1 Introduction

Money matters to the military; it is needed to finance fighting, and desire to acquire it is often the motive for fighting. Fighting matters for the economy, since military power and conflict have shaped economic development. Both fighting and finance are often driven by the same basic human motives: fear and greed. This book examines the interaction of economics and conflict. There is a large economic literature devoted to conflict and to finance and resource allocation by the military, which is known either as defence (or defense) economics or as peace economics. The journal of the subject is called *Defence and Peace Economics*. Economists are the specialists in studying money, though not usually in making it, and they have contributed much to military analysis. For instance, Thomas Schelling gained a Nobel Prize in Economics for his game-theory analysis of strategy, particularly nuclear strategy. Since defence economics is often about attack and peace economics is often about war, I have used the title military economics: the economics of the use of organised force.

Military money also matters because a large amount is spent on the military, about $1300 billion in 2007, and military equipment is expensive, US B2 bombers cost about $2 billion each. This money plays a major role in issues of war and peace which have repercussions on economic development. In 2008, major conflicts were continuing in Iraq and Afghanistan and there were about 20 other wars in progress, mainly intra-state civil wars, many involving substantial loss of life. One cannot understand the economies of many countries, particularly poor countries, without understanding the role of war. The genocide in Rwanda in 1994, where about 800,000 were killed, was the beginning of over a decade of conflict in the Great-Lakes Congo region in which perhaps millions died, large numbers from disease and malnutrition. As well as

Rwanda and Zaire/Democratic Republic of Congo the war involved combatants from Angola, Burundi, the Central African Republic, Chad, Libya, Namibia, Sudan, Uganda and Zimbabwe plus foreign mercenaries. Despite a ceasefire in 2003, elections in 2006 and 17,000 UN peacekeepers stationed in the area, the conflict in the Democratic Republic of Congo restarted in late 2008. The area is a source of crucial minerals, so conflicts there have global economic implications.

Defence and peace economics, like much of the rest of economics, uses a mathematical and statistical language that makes it incomprehensible to many who might be interested, but do not have a quantitative training. This includes many students on courses in war or peace studies, many in the military, and many of those working with non-governmental organisations (NGOs), campaigning on military issues. This book draws on the mathematical literature, but presents the economic aspects of defence in a non-technical way without equations or regressions. It tries to provide a self-contained account which explains the economic concepts used and introduces related literature. Just as different military services – army, navy and air force – have their own cultures, so do different academic disciplines. These cultural differences extend to how they reference and refer to the literature. Relative to work in history or international relations, economists tend to economise on references, thus there will not be quite as many citations to sources of alleged facts, ideas or opinions as is usual in other subjects. Economists also use a different referencing system. Where literature is referred to in the text, it will mainly be to material that is accessible to a non-mathematical audience and presented in the author-date format, as in Schelling (2006), with a page or chapter number where necessary. Full details of the book or article can be found in the reference section at the end. Because I have tried to cite literature that is accessible to non-specialists, I have not given credit to the authors of most of the mathematical and statistical literature that I have used. I apologise to them for this. The final chapter contains some more general discussion of the various approaches in the literature. Both economists and the military use abbreviations heavily and a list of abbreviations can also be found at the end.

The book uses a very simple framework to try and organise a range of questions about the interaction between the spheres of economy and strategy. It looks at a process by which money, the defence budget, is used to acquire forces, troops and weapons; these forces are used to provide military capability, the potential to prevail in combat; and this military capability contributes to security or insecurity, peace or conflict.

This structure is very similar to one used in relating ends to means in military operations. A military plan is based on: the desired ends, the political aims of the campaign (security); the military objectives to support those aims (capability); the means to attain those objectives (forces); and the resources to provide those means (budgets). Analysing these four elements occupies the bulk of the book and these elements operate at an individual, national and global level. The rest of this chapter provides some background to how they will be analysed.

Economics

The birth of economics as a discipline is usually dated to the publication in 1776 of *The Wealth of Nations*, by the Scottish moral philosopher Adam Smith. Besides providing a general framework for economics, Smith addressed a range of military questions and he will be referred to a number of times. Since then economists have examined the economic dimensions of many aspects of war and military preparations. Financing war and managing the war economy have been recurrent issues throughout history. The economic analysis they generated includes David Ricardo's involvement in the Bullion Controversy provoked by the suspension of the Gold Standard during the Napoleonic Wars and John Maynard Keynes's advice on how to pay for World War II. The economics of war remains an issue of current concern. Within much of the poor world, particularly Africa, civil wars are a major cause of economic dislocation and the international financial institutions are struggling to come to terms with this linkage. It has proved difficult to manage post-conflict stabilisation and reconstruction and to provide incentives for combatants to return to civilian life.

Economics can contribute to understanding the causes of conflict, particularly when there may be economic elements in those causes. Such economic elements include the liberal view that free trade and economic integration promotes peace; the mercantilist-Leninist view that war is the continuation of national economic competition by other means; and the materialist view that wars, including civil war in poor countries, are explained by the drive to control natural resources like oil, water or diamonds. Economic analysis has also been applied to military effectiveness. This runs from Smith's discussion of the relative advantages of standing armies and militias to 20th-century applications of economic and mathematical models, to optimise military procedures. The more general application of quantitative methods to military problems is often called operational analysis.

The application of game theory to nuclear targeting is a classic example of the use of economic models in strategic analysis. In 1964 Stanley Kubrick made a dark comedy about nuclear war: *Dr Strangelove or: How I Learned to Stop Worrying and Love the Bomb*. Dr Strangelove may seem a mad and implausible character, but he was sufficiently recognisable that there is considerable dispute about which members of the nuclear–academic community contributed to the composite. Candidates include the mathematician-economist John von Neumann, who developed game theory; Edward Teller, who developed the Hydrogen bomb; Herman Kahn, who wrote the text book on Thermonuclear War; and Wernher von Braun, who developed the US rocket programme and had been a Nazi, like Strangelove.

This book approaches the military from the perspective of an economist, thus there is an emphasis on the incentives people face and how these incentives can shape choices. Fear and greed will be the motivators we focus on. However, people have other motives and there are other perspectives on the military that are not discussed or only mentioned in passing. These include environmental, feminist, legal, philosophical, psychological and sociological perspectives. The fact that they are not discussed does not mean that they are unimportant. War and the military have many dimensions and this book focuses on the economic dimension. For instance, gender issues are central to the military because the role of women in the armed forces, particularly in combat, is a matter of dispute in many western countries; these western armed forces, including women, may serve in countries like Iraq or Afghanistan where the role of women is quite different; and in most wars women are prominent among the victims, not least because rape is endemic in war. Similar points could be made about legal and environmental dimensions. However, despite the importance of these other dimensions, this book will emphasise the economic perspective. The economic influences are important but not deterministic. An analogy is the influence of the wind on a yacht. The wind does not determine the path of a yacht, the skill of the skipper matters. But the wind is a constraint. Without wind the yacht cannot move, and you cannot understand the course of the yacht without knowing the wind. As Karl Marx put it: men make their own history, but not under circumstances of their own choosing. Economic circumstances are not the only ones that shape history, but they do matter.

There is one respect in which the economic perspective may appear strange: economists usually assume that people are rational. While this rationality assumption has been questioned in many areas, in the

military area in particular, it can seem to fail to capture the reality of war with its waste, passions and emotions. Carl von Clausewitz, in his 19th-century classic *On War*, saw war as uniting the trinity of passion, chance and reason. We will return to passion later in this chapter and to chance in Chapter 2, but reason does play a role. Rationality is not a straightforward concept and there are many types of rationality. It may be instrumental and apply to the decision itself (was it in the person's best interests, an action consistent with their objectives and beliefs) or procedural, the process by which the decision was made. In terms of process, economists sometimes assume that decisions makers can effortlessly calculate the optimum solutions to complicated probabilistic problems and face no obstacles to implementing the solution. If this was the case most wars would not happen. Uncertainty is fundamental to military matters and can rarely be represented by probabilities. Information is suspect, tainted by secrecy, deception and the fog of war. Acceptable let alone optimal solutions are rare and implementation is problematic, constrained by hierarchy, bureaucracy, standard operating procedures, inter-service rivalry and logistical difficulties.

The traditional image of economic man, the self-interested calculator, is an approximation that has been qualified by recent experimental work in behavioural economics. This work suggests that emotions matter and that people are less selfish, more altruistic and more co-operative than traditional economic theory predicts. Optimists are pleased that people are nicer than economists supposed; pessimists worry that such selfless, altruistic individuals, who are happy to co-operate within groups, can be easily mobilised to slaughter other groups. Motivating the selfish, individualistic, economic man for war could be more difficult. Although sometimes neglected by economists, psychological biases play an important role in war. For instance, leaders tend to be over-optimistic about their military capabilities and, like rogue traders in banks, take big gambles to try and recover from losses.

Military problems are hard in ways that are not captured by certain economic models, hence the prevalence of apparent irrationality. Clausewitz emphasised the fog of war: 'everything in war is simple, but the simplest thing is very difficult.' In particular, control is difficult. Tolstoy, writing about the Battle of Borodino, said: 'It was not Napoleon who directed the course of the battle, for none of his orders was carried out and during the battle he did not know what was going on.' Optimisation is a good place to start, and it is where we will usually start, it is a bad place to finish. One must go on from simple optimisation to the realities of military decision making, with its uncertainties,

organisational constraints and often perverse incentives. There are a range of other sorts of economic models that allow for these factors and can help one understand the systemic reasons for certain types of failure: rules, structures and standard operating procedures that are functional from one perspective, but profoundly dysfunctional from another.

In the application of economics to military issues it will become apparent that military problems have a lot of similarities to economic problems. Not only are fear and greed central to both fighting and finance, but so is competition. Military competition is closer to real economic competition, with agents striving for relative advantage, rather than the abstract perfect competition of elementary economics text books. There are other analogies. In 2002 the renowned investor, Warren Buffett, possibly the world's richest man, compared derivatives to financial weapons of mass destruction. Though unlike neutrons bombs, which kill people and leave the property untouched, derivatives can destroy property and leave the people alive, if without jobs. The analogy of derivatives and weapons is pursued in Satyajit Das's (2006) *Traders, Guns and Money*. Das examines the racy realities of finance and those from a military background should be warned that financial traders make an infantryman sound like a well-spoken, sensitive, moralist.

Economics was traditionally regarded as the study of the allocation of scarce resources between competing ends: the problem of allocative efficiency given resource constraints. More recently, there has been a shift to the study of the rules by which resources are allocated: the problem of incentive efficiency and the constraints that people face in allocating resources. The focus then shifts to the nature of social institutions (rules, beliefs and behaviour patterns) as mechanisms for communicating information between people and co-ordinating their actions. The Nobel Prize lecture by Roger B. Myerson (2008) explains this approach to economics. The general problem of aligning incentives to achieve co-ordination is known in economics as a principal–agent or contracting problem. One partner to the trade, the principal has some goal. To reach that goal, the principal must employ an agent with specialist knowledge and skills, which the principal does not have; there is asymmetric information. The problem is that the agent has different objectives from the principal, so the principal cannot easily get the agent to do what the principal wants. The principal then has to try to design a contract or institution that aligns their conflicting interests. This might be done by providing some incentives to the agent that encourage them to implement the principal's objectives, such as threatening to shoot any soldier who refuses to advance into battle.

The principal–agent problem is pervasive; it arises when owners of a firm hire managers and when people hire professionals like doctors, lawyers or builders. The builder who comes to work on your house may say that they are acting in your interest, but they also have their own agenda and goals. To align these interests you have to try and agree terms, design a contract, so that the builders have incentives to turn up and do the work on time, in the way that you want it done, to an acceptable quality standard. The incentive problems are bad enough when you hire builders; they are much worse when you hire heavily armed killers. Brauer and van Tuyll (2008) discuss the problems of designing contracts between the Renaissance Italian Cities and the Mercenaries they employed to fight for them. These private military contractors were known as Condottieri, from the Italian for contract. The difficulties included the fact that the Condottieri often had more incentive to take over and loot the City that had hired them, rather than to fight that City's enemies. Similar issues apply to governments that fear military coups or hire modern private military companies.

A major element of the principal–agent problem is asymmetric information: the two sides of the contract know different things. This information difference, which arises with regular armies, has two aspects that are given names taken from insurance. The first is adverse selection, where there are hidden characteristics of the agent, such as whether the general you hire is brave or not. The second is moral hazard, where there are hidden actions by the agent, such as whether the general tries very hard or not. The problem gets more difficult when the principal cannot monitor the actions of the agent, just observe the outcome. In the early years of the US Civil War, President Lincoln (the principal) could only observe the lack of progress by General McClellan (the agent) in fighting the war. But Lincoln did not know how much of this lack of progress was a consequence of General McClellan's psychological aversion to fighting (an adverse selection problem, Lincoln had hired the wrong sort of General); how much was a consequence of a lack of effort by McClelland (a moral hazard problem) and how much was really a consequence of the strength of the Confederate enemy.

Such principal–agent problems recur throughout the book. For instance, most ministries of defence see their main enemy not as the country they might fight, but the finance ministry that controls their budgets and the audit office that evaluates their expenditures and publicises their mistakes (in the US the Government Accountability Office, GAO, in the UK the National Audit Office, NAO). This hostility may be well founded; finance ministers can be the most effective disarmers.

The disputes between defence and finance ministries about balancing resources and commitments play a major role in many military decisions.

The military

While this book may often appear critical of military procedures, like Norman E. Dixon's (1976) classic *On the Psychology of Military Incompetence*, it is not an attack on the armed forces. Although I may have met a unrepresentative sample, most members of the armed forces and defence civil servants that I have met are well intentioned, intelligent people who have good reasons for what they do, however unhappy the consequences. Often the military personnel are the most articulate critics of the unhappy consequences, though they are usually ex-military by the time it gets into print. Lewis Page (2006) is a recent UK critique of waste and blundering in the armed forces by an ex-officer. There are many similar books.

Unlike Dixon's book which emphasises psychological factors, I emphasise organisational incentives, though the explanations are not mutually exclusive. His focus was on failures in combat under great pressure with little time for deliberation; but there can also be failures in defence ministries, with less pressing time constraints. Organisational structures that are functional, providing the right incentives, in certain respects are dysfunctional, giving the wrong incentives, in other respects. These are often peacetime mistakes. War is rightly usually presented as a period of great uncertainty, but in some respects the uncertainty is reduced. In war you know who you are fighting, where and how, which you do not in peacetime. All organisations face the same issue: how to ensure that individuals that comprise it are encouraged to act in ways that support the organisation's objectives. This problem is not unique to the military; every commercial firm faces it. But in commercial firms the objectives are generally clearer and the contribution of an individual's behaviour to those objectives can be determined much more quickly than in the military. If the sales staff alienates the customers, this is reflected in sales and profits, which prompts some response by management. How quickly this response occurs depends on competition. In a very competitive market the response tends to happen quickly or the firm goes out of business. If the firm has a near monopoly and customers have few alternatives, the response can be very slow. Likewise the speed of military response tends to be determined by the nature of the competition, being much faster in war.

In military activities, the objectives are vaguer (particularly in peacetime, when there is no direct pressure from the competition) and the effect of individual actions on those objectives much harder to determine. These two themes recur: the lack of clarity about objectives and the difficulty of evaluating how actions contribute to objectives. Even in war these can be issues. While the overall objective, defeating the enemy, is clear, the best way to do it is less clear. It may be better achieved by unconventional and indirect means, such as deception, than by more conventional direct assault. Partly because of these difficulties, the military is also prone to a pattern of goal displacement, switching objectives in response to difficulties. The intangible objective, having troops that can prevail in combat, is replaced by more tangible objectives, such as having troops that look smart, are disciplined and perform well on parade. Goal displacement is not peculiar to the military; academics are equally prone to it: replace a messy, difficult, important problem by a simpler formal one to which there is an answer.

Values

We saw above that Clausewitz thought war united passion, chance and reason. Passion covers not only the strong feelings aroused by particular conflicts but the strong feelings about conflict itself. War and peace involve fundamental values about how conflicts of interest should be resolved, on which people differ. Some believe that all violence is wrong thus organising violence, as the military does, is inherently immoral. Some value peace equally sincerely, but believe that the best way to preserve peace is to prepare for war. Some believe that 'might makes right' and the powerful are entitled to what they can take. Each of these views tend to regard war as instrumental, a means to an end; but some regard it as an end in itself: an exciting and enjoyable activity in which one can realise oneself and attain honour and glory. While the enjoyment often fades with the experience of war, such views were once very widespread. Max Hastings (2005) quotes Winston Churchill on the exhilaration he felt fighting in the Boer War. Such enthusiasm for war would now be regarded as politically incorrect; but once admiration of the warrior spirit and prowess in war was pervasive. War was thought a proper source of education and amusement for the younger members of the upper classes. Joanna Bourke (1999, chapter 1) uses letters and diaries to illuminate perceptions of the pleasures of war.

Despite their need for military skills, modern developed societies are understandably ambivalent about the warrior spirit. In 2008 the

issue of reintroducing awards for military bravery generated controversy in Germany. Germany had abolished awards, like the Iron Cross, after World War II; but the combat experience of German troops in Afghanistan prompted reconsideration of the issue. Since soldiers risk their life for their country, societies have traditionally recognised this sacrifice by remembrance services and awards for valour like the Congressional Medal of Honor in the US and the Victoria Cross in the UK. It can be difficult to separate recognition of sacrifice, by those who served or died in war, from glorification of the war in which they served. This is most obvious in the political sensitivity of recognition of Germans and Japanese who died in World War II, but is also an issue in unpopular wars like Vietnam in the US and the current war in Iraq.

These conflicting values about war and preparation for conflict are important, but they will not be the focus of this book; economists have no special expertise in judgements on values. The book tries to describe what happens from an economic perspective, in the hope that readers will find it useful, whatever their values. Some readers may find this economic approach rather amoral, because it takes the objectives and preferences of the actors as given, rather than something to be judged. In the past I have presented this material to many military groups and to many anti-military groups in the peace movement. Both groups seem to have found it helpful to understand the economic issues and they have even invited me back on occasion. Knowing your enemy is as important to anti-militarists as it is to the military. Many people would be surprised at the similarity of what is taught on War Studies and Peace Studies courses. The values of those attending the courses may differ, but the issues they study are largely the same.

Language cannot be value free. While I have tried to avoid value-laden words, it is impossible to do so completely. The problem is made more difficult by the fact that particular words have different connotations to different people. I tend to see fear and greed as quite useful emotions; fear stops people hurting themselves and greed motivates them to great achievements. Others may see fear and greed as bad things to be disapproved of. I tend to refer to groups using force to oppose governments as insurgents (rather than terrorists or freedom fighters) without implying whether their opposition is legitimate or illegitimate, but even the term insurgents has connotations. Many economic terms have implicit connotations. While efficient markets, Pareto optimality and the natural rate of unemployment have specific technical meanings, there may be a temptation to think that things which are efficient, optimal or natural must be good. This need not be the case; markets for illegal drugs and

weapons can be very efficient. The main empirical implication of the efficient market hypothesis is that future changes in prices are unpredictable; but had it been called the unpredictable prices hypothesis, it may have had less impact.

Facts

People differ not only on values, but also on the evidence: what the facts are and how they are to be interpreted. For instance, there currently appears to be a pattern by which poor countries are more prone to civil war. This fact depends on particular measures of poverty and civil war, which could be disputed, issues we return to. Even if we agree on this association or correlation in the data, we may disagree on interpretation. War may cause poverty, poverty may make war more likely, or some third factor, such as the quality of the country's political institutions, may determine both war and poverty. Even if we think that poverty causes war, it may be because governments in poor countries cannot afford to maintain security or because some people find insurgency attractive, given the low income provided by peaceful alternatives. To resolve such issues of interpretation, natural sciences can often use experiments, which control the variation in factors. Social sciences have to rely on observed variations, not controlled variations. For instance, one might observe a poor country rapidly becoming rich and consider whether this changed the probability of the country being involved in a war. But the reason for a poor country becoming rich, such as the discovery of oil, will have other effects; including on the likelihood of war. We would also need to observe a number of such cases to be sure that the association was not just chance in that particular case.

There is the further problem that very few events have a single cause, so mono-causal explanations tend to be inadequate. In Oscar Wilde's phrase, the truth is rarely pure and never simple. Outcomes tend to be the result of the interactions of a large number of factors with luck and chance playing an important role. People make fun of the way economists qualify their theory with the Latin phrase *ceteris paribus*, other things being equal. The qualification is important, because there are always so many different factors operating. But the multiplicity of factors makes for more complicated explanations and disputes about the events themselves (what happened) and the interpretation of the events (why they happened). I will try to indicate the uncertainties and where the facts or interpretation are controversial; but when in doubt assume that they are controversial and that there will be disagreement

about both the facts and interpretation. I am afraid that this may result in the reader having sympathy with the US President Harry Truman who is reputed to have asked for a one-armed economist who could not say 'on the one hand . . . on the other hand . . .'.

In many cases, the facts are numbers: how many were killed in a war or how much was spent on defence. There are three issues about the numbers. Firstly, the numbers are often very big. The Stockholm International Peace Research Institute (SIPRI), a standard source, estimates that world military expenditure in 2007 was about $1339 billion and had increased by about 45 per cent in the previous decade, from a low in the mid 1990s. Almost half of this total was spent by the US. A billion is one followed by nine zeros; $1000 billion, sometimes called a trillion, is one followed by 12 zeros. To get a feel for big numbers, like world military expenditure, it sometimes helps to relate them to something else. For instance, world population is just over 6 billion, so military expenditure is about $200 a year for every person in the world. For the large number of people who subsist on less than a dollar a day that is a big number; for the world as a whole it is not a large number, about 2.5 per cent of world output.

Secondly, the numbers are often very inaccurate. We will spend quite a lot of time discussing how they are measured. For instance, there are many different definitions of what constitutes military expenditure or what constitutes a war. Because of the large uncertainties attached to most of the numbers in this book, they should be regarded as rough orders of magnitudes rather than precise figures. While it is useful to know how the details of how the numbers are constructed, there is rarely a right answer, just a range of probabilities. For instance, on one measure (using market exchange rates) China's annual military expenditure in 2006 was about $50 billion. On another measure (using purchasing power parity (PPP) exchange rates) it was estimated to be about $190 billion in 2006 and $140 billion in 2007. The fall between 2006 and 2007 was not a result of a reduction in Chinese military expenditure, but a result of the World Bank getting better estimates of Chinese prices and changing their estimate of the PPP exchange rate. These measures are discussed in more detail in Chapter 4. As another example of the uncertainty attached to the numbers, in early 2008 the estimates of the number of Iraqis who had died in the 5 years since the invasion in 2003 ranged from 60,000 to 600,000. The figures differ in which deaths are included (just directly conflict related deaths or also indirect deaths from the disruption and disease caused by the conflict) and in the sources of information on which the estimates are based

(such as press reports of casualties, morgue and hospital records, bodies in mass graves, or household surveys). While most of the numbers are just rough order of magnitudes, the remainder are not even that good and should be regarded as someone's best guess. Despite the uncertainties, working with the numbers gives you a feel for the order of magnitudes, possible relationships and the degree of uncertainty, the estimated margin of error around the number.

At times the reader may feel that I am being a little cavalier with the numbers. That is because I think it better to be roughly right rather than precisely wrong. One can be wrong in a number of ways with numbers. One is treating them as being less uncertain than they actually are and becoming anchored to them. Another is switching the focus from the relevant uncertain magnitudes to irrelevant but more precisely measured magnitudes. This tendency is common and generates many stories. One is about the drunk who searched for his lost coins by the lamp post, because the light was better there than where he dropped them. Another is about the balloonist, blown off course and lost, coming down and asking a person on the ground, where he was. The person on the ground replied 'in a balloon'. To which the balloonist said the man on the ground must be an accountant: providing information that was perfectly accurate but perfectly useless. The accountant's response was that the man in the balloon must be a general: completely screws things up and then drops from the sky to blame the people on the ground.

There is a third, more subtle, issue with the numbers. Many variables, such as the height or weight of individuals, show a pattern of a strong central tendency with some dispersion around it. There are short people and tall people but they represent relatively small deviations around typical values. We do not see people who are ten times average height. With variables like height or weight, adding or subtracting the observation for an individual from the group does not change the total, or the average for the group, by very much. As the sample of observations gets larger the estimate of the average gets more precise. This is called the law of large numbers in statistics. Variables with this sort of pattern also often follow a bell-shaped curve, called the Gaussian or normal distribution. This results from, what statisticians call, the central limit theorem. Economic and military variables tend not to follow a normal distribution; they have highly skewed and unequal distributions: we observe people with 100 times average income. As a result totals and averages can be very sensitive to the set of observations used. Since the US accounts for almost half of world military expenditure, including or excluding the

US makes a big difference. Many economic and military variables have skewed distributions like this; and the processes that generate them may not satisfy the assumptions required for central limit theorems or laws of large numbers to work.

One, though not the only, source of the very unequal, skewed, distribution of outcomes observed in economic and military numbers is that they reflect multiplicative rather than additive processes. Suppose that there are three elements that contribute to success in combat: the quantity of forces, their quality and logistics. Side A scores 4, 4, 1 and Side B scores 3, 3, 3. When the elements are added the two sides are equal; both sum to 9. But when multiplied, they are very unequal. For side A the product is 16, for side B it is 27. Although A is better than B on two of the three elements it is only about half as effective overall. If side A had scored 0 for logistics it would be even more obvious, the product would be 0. Although side A is better in quality and quantity of forces than side B, A is let down by logistics. Because A cannot get enough fuel and ammunition to its troops, they suffer severely despite their quality and quantity. This interactive effect is recognised by the military who often talk of 'force multipliers'. What often counts in military and commercial competition is the weakest link in the chain, get one element wrong and it can mean disaster, however good the other elements. This is a major factor in strategic skill. The ability to combine arms (archers, cavalry and infantry, or artillery, aircraft and tanks) in a way that maximises the effectiveness of their interaction is a rare skill in generals.

Theories

There are deep theoretical disputes in economics, international relations and strategic studies. Within economics the dominant theory is labelled neo-classical or marginalist economics, but there are also Keynesian, Marxist and many other approaches. The theories differ about the nature of rationality and social interactions and their perceptions of the relative efficiency of states and markets. Within international relations, there are also theoretical divisions, such as between realists and idealists. Realists tend to see war as an inevitable outcome of the interaction of sovereign states, each with their own interests, operating in an anarchic international system. Idealists, also called liberals, tend to see an inherent harmony of interests among people and war as an aberration which could be avoided by appropriate political institutions within and

between states. Throughout this book, I use liberal in the classical sense of those who believe in free markets, free trade and free elections. In the US the term liberal is often given a socialist tinge, and a classical liberal would probably be regarded as a neo-conservative who is soft on the use of force.

Many books in economics and international relations are organised around these theories; this book is not. Instead it adopts a relatively eclectic approach to the questions that arise in the interaction of the spheres of power and money. Theory is used; it is impossible to avoid using some theory, whether implicit or explicit, to organise the information. However, there is no grand unified theory to provide an integrated explanation. One consequence of the lack of a unified theory is the danger of inconsistency and one example of such inconsistency is the treatment of the state. It will prove useful at some times, to treat the state as a rational actor making decisions for the country as a whole; and at other times, to treat it as an arena of conflict between various interests. The state is the term used for the whole apparatus that runs a country, including politicians in government, bureaucracy, military, legislature and judiciary.

Part of the reason for not using more explicit theoretical structures is that the theories in economics and international relations do not really overlap: the theoretical divisions in economics do not match those in international relations. There are some overlaps; rational actor models are widely employed both in economics and in other subjects and there are Marxist theories both of economics and of international relations. But even here the match is not close. Rational actor models in different disciplines involve different conceptions of rationality and Marxists in different disciplines tend to read different parts of Marx. There are also differences in how social interactions are perceived. There is some evidence that people have a tendency to co-operate within groups and compete between groups. This raises the question of how the groups (families, firms, football teams, *Fedayeen* cells) are defined and the forms that competition takes. One theory of international relations, the constructivist, emphasises the cultural determination of group identity and the role of modes of discourse, how people talk about things, in determining when this competition takes the form of conflict. This provides a useful insight. Economics and international relations have non-overlapping modes of discourse and different assumptions about the relevant groups and forms of conflict. For instance, in international relations, *securitisation*

refers to the classification of certain phenomena, such as illegal drugs or resource shortages, as security issues; existential threats requiring emergency and possibly military responses (e.g., Collins 2007). In economics *securitisation* is the process where certain debts, such as mortgages, are bundled into assets which are traded as securities on financial exchanges. Such asset-backed securities played a starring role in the credit crunch, the global financial crisis that started in August 2007.

In such cases of multiple meaning, I have tried to signal which meaning is involved. Oil is securitised in both senses. It is seen as a major security issue which may cause conflict and it is the basis for a range of derivatives which are traded on markets as securities. Derivatives are contracts, such as futures and options, whose value derives from the price of some underlying asset such as oil. The term derivative also has multiple meanings. The *Financial Times* reported that in 2002, when the US Congress was debating whether to close the 'Enron Loophole' – that is, to require that over-the-counter energy markets be brought under the full oversight of the US futures regulator – Republican Trent Lott rose to his feet in the Senate chamber, brandishing a dictionary; the senator looked up a definition of 'a derivative', a term referring to the complex futures contracts used in the energy markets to hedge the risks associated with holding physical supplies of commodities such as oil and natural gas. The dictionary told him that it was 'the limit of the ratio of the change in a function to the corresponding change in its independent variable as the latter change approaches zero'. Mr Lott turned to his colleagues with a warning: 'We don't know what we are doing here. I have serious doubts how many senators really understand [this] and it sounds pretty complicated to me.'

Adopting an explicitly theoretical structure would also involve digressions into the controversial, but peripheral, issue of what really constitutes the essence of the various types of theory: Marxist, realist, idealist, neo-classical or constructivist. Another justification of the eclectic approach is that the subject is inherently eclectic. Lawrence Freedman, discussing War Studies in a paper entitled *Mindless Eclecticism or Creative Synthesis*? (chapter 10 of Clarke, 1993), concludes that strategy is unavoidably eclectic. Although it is not ideal to use different theories for different applications, it is not uncommon. While I would not wish to claim any similarities between economics and physics, physicists use a different theory for the very large, general relativity, than they do for the very small, quantum mechanics.

Outline

The interaction between strategy and economy, power and money, is discussed in Chapter 2. This examines a set of relations in which military budgets are used to buy forces, which provide military capability that may be used to provide security. Such relations are often called input–output processes: there is an input, budgets, and an output, forces, which itself is an input into the processes determining military capability and security. The final output, security, is discussed in Chapter 3. While economists have written about war since, at least, Smith in 1776, defence economics emerged as a distinct speciality in the 1960s. Charles H. Anderton (2003) provides an introduction to this history. The 1960s defence economists were largely working in the US Department of Defense (DoD), or at a think-tank, RAND, that advised DoD. Their original questions were about the defence management aspects of budgets, forces and military capability. While one might not agree with their answers, they provided a good set of questions and I will use them to organise my discussion of military economics. However, I will do it in a much wider historical and geographical context than the narrow issues of contemporary military management in industrial countries. Although current military technology and organisation differs from that of the past, many of the fundamental issues are timeless. Thus the historical perspective is illuminating. Because the issues are timeless, works like Sun Tzu's *On the Art of War*, written in China about 450 BC, and Thucydides' *History of the Peloponnesian War*, written in Greece about 400 BC, are still taught in military academies and widely cited.

The first of the questions raised by the defence economists of the 1960s is about the optimal size of the defence budget: 'how much is enough?'; this is the subject of Chapter 4. Their second question was about force acquisition: 'how to get the biggest bang for a buck?' Force acquisition is examined in two stages. Chapter 5 looks at the demand side of force acquisition, how to recruit the troops and procure the weapons required. Chapter 6 looks at the supply side: the arms industry and the arms trade, the so-called merchants of death who provide the weapons. Their third question concerned how to organise these forces to produce the maximum military capability, how to win in combat; this is the subject of Chapter 7. The final question posed by the 1960s defence economists was about the opportunity costs of defence, what you have to give up: 'guns or butter?' or as the Bible has it 'swords or plowshares?' This choice is the subject of Chapter 8.

The questions posed in each chapter are rhetorical, there are rarely clear answers beyond 'it depends'. Neither the study of strategy nor the study of economics provides clear answers; they are primarily ways of thinking about issues. Thus rather than providing overall conclusions, the final chapter examines the methods that used to understand military economics and the literature on these issues. But we begin with issues that relate to the wider interactions between economy and strategy and the production of security.