

ANDERTON, Charles H. and CARTER, John R. *Principles of Conflict Economics: A Primer for Social Scientists*. New York: Cambridge University Press, 2009. This is a copyright protected work, to be used for class work only; not to be used for any further distribution.

1

Introduction: Definition and Scope of Conflict Economics

For many people, in many places, violent or potentially violent conflict is part of the human experience. Headline stories of civil strife, insurgency, nation-state warfare, terrorism, and the proliferation of weapons of mass destruction document the prevalence of conflict as a basic fact of life. Less dramatic indications of conflict include deadbolt locks, gated residential communities, electronic security systems, and handgun sales, to name a few. At first blush, it might appear that economics has little if anything to say about life's harder side. Economics textbooks typically restrict their attention to the peaceful behavior of consumers, producers, and governments in the marketplace. Thus, it might seem that potential and actual violence over resources, goods, and political power lie outside the domain of economics. But this is a misperception, as is demonstrated by the rapidly developing field of conflict economics.

1.1. What Is Conflict Economics?

Conflict economics has two defining characteristics. First, it maintains that the concepts, principles, and methods of economics can be fruitfully applied to the study of conflict activities. Thus, diverse phenomena like war, arms races, alliances, and terrorism are analyzed and understood as outcomes of purposeful choices responsive to changes in underlying incentives. As just one example, economics explains how consumers shift purchases from one good (say orange juice) toward another (say grape juice) when the price of one rises relative to that of the other. Similar economic forces are at work in many conflict settings: when one type of weapon is constrained by arms control, another type is substituted; when political targets are hardened, terrorists turn to less costly civilian targets;

and when entrepreneurs of local violence lose access to land mines, they employ young males armed with assault rifles.

But conflict economics is more than the application of economics to conflict. It also involves a gradual reconstruction of the core of economic theory to take account of conflict. Conflict of the sort considered in this book ultimately involves intended or realized appropriation, where the term "appropriation" refers to a taking that rests on force or the threat of force. As its second defining characteristic, conflict economics treats appropriation as a fundamental economic activity, joining production and exchange as a means of acquiring wealth. Traditional economic models assume that economic behavior is peaceful. Yet in real economies, conflicts over goods and resources abound. Conflict economics seeks to close this gap between theory and reality. Thus, a range of appropriative activities has been modeled, including resource conflicts, piracy, and extortion. These models reveal how conflict both shapes and is shaped by the traditional economic activities of production and exchange.

For the purposes of this book, we define conflict economics as (1) the study of violent or potentially violent conflict using the concepts, principles, and methods of economics and (2) the development of economic models of appropriation and its interaction with production and exchange activities. By including the qualifier that conflict on some level be violent, the definition intentionally excludes the analysis of ordinary market competition and, more tentatively, activities like litigation and rent seeking. Clearly included by the definition is the study of what might be called macro conflict, comprising interstate conflict (e.g., war between states), intrastate conflict (e.g., civil war, domestic terrorism), and extra-state conflict between states and external non-state actors (e.g., international terrorism, colonial wars). Also included is the study of micro conflict, meaning conflict activities among private persons and organizations (e.g., theft, extortion, human trafficking). In the next section, we begin to document empirically the enormity of conflict in the human experience.

1.2. A Look at Conflict Large and Small

Macro Conflict

Interstate, intrastate, and extra-state conflicts are the primary subject matter in conflict economics. Based on data from the *Correlates of War*

1.2. A Look at Conflict Large and Small

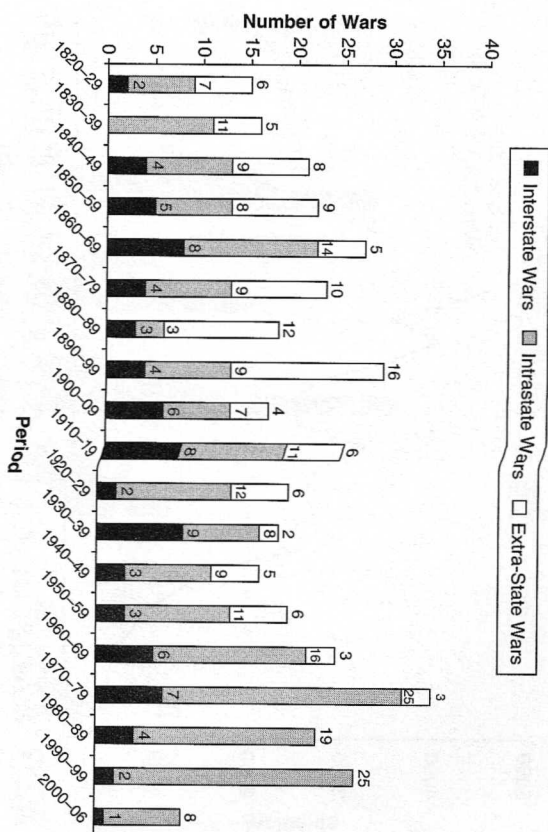


Figure 1.1. War onsets per decade by war type, 1820–2006.

Sources: Sarkees (2000) for 1820–1989 data; Uppsala Conflict Data Program (UCDP) and International Peace Research Institute, Oslo (PRIO) and Gleditsch, Wallensteen, Eriksson, Sollenberg et al. (2002) for 1990–2006 data.

(COW) Project, Uppsala Conflict Data Program (UCDP), and International Peace Research Institute, Oslo (PRIO), Figure 1.1 shows the frequency of interstate, intrastate, and extra-state war onsets from 1820 to 2006. War onsets are wars initiated during the time periods indicated. Figure 1.1 shows that there were 408 war onsets of all types in the international system from 1820 to 2006. About half of the wars were intrastate (221, or 54.2%), followed by extra-state (106, or 26.0%) and interstate (81, or 19.9%). Figure 1.1 also shows that there were more interstate and intrastate wars in the 1900–99 period relative to 1820–99 (50 and 143 compared to 30 and 70), but fewer extra-state wars (35 compared to 71). Over the past five decades, intrastate wars have become more frequent while extra-state wars have diminished significantly. According to Sarkees, Wayman, and Singer (2003), the decline in extra-state wars is due to the reduction in the numbers of colonies and dependencies in the international system.

Figure 1.2 depicts the worldwide frequency of international and domestic terrorist incidents combined for the period 1970–2004. Domestic terrorism “is perpetrated within the boundaries of a given nation by nationals from that nation,” while international terrorism involves “the

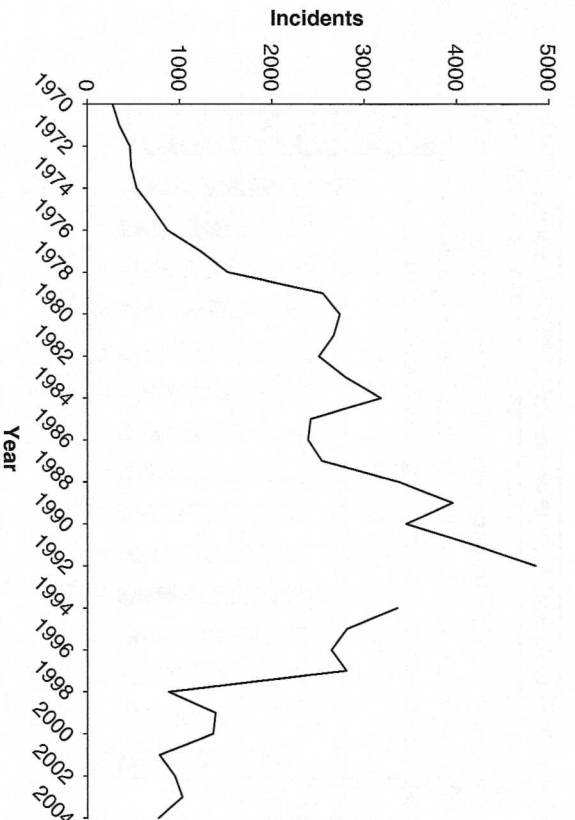


Figure 1.2. International and domestic terrorist incidents combined, 1970–2004.

Note: Data for 1993 are missing.

Sources: LaFree and Dugan (2006, 2007a).

interests and/or nationals of more than one country” (LaFree, Dugan, Fogg, and Scott 2006, pp. 5 and 22). Figure 1.2 suggests two observations. First, no upward (linear) trend is evident in the incident series for the full time period. Second, terrorist incidents around the globe were far more numerous in the 1980s and early 1990s relative to the latest years in the sample. However, in recent years the number of casualties per incident (not shown) has been rising (Enders and Sandler 2000).

Although scholars distinguish interstate, intrastate, and extra-state conflict, some conflicts fit two or even all three of the categories. For example, the post-Gulf conflict in Iraq began in March 2003 as an interstate war between Iraq and a coalition of states led by the United States. Following the official end of major combat operations in May 2003, the United States and its allies began a transitional occupation until the Iraqi Transitional Government was installed in January 2005. This was followed by violent conflict between irregular armed forces on one side and the new Iraqi state and the US-led coalition on the other. Since the irregular forces encompass both Iraqis and foreign forces putatively associated with al Qaeda, this stage of the conflict in Iraq is both intrastate and extra-state in nature.

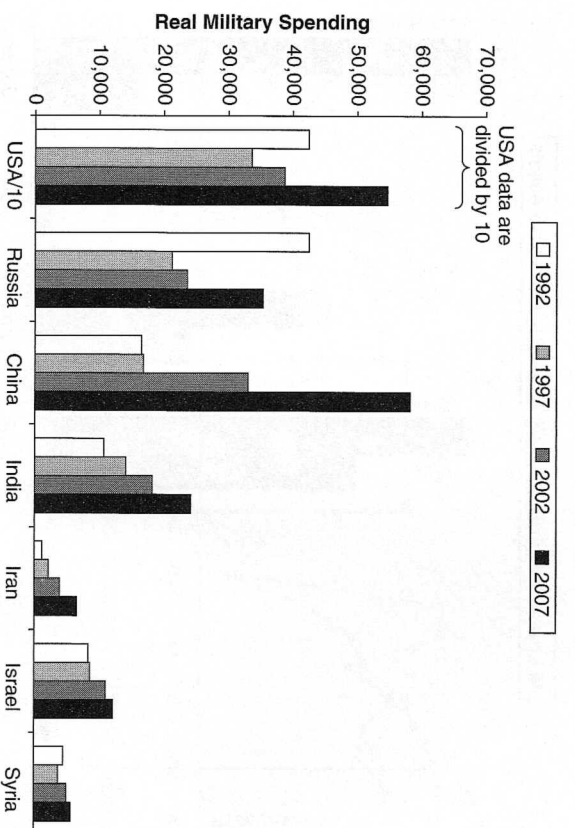


Figure 1.3. Real military spending in selected nations (millions of US dollars at constant 2005 prices and exchange rates).

Source: Data used with permission courtesy of Stockholm International Peace

Research Institute (www.sipri.org).

The macro conflicts summarized in Figures 1.1 and 1.2 involve three types of economic costs. First, when nations and groups allocate resources to conflict, alternative goods that could be produced with those resources, such as food and clothing, are forgone. This economic cost is borne even when the conflict activities are purely defensive and no violence occurs. Second, when violence does occur, goods and resources (including human lives) are destroyed, causing current and future consumption and production to be sacrificed. Third, threatened or realized violent conflict causes some present and future production and exchange activities to be rendered uneconomical and hence lost. Collier (1999, p. 171) characterizes the three economic costs of conflict as diversion, destruction, and disruption. The next three figures provide some sense of the nature and magnitude of these economic costs of conflict within the international system.

Figure 1.3 shows real (inflation-adjusted) military expenditures for selected nations in 1992, 1997, 2002, and 2007. These expenditures serve as a proxy for the direct diversion of resources associated with potential or actual conflict involving nation-states. The years 1992 and 1997 reflect conditions following the end of the Cold War rivalry between the United States and the

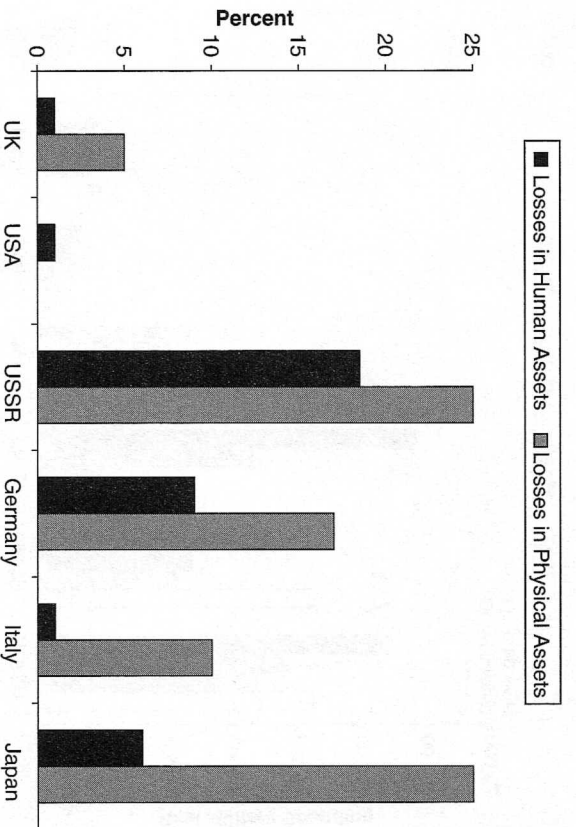


Figure 1.4. Destruction of human and physical assets during World War II (percent of assets).
Source: Harrison (2000, p. 37).

Soviet Union in 1989 and the 1990/91 Gulf War. The decline in real military spending for the United States and Russia from 1992 to 1997 is consistent with a hoped for “peace dividend” following the Cold War. The years 2002 and 2007 follow the September 11, 2001, terrorist attacks on the United States. The substantial increase in real military spending for the United States from 1997 to 2007 suggests that the terrorism threat squelched any continued peace dividend. Note that Figure 1.3 also shows upward trends in real military spending for several nations in South Asia and the Middle East. Estimates of the destruction of human and physical assets for selected states involved in World War II are presented in Figure 1.4. The figure shows the destruction of human lives as a percentage of the working-age population and the destruction of physical assets as a percentage of national wealth (or industry fixed assets in the cases of Germany and Italy). Human destruction ranged from one percent for the United Kingdom and the United States to as high as 19 percent for the USSR. Physical asset destruction ranged from zero percent for the United States to 25 percent for the USSR and Japan.

Figure 1.5 shows the United States’ real merchandise trade (exports plus imports) with Germany and Japan before, during, and after World War II. Notice how trade is driven to zero or near zero during the war and

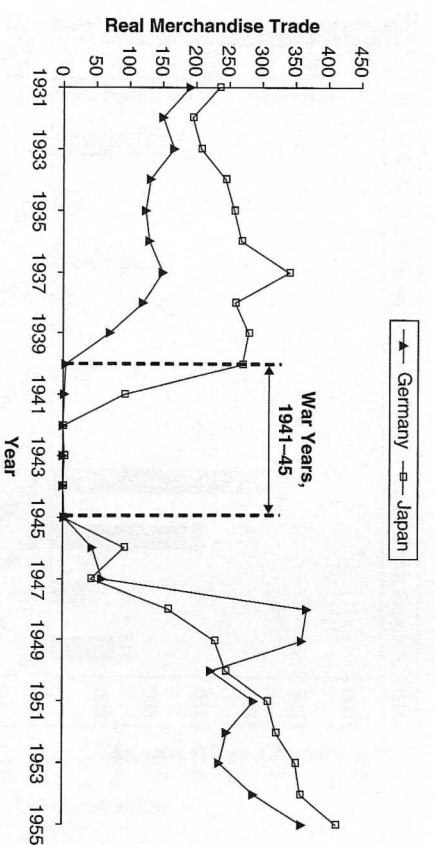


Figure 1.5. United States’ real merchandise trade with Germany and Japan (millions of US dollars at 1913 prices).

Note: Data for Germany from 1952 through 1955 are for West Germany only.
Source: Anderson and Carter (2003, pp. 302–303).

rebounds with the restoration of peace. Figure 1.5 is but one example of how conflict disrupts economic activity, in this case trade.

Figure 1.6 depicts the cost for 2007 of selected multilateral peace missions by location and by the sponsoring intergovernmental organization (IGO). Several observations follow. First, numerous IGOs, such as the United Nations (UN) and the North Atlantic Treaty Organization (NATO), undertake peace missions. Second, some missions involve multiple IGOs, such as the Organization of Security and Cooperation in Europe (OSCE) and NATO in Kosovo and the African Union (AU) and the UN in Sudan. Third, peace is costly. For example, the annual cost of peace missions exceeds \$1 billion both in the Democratic Republic of Congo and in Sudan. According to the Stockholm International Peace Research Institute, the annual cost of all multilateral peace missions in 2007 was \$7.5 billion. While war clearly entails economic costs, Figure 1.6 documents that substantial resources are invested to establish or maintain peace in many nations and regions.

Micro Conflict

Common theft, piracy of merchant ships, and human trafficking are but a few examples of appropriation possibilities at work in modern economies at the micro level. Figure 1.7 shows real (inflation-adjusted)

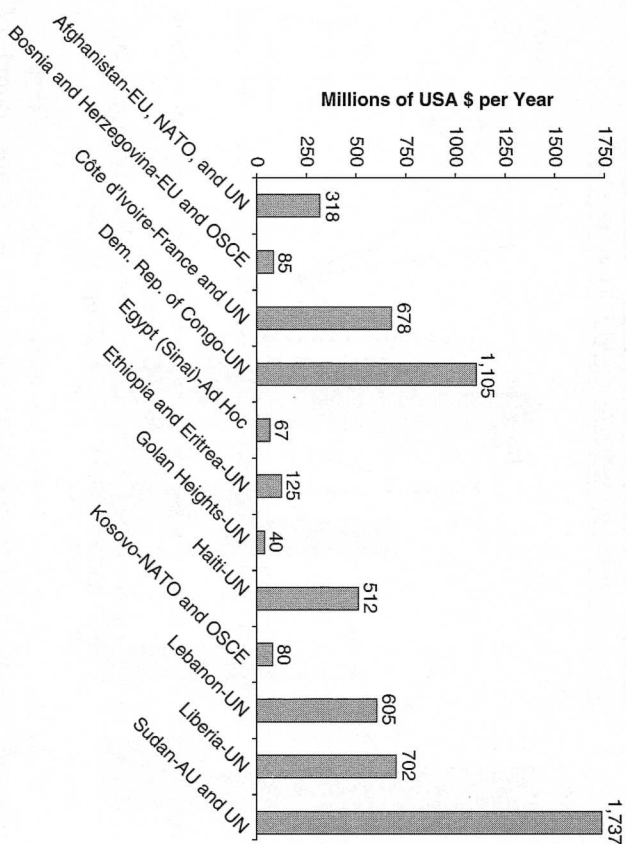


Figure 1.6. Annual cost of selected multilateral peace missions, reporting year 2007.

Notes: AU – African Union, EU – European Union, NATO – North Atlantic Treaty Organization, OSCE – Organization of Security and Cooperation in Europe, UN – United Nations. The EU cost for Bosnia and Herzegovina is the sum of the EU Police Mission and the EU Military Operation.

Source: Data used with permission courtesy of Stockholm International Peace Research Institute (www.sipri.org).

expenditures on defense against crime (police protection, correction, and judicial and legal activities) by federal, state, and local governments in the United States (measured on the left axis). Also shown is the real lost value associated with property crimes such as robbery, burglary, larceny, and motor vehicle theft in the United States (measured on the right axis). Figure 1.8 shows the total number of actual and attempted pirate attacks against merchant ships worldwide from 1998 to 2007. In 2007, a disproportionate number of pirate attacks occurred in the waters of South Asia (Indonesia – 43, Bangladesh – 15, India – 11, Malaysia – 9) and Africa (Nigeria – 42, Somalia – 31, Gulf of Aden/Red Sea – 13) (ICC International Maritime Bureau 2007, pp. 5–6). Attacks against ships in the Malacca Straits were much less frequent than in the early 2000s, due in part to increased naval patrols by Indonesia, Malaysia, and Singapore, and in part to the adoption of new merchant defense technologies, including electrified fences

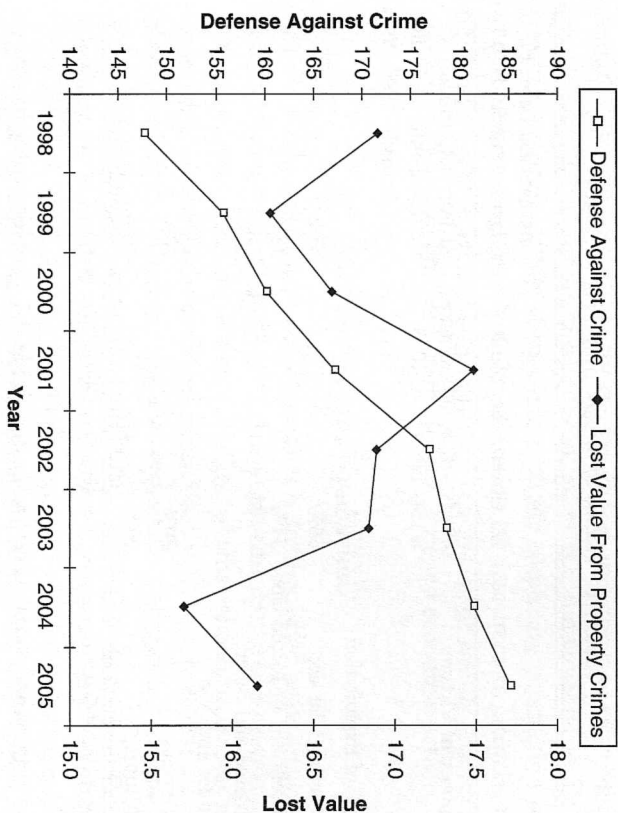


Figure 1.7. Real expenditures on defense against crime (left axis) and lost value from property crimes (right axis) (billions of US dollars at 2001 prices).

Sources: Bureau of Justice Statistics (2008) and United States Census Bureau (2001, 2003, 2006, 2008).

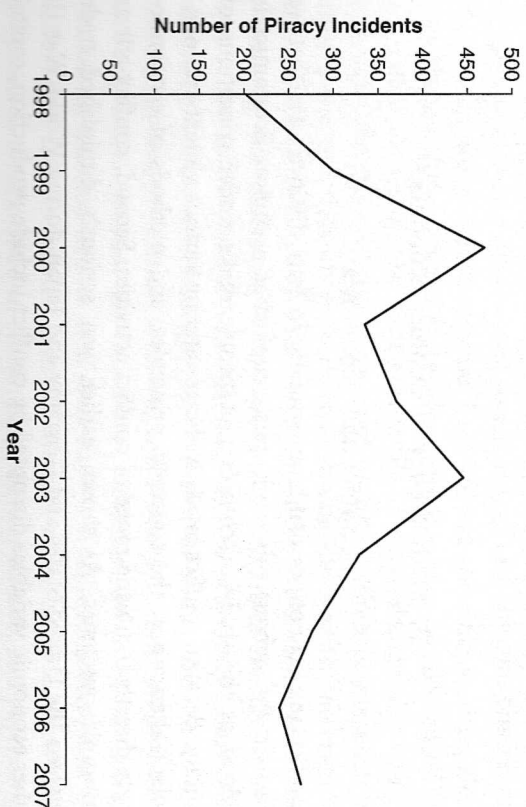


Figure 1.8. Worldwide pirate attacks against merchant ships, 1998–2007.

Source: ICC International Maritime Bureau (2006, 2007).

Table 1.1. *Victims of human trafficking worldwide.*

	US Government Study	International Labour Organization Study
Number of Victims	600,000–800,000 trafficked across borders in 2003	At least 2.45 million trafficked internationally and internally, 1995–2004
Type of Exploitation		
Commercial sex	66%	43%
Economic or forced labor	34%	32%
Mixed and other		25%
Gender and Age		
Females	80%	80%
Minors	50%	40%

Source: United States Government Accountability Office (2006, p. 12).

and unmanned aerial vehicles. Lastly, Table 1.1 provides information on victims of human trafficking, which is “a worldwide form of exploitation in which men, women, and children are bought, sold, and held against their will in slave-like conditions” (United States Government Accountability Office 2006, p. 1). As shown, an estimated 2.45 million people were trafficked over the 1995–2004 period, with a high percentage of victims being females and minors.

1.3. Methodology of Conflict Economics

Conflict and Economics

Conflict and economics combine naturally in four distinct ways that we draw on throughout this book. First, conflict is a choice. Economics is defined as the study of choices that people make under conditions of scarcity. Because conflict involves choices among various violent and non-violent alternatives, the concepts, principles, and methods of economics apply directly to a wide range of conflict activities. Second, conflict affects economic outcomes. As shown earlier, war seriously diminished trade between the United States and Germany and Japan during World War II. Other economic variables disrupted by conflict include production, capital and labor migration, investment, and growth. Third, economic variables affect conflict. Trade, foreign direct investment, growth, income, and

resource endowments can affect the likelihood and duration of conflicts. Fourth, conflict in the form of appropriation is a fundamental mode of wealth acquisition. While economists typically emphasize production and trade, conflict often involves the allocation of resources to acquire the holdings of others. Hence, appropriation is a means of wealth acquisition coequal with production and trade as a fundamental economic activity.

Rationality and Equilibrium

Like other scholarly disciplines, economics is distinguished by its analytical concepts and organizing principles. Analytical concepts are just terms that categorize and refer to abstract aspects of the phenomena studied. Examples already encountered here include scarcity, cost, production, and trade. Organizing principles are the systematic and general means by which the analytical pieces are brought together to yield predictions and explanations. Paramount in economics are the organizing principles of rationality and equilibrium. Actors are assumed to be rational, meaning that they have consistent preferences and choose from among the best alternatives available to them. The choices in turn are assumed to adjust and combine in ways that yield equilibrium outcomes. An equilibrium is a coordination among the actors' choices so that no single actor has an incentive to change his or her choice. For example, a market is said to be in equilibrium when the quantity that consumers want to buy just balances the quantity that producers want to sell at the current price.

The rationality assumption has been subject to criticism, sometimes from within economics but more often from the other social sciences. For discussion and debate about the assumption, see the bibliographic notes at the end of this chapter. Here we are content to make three points. First, the assumption of rationality by itself says nothing about either the origin or the content of preferences. The formation of the preferences of violence-producing individuals and organizations is an important question studied by a variety of disciplines. Although most models of conflict assume self-interested preferences, it might prove useful in some cases to assume other-regarding preferences involving malevolence or concerns of fairness or reciprocity. Second, in this book we often assume that groups (including nations) behave as if they have well-defined preferences. We believe that this assumption is useful in many cases, but it is not without problems as documented in economics, political science, and psychology. Third, we expect to see continued refinements and alternatives to the rationality assumption that will advance our understanding of human

behavior in general and conflict in particular. Evolutionary models, wherein actors are assumed to imitate or learn successful choices, are especially promising for the study of long-lasting conflicts.

Quantitative Methods

Economics, like other social sciences, requires interplay between theory and observation, or, in practice, between models and empirical tests. The models tend to be mathematical, because the organizing principles of rationality and equilibrium are themselves mathematical. Rationality is formalized as a constrained optimization problem, whereby an actor maximizes an objective (e.g., territory controlled) subject to one or more constraints. Equilibrium is a solution to a set of simultaneous equations. Fortunately, the logic of conflict models can often be conveyed verbally together with relatively straightforward algebra and graphs. Because the outcomes of conflict depend on the choices of multiple actors, there arises what is called strategic interdependence, meaning that the best choice for one actor depends on the choices of others. To allow for this interdependence, conflict models are often constructed using the principles of game theory, a branch of mathematics that is now prominent in both the natural and the social sciences. Again, the basics of game theory can be presented with relatively modest demands in terms of mathematics.

Models of conflict are tested empirically using standard methods of statistical inference. The sources of data for various forms of conflict are rapidly growing in this age of information. Large panels of cross-country data now permit scholars to conduct epidemiological studies, wherein the risks of interstate, intrastate, or extra-state conflict are estimated based on socioeconomic and geopolitical variables, much like studies in medicine estimate risk factors for cancer and other diseases. Most of the data used in studies of conflict are naturally occurring, meaning that they result from historical events and are collected and disseminated by various organizations. With the growth of game theoretic models of conflict, data are also being generated with increasing frequency using experimental methods in controlled laboratory settings.

Multidisciplinary Nature of Conflict Economics

Many conflict activities have important political, sociological, and psychological aspects. The central purpose of conflict economics is to

promote an understanding of the economic nature, causes, and consequences of conflict. Conflict economics informs and is informed by other disciplines. At numerous places in this book we draw on literature from other disciplines, especially political science.

1.4. Organization of Book

We have defined conflict economics as the economic analysis of conflict together with the development of models of appropriation. The remainder of the book is organized in accordance with this definition. Chapters 2 through 4 provide grounding in the economic concepts, principles, and methods that are utilized throughout the book. Chapter 5 presents a simple bargaining model of conflict and provides a transition to conflict economics proper. Chapters 6 through 11 apply economic analysis to historical and contemporary conflict topics, including war between and within states, terrorism, spatial and technological aspects of conflict, arms rivalry, proliferation, arms control, and alliance behavior. Chapter 12 introduces appropriation possibilities into mainstream production and trade theory. At the end of each chapter we include bibliographic notes whereby the interested scholar, student, or practitioner can explore the field in more depth. Appendix A offers a brief review of statistical methods, and Appendix B presents a bargaining model of conflict.

1.5. Bibliographic Notes

Insightful perspectives on the economics of peace and war were developed by well-known economists in the eighteenth, nineteenth, and early twentieth centuries (see Goodwin 1991 and Brauer 2003 for overviews). The widespread application of formal economic models to the study of conflict began largely during the Cold War, when attention was drawn to various aspects of international conflict. The resulting scholarship was called alternatively peace economics or defense economics. Peace economics focused on the causes of violence and ways that violence can be avoided, managed, or resolved, while defense economics also addressed questions of weapons production and resource allocation in war. Richardson (1960a, 1960b), Schelling and Halperin (1961), Boulding (1962), and Isard (1969) provided classic works in peace economics, as did Hirsch and McKean (1960) and Peck and Scherer (1962) in defense economics. Also important were Schelling (1960, 1966) on strategic behavior and game theory, Olson and Zeckhauser (1966) and Sandler and

Cauley (1975) on alliance behavior, McGuire (1965) and Intriligator (1975) on arms rivalry, Tullock (1974) on intrastate conflicts, and Benoit (1973) on defense expenditures and economic growth in developing countries. Defense and peace economics has since expanded to include such topics as civil wars, peacekeeping and peace enforcement, the arms trade, proliferation of weapons of mass destruction, terrorism, economic interdependence and conflict, and the appropriation and defense of wealth. Key contributions in these and other topics are available in the edited volumes of Hartley and Sandler (1995, 2001) and Sandler and Hartley (2003, 2007).

Emphasis in this book is primarily on topics in macro conflict. Under the heading of micro conflict, formal treatment of the economics of crime is well developed. See, for example, Becker (1968) and the collected papers in Ehrlich and Liu (2006). The study of other micro topics is more dispersed. On human trafficking, see Laczko and Gozdziak (2005).

Conflict economics is part of a broader social scientific study of conflict. An excellent overview of the historical development of the social scientific study of interstate conflict is provided by Singer (2000). Sambanis (2002) reviews the development of the social scientific study of intrastate conflicts, while Enders and Sandler (2006a) do the same for terrorism.

Central to most economic analysis of conflict is the assumption that actors are rational. Introductions to the rational choice model can be found in intermediate microeconomics textbooks. More formal statements are available in Kreps (1990) and Mas-Colell, Whinston, and Green (1995). For a sampling of the debate surrounding the rationality assumption in economics, see Hirshleifer (1985), Binnmore and Samuelson (1994), and Kahneman (2003), and in political science see Brown, Côté, Lynn-Jones, and Miller (2000), Quackenbush (2004), and Vahabi (2004).

Production Possibilities and the Guns versus Butter Trade-Off

Modern economies are highly complex. In the United States economy in 2006, for example, 145.8 million workers combined their labor with \$23.1 trillion worth of capital to produce \$13.2 trillion worth of goods and services. Fortunately, the concepts and principles that guide economists' understanding of economic activity are relatively simple. In this chapter we explain selected aspects of the economics of production such as the production function, scarcity, production possibilities, opportunity cost, efficiency, comparative advantage, and gains from trade. We then apply these principles to better understand the economic costs of conflict, the effects of defense spending on economic growth, and the depressed state of North Korea's militarized economy.

2.1. Production Possibilities Model

Production Function

Assume that an economy produces two types of goods: military (M) and civilian (C). Military goods include tanks, fighter aircraft, and the like, while civilian goods encompass food, clothing, shelter, and so on. In economics, military goods are often called "guns," while civilian goods are called "butter." The production of military and civilian goods requires inputs such as labor (L) and capital (K), where the latter refers to physical assets like buildings and machines. A production function specifies the maximum amount of a good that can be produced with any given combination of inputs under the current state of technology. Technology is the scientific and organizational knowledge available to transform inputs