4

Military Spending: How Much Is Enough?

Military spending, the defence budget, is the first element in the value chain producing security. In principle, governments should determine how much is enough by adjusting military expenditure to the point where the marginal security benefit of a little more military expenditure is equal to the opportunity cost. The opportunity cost is what could be gained if the money was used for other government expenditures, like health and education, or used to reduce taxation, which would allow higher private consumption. While this is a useful framework, reality is more messy, partly because of the difficulty of measuring the marginal security benefits and partly because states are not unified rational actors that could make such decisions. Instead decisions arise from competition between groups. Some, like the arms manufacturers and the military, may have an interest in higher military expenditure and in presenting the threats as more pressing than they are. Others, like the general public, may have little interest in strategic calculation or awareness of potential dangers.

This chapter begins with the difficult measurement issues involved in determining how much is actually spent on the military. There is then a general review of the motives for arming. Our main explanation of military expenditures emphasises the interaction of resource constraints, ability to pay, with strategic perceptions, as mediated through various interest groups. There is however an alternative explanation which emphasises the economic rather than strategic functions of military expenditure. This explanation has been most popular in the US and it is discussed in the third section, in the context of the evolution of US military expenditures. Even if countries have decided how much is enough, they have hard choices about the broad allocation of the money between manpower and equipment. The fourth section discusses

April 22, 2009 19:25 MAC/MILT Page-88 9780230_228535_SinglePDF

these choices using the UK and France as examples. Arms races were discussed in the last chapter and the fifth section uses India and Pakistan as an example. The chapter ends with two important, but rather more technical, issues. The first is defence inflation: how to measure military prices. The second concerns stocks and flows. Military expenditure is a flow of money that buys new equipment and pays for troops. The equipment lasts, so at any time military capability depends on the stock of equipment, the military assets available, not just the current expenditure. Just as firms have balance sheets which measure their stock of assets and their liabilities, one can construct military balance sheets. The final section examines these.

Military budgets

The institutional process for determining military budgets differs across countries. In democracies the usual pattern is for the executive arm of the government to propose a defence budget and for this to be debated and perhaps amended by the legislature which approves the final budget. The degree of detail that is given in the budget differs substantially between countries as does the freedom of the legislature to amend the budget. There are usually specialised committees of the legislature that oversee the budget and specialised agencies, like the GAO and NAO, that conduct the detailed auditing. In some countries, this process provides considerable detail on the composition and use of the defence budget. In other countries, there is little information.

The main source for comparable international data on military expenditures is the Stockholm International Peace Research Institute (SIPRI). They publish an annual yearbook which provides figures on military expenditure as well as many other aspects of the military such as arms production and the arms trade. They estimated that in 2006 world military expenditure totalled $1204 billion, of which 46 per cent was by the US, which is a relatively secure society, and less than 1 per cent was by sub-Saharan Africa, which is very insecure. Between 2006 and 2007 global military expenditure increased by about 6 per cent in real terms. There are substantial variations over time. Between 1986 and 1999 it is estimated that global military expenditures dropped by about a third, while procurement spending on weapons and employment in the arms industry halved. The estimates come from Michael Brzoska (2007, p. 1179) who discusses the economic adjustments to this long decade of disarmament and the conversion of military resources to civilian uses.

Although these estimates are probably the best available, as SIPRI emphasises, these figures are not straightforward and they should be interpreted with caution. Their appendix to the military numbers on sources and methods is an excellent introduction to the issues. They emphasise that there are problems of reliability (different sources give different numbers), validity (exactly what is being measured) and comparability (the numbers can mean different things in different countries). Validity relates to the purpose for which the data are used. Military expenditures measure the resources devoted to defence; they are input measures, not output measures like forces available, military capability or security.

Countries differ in what spending is included in military expenditure. There are variations in the treatment of the intelligence services; paramilitary forces like the Gendarmerie in France and the Guardia Civil in Spain; nuclear or space research which has civil and military applications; and pensions of retired members of the armed forces. Definitional differences can be large and cause differences between sources even within one country. For instance, the figure for defence spending in the budget approved by the legislature for the defence ministry may be different from the figure in the national income and product accounts because the coverage differs. This is prior to the problem that not all countries are honest in reporting how much they spend on the military.

The spending figure is initially presented in current prices in local currency. To remove the effect of inflation, it is converted to constant prices, or real terms, deflated by some price index. The choice of price index is problematic, a question we return to. In practice, one of the various general price indexes is used. To compare military spending across countries, the local currency figure is converted to a common currency, usually dollars. This conversion produces a measure that can be compared over time and countries: military expenditure in constant US dollars. The conversion to dollars can be done using either market exchange rates or purchasing power parity (PPP) exchange rates. Military expenditures at market exchange rates can fluctuate not because the military expenditure changed, but because floating exchange rates can be volatile. PPP exchange rates allow for the fact that relative prices are very different in different countries: labour is very cheap in poor countries and expensive in rich countries. In rich countries only the very rich can afford personal servants, whereas in poor countries the middle classes take them for granted. The world total above uses market exchange rates. For poor countries the choice of exchange rate measure – market or PPP – makes a very large difference. In the 2007 SIPRI yearbook

China's military expenditure in 2006 was estimated at about $50 billion when converted at market exchange rates, but about $190 billion when converted at PPP exchange rates. SIPRI uses World Bank estimates of PPP exchange rates and in 2008 the World Bank issued new estimates based on better price data. In particular, it took account of the first detailed survey of prices in China. This led to the estimate of the Chinese PPP rate being reduced by about 40 per cent with a similar reduction in the estimate of Chinese military expenditure at PPP rates.

The problem of inflation and exchange rates can also be avoided by expressing military spending as a percentage of gross domestic product (GDP). Being a percentage, the share of military expenditure in GDP is comparable across countries. This share of military spending, sometimes called the military burden, is a measure of the priority given to defence, the share of output devoted to the military, not military power or the absolute level of military expenditure. If the growth rate of military expenditure is greater than the growth rate of output, the share will rise.

GDP measures the total output, incomes or expenditures of the whole economy. All three should be equal: if you spend to buy something, it has to be produced and the producers have to be paid income, wages or profits. GDP covers only marketed goods, so non-marketed output like domestic labour in the home is excluded. Expenditure is made up of consumption, plus investment in capital goods, plus government expenditure on goods and services, plus exports, minus imports. Imports are subtracted because the imported part of consumption or investment is not produced in the country. Not all government expenditure is included. Transfer payments, such as pensions or debt interest payments, do not create a demand on the output of the economy until they are spent on consumption and investment, where they are counted. Nearly all military expenditure is a demand for goods, like weapons, or services, like those provided by the armed forces; so it is included in GDP. There is another measure, gross national product (GNP). Domestic measures production within a country's border, whether by citizens or foreigners; national measures the production by the citizens of the economy, wherever it takes place. The difference between GDP and GNP, net property income from abroad, is quite small for most countries. The ratio of the current price GDP series to the constant price measure is a price index called the GDP deflator. These national accounts measures were developed in the middle of the 20th century, but economic historians have made estimates for earlier times. Angus Maddison (2007) gives a history of national accounting and estimates back to 1 AD.

Estimates of the GDP of the Roman Empire are inevitably subject to some uncertainty.

Military expenditures can change quite rapidly. On SIPRI figures the combined military spending in the South Caucasus by Armenia, Azerbaijan and Georgia in 2007 was five times what it had been in 1998. Since countries also differ in the size of their populations, military expenditure figures are also expressed in per capita terms, per head of population. Table 4.1 gives some SIPRI measures for the dozen largest military spenders, who account for about 80 per cent of world military expenditure. The first column gives estimates of total military expenditure in 2007 measured in US dollars at 2005 prices converted using market exchange rates. The second column gives the per capita figure, military expenditure divided by the country's population. The third column gives military expenditure as a percentage of GDP. The fourth column gives total military expenditure converted to dollars using PPP exchange rates. The Chinese and Russian figures are estimates with potentially large errors.

Table 4.2 gives some figures for 1985 towards the end of the Cold War when military expenditures peaked. These come from a different source, *World Military Expenditure and Arms Transfers*, a publication of the US government which has not been published since 2000. The table

Table 4.1 Military Spending in 2007

Country	Spending MER(2005$bn)	Spending per-capita	Percent of GDP	Spending PPP(2005$b)
US	547.0	1799	4.0	547.0
UK	59.7	995	2.6	54.7
China*	58.3	44	2.1	140.0
France	53.6	880	2.4	47.9
Japan	43.6	339	1.0	37.0
Germany	36.9	447	1.3	33.0
Russia*	35.4	249	3.6	78.8
Saudi Arabia	33.8	1310	8.5	52.8
Italy	33.1	568	1.8	29.6
India	24.2	21	2.7	72.7
South Korea	22.6	470	2.5	29.4
Brazil	15.3	80	1.5	26.7
Total	963.5			1149.6
World	1214.0	183	2.5	

* Estimate. MER: Market Exchange Rate. PPP: Purchasing Power Parity. Spending figures are in US$ at constant 2005 prices and exchange rates.
Source: SIPRI Yearbook.

Table 4.2 Military Spending in 1985

	M	YPC	POP	AF	M/AF	M/Y	AF/POP
Argentina	7673	6627	30.4	129	59.5	3.8	4.2
Brazil	4172	3718	136.8	496	8.4	0.8	3.6
China	53470	1040	1052.9	4100	13.0	4.9	3.9
Egypt	4289	677	49.5	466	9.2	12.8	9.4
France	48990	22330	54.9	563	87.0	4.0	10.3
Germany, West	54000	27670	61.0	495	109.1	3.2	8.1
India	6883	252	771.7	1260	5.5	3.5	1.6
Israel	10650	12870	4.1	195	54.6	20.2	47.6
Japan	37550	31880	120.8	241	155.8	1.0	2.0
Korea, South	8919	4380	40.8	600	14.9	5.0	14.7
Nigeria	1038	935	74.7	134	7.7	1.5	1.8
Pakistan	2480	402	99.1	483	5.1	6.2	4.9
Saudi Arabia	29240	9769	13.2	80	365.5	22.7	6.1
South Africa	4282	3394	33.4	95	45.1	3.8	2.8
Soviet Union	379900	10410	278.9	3900	97.4	13.1	14.0
Spain	10060	10810	38.4	314	32.0	2.4	8.2
Sweden	5904	23800	8.4	69	85.6	3.0	8.2
Syria	7445	3258	10.5	402	18.5	21.8	38.3
Turkey	4890	2100	50.7	814	6.0	4.6	16.1
UK	45850	15800	56.6	334	137.3	5.1	5.9
US	353800	24140	238.5	2244	157.7	6.1	9.4

M military spending million 1995$
YPC per capita GDP 1995$
POP population, millions
AF number in armed forces, thousands
M/Y share of military spending in GDP percent.
Source: WMEAT 1996.

also provides some ratios of the variables that might be useful for certain purposes. Military expenditure per member of the armed forces, M/AF in the table, is a rough measure of the capital intensity of the military. Military expenditure per capita, M/POP, given in Table 4.1 is a measure of the cost per person in the society. Armed forces as a proportion of the population, AF/POP in Table 4.2, gives the proportion of people that have to serve in the armed forces. One can link these ratios; for instance, the second ratio, M/POP, divided by the third ratio, AF/POP, gives the first ratio, M/AF.

The high shares of military expenditures in the Middle East, Egypt, Israel, Saudi Arabia and Syria are noticeable, though the measurement problems should be emphasised and the Saudi figure is probably inflated by weapons deliveries and the high oil price, prior to 1985. The shares of military expenditure are generally higher in this period than they are in

2007 and the degree of militarisation varies more substantially. China, despite having 20 times the population of the European countries like France, Germany and the UK, has very similar military expenditures because its per capita income is so much lower.

Adam Smith said, 'Among the civilized nations of modern Europe, it is commonly computed, that not more than one hundredth part of the inhabitants of any country can be employed as soldiers, without ruin to the country which pays the expenses of their service.' In crisis, the military may take a much larger proportion, but trying to sustain such higher proportion for a long period will bankrupt the country. Azar Gat (2006) gives various historical examples which suggest that this 1 per cent estimate of the sustainable proportion of the population devoted to the military was about right. In Table 4.2, values of AF/POP greater than 10 correspond to armed forces which are greater than 1 per cent of population. Israel and Syria were both about four times Smith's limit. The 1 per cent in the military need to be fed and equipped and if this took two other workers, 1 per cent of the population in the military would require military spending of about 3 per cent of GDP. Rich countries can substitute capital for labour and devote a much higher share of output than 1 per cent to the military. During both the Civil War and World War II about 15 per cent of the US population were enrolled in the armed forces. But whereas military expenditures took about 17 per cent of GDP in the Civil War, they took over 40 per cent during World War II. There seems to be very little evidence on whether some limit like that suggested by Smith operates today.

Table 4.3 shows the distribution of shares of military expenditure for the countries for which there is data for 2005 in the 2008 SIPRI Yearbook. The modal (most common) share is between 1 per cent and 1.9 per cent and over half the countries have shares of less than 2 per cent. Shares tend to be rather higher in the Middle East than in other regions and the Americas have 82 per cent of the countries with a share below 2 per cent, the other regions except the Middle East have around 60 per cent below 2 per cent. Although it is a relative judgement overall in 2005, there was not much variation in shares of military expenditure in GDP between countries. Of course, average shares were lower in 2005 than in earlier periods when more countries were involved in conflicts, including during the Cold War. Shares of military expenditure were around 50 per cent in the UK and US during World War II.

Table 4.3 Distribution of Shares of Military Expenditure in GDP, percent, by Region 2005

	Number of countries					
	Africa	**Americas**	**Asia & Oceania**	**Europe**	**Middle East**	**Total**
0–0.9	7	11	2	6	0	26
1–1.9	20	7	15	21	1	64
2–2.9	10	1	5	13	1	30
3–3.9	4	1	3	3	2	13
4–4.9	2	2	1	0	4	9
>5	1	0	0	0	5	6
Total	44	22	26	43	13	148

Source: SIPRI Yearbook, 2008.

Motives for arming

The primary factor determining a country's military expenditure is its GDP, what it can afford. As the data above indicated, the share of GDP devoted to the military varies less between countries than the levels of military expenditure. What share is thought appropriate depends on the perceived threat and foreign policy goals. The perceived threat will reflect the danger of armed conflict, enduring hostilities, and domestic political factors which shape perceptions, such as militaristic traditions. Other foreign policy goals may include provision of peacekeeping troops or the felt need to acquire military indicators of international status. History and inertia also matters: the bureaucratic baseline budget tends to be the amount spent last year.

There is a considerable quantitative work on explaining the levels of military expenditure in different countries. The other side of the coin is explaining why countries do not spend on the military and disarm or not arm. However, the sample of countries that chose not to arm and have zero military expenditure is small. It includes Iceland, whose contribution to NATO was hosting a large US military base; Costa Rica, which abolished its army in 1949 after a Civil War; and Panama, which has only paramilitary forces. There are few political parties around the world who advocate zero military spending. An exception was the Danish Progressive Party in the 1980s, which wanted to abolish taxation; their defence policy was said to be an answer machine that said 'We Surrender' in Russian. Most countries tend to spend about 1 per cent of their GDP on the military, even when there are no threats.

Consider a decision with more zero observations, having nuclear weapons. Most countries have armies, why not nuclear weapons? Initially the spread of nuclear weapons was almost linear, one every five years: US 1945, USSR 1949, UK 1952, France 1960 and China 1964. In the 1960s, optimists hoped this linear pattern would continue so that there would be about 15 nuclear powers by 2000. Pessimists, looking at supply-side capabilities, noted that followers could acquire nuclear weapons more easily than pioneers and that the expansion of civil nuclear power would also provide weapons capabilities. They guessed that around 30 countries would have the capability to build a bomb by 2000 and assumed that everyone who could build a bomb, would build one. In terms of capabilities their estimate was a bit low: it did not allow for the rapid growth of the Asian Tigers and some other countries. By 2007 probably most of the 45 members of the Nuclear Suppliers Group (NSG) had the capability to build nuclear weapons. In addition a number of non-members of the NSG had the capability to build nuclear weapons, and non-members, India, Pakistan and Israel, did build nuclear weapons.

Although there are probably about 50 countries that could have nuclear weapons, the vast bulk of them have chosen not to do so, often as in the case of Sweden and Japan after serious consideration. Since 1965 only two countries have publicly joined the nuclear club: India and Pakistan. There is some question as to whether two other nuclear states, Israel and South Africa, carried out a test and North Korea did carry out a test in 2006 but its low yield reinforced doubts about their ability to reliably manufacture a deliverable nuclear weapon. South Africa denuclearised before the African National Congress (ANC) came to power. The three former Soviet Republics of Belarus, Ukraine and Kazakhstan also denuclearised. Brazil is reported to have been preparing a test explosion when the programme was stopped in 1990. Other countries, including Libya, started to try to build them and decided not to. Had you forecast in 1965 that there would be only eight nuclear powers in 2007, not 30 or 40, and that four powers would have denuclearised, few would have believed you.

In his Nobel Prize Lecture, Thomas Schelling (2006) wrote, 'The most spectacular event of the past half century is one that did not occur. We have enjoyed 60 years without nuclear weapons exploded in anger.' He quotes C.P. Snow saying, in 1960, that unless the nuclear powers drastically reduced their nuclear armaments, thermonuclear war within a decade was a 'mathematical certainty'. Now with 11,530 operational (capable of being delivered) nuclear warheads and about 26,000 in total,

the risk is still there; but the taboo against their use is well established. Not only was there no use, but there was much less ownership or proliferation than many feared. Some supply-side initiatives may have helped including the nuclear non-proliferation treaty, but it was primarily demand-side factors that mattered: most countries that were capable of building nuclear weapons decided, often after some consideration, that it was not in their interests to do so. The arguments that persuaded so many states not to acquire nuclear weapons seem to have been that they are expensive and dangerous. Owning nuclear weapons made one more likely to become a nuclear target, because of the strong incentives for a pre-emptive strike against a nuclear opponent. Inadvertent war is another danger. Many scenarios for nuclear use during the Cold War were of accidental or inadvertent launch or becoming locked into pre-committed responses, as had the generals before World War I, with their mobilisation timetables. The political flashpoints which led to nuclear mobilisation included the Korean War, the Cuban Missile Crisis and the 1973 Arab–Israeli war. There were also instances where the US had received false alarms of Soviet attacks. With the end of the Cold War Soviet equivalents became known, such as the case in 1983 where a Soviet satellite malfunction led to signals that there had been a sequence of US missile launches at a time of political tension.

This raises the question: why do countries choose to have armies but not nuclear weapons? The obvious justification for military expenditure is threats, internal or external. But this can easily be self defeating. In the case of external threats the spending may just provoke a response by the other side and in the case of internal threats, Paul Collier (2007) suggests that post-conflict military spending increases the probability of conflict recurring. Non-military measures may be a better way to increase security. Examples are the use of economic integration in the case of France and Germany after World War II or the abolition of the armed forces by Costa Rica after a Civil War. But when there are no real threats what is the explanation? Status and prestige are certainly important: to be a proper state is thought to require armed forces. Certainly in the case of the UK and France considerations of status and prestige, or *grandeur*, motivated the decision to acquire nuclear weapons. Supply-side forces, such as a powerful military–industrial complex, can also be an explanation for military expenditures. Even if there is no immediate threat countries may want to be able to project power to reassure allies and stop threats developing.

The military often have a range of more general functions. Troops may be useful in natural disasters and emergencies, what in the UK is called

'aid to the civil power'. The coast guard usually provides functions like search and rescue, towing stranded vessels, dealing with oil spills and more general police type functions like preventing piracy and enforcing fishing controls. These essential activities may, in many cases, be efficiently provided by the military, since they have relevant training and equipment. But they could be provided in other ways, if there were not a military. Providing them by the military does raise the danger that they may be neglected or starved of resources should the military emphasise their central war-fighting role relative to these peripheral civilian roles. The UK switched military helicopters from civilian search and rescue to Afghanistan in 2008. Troops may be used abroad in peacekeeping operations and UN payments for this can be a useful source of income to some poor countries. Even when there are no apparent threats, there may be a general concern for insurance: one never knows what may come up, so it is useful to have some military forces just in case.

The arguments that appeal to a government's interest in not having armed forces are essentially the same arguments that appeal to its interest in not having nuclear weapons, arguments that persuaded so many states not to acquire nuclear weapons: they are expensive and dangerous. When large armed forces face each other minor miscalculations can have major consequences, as the war between Russia and Georgia in August 2008 over separatist element in South Ossetia and Abkhazia indicates. Changing the status quo, acquiring nuclear weapons or giving them up, is more difficult than maintaining the status quo. Similarly, giving up armed forces is a big political step; but given a history of civil war, as in Cost Rica, it may be appealing, particularly as a way of signalling commitment by the government not to renege on agreements. In some cases it may be necessary to provide an independent security guarantee as insurance. Iceland though without armed forces did have a large US base in the country and when that closed had to consider other arrangements for its defence, given its strategic position in the North Atlantic.

Having armed forces can be dangerous because they may provoke neighbours into arms races and make internal measures that may increase security more difficult, just as military build-ups after civil wars seem to increase rather than reduce the risk of conflict resuming. They are also dangerous to their governments in that, statistically, a major threat to the survival of a government comes from its own armed forces through military coups. This should be a real concern in poor countries though it tends not to be of much concern to rich countries today, though Thailand and Turkey, where there have been military coups, are

quite rich. But it was of concern to developed countries in the past. Until late Victorian times British policy towards the army was influenced by the memory that during the Civil War the army had taken over the country and beheaded the king. The French attachment to conscription was influenced by similar fears and more recently in the 1960s members or ex-members of the French military tried to kill the President, de Gaulle, on a number of occasions after he withdrew from Algeria.

That leaves the expense argument and often cuts in military expenditure are driven by financial crises: finance ministers can be effective disarmers. However, their leverage is often reduced by 'separate tracking', the fact that different people deal with international economic issues than with international security issues, so economic criteria are sometimes not applied to security decisions.

Economic functions of the defence budget and US military spending

Figure 4.1 below shows the US share of National Defence Expenditures in GDP 1929–2007, cut off at 15 per cent, for clarity. The share was less than 2 per cent of GDP during the inter-war period; then rose with the

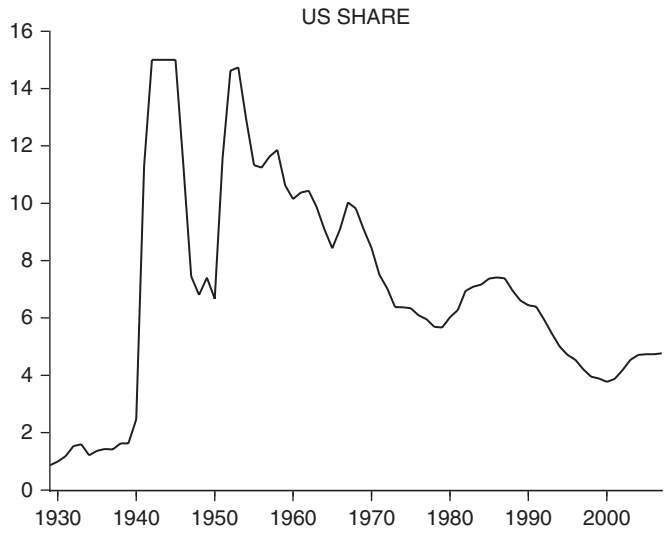

Figure 4.1 Share of military expenditure in the US, per cent of GDP 1929–2007 (cut off at 15 per cent)

war, peaking at just over 40 per cent of GDP in 1943 and 1944 (though this is not shown). With the end of World War II, the share fell sharply to around 7 per cent, rising again to almost 15 per cent in 1953, with the Korean War. Subsequently the share trended downwards, jumping upwards in the late 1960s with the Vietnam War, reaching a peak of 10 per cent in 1967. The share then resumed its downward trend till 1979, falling to 5.7 per cent. With the Soviet invasion of Afghanistan, the election of President Reagan and worsening relations with the Soviet Union, the share rose, peaking in 1986 at 7.8 per cent. As the Cold War thawed and then ended, the share fell, reaching a new low of 3.8 per cent in 2000. The 1991 Gulf War, Desert Storm, is not obvious on the graph; it was not expensive and was partly financed by allied contributions. The Global War on Terror, after 2001, increased the share to just over 4.5 per cent. By US post-war historical standards this is still quite low; military expenditure had accounted for over 5 per cent of US output in every year from 1941 to 1994.

There is a long tradition of explaining military expenditures not by their strategic functions but by their economic functions: that they are necessary to maintain growth and profitability. This type of explanation has been particularly popular for US military expenditures. Part of the context for this explanation is the high unemployment of the inter-war period. Despite the passage of time the causes of this great depression that followed the 1929 US stock market crash remain a matter of controversy, though it was worsened by the widespread adoption of protectionist measures which led to a large drop in world trade. The slump was widely interpreted as an inability of capitalism to generate enough effective demand, consumption or investment, to maintain full employment. Keynes argued that there was a role for the Government to maintain demand. Some Marxists and others argued that under-consumption, an inability to generate demand, was a systemic and unavoidable feature of capitalism. Many forecast that World War II would be followed by a slump like that following World War I. This did not happen; the period from the end of World War II until the crises of the 1970s was one of low unemployment that, in retrospect, was labelled a golden age of capitalism. Some argued that military expenditure was the source of the extra effective demand that stopped capitalism sinking into depression, since the US and UK devoted a much higher share of output to the military than their previous peacetime norms. The most influential exposition of this view was Baran and Sweezy (1966). This argument, sometimes labelled military Keynesianism, was developed by various other authors, particularly with reference to the US.

They suggested that military expenditure was used to offset the tendency to stagnation and unemployment and adjusted to stabilise the economy. Thus military spending was driven by its economic functions, not its strategic functions and that it was a blessing for capitalism, allowing it to grow, rather than a burden.

While this book is largely about the importance of economics to military matters, in this case the economic explanation does not seem convincing. I am partisan in this dispute, having written a paper, Smith (1977) 'Military Expenditure and Capitalism' which criticised the military Keynesian, under-consumption, arguments from a Marxist perspective. There are various problems with the military Keynesian argument. It is not clear that either Marxist or Keynesian theory actually predicts such under-consumption and Keynes certainly did not. The strategic explanations, concern with the threats from communism and the wars in Korea and Vietnam, seemed more important explanations of military expenditures than economic justifications. It is relatively straightforward to tell a strategic story to explain the graph of the share of military expenditure in the US, as was done above. It is very difficult to tell an economic story. Although World War II, the Korean Wars and the peak of the Vietnam wars were periods of relatively full employment in the US, the strong downward trend in the share of military expenditure is not marked by any corresponding upward trend in unemployment. The shares of military expenditure and the unemployment rate in the US are given in Figure 4.2.

The communist threat may have been exaggerated but it was certainly perceived as real. While economic factors were certainly important at a micro level (weapons projects and base locations), they seem less so at a macro level. Military expenditure would be a very bad fiscal regulator because of the lags before it comes into effect: it takes too long to plan and implement to be an effective stabiliser. Many countries with low military expenditure, in particular Germany and Japan, showed lower unemployment and faster growth than the US and UK, though it could be argued that they benefited from the spill-overs from UK and US military Keynesianism. There are other explanations for the golden age and why it came to an end in the 1970s. Dunne and Smith (1990) conduct a detailed quantitative analysis of the relationship between military expenditure and unemployment in Organisation for Cooperation and Development (OECD) countries and find no relation. Subsequent experience has not provided any more support to the view that high military expenditure is needed to maintain low unemployment. When the Cold War ended, the UK and US cut their military expenditures

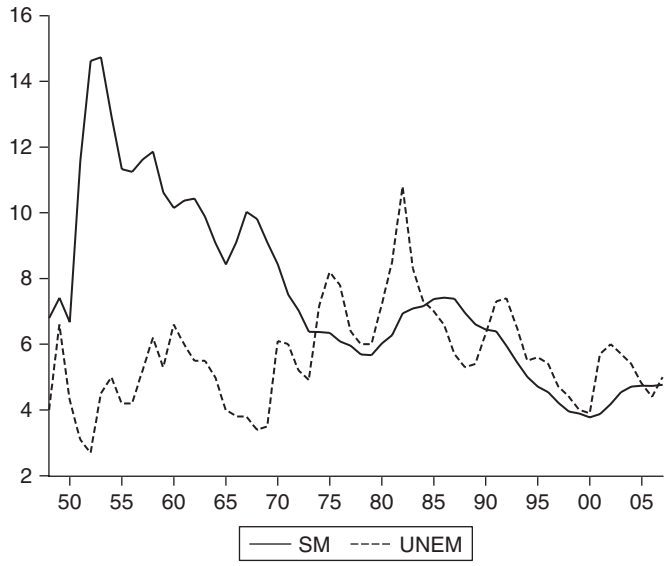

Figure 4.2 Share of military expenditure and unemployment in the US, per cent 1948–2008

substantially and rather than sinking into unemployment both grew rapidly, benefiting from the peace dividend. The cuts in military expenditure reduced government deficits, which allowed lower interest rates boosting investment in the technology boom of the 1990s.

Hard choices: UK and France

The UK and France provide a revealing case study of military choices. Both were once Great Powers, who show both similarities and differences in how they balanced strategic aspirations with financial resources.

There are long runs of data available for the UK. Figure 4.3 gives UK military spending as a share of GDP since 1830, again cut off at 15 per cent for clarity. In the period before World War I, there are two noticeable spikes. The first is for the Crimean War 1854–1856, when Britain and France fought with Turkey against the Russians, followed in 1857 by what the British call the Indian Mutiny and the Indians the First War of Independence. The second spike is for the Boer War, 1901–1903, fought in South Africa. Although it is not obvious from the figures, during the 19th century Britain fought various small and

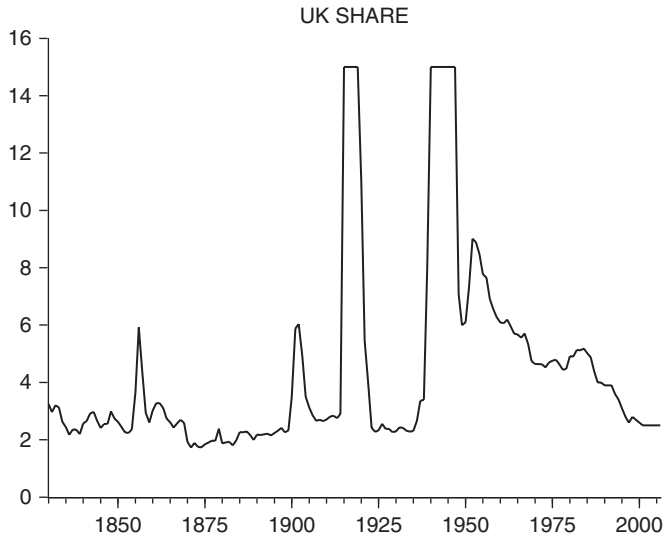

Figure 4.3 Share of military expenditure in the UK, per cent of GDP, 1830–2006 (cut off at 15 per cent)

medium sized wars and expanded its empire out of a peacetime budget of around 2.5 per cent of GDP. Saul David (2006) provides a history of Queen Victoria's Wars. Britain could do this in the 19th Century because it did not need to maintain expensive standing armies to defend its borders like the continental powers; naval forces provided a relatively cheap form of power projection; and the colonies, in particular India, shouldered a lot of the military burden of empire. India prior to the mutiny of 1857 had been run by the East India Company and so was not a burden on the British government. After the company was abolished, Britain financed the military expenditures in India out of its own budget for a few years before they were taken over by the colonial government of India.

During World War I the share jumped to around half of GDP, then dropped back to peacetime levels until rearmament for World War II, when it again rose to over half of GDP. After World War II, the usual pattern of the share dropping back to its historical peacetime level was interrupted by the Korean War rearmament of the early 1950s and the higher though declining Cold War level. There was then a fairly steady downward trend in the share. This was interrupted by increases following the 1977 NATO target to raise defence spending by 3 per cent more than inflation from 1979, which was accepted by the Labour

Government and implemented by Mrs Thatcher. This was reinforced in the early 1980s in response to a perception of an increased Soviet threat after the invasion of Afghanistan. This increase was similar to that in the US. The Falklands War of 1982 and the Desert Storm recapture of Kuwait in 1991 hardly disturbed the trends. Recently the share has stabilised close to the peacetime average of around 2.5 per cent. This share is higher than that in most continental European countries other than France.

Shares of military expenditure give only a very broad brush picture, since they do not show the political context and the composition of military expenditures. Since World War II Britain and France have had similar populations, GDP and military expenditures. Both have spent a higher share of GDP on the military than most European countries, though less than the US. Economic constraints and domestic political pressures made financing their defence budget difficult. They are geographically close, with similar strategic positions in the post-World War II world. Historically, their strategic positions differed because Britain was an island and France a continental power; thus the relative roles of their armies and navies were different. Since the successful French invasion of Britain in 1066, the British have repeatedly worried about the threat of further French invasions. Their closeness meant that historically they have alternated between being allies and enemies and they tend to have difficulty remembering, at any particular time, what their current relationship is supposed to be.

Britain and France were both colonial powers who had to decolonise and who have maintained close links with at least some of their ex-colonies. Both are permanent members of the UN Security Council and acquired nuclear weapons. During the Cold War, both were dwarfed by the superpowers and were thus extremely sensitive about their status: their grandeur as the French put it, or their seat at the top table as the British put it. Both valued the ability to project force internationally, which they did on various occasions; sometimes jointly, as in their joint invasion of Suez in 1956 and their joint participation in the 1991 Gulf War to retake Kuwait from Iraq. Their similarity in position made co-operation between them attractive in principle, but the dissimilarity in their interests, including rivalry over dominance in Europe, made it difficult in practice. Though there was some collaboration in weapons procurement, such as the Anglo-French Jaguar aircraft, they often found it easier to collaborate with other European countries than each other. A late Cold War comparison is provided by Boyer, Lellouche and Roper (1989). Despite the title *Franco-British Defence Co-operation:*

A New Entente Cordiale, the papers in the collection tend to bring out the difficulties of co-operation. Keith Hartley (2008) discusses recent European defence collaboration.

There are also interesting differences. For France the large wars in Indochina and Algeria made decolonisation more traumatic than for Britain. Although the partition of India after the British departure was a bloody affair, Britain was not directly involved in the conflict. France withdrew from Indochina after the defeat at Dien Bien Phu in 1953. War started in Algeria in 1956 and by 1958 a large part of the French defence budget was directed to North Africa. The acquisition of power by General de Gaulle in 1958 was followed by withdrawal from Algeria, a progressive reduction in the defence effort and an improvement in the economic situation. Between 1964 and 1969 equipping the armed forces took priority with capital expenditures taking over half of the budget with nuclear expenditure reaching 52 per cent of procurement in 1967. The period after 1966 is marked by stability in military expenditures relative to the variations before. This is apparent in Figure 4.4 below.

Although France has some terrorism and internal unrest, such as in Corsica, it had nothing comparable to Britain's long war in Northern Ireland. Britain, after Suez, maintained its very close 'special relationship' with the US and strongly supported NATO. As a consequence of

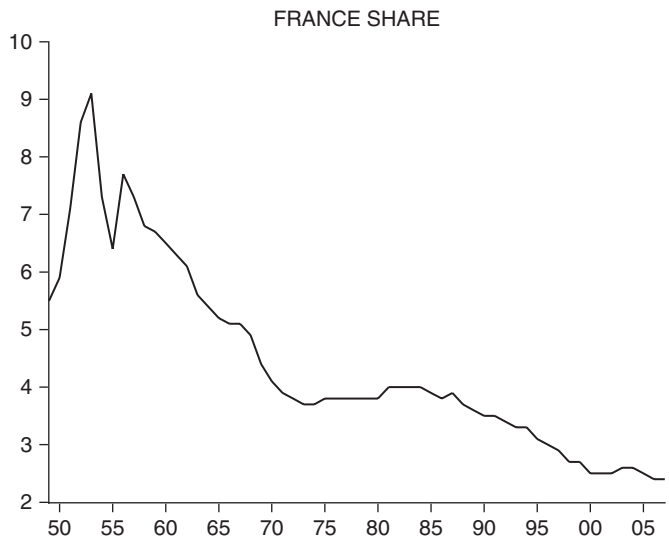

Figure 4.4 Share of military expenditure in France, per cent of GDP 1949–2007

this it got its nuclear weapons systems relatively cheaply, bought or copied from the US. France insisted on its independence from the US and left NATO's integrated military command in 1966. Financing its independent nuclear forces (force de frappe or force de dissuasion) was expensive and at the expense of conventional forces. Brauer and van Tuyll (2008) discuss this choice. Britain announced the end of conscription in 1957; France maintained conscript forces till 2001. Throughout the period France adopted a more labour-intensive military expenditure than Britain. As Table 4.2 shows, for very similar military expenditures France had 563,000 in the armed forces compared to the UK with 334,000. Even by 2008, after the end of conscription, again with very similar military expenditures France had 255,000 in the armed forces plus 99,000 paramilitaries, compared to the UK's 181,000. However, the French 2008 Defence White Paper planned substantial cuts in the number of personnel.

The defence budget is usually split into various sub-totals: these typically include the wages of the military and defence civilian employees; running and support costs for the weapons systems (operations and maintenance) including fuel; procurement of new weapons systems; research and development; and construction of military bases and housing for troops. Good international data on these sub-totals is very difficult to get, but they appear to differ substantially between countries. The cost of military personnel is less than a quarter of the US budget, and total personnel costs around a third, because it has a relatively capital-intensive military. In the UK personnel costs are just over 40 per cent of the budget, rather higher in France. By international standards these are rather low proportions; personnel costs can be between a half and three quarters of military budgets in countries that adopt more labour-intensive military postures, as most do. France tried to develop its defence industry by the arms trade. Britain privatised almost the whole of its arms industry; France retained a considerable degree of state ownership. Ownership does not imply control and at times it appeared that state ownership in France meant that the arms industry was controlling the state rather than the state controlling the arms industry.

The relationship between the state and the military sector was rather different in the two countries. In France a tight symbiotic relationship existed between the procurement agency, the Delegation Generale pour l'Armement (DGA), and the largely nationalised arms firms. The DGA acted as a patron for the industry, using procurement and export promotion as part of a coherent industrial strategy developed over decades, in which defence firms, mainly state-owned, had considerable freedom to

develop weapons they thought would sell abroad (Kolodziej, 1987). The armed forces and politicians were marginalised by technocrats trained at the Ecole Polytechnique who moved between the arms firms and the DGA. French foreign policy was often driven by the desire to export arms and that equipment was designed in the light of perceived foreign demand rather than French military needs, prompting complaints by the armed services. The British approach was rather different, particularly after Mrs Thatcher privatised the arms firms and introduced competition under Peter Levene, the head of defence procurement, during the 1980s. This commitment to competition was given credibility by occasional purchases of foreign weapons. As in France foreign policy could be driven by arms exports, in particular the Al Yamamah programme of arms exports to Saudi Arabia. The contract, initially signed in 1985, was worth about £40 billion over two decades and is still continuing today as Project Salam. G.C. Peden (2007) reviews the interaction of technology, resources and strategic goals in the evolution of the UK budget.

An arms race: India and Pakistan

Examples of contemporary arms races usually include India and Pakistan. As noted in Chapter 3, while arms races are usually seen as bilateral they happen in a wider strategic context. Thus whereas in strategic contexts India was once usually juxtaposed with Pakistan, it is now as likely to be juxtaposed with China, both rapidly growing Asian powers with large populations. This wider context needs to be kept in mind while we consider the interaction between India and Pakistan.

On independence in 1947, British India was partitioned along religious lines into India and Pakistan. Partition was a bloody affair with large movements of people. Partition left the position of Kashmir disputed. This was a Muslim state with a Hindu ruler which was separated along the Line of Control into Pakistani-administered and Indian-administered parts, which remain a source of conflict. Pakistan is an Islamic Republic; India, though predominantly Hindu, has a large Muslim minority and a secular constitution. The Congress Party which ruled for long after independence was explicitly secular but lost ground to the Hindu Bharatiya Janata Party (BJP). Pakistan alternated between civilian and military governments; India remained democratic except for a period of a year-and-a-half of emergency imposed in June 1975 by Indira Gandhi. Pakistan was initially separated into Eastern and Western sections on opposite sides of the sub-continent. West Pakistan

gained its independence with Indian help in a 1971 war and became Bangladesh. India and Pakistan fought fairly small wars in 1947 and 1965 over Kashmir, in 1971 over Bangladesh and an unofficial war in the mountainous Kargil district of Kashmir in 1999. Periods of tension followed the 2001 attack on the Indian Parliament and the 2008 attacks in Mumbai. In both cases India believed that the attacks had been organised in Pakistan. India and China fought a small war over disputed border areas in 1962. Pakistan borders Iran and Afghanistan as well as India and China, so is in a geo-political hotspot. Its role in the Afghanistan conflicts since 1979 has given it international strategic importance.

Neither India not Pakistan signed the nuclear non-proliferation treaty. India conducted a test of a 'peaceful' nuclear explosion in 1974 and conducted full-scale weapons tests in May 1998, followed within a couple of weeks by Pakistan. China had provided considerable aid to Pakistan in developing its nuclear weapons and Pakistan, through the A.Q. Khan ring, aided other aspiring nuclear powers. China, India and Pakistan initially all adopted policies of planning that were inimical to growth. The Chinese take-off into rapid growth began with the reforms of 1978; India's reforms were much later dating from 1991. Pakistan has still not taken off. The patterns of Indian and Chinese growth were quite different, China relied on export of manufactures, exploiting its supply of low wage labour; India emphasised services, particularly software, exploiting its supply of highly educated English speakers.

Figures 4.5 and 4.6 show levels and shares of military expenditure in India and Pakistan taken from SIPRI. SIPRI currently only give data from 1988. Estimates for earlier years come from old Yearbooks, though SIPRI advises against chaining series in this way. The Indian figures do not include spending on military nuclear activities and the Pakistan figures are only for current expenditures, excluding capital expenditures on equipment. So both are likely to be underestimates, but they are the best estimates available. Figure 4.5 shows shares of GDP devoted to the military in the two countries. After a jump at the beginning of the period, the Indian share was relatively stable at between 3 and 4 per cent, falling just below 3 per cent towards the end of the period. The Pakistani share was higher and more volatile but coming down towards the end of the period.

India is a much larger economy than Pakistan and towards the end of the period was growing considerably faster than Pakistan, so it was expensive for Pakistan to match India's military spending. As Figure 4.6 shows, in terms of levels of military expenditure, measured in millions of 2005 US dollars, Pakistan spending was dwarfed by Indian spending.

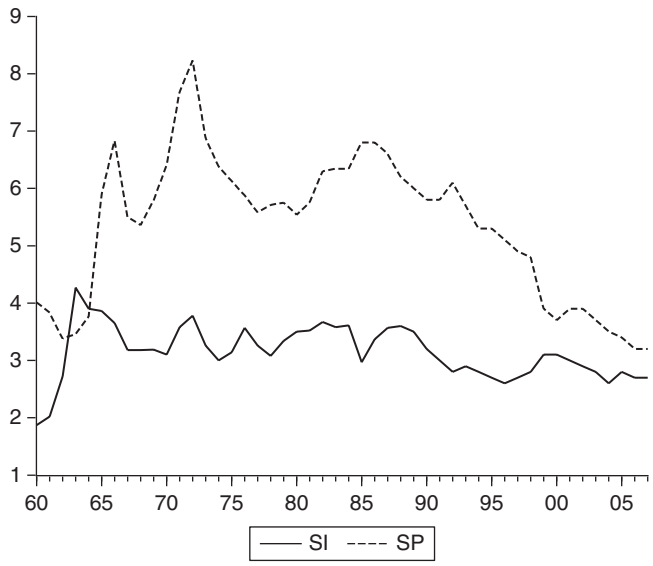

Figure 4.5 Shares of military expenditure in India and Pakistan, per cent of GDP 1960–2007, India: SI, Pakistan: SP

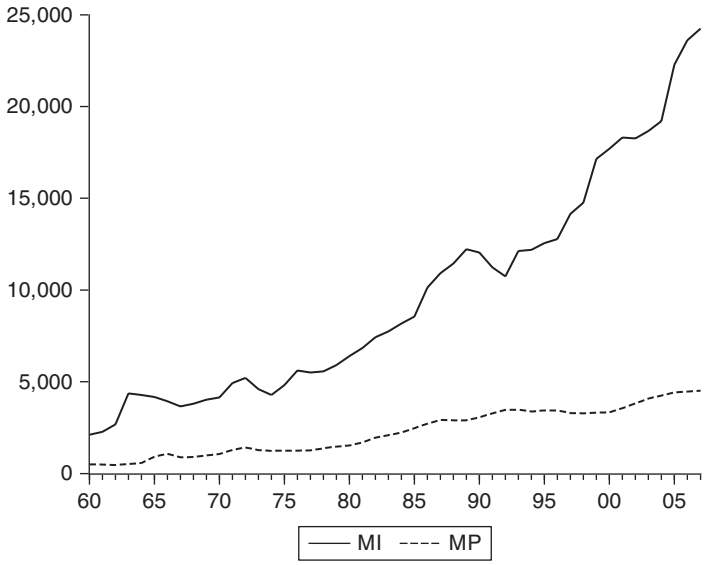

Figure 4.6 Levels of military expenditure in India and Pakistan 1960–2007, (2005 $m): India, MI, and Pakistan, MP

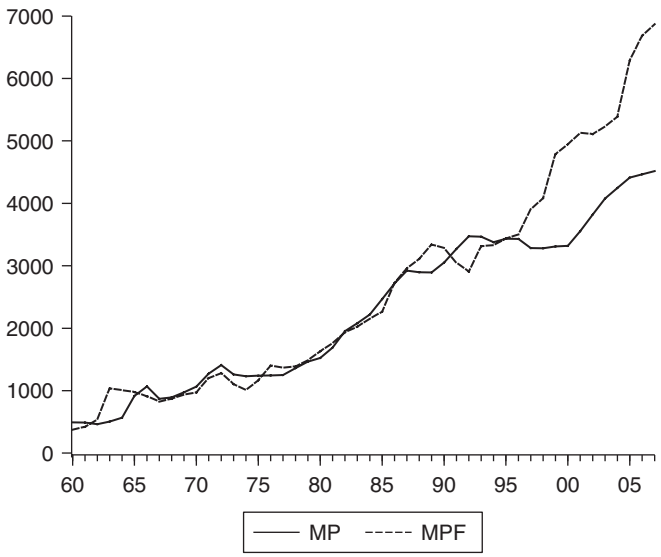

Figure 4.7 Actual and predicted military expenditures in Pakistan 1960–2007, Actual: MP, predicted: MPF

For a long time there seemed to be a stable relationship between Indian and Pakistani military expenditure. Pakistani military spending seemed to stay about 30 per cent of Indian military spending, though of course this relationship might hold only for reported, rather than actual, military spending. This is illustrated in Figure 4.7, which shows predicted Pakistani military spending based on the 30 per cent of India rule as the dotted line and reported Pakistani military spending. It is noticeable that they move together very closely until about 1995, when they diverge. Subsequently, Pakistani military expenditure is well below what would be predicted on the basis of the historical relationship with Indian military spending. There are various possible explanations. The fact that both became nuclear powers may have reduced the need for Pakistan to match India in conventional expenditures. The economic constraints imposed by its lower growth rates may have meant that Pakistan was unable to finance the required growth in expenditures to match the historical relationship with India.

There are divergent views on the issue of whether both India and Pakistan becoming explicit nuclear powers should be regarded as a positive or negative development. The people of the two countries seem to regard it as a good thing, giving them protection and extra status.

Military expenditures may be lower if cheap nuclear weapons substitute for expensive conventional ones. Some regard the possession of nuclear weapons as reducing the probability of war, since the consequences of a nuclear war would be so disastrous. The US and Soviet Union took some time to learn to manage mutual assured destruction, though India and Pakistan may be able to benefit from the superpower's Cold War experience. Should deterrence fail and war happen, the severity of the destruction is likely to be increased by the use of nuclear weapons. There is also concern about the security of the command and control of the weapons, the effectiveness of the systems for preventing unauthorised or inadvertent use, and concern that future governments may be less responsible than current ones.

Military prices

In the national accounts, aggregates such as GDP are expressed both in current and constant (adjusted for inflation) prices. The constant price measure gives an estimate of the real output of the economy. The ratio of GDP at current prices to GDP at constant prices is an index of the price level called the GDP deflator. This is probably the most general price index for a country, but there are a large number of other prices indexes which measure prices in different sectors of the economy. Consumer price indexes, which measure the cost of living, are probably the most familiar since they are widely used for many purposes. This raises the issue as to how we should measure military prices, or defence inflation, to get an estimate of the real output of the military sector. There are three different aspects to defence inflation.

First, there is cost escalation between generations of a particular type of weapons system, such as fighter aircraft. Over time the growth in real unit production costs, after allowing for general inflation, between generations of different system has been on average about 8 per cent per year. As a result each new generation of tank, aircraft or ship costs a lot more than the unit it replaces. Part of this is not pure inflation but reflects performance enhancement and improved capability: Typhoon can do more than Tornado, the F35 is more capable than the F16. Separating cost changes into their price and performance elements is difficult. The average 8 per cent growth reflects a set of vicious circles, or positive feedback loops, driving up costs. The effectiveness of a military system does not depend on its absolute technical performance but its performance relative to an enemy. There tend to be diminishing returns to technology, so that adding an extra 5 per cent to performance may

double the cost of a system. Because it is relative performance that matters in combat, countries are in the position of the Red Queen in Lewis Carrol's *Alice Through the Looking Glass*: 'It takes all the running you can do to stay in the same place.' This Red Queen effect is important in evolution, which is also driven by relative fitness.

Since costs between generations grow faster than the budget, one can only afford smaller numbers of units in each generation. This reduction in numbers means that fixed costs are spread over a smaller number and the benefits of economies of scale and learning curves are lost, raising the unit production costs. Learning curves come from the experience gained in production, causing costs to fall with the total number of units produced. Economies of scale depend on the rate of production, the number produced in any period of time. There also appears to be a tendency for fixed costs, such as software and networks to support the system, to grow relative to variable costs, the production cost of each unit.

Rising costs increase the temptation to keep the systems longer, making the gaps between generations bigger: many military platforms, like the US B52 bombers, are very old. The capability of the platform is maintained by updates and the insertion of new avionics, electronics, sensors and weapons. But the long gaps between generations add to the uncertainty and cost of building the replacement. The vicious circles interact. Technological competition for relative performance causes cost escalation, which causes smaller numbers produced with longer gaps between generations, which increase the cost escalation.

The second aspect of defence inflation is cost escalation on individual projects, which often cost a lot more than initially estimated. To a certain extent these forecast failures reflect the 'conspiracy of optimism' by which military and industry have incentives to collude in underestimating costs to get the project accepted and included in the planned budget. Project cost escalation is discussed in detail in Chapter 5. On long projects, the agreed initial price is often indexed to allow for inflation: the agreed price is increased each year in line with some price index. There are many possible indexes and one needs to choose among them. The contractor for the UK EH101 helicopter, IBM, suggested one index; MoD insisted on another index. NAO (1993) concluded that MoD would have saved £70 million if they had accepted the index IBM suggested. This got very little publicity or political attention at the time the NAO reported, probably because politicians and journalists, like my students, tend to find that discussion of price indexes sends them to sleep. The difference between the indexes was that the one suggested

by IBM was a price index and the one MoD insisted on was a cost index. Costs tend to grow faster than prices. Productivity growth means that even if input prices, such as labour and material are growing, improved efficiency means that the items can be produced for less, so that the growth in prices is less than the growth in costs. For the UK on average this difference is about 2 per cent a year. In particular areas, such as electronics, the rate of productivity growth is much faster. For many firms, despite high inflation in input costs like wages and raw materials, they are selling higher quality goods at lower prices, because of technological progress and productivity growth.

The third aspect of defence prices is the rate of inflation for the whole budget. This can be measured in terms of the cost of inputs to defence or the price of defence output. Some input costs are reasonably easy to measure: wages tend to grow at the same rate as the economy as a whole; fuel prices tend to move with oil prices; and defence benefits from being an intensive user of the inputs whose prices have fallen most rapidly: electronic and IT equipment. In the US, defence prices indexes are largely input based. On the output side, inflation, the rate of growth of output prices is equal to the rate of growth of input costs minus the rate of growth of productivity (output per unit input). To measure prices you need a measure of the output or productivity of defence. Measuring defence output is difficult, though it is being attempted in the UK in order to construct a measure of defence inflation, to match existing output figures for health and education spending. To get a good defence inflation estimate would require making the appropriate adjustments for quality and productivity improvements to get a measure of the real output of defence. This presents formidable difficulties. In the past the UK did try to control public expenditure in real terms, but this just provoked disputes between the Departments and the Treasury about the appropriate way to measure inflation in particular areas of public expenditure, like defence.

Military accounts and balance sheets

Military expenditure is a flow of money each year, some of which goes to pay troops and other personnel, some to operate existing weapons and some to buy new weapons. Military capability depends not on the purchases of weapons in a year but the total stock of weapons, most of which were purchased in previous years. This stock of military assets (guns, ammunition, planes and ships) depreciates. During peace equipment wears out, becomes obsolete or is lost in accidents; during war

munitions are used up in combat, equipment is destroyed by enemy action and wears out more quickly through heavy use in operations. The Humvee vehicles used by the US in Iraq need to be replaced after two years rather than the usual 13 years because of heavy wear.

Commercial firms summarise the value of their assets (what they own, including machinery and property) and liabilities (what they owe others) in a balance sheet, which together with their income and expenditure and profit and loss accounts makes up their financial statements. Governments tend to focus just on the cash flows, the income and expenditure accounts. There has usually been fairly limited information on balance sheet items, such as military stocks, except where they can be easily counted, such as the number of warships or missiles. The UK is somewhat unusual in having a military balance sheet. After some trial years, in 2003–2004 Resource Accounting and Budgeting (RAB) was introduced for public sector accounts. This makes interpreting UK defence spending somewhat more difficult. Previously, the budget was a relatively straightforward measure of cash spent; now there are extra accounting adjustments. Under cash accounting, costs are counted when the money is actually spent; under accruals accounting, costs are counted when they are incurred. There are also various balance sheet adjustments, including the cost of capital and depreciation. Cost of capital is equivalent to interest paid on the assets valued on the balance sheet. The interest rate used to calculate this is largely notional and was reduced from 6 per cent to 3.5 per cent in 2003/2004. Depreciation and impairments to those assets is also charged as a cost. For most government departments these are rather minor adjustments; but MoD has £90 billion of assets, £34 billion of that being Single Use Military Equipment, which does not have a civilian use. That makes the cost of capital and depreciation big numbers for MoD, about £10 billion in total. Adjustments to these figures can make significant differences to the reported budget. There are also various other adjustments, relating to nuclear liabilities and to Private Finance Initiatives (PFI) for instance. RAB also has incentive effects, because of which totals are controlled; not all of them are desirable.

For commercial firms there are three ways to value an asset, such as a piece of machinery: on the basis of its historical cost, its market price or its going concern value. The historical cost of an asset is what the firm paid for it adjusted for depreciation, which is usually calculated on some conventional basis, such as estimating a lifetime for the asset and allowing for it to be written off over its lifetime. This is the usual book value of an asset. The market price of an asset is what someone else would pay

for it. For some assets, such as mobile construction equipment, market prices can be discovered relatively easy; for others there is no obvious market. The going concern value of an asset is the present value of the future profits that would accrue to the firm from owning and using the asset. A lot of financial management involves adjusting to discrepancies between these three measures. If the market price of the asset is greater than its going concern value, it is worth more to someone else and you should sell it. With financial assets there is dispute about the extent to which they should be 'marked to market', constantly revalued in the light of possibly volatile market prices.

Valuing military assets presents difficulties. Historical costs are usually available, but some equipment is very old and it is not clear what rate of depreciation should be used. Sometimes one can determine a market price, for instance the UK MoD sold Chelsea Barracks in central London to a property developer for a lot more than its book value. But in most cases there is no well-defined market price for assets that have no non-military use. The people who would pay the most for your advanced fighter aircraft are usually people that you would usually rather not sell them to, since they may use them against you or your friends. Valuing fighter aircraft on a going-concern basis is equally difficult since there are no monetary equivalents for the services they provide in the future. Valuing MoD assets for RAB took some creative accounting.

The assets may not be owned by the government, in which case they are 'off balance sheet' not incurring cost of capital and depreciation charges. Under PFI, the assets may be acquired by a private consortium and leased to the military as required. An example is the Future Strategic Tanker, which is urgently required to replace the old 1960s VC10s and Tristar in-flight refuelling aircraft. The project is estimated to cost £13 billion over 27 years. The replacement is to be provided by a consortium, involving the manufacturer, which owns the aircraft. It leases them to MoD and can use the aircraft, for private air-freight contracting, when the MoD does not need them. This alternative use of the aircraft reduces the cost to the MoD, though there are issues as to whether the US would regard the aircraft as commercial or military, subject to restrictions, in this alternative use. Such a leasing arrangement gives the manufacturer an incentive to make the aircraft reliable and cheap to maintain, since it operates the aircraft itself rather than just selling it to MoD. Negotiating such contracts can be difficult because of the uncertainties involved in financing and sharing risks. One risk is whether MoD will need a refuelling aircraft in 10 years time. By 2008 the UK had spent almost a decade negotiating prices and conditions,

which had cost the taxpayer about £47.5 million. The firms had also incurred heavy costs in the negotiations. Unlike the US case, discussed later, there was no doubt about the aircraft chosen: a converted A330 Airbus produced by European Aeronautics, Defence and Space (EADS). The PFI consortium borrows the money to acquire the assets. Private firms usually have to pay higher interest rates than the government, because of default risk, and this raises the cost. The spread or excess over the government borrowing rate depends on circumstances. During most of the negotiations this spread was quite small, but then there was the credit crunch of August 2007. This raised the spread to 100 basis points over LIBOR, the London inter-bank offered rate, at which banks lend to each other. A spread of 100 basis points is 1 per cent, so if LIBOR was 5 per cent, they would pay 6 per cent interest. Normally LIBOR is very close to the base rate, which the Bank of England controls and the Government can borrow at. But the credit crunch, and the lack of trust between banks, caused LIBOR to diverge sharply from bank rate, increasing the cost. PFI schemes are often big with large early uncertainties. If the contractors can successfully surmount these early risks, the operation phase can be very profitable indeed. If the contractors cannot surmount the risks, they may be bankrupted. Because they are long-term contracts PFI schemes may commit a large proportion of future budgets.

The usual reported UK defence budget is called the total Department Expenditure Limit (DEL), which is the resource DEL (current spending plus depreciation and cost of capital) less depreciation plus the capital DEL. Since capital expenditure is added in, depreciation is subtracted, to stop double counting. Actual cash spending is about £3 billion lower than the reported budget mainly because the cost of capital does not require any cash spending. Clearly the government, like any firm, must manage its assets; but managing military assets should be driven by military needs not accounting conventions.

Accounting procedures can reduce transparency in ways not related to RAB. For instance the NAO 2007 Major Projects Report notes how 62 per cent of the reported cost reductions by MoD had been achieved by reallocating expenditure to other projects or budgets. Operations such as those in Iraq and Afghanistan (including any urgent operational requirement (UOR) for equipment) are funded outside the defence budget from the Government's general reserves. The US has a similar system of supplemental appropriations for expenditure on operations which are outside the normal budget. The UK Winter Supplementary for 2007–2008 estimates costs for Iraq and Afghanistan of £1.9 billion, but noted that the need for UORs may require additional provision.

The actual figure is proving much higher, perhaps £3 billion. There are also complications like the costs of peacekeeping operations in the Balkans are included in the Foreign Office Estimates rather than the MoD estimates. Some of the equipment provided under UORs represents a response to new threats that appeared in operations, but the bulk of it represents operational equipment that was identified as necessary but not funded due to budgetary constraints, squeezed out as the large equipment projects running over budget forced economies elsewhere. Both in the US and UK, the military may try to finance what they cannot get in the regular budget through such UORs and supplementals.

The accounting issues are complex and I have only given a simplified picture; it is said that economists are people who are good with numbers, but not creative enough to be accountants. Budgeting for defence is inherently difficult; the difficulties are compounded if the budgetary system itself is not transparent and the senior managers do not understand the numbers. In the UK, complexity is introduced by the treatment of depreciation, capital consumption, balance sheet adjustments, contractual PFI terms and operations financed outside the budget. This complexity creates scope for financial engineering, may confuse planners and can distort incentives.