Middle East, Far East) and a new set of threats (e.g. terrorism, drugs, environmental problems). New roles have emerged to justify a certain level of NATO forces and their continued requirement for modern defence equipment capable of operating in a variety of combat situations in areas outside the traditional NATO boundaries. Thus, there is an emphasis on crisis-management, peace-keeping, peace-enforcing and humanitarian roles in support of the UN (e.g. Bosnia) with such roles requiring rapid reaction forces with supporting strategic air and sea lift capabilities. These roles are likely to attract public support for continued defence funding following the end of the Cold War. They are a further example of the efforts by bureaucracies and interest groups to affect favourably the demand for their services whilst under-estimating or ignoring the costs of these policies. Similar behaviour occurred over the expansion of NATO where the emphasis was on the likely benefits of adding new members from the former Warsaw Pact with little focus on the risks and costs associated with expanded membership (e.g. force thinning; a willingness to defend Budapest, Prague, and Warsaw). Some of these benefits accrue to industrialists from participating in collaborative defence projects and opportunities for arms sales to the new members.

A public choice analysis appears attractive and is supported by casual empiricism, but such features of an analytical framework are no substitute for clearly-specified hypotheses and predictions capable of being tested and refuted and compared with alternative models. Certainly, the public choice “story” seems persuasive and “fits” the facts of the military-industrial-political complex and its behaviour. Also, most democracies have voting systems which are extremely restricted in allowing voters opportunities for expressing their preferences for various defence and NATO policies. Voters usually vote for a package of policies of which defence policies and especially policies towards NATO are only one element in the range of alternatives offered to the electorate. Secrecy also means that voters are poorly informed and have only limited information about defence issues and the nature of threats. On this basis, there must be serious doubts that the defence policies of NATO represent a preferred position for the electorate and hence a social welfare maximum. Indeed, the public goods nature of defence and military alliances provides considerable opportunities for various interest groups in the military-industrial-political complex to pursue their own ends but to do so by presenting themselves as well-informed agencies able to interpret society’s preferences and to act in the “best interests of society” (by defending the national interest: Hartley, 1997).

The Contribution of Economics

Defence policy in NATO countries is faced with two pressures:

- Falling defence budgets (see Table 1).
- Rising equipment costs for equipment which is already costly. Typically, equipment costs have risen at about 10% per annum in real terms, resulting in a long-run reduction in the numbers of equipment in front-line units (and forecasts of a single ship navy and one aircraft air force: Kirkpatrick, 1995).

These two pressures mean that defence planners cannot avoid the need for some difficult choices (something has to go and the question is what goes?). The range of choices embrace issues about the relative size and mix of armed forces (e.g. the price of a modern air force might be a smaller navy or army); service roles and missions and the appropriate mix of specialist (single) services versus various arrangements of joint forces (Hartley, 1998); the use of reservists, civilians and private contractors; and the opportunities for savings in procurement policy (e.g. via a Single European Market for defence equipment or a NATO free trade area for equipment).

In making these choices, economists can contribute three economic principles:

- **Principle I. Focus on final outputs** rather than inputs in the form of the numbers of aircraft, ships, tanks and personnel. The relevant question is what is the contribution of these various inputs to final output in the form of peace, protection, security, crisis management and peace-keeping; and what are the implications for output of making small variations in these various inputs?

- **Principle II. Substitution.** Recognise that there are alternative methods of achieving protection. Examples include reserves and civilians vs regulars; helicopters vs tanks; missiles vs aircraft; aircraft vs ground troops; maritime patrol aircraft vs frigates; and support for a domestic defence industrial base vs importing equipment.
- **Principle III. Competition promotes efficiency.** There are extensive opportunities for promoting competition in equipment procurement and for activities traditionally performed “in-house” by the armed forces (e.g. repair, maintenance, management functions, training). Within defence, there are extensive opportunities for creating markets and for simulating market solutions. However, creating markets requires privately-owned firms which will focus on profitability compared with state-owned firms which will pursue a variety of politically-determined objectives (Ott and Hartley, 1991). Also, competitive markets require rivalry which for defence equipment means a willingness of nations to “open-up” their procurement markets to foreign firms. This will be a major challenge for the USA and the EU where the focus has been on restructuring to create large defence firms with little consideration of the implications of mergers for future competitions. Simulating markets is more difficult and involves controversial proposals for inter-service competition and for creating profit centres for military bases and commanders (cf. firms: Hartley, 1997).

NATO Burden Sharing and Efficiency Issues²

Reduced defence budgets will create further debates about burden sharing in NATO and whether the Alliance can achieve further efficiency savings. Questions continue to be asked about the contribution of each ally to NATO’s defence effort, especially in the context of expanded membership; who benefits and who pays; and is there evidence of free-riding?

Economic Theory of Alliances

NATO is a voluntary international club which specialises in providing collective defence (a public good). Nations will join the club and remain members so long as membership is expected to be worthwhile (benefits exceed costs). On this basis, NATO survives so long as it offers more protection and/or lower defence costs at an affordable cost of membership compared with non-membership (national independence). The benefits of membership take the form of collective defence, including the protection offered by the American strategic nuclear umbrella. Under the North Atlantic Treaty of 1949, members agree to regard an armed attack on any one or more of them as an attack against all of them (Article 5). The costs of membership include a financial contribution to the funding of NATO’s common infrastructure (e.g. airfields, communications, pipelines), acceptance of NATO defence strategy, the provision of bases for

forces from other NATO states, a commitment of national forces to the alliance and a willingness to abide by the rules of the club. Significantly, the NATO club has survived new weapons technologies, new strategies, new threats, debates over burden sharing and over the years, has attracted new members (Greece and Turkey in 1952; West Germany in 1955; Spain in 1982; Czech Republic, Hungary and Poland in 1999). Even with continuing controversy over burden sharing, the fact that states have remained members and that the club has continued to expand indicates that membership remains worthwhile (only France was involved in a temporary exit from parts of NATO - e.g. its military structure and defence planning committee).

Economic models of military alliances provide a basis for understanding burden sharing. In these models collective defence in the form of deterrence is viewed as a **pure public good**. Such goods have two characteristics. First, a nation's consumption of defence does not affect the amount still available for consumption by other nations. For example, the US nuclear deterrent can protect additional allies without diminishing the protection available to existing allies (non-rivalry). Second, once these goods are provided, they are available to everyone: exclusion is so costly that it is not worthwhile (non-excludability). This characteristic provides the incentive for a nation to "**free-ride**" when it knows that other nations will provide sufficient alliance defence for its needs (Sandler and Hartley, 1995).

The original versions of alliance models offered three related and policy-relevant predictions resulting in unequal burden sharing. First, because larger members of an alliance place a higher valuation on security and protection, they will usually devote larger shares of their national income to defence than smaller nations: it is in their national self-interest to do so. Second, the free-rider problem, which arises when smaller allies rely on larger allies for defence protection, so allowing the free-riders to "consume" more civil goods and services (Olson and Zeckhauser, 1966). Third, a further implication of the model was that there was no need to limit the size of an alliance since a new member would not diminish benefits for existing allies (deterrence) and may reduce burdens for other allies by its defence provision.

For the 1950s and 1960s evidence supported free-riding in NATO, with the larger, wealthy allies (USA, France, Germany, UK) bearing a disproportionate share of the burden of collective defence, so allowing the smaller nations to free-ride. This was the era of mutual assured destruction (MAD), with nuclear deterrence as an example of a pure public good. However, in the early 1970s, NATO changed from a strategy of MAD to flexible response which placed greater reliance on conventional forces so reducing opportunities for free-riding.

In the 1970s and 1980s, there was a reduction in the "shares gap" between the defence burdens borne by the rich and poor nations in NATO which was not explained by the pure public goods model.

To explain these facts, the pure public goods model was modified to recognise that defence provided a spectrum of outputs ranging from purely public to private or country-specific defence outputs (**the joint product model**: Sandler and Forbes, 1980). In other words, defence provides more than the single output of deterrence implied by the pure public goods model: it also provides protection and damage limitation when deterrence fails, as well as national or private benefits (e.g. maintaining domestic order; patrolling national coastal waters; colonial ventures). The more these defence outputs are private to the ally (but public within it), the more likely they are to be funded by the nation which benefits directly, so that free-riding is not expected. Unlike nuclear deterrence, conventional forces are not pure public goods since they are subject to “force thinning” as more territory has to be defended: hence, “**force thinning**” effects can lead to restrictions on the size of an alliance. The joint products model of alliances predicts less free-riding.

In the 1980s and 1990s a number of significant events occurred which could have affected burden sharing. These included the Reagan administration build-up of US military forces and its Strategic Defence Initiative, new weapons technologies (e.g. stealth; satellite communications), the modernisation of British and French nuclear forces, the end of the Cold War, NATO expansion to include new members from the former Warsaw Pact and the adoption of a new NATO defence role embracing crisis management and peace-keeping. Questions arise as to whether the net impact of these various developments has led to and will lead to more or less free-riding in NATO with implications for the defence burdens of the larger allies (France, Germany, UK and USA: Khanna and Sandler, 1997).

Measuring Burden Sharing: Some General Principles

NATO burden sharing debates are about *what is* and *what ought to be*. They are about the *actual* contribution of each nation to collective alliance defence and the “*fairness*” of each state’s contribution. Equity issues are inevitably controversial and for NATO they require international collective agreement on whether member states should contribute to the alliance on the basis of the benefits received or on the basis of ability-to-pay with payments (cf taxation) on a proportional or progressive basis. In fact, member states contribute to NATO in the form of cash payments for the NATO infrastructure programme and payments-in-kind through the allocation of national forces to NATO command.

Analysis of burden sharing requires the selection of a burden sharing measure or indicator. The choice of measure will depend on what is to be measured. In principle, NATO is providing collective defence output in the form of peace, protection and security. Defence expenditure is an *input* which purchases air, land and sea forces designed to provide *final outputs* in the form of peace and protection. The focus on final outputs suggests that both military and civil

indicators might be included in measures of burden sharing. For example, economic aid in cash or kind from NATO countries to former Warsaw Pact states to assist the conversion of their defence industries and the transition of their economies from centrally-planned to market systems can be viewed as contributing to peace, protection and security; hence, such aid should be included in any assessment of defence burdens in NATO. Similarly, it has been argued that international aid to developing countries outside the NATO area should be included in burden sharing assessments, although it is not at all clear what the contribution of such aid is to European security.

Table 2 presents a range of quantitative and qualitative measures of burden sharing. These are divided into military and civil indicators. The military indicators distinguish between expenditure, the components of defence budgets, national contributions to NATO and final outputs in the form of force effectiveness. Data on some of these indicators are not available in the public domain (e.g. force effectiveness). Where data are available, the spending levels on the various categories need to be placed in perspective: for example, contributions to NATO common funding (e.g. infrastructure) average about 1% of total NATO defence spending. Nonetheless, Table 2 illustrates the range of possible burden sharing measures and the limitations of relying on one single “best” measure.

Table 2 - Burden Sharing Measures

Military Indicators

a. Expenditure Measures

- Level of defence spending (D, constant prices)
- Defence share in national output (D/GDP)
- Defence share in government spending (D/G)
- Defence spending per capita (D/Pop)
- Defence share in total NATO defence spending (Di/NATO)

b. Components of Expenditure

i. *Equipment*

- Equipment expenditure (E)
- Equipment share in defence budget (E/D)
- Defence research and development spending as share of defence (R&D/D)
- Expenditure on nuclear and conventional forces
- Stocks of equipment (total number of holdings)
- Age of equipment (vintage of capital stock)

ii. *Personnel*

- Personnel expenditure (P)
- Personnel share in defence budget (P/D)
- Personnel numbers - *regulars* (including average length of service); *conscripts* (including duration of draft); reserves.

iii. **Force Structures**

- *Combat* forces against *Support forces*
- Mobility: strategic and tactical air and sea transport
- Out of area forces (rapid deployment forces - e.g. joint forces; amphibious forces)

c. **Contribution to NATO**

- Infrastructure budget
- NATO forces (by expenditure; by numbers of forces/units based overseas in other NATO countries)

d. **Final Outputs: Force Effectiveness**

- Peace, protection, security, deterrence
- Recognise economic principles of substitution, comparative advantage and specialisation.

e. **Peace-keeping.**

- National contributions to NATO peace-keeping forces and UN peace-keeping forces

f. **Other Indicators**

- National contributions to overseas basing of NATO forces (host nation support)
- Arms exports and imports
- Qualitative indicators such as the looseness or tightness of the alliance and strength of commitment (lukewarm to complete obedience)

Civil Indicators

a. **Contributions in cash or kind to:**

- UN and UN humanitarian operations (e.g. disaster relief)
- Other international agencies

b. **Economic aid to:**

- Central-Eastern Europe and Russia

c. **Development aid in cash or kind**

Ability to Pay

- National output (GDP) and national output per head of population (GDP/Pop).

Note: For many measures there are a variety of burden sharing indicators - e.g. absolute number of armed forces personnel or share of NATO total, or share of NATO forces based overseas.

Typically, defence spending as a share of national output (D/GDP) is the most commonly used measure of defence burdens. However, it has its limitations. Nations can differ in their definitions of defence spending (e.g. pensions; defence R&D) and some countries rely on conscript forces so that their defence budgets under-estimate their defence burdens (as reflected in opportunity costs). Countries also have different mixes of public and country-specific defence forces as reflected in the allocation of their budgets between nuclear and conventional forces and the geographical distribution of their conventional forces between home protection, NATO commands and non-NATO areas (e.g. colonies). Nations might apply the economic principle of substitution using alternative methods

of providing protection reflecting each nation's comparative advantage in resources (e.g. equipment replacing manpower; nuclear forces replacing conventional forces). Differences are also likely to arise in the efficiency with which various nations convert defence expenditures into combat-effective armed forces. Some nations might have highly inefficient forces which would not be evident from D/GDP measures, although the impact on force effectiveness might be assessed by examining various components of the defence budget (e.g. an increasing proportion of the budget spent on equipment might be at the expense of operations and maintenance spending with adverse impacts on force effectiveness). Nor do the various indicators show the strength of a nation's commitment to NATO as reflected in its willingness to support the alliance leader (e.g. basing and over-flying rights for US air raids on Libya).

Evidence on NATO Burden Sharing

This section reviews some of the evidence on NATO burden sharing. Table 3 presents data for various defence spending indicators, especially for the period since the end of the Cold War in 1990. The Table shows:

- Country rankings are sensitive to the choice of indicators. For example, Germany ranked between 3 and 11; Greece ranked 1 to 11; and Norway ranked 2 to 12. An aggregate ranking is shown based on the average of each of the three indicators shown in Table 3. Perhaps the surprise for the aggregate ranking is the relatively high position for Greece and Norway. Canada appears to be free-riding on the USA. Questions arise about the closeness of the relationship between the aggregate ranking measure and the standard burden sharing indicator. A significant rank correlation coefficient of 0.73 was estimated between the defence share of GDP and the aggregated ranking which confirms some of the limitations of the standard share measure.
- Each nation's defence indicator in relation to the averages for NATO Europe and NATO Total. Nations which are substantially below these averages might possibly be classed as free-riding.
- Cuts in defence spending 1990 to 1995/6. The USA reduced the level of real defence spending by 26% between 1990 and 1996 compared with a reduction of 14% for NATO Europe. As a result, NATO Europe's share of the NATO Total of defence spending rose from 37% in 1990 to 40% in 1996. Similarly, using the classical burden share indicator of defence shares, the US reduced its share by 1.8 percentage points over the period 1990 to 1995, compared with a reduction of 0.7 percentage points for NATO Europe.
- The burden sharing gap. Since the end of the Cold War, more of NATO's defence burden has been shifted from the USA to its NATO allies, so narrowing the burden gap (i.e. providing support for the joint product model).

Table 3 - Burden Sharing Measures: Defence Spending Indicators

Country	Defence share of GDP (%)						Defence spending (US \$ millions 1990 prices)		Per capita defence spending (US \$)		Aggregate ranking	
	Average 1985-89	1990	1995	1990	1996	1996	1995/6					
Belgium	3.0 (8)	2.4 (10)	1.7 (11)	4644 (10)	3443 (11)	455 (9)	11					
Canada	2.1 (13)	2.0 (13)	1.6 (13)	11547 (6)	8817 (6)	310 (12)	11					
Denmark	2.1 (13)	2.1 (11)	1.8 (9)	2650 (13)	2544 (13)	600 (4)	9					
France	3.8 (4)	3.6 (4)	3.1 (4)	42589 (2)	38432 (2)	820 (3)	2					
Germany	3.0 (8)	2.8 (7)	1.7 (11)	42320 (3)	30507 (4)	509 (7)	5					
Greece	6.2 (2)	4.7 (2)	4.4 (1)	3863 (11)	4072 (10)	481 (8)	4					
Italy	2.2 (11)	2.1 (11)	1.8 (9)	23376 (5)	23059 (5)	349 (11)	7					
Luxbg	1.2 (15)	1.1 (15)	0.9 (15)	97 (15)	107 (15)	365 (10)	15					
Nlds	3.0 (8)	2.6 (9)	2.0 (8)	7421 (8)	6180 (9)	527 (6)	7					
Norway	3.1 (7)	2.9 (6)	2.3 (7)	3395 (12)	3380 (12)	863 (2)	5					
Portugal	3.2 (6)	2.8 (7)	2.6 (6)	1875 (14)	2156 (14)	285 (13)	13					
Spain	2.2 (11)	1.8 (14)	1.5 (14)	9053 (7)	8094 (7)	216 (14)	14					
Turkey	3.5 (5)	3.5 (5)	3.4 (3)	5315 (9)	6306 (8)	97 (15)	9					
UK	4.5 (3)	4.0 (3)	2.9 (5)	39776 (4)	31475 (3)	586 (5)	3					
USA	6.3 (1)	5.5 (1)	3.9 (2)	306170 (1)	226369 (1)	1048 (1)	1					
NATO Europe	3.3	2.8	2.3	186375	159756							
NATO Nth America	6.0	5.5	3.7	317717	235186							
NATO Total	5.0	3.8	3.0	504092	394943							

Notes:

- Aggregate ranking was constructed by taking the average of rankings for the three indicators in 1995/96 and then scaling on a 1-15 basis.
- Figures in brackets show rankings.

Sources: As for Table 1 above; Sandler and Hartley (1998); Cmnd 3223 (1996).

The debate about burden sharing can be conducted at two levels involving, first, the choice of indicator and, second, the evaluation of burden sharing. A review of evidence confirms that burden sharing debates are affected by the choice of indicator. Different indicators give different rankings and results. The USA will refer to its level of defence spending and its share in GDP to claim that it bears an “unfairly” high burden. European allies respond by stressing that most of their defence expenditure and their forces are based in Europe and committed to the forward defence of Europe. They will also point to the burdens borne by the European allies in terms of the “imbalance” of the arms trade

between Europe and the USA, their contribution to host nation support costs and their contributions to peace-keeping and overseas aid. As a result, when all these contributions to NATO defence are included in the evaluation of burden sharing, the European allies claim that they are more than bearing their “fair share” of NATO defence burdens.

Statistical studies have assessed relative defence burdens and benefit shares in NATO. Benefits were measured by using population, GDP, exposed borders and areas and burdens were adjusted for conscription. The results of this analysis show that “The closing of the defence burden gap in the 1990s and the European allies’ generosity towards peace-keeping and foreign assistance makes for more equitable defence burdens in the post-Cold War era. Ally specific benefits as a share of aggregate defence benefits are anticipated to increase in the next few years, thus implying even less concern about free-riding. If free-riding presents a problem in the 1990s it should be confined either to Europe where British and French strategic arsenals provide European neighbours with free-riding opportunities, or else to North America where Canada continues to free-ride on the United States” (Khanna and Sandler, 1997, p118).

Future Problems and Prospects

Debates about NATO burden sharing are dominated by myths, emotion and special pleading. Self-interest dictates that each nation will use the burden sharing indicator which shows that it is bearing an “unfairly” high share of the alliance defence effort. An independent evaluation of each nation’s real contribution is complicated by the absence of a single comprehensive indicator which measures the multi-product and multi-dimensional nature of each ally’s contribution to alliance defence. Nonetheless, two points cannot be ignored. First, despite claims about “unfair” burden sharing, no ally has withdrawn from the club. Second, studies suggest that the burden gap between the USA and Europe has reduced considerably and that free-riding is no longer a major problem in the 1990s. On this basis, further emphasis on burden sharing is probably not worthwhile and diverts NATO from more important issues concerned with the ideal size of the club and improving the efficiency of the alliance in a disarmament era.

NATO expansion involves both benefits and costs. Benefits include improved collective defence capabilities and security, improved burden sharing and greater weapons sales in NATO. The costs of expansion embrace infrastructure in the new member states, modernisation of forces for the new members, enhanced reinforcement capabilities, the thinning of forces to defend longer borders and larger areas and the increasing problems of decision-making in a larger NATO.

Expansion is worthwhile so long as expected benefits exceed expected costs for existing members and for the new entrants. Problems arise since there are a wide range of cost estimates for current NATO expansion (US\$27-109bn over a 10-15 year period), no estimates of force thinning effects and no estimates

of potential benefits from current expansion. Two policy guidelines can be suggested for future NATO expansion. First, further expansion requires a careful evaluation of benefits and costs for existing members and new entrants (including an evaluation of past and current expansions). The impact of expansion on force thinning cannot be ignored. As a result, there are likely to be limits to the size of the NATO club. Second, consideration needs to be given to the decision-making rules for an enlarged NATO: a majority decision-making rule probably needs to replace the unanimity rule where decisive collective military action is required (Sandler and Hartley, 1998).

NATO remains an inefficient organisation for the provision of armed forces and for the acquisition and supply of defence equipment. There is significant duplication between each nation's armed forces with each ally maintaining independent air, land and sea forces with duplication of national Defence Ministries, training, support, repair and spares units. Specialisation of each nation's armed forces by comparative advantage is conspicuous by its absence. Even limited specialisation and rationalisation (e.g. groups of nations agreeing to combine their training, stores, spares and repair organisations) would offer worthwhile cost savings. Similarly, national defence markets are characterised by protection with restrictions on market entry by foreign firms (e.g. Buy America Act). Within Europe, support for small scale national defence industries is costly, resulting in the duplication of costly R&D programmes and small scale production based on small national orders and a failure to obtain economies of scale and scope. Substantial efficiency improvements are available if the European Union were prepared to extend the Single Market to embrace defence equipment. The creation of such a Single Market and an associated European defence industry might be the first stage leading to the eventual creation of a NATO free trade area for the procurement of defence equipment.

Conclusion: The Economic Impacts of Disarmament

Reduced defence spending and efficiency improvements involve benefits and costs (winners and losers). Benefits involve peace itself (providing opportunities for mutually-beneficial trade and exchange) and the re-allocation of resources from the military-industrial complex to the production of a larger output of civil goods and services (the Peace Dividend). But such re-allocation is not costless: disarmament involves costs as well as benefits. Re-allocating resources from military to civilian production takes time and involves costs in the form of unemployment and under-employment of resources (e.g. job losses; the closure of military bases and industrial plants; there might also be impacts on technical progress depending on whether defence R&D is reduced and then offset by increased civil R&D and the relative productivities of such R&D). On this basis, disarmament can be viewed as an **investment process** involving short-run costs to achieve long-run benefits (a greater output of civil goods and

services: UN, 1993). In several countries, the adjustment problem is greater since disarmament is occurring simultaneously with a shift from a centrally-planned to a market economy.

The task of re-allocating resources from defence to civil activities presents opportunities for public policies to assist the re-allocation process and to minimise the adjustment period. A range of policy options are available, including policies towards **manpower** (e.g. training; mobility), **capital** (e.g. re-tooling plant-equipment), **technology** (civil R&D - e.g. space, supersonic airliners, health research) and **regions** (e.g. roads; enterprise zones). Other policy options include state conversion or diversification agencies, aggregate demand policies and welfare safety nets to protect the losers from disarmament. Such policy options will create new demands on government budgets but should be viewed as part of the price needed for the eventual achievement of a Peace Dividend.

Notes

1. This section is based on a forthcoming book with Todd Sandler: *The Political Economy of NATO: Past, Present and into the 21st Century*, Cambridge UP, New York, 1999.
2. This section is based on a paper on **NATO Burden Sharing** prepared with Todd Sandler: Hartley and Sandler (1998).

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