Economics and Violent Conflict

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Executive Summary

This essay reviews recent research on the relationships between economies and violent conflict.

It begins by considering the economic factors that make some societies susceptible to conflict. One of the main factors is poverty, though this is mostly a feature in civil wars, not international ones. Economic growth is also associated with lower levels of conflict. Thus, policies that aim to promote growth in developing countries are, in effect, also likely to act as agents for conflict prevention. However, although wealth reduces the chances of conflict, the rise in global economic prosperity throughout the 20th Century has corresponded with an increase rather than a fall in the number of civil wars. This is likely due to the rise in other conflict-inducing factors, such as population levels, and the fact that global growth has been unbalanced.

Also considered is whether violent conflict is caused by economic inequality. Statistical research has not found evidence for such a relationship, though that may be because researchers are not working with the right data. While qualitative studies suggest that inequality between regions or groups – known as "horizontal inequality" – is what matters for violent conflict, econometric research has used a measure of "overall inequality" – that is, inequality between individuals irrespective of their group membership The two types of inequality need not be in any way correlated.

The ways in which economies are structured is also found to matter. Countries that depend on the sale of primary commodities, for example, are more likely to have wars. In particular the role of natural resources, such as oil and diamonds, has been widely discussed but there is a lack of consensus on the nature of their relationship to conflict. Researchers at the World Bank suggest that natural resources lead to wars because greedy citizens take up arms to capture them. But there are alternative explanations that are at least as plausible. These explanations suggest alternative policy responses on the part of governments and international organizations.

Some political scientists have tried to distinguish between different types of natural resources in order to explore the mechanisms that link resources to conflict. Their research distinguishes between different commodities based on dimensions such as the extent to which production is centralized, the geographic distances between zones of production and the seat of government, and the extent to which trade in the resource is legal. It has also been argued that the institutional capacity of governments alters relationships between natural resources and conflict. These different lines of research have been developed through the examination of case study evidence, but their conclusions have not been tested using statistical techniques.

The type of economic policies that governments choose plays a significant role in determining the likelihood of conflict. Policies that induce conflict may result from deliberate decisions to weaken state institutions so that leaders can more easily enrich themselves. Sometimes however conflict may result from attempts to increase economic efficiency. There is for example ample anecdotal evidence about how the World Bank and IMF's structural adjustment programs of the 1980's and 1990's spawned civil conflicts. This review however has found no systematic support linking structural adjustment to war.

Another feature of economies that is often related to levels of conflict is trade. There is strong evidence that countries that trade with each other are less likely to fight each other, though no comparable work has yet been undertaken on the effects of internal trade.

Also covered in this essay is research that has been undertaken on the ways in which economies function once violent conflicts have broken out, including attempts to quantify the economic costs of conflicts. Some conflicts reduce the levels of investment within zones where fighting takes place; others spur technological innovation and growth. Different studies have tried to estimate aggregate costs and benefits of conflict, using a model of economic production that uses information on levels and rates of change of physical capital, population, human capital, and "total factor productivity." No study however has yet measured the aggregate costs that arise from all these different channels. And while recent work has focused much on looting activities of groups there has not been much work studying the effects those activities have on economic producers.

Researchers have also studied the economic behavior of different groups during conflicts. Many have focused on ways rebel groups finance themselves. Some rebels do it by gaining control of natural resources, others are supported financially in part by emigrant populations (although this link is still poorly understood) and from third party sources such as foreign governments. Agricultural production is often as important for rebel financing as natural resources, although it is largely ignored by policy makers. The requirements for financing and the form of financing depend however on the relations between rebel groups and civilian populations. When rebels have popular support, they may benefit from donations in cash or in kind. Otherwise, they may rely on extortion. Unfortunately however, research is relatively sparse on the different ways rebels relate to civilian populations even though such variation is likely to have implications for financing, for forms of peace settlements and for war duration.

The review also covers research on how governments finance themselves, how they spend their revenues and what economic policies they pursue during conflicts. Not surprisingly, government spending often shifts from social sectors to defense and industries associated with it. These actions are hardest upon poor populations and persist long after conflicts end. While there are historical examples of conflict helping a government to strengthen its institutions of taxation, particularly in Europe and North America, there is little evidence that this holds true in countries where civil wars are currently taking place, as most governments that are party to these conflicts have poor administrative capacity. The culmination of shifts in expenditure, a collapsing tax base, and severe losses of foreign exchange (especially when governments lose revenues from natural resources) can lead to high deficits and a combination of rises in interest and inflation rates.

Also considered is how international actors respond. The role of international corporations in conflict zones has come under increasing scrutiny, particularly by NGOs. There are, for example, a number of conflicts during which oil corporations have supported governments, possibly perpetuating the conflicts. Efforts to increase the accountability and transparency of international corporations have produced a range of policy responses, including formal bans on exports from particular sectors, a certification process in the case of diamonds, and increasingly, the publication of social responsibility reports by corporations. Most innovations rely on voluntary participation by corporations and no formal body has yet been established to monitor the activities of corporations during violent conflicts.

Like corporations, relief agencies have sometimes been accused of doing more harm than good. In order to provide aid to priority areas, they have in some cases helped to fuel wars by inadvertently providing material security or goods to fighting groups. Evidence of these effects remains largely anecdotal and this review has found no rigorous attempts to quantify them. A principal lesson nonetheless is that aid agencies cannot turn a blind eye to the political ramifications of their engagements.

Foreign governments employ economic tools for working in conflict areas, such as sanctions and military aid and trade. Sanctions are often seen as the primary economic weapon. Their effectiveness however has been weak, principally because they often hurt citizens more than policy makers. Recent attempts now target decision makers directly. Military aid is also a blunt instrument in civil war situations, being more effective for influencing a county's foreign policy. There is little evidence that it has been used successfully to promote peace. The arms trade is another factor in civil wars. Attempts to regulate the arms market have so far been unsuccessful, with arms (particularly from Eastern Europe) making their way to conflicts despite embargoes and sometimes with the complicity of neighboring states. Several NGOs call for more attention to be paid to the activities of countries that produce the arms rather than simply to illegal traders.

There is also research that considers the economic factors that explain why and when conflicts end. This research suggests that there are economic reasons why some wars will be harder to end than others, with peace deals being especially difficult to reach when fighters are benefiting from the sale of illegal goods. While there may be fears that donor economic involvement in post-conflict situations may by counterproductive, the evidence indicates that the impacts of aid on economic growth are particularly strong in countries emerging from large-scale civil wars, especially when social policies are prioritized. In the past, however, the performance of the international community in aiding transitions has been mixed, possibly due to difficulties they have in recognizing when a peace settlement is robust.

The essay concludes by summarizing areas in which recent research has reached some consensus, highlighting areas where policy prescriptions follow from this research, as well as areas where policy prescriptions are not in fact adequately supported by data, and by identifying areas where more research is needed in order to help develop adequate policy responses.

Contents

I Introduction

Since the end of the Second World War there has been a steady rise in the number of civil wars. They have become much more common than international war, affecting close to one quarter of all countries in the world by the mid 1990s. Over this period these wars not only became more frequent; they have also gotten longer.[1] They mark a change in the character of war generally: The victims of war now, more than in the past, are economic producers rather than military targets. Fighting groups also have to act as economic agents in the areas in which they fight in order to survive. In some areas they run industries, regulate production and provide services. In others their main activity is looting. These changes have occurred during a period of rapidly rising global prosperity, increased globalization and growing global inequality. The result is a world increasingly divided into those countries that are wealthy and largely peaceful and those that are poorer and for whom war provides the backdrop for daily economic activity.

Why has this happened? What are the causes of these new types of wars? What role is played by wealth, or by trade levels? What are the costs and possible benefits? How do economies function during wars? How do rebels finance themselves? How do the economic activities of international NGOs, donors and corporations exacerbate war or bring about peace? A variety of researchers have puzzled over these questions in recent years, using new approaches and new methodologies.

Some of the new approaches re-conceptualize the roles of violence. While traditional analyses focused on what belligerents hope to gain by winning a war, new literatures concentrate on what fighters can gain while fighting.[2] War is not seen as something that interrupts economic activity. Rather, for many researchers, the reasons for war are tied to the opportunities they afford, during the course of the conflict, to individuals (such as those accumulating diamonds in Sierra Leone[3]) and states (such as various states benefiting from the war in the Democratic Republic of Congo[4]).

Other researchers, arguing that we cannot understand economic development without understanding violent conflict (and vice versa), address these linkages by trying to change the way we think about human well-being. This has resulted in a rise in prominence of the concept of "human security" – a term used to try to redefine what is meant by human well-being (traditionally measured using exclusively economic criteria) in order to take account of the impacts of violence.[5]

Recent research on civil wars has introduced the tools of applied economics: Econometrics – statistical methods for the study of economic processes – have been used by a prolific group of researchers at the World Bank's "Economics of Civil War, Crime, and Violence" project[6] as well as by a wide range of academics particularly in US universities.[7] A new theoretical literature has also developed using the tools of economic theory – notably game theory – to study violent processes.[8] In many cases researchers using these new methodologies have joined forces with academics working on more traditional case studies. Indeed, these case studies are now often produced in tandem with statistical work. Collections of case studies have been commissioned by the World Bank to test the logic of their econometric models. Others have been published by research groups and NGOs such as Queen Elizabeth House in Oxford, the International Peace Academy in New York and the Overseas Development Institute in London. Alongside this academic work is research undertaken by non-governmental organizations and international organizations studying the effects of the actions of corporations and governments operating in war zones.

Many of the findings of this research are reviewed below. The focus of the review is on findings from empirical work and on research that aims to facilitate the development of policy.[9] Although there are many forms of violent conflict, the focus here is on war. Moreover, since most contemporary wars are civil wars, I focus especially on these.

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[1] More precisely, the average duration of wars *in progress* has been increasing; it is not necessarily true that wars that start at a later date are likely to last longer. See Fearon 2002.

[2] See Jean and Rufin (1996), Keen (1998) and Kaldor (1999).

[3] See Reno (2000a).

[4] See Mwanasali (2001).

[5] See UNDP (1994) and King and Murray (2001).

[6] While this project has produced a number of controversial findings, some of which are criticized in this paper, it and in particular the work of Paul Collier, Director of Research at the Bank has produced much innovative research, has opened up new areas of inquiry and has stimulated and supported academic researchers to explore a wide range of relationships between economics and civil war.

[7] Econometric work has also been produced by PRIO in Oslo and SIPRI in Stockholm. For a review of this econometric literature see Sambanis 2001. See in particular work by Fearon (2002) and Fearon and Laitin (2002), associated with the Ethnicity, Insurgency and Civil Wars program at Stanford University, which focuses on the causes and duration of conflict; work associated with the Program on Human Security at Harvard, which has attempted to estimate the long term costs of violent conflict; and work associated with the US government-sponsored State Failure Task Force which has attempted to use econometrics to explain a variety of forms of state failure.

[8] This work typically assumes that political actors are materially motivated and then attempts to explain how they allocate their resources between productive activities and predatory activities. Violent conflict in this theoretical work typically results from the inability of actors to commit to peaceful resolutions of their antagonisms or from misinterpretations of the intentions of other actors. Other rationalist explanations for violence include differing estimates of the probabilities or expected benefits of victories and indivisibility of goods. The simplest rationalist explanation is that individuals enjoy violence. Examples include Grossman (1995), Hirschleifer (1995), Azam (1995), Bates, Greif, and Singh (2001) and Skaperdas (2001); see also van Tuyll and Brauer (2002).

[9] In particular, recent advances in game theoretic studies of conflict as well as more philosophical work relating conflict and economics are ignored. In focusing on this more recent research I ignore also large bodies of literature within Defense and Peace Economics that study the economics of the arms race and disarmament and the related Marxist and Neo-Marxist literatures on the economic functions of war in capitalist systems. For review essays on these literatures, see Coulomb and Fontanel (2002) and Anderton (2002) in Brauer (2002).

II The Economic Origins of Conflict

WEALTH AND WAR

One might expect rich nations to be more violent than poor ones because the rich ones have more to fight over.[10] The econometric evidence however suggests the opposite. Most research shows that wealth reduces the likelihood of civil war,[11] and that economic growth also reduces risks while recessions worsen them.

Figures derived from World Bank econometric models (Figure 1) show a striking relationship between the wealth of a nation and its chances of having a civil war.[12] The figure suggests that differences in wealth are most relevant among poorer countries. A country with GDP per person of just $250 has a predicted probability of war onset (at some point over the next five years) of 15%, even if it is otherwise considered an "average" country. This probability of war reduces by half for a country with GDP of just $600 per person and is reduced by half again to below 4% for a country with income of $1250. Countries with income per person over $5000 have a less than 1% chance of experiencing civil conflicts, all else being equal.

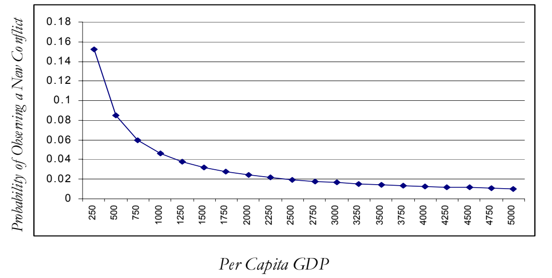

Figure 1

There are various explanations for why this is so. But so far little work has been undertaken to distinguish between them. The most common is that wealthier societies are better able to protect assets, thus making violence less attractive for would-be rebels.[13] Another explanation, given by political scientist Thomas Homer-Dixon argues that poverty causes violence, and points to cases where scarcity leads to migrations that result in conflicts between identity groups over resources. Alternatively, the relationship could be spurious in the sense that there are other features of a country, such as a democratic culture, that make it at once more prosperous and less violent. And causality may in fact run in the opposite direction: rich countries may be rich in part because they have had little civil conflict in their recent past.[14]

Whatever the reason, the figures suggest that growth-oriented initiatives and conflict prevention initiatives are mutually reinforcing. And the figures provide a rationale for those who say that it is in the interest of wealthy nations to promote economic growth in poor countries in order to avoid the spillover effects of likely conflicts there. In terms of policy implications, the analysis suggests that the greatest gains in conflict prevention are to be made by focusing development efforts on the very poor rather than on countries of intermediate wealth.[15]

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[10] A number of academic researchers provide theoretical and empirical reasons why rising wealth may drive people to fight more. Some argue that if economic growth results in a rise in the value of assets available in an economy, it may also increase the incentives to use violence to secure those assets. An implication is that we may expect to see violence and prosperity go hand in hand. Some evidence has been found for this in the historical literature on European development (Bates 2001) and anthropological literature suggests that in stateless societies wealth accumulation is avoided in part to avoid conflict (Colson 1974). A rise in the value of the assets of a country may also raise the value of controlling the state (Keen 2000). A counterargument is that in wealthier societies, while it may be the case that the value of lootables is higher, the value of production may also be higher. As a result it may be more worthwhile putting your energy into economic production rather than into predation. Another set of arguments for a positive correlation between wealth and violence relates to the process of economic development. Economic development may produce a radical re-organization of political structures that may in turn provide opportunities for conflict. In this context, Bates (1973) for example argues that conflictual ethnic politics, far from being atavistic, is in fact a function of modernization.

[11] There is a substantively large, statistically significant and robust negative correlation between wealth and conflict. This relationship has been found amongst others by Collier and Hoeffler (2002a) and Fearon and Laitin (2002). There are nonetheless good reasons to be cautious in using and interpreting these statistical results. One is that this econometric evidence typically uses aggregate data and as such measures the wealth of the economy as a whole rather than, for example, the number or concentration of poor people within countries. Another reason is that data is more likely to be absent for countries that experience conflicts. If this happens in econometric models like those used for these studies, then the effect of wealth on conflict is likely to be *under*estimated. There may also be problems of interpretation – it may in fact be the case that conflict determines wealth rather than vice versa or that other features of an economy (such as "social capital") simultaneously make it wealthy and less prone to war. Add to this the fact that the wealth of an economy is itself a somewhat abstract notion and may in fact proxy for a range of different phenomena; interpretations include Collier and Hoeffler's (2000b) interpretation of GDP as a proxy for opportunity costs for would-be rebels and Fearon and Laitin's (2002) interpretation of GDP as a proxy for state strength.

[12] To produce this graph I use the Collier-Hoeffler (2002a) model to predict the expected probability of civil war onset conditional upon different income levels ranging from $250 to $5000. To make these predictions I hold all other variables constant at their means. The data and model used are available from Anke Hoeffler's website (icoll&hoe.zip).

[13] See for example Homer-Dixon (1994) and Fearon and Laitin (2002).

[14] Although this last possibility casts doubt over the extent to which the relationship can be considered causal, the econometric approaches used in this work uses past income to predict future conflict. The success of these predictions give some faith that, while it is possible that the relationship is spurious, the relationship is not a function simply of the wealth-destroying effects of conflict.

[15] Although naturally, targeting of countries should use information beyond that contained in GDP data. The emphasis on the very poor arises in part as a function of the model that is employed by Collier and Hoeffler. Using the log of GDP effectively places more weight on absolute differences between poor countries than on differences between large countries. The logistic functional form employed also requires that the estimated function, if downward sloping, be convex on the right hand side but it does not constrain the function to be convex throughout the range of the data. Employing a similar model using the level of GDP *per capita* rather than the log of GDP *per capita* produces a similar relationship: convex throughout the range of the data. Other models using quite different definitions of civil wars and data find similar relationships: Fearon and Laitin (2002) for example predict that countries with around $600 *per capita* GDP have a 18% chance of having a civil war over the next decade, dropping to 11% for countries with incomes of $2000 *per capita* and to less than 1% for countries with incomes of $10,000.

If economic growth makes conflict less likely, why then has there been a rise in the number of conflicts during a period of global growth?[16] One explanation for this counterintuitive fact is that other factors that are positively correlated with conflict – such as population sizes – have been rising over time. This makes it possible that the conflict-inducing effects of these factors may outweigh the mitigating effects of increased wealth. Another explanation is that global economic growth has been unbalanced with the benefits from globalization being spread unevenly across different regions.[17] Some regions – notably Africa – have had negative average growth rates and high rates of conflict. The result is a world in which conflicts are increasingly concentrated in poorer parts of the world, with differences in income between countries in conflict and those not in conflict becoming greater now than they have been in the past.[18]

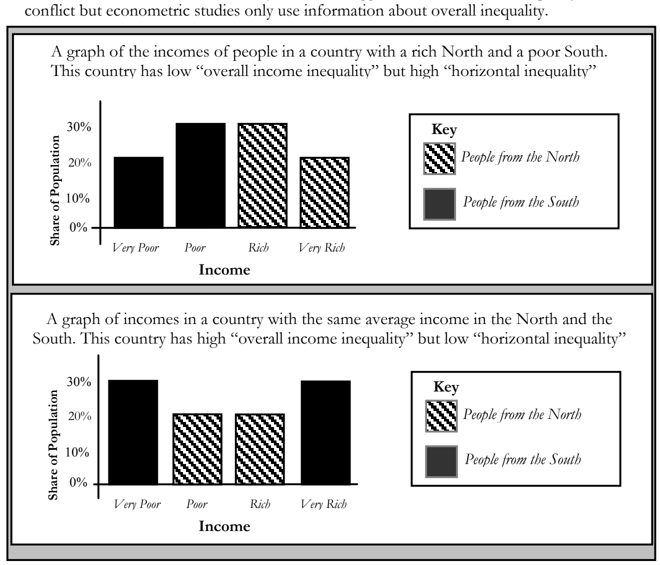
Is there also a relationship between wealth and inter-state war? Some international relations theorists have argued that as states get richer they look for conquests abroad to fuel their economies.[19] But the statistical evidence for this hypothesis is very mixed and most recent research suggests that there is no strong relationship. Nor is there a strong relationship between short term income fluctuations – the business cycle – and conflict onset.[20] A long tradition in international relations theory looks to the international distribution of power—itself often proxied by economic wealth—rather than to levels of wealth to explain stability, with some suggesting that an equal distribution of power will lead to stability[21] and others suggesting that inequality produces stability.[22] However, the evidence strongly suggests that wealthier states are less likely to go to war *with each other*. One possible reason for this (discussed below) is that wealthier states are also more likely to trade with each other.

INEQUALITY AND CIVIL WAR

While there is then a broad consensus that wealth and growth are associated with lower risks of conflict, there is no consensus on whether or not some types of growth make conflict more likely. It has often been assumed by political scientists (and among Marxist theorists) that inequality[23] is a cause of conflict, but a research project at the World Bank has now cast some doubt over the generality of this relationship. In its econometric work the Bank fails to find a significant relationship between inequality and conflict.[24]

The Difference Between Horizontal and "Overall" Inequality

Measures of "Overall Inequality" look at differences between the incomes of all individuals in an economy. Measures of "Horizontal Inequality" look instead at differences in income between regional or ethnic groups. The figures below show that the two measures need not be related to each other. Case study evidence suggests that horizontal inequality leads to conflict but econometric studies only use information about overall inequality.



Source: Author. **Figure 2**.

This (non-) finding should however be qualified. There are a number of technical reasons why a relationship might not be supported by the World Bank model.[25] One

[16] Since global wealth is rising we should expect to see a fall in the amount of conflict in the world, all else being equal. In fact, we observe the opposite. Andrew Mack points out this paradox (see Mack 2002).

[17] The unevenness of the effects of globalization may also have systematic impacts on the distribution of violent conflicts. In part due to restricted access to the markets of the developed world, foreign direct investment in the poorest parts of the world continues to be focused in sectors that are associated with conflict, such as natural resources, rather than in sectors that appear to reduce conflict risks, such as manufacturing.

[18] This is the case for the likelihood of countries having on-going civil conflicts rather than for the risk of conflict onset and it is no doubt related to the fact that there are more longer wars and conflicts have negative impacts on GDP growth. This produces a growing cluster of ever poorer countries in conflict. In econometric terms this effect can be seen in the existence of a negative term on the interaction between wealth and a time variable – the marginal effect of wealth on reducing the risks conflict is greater now than in the past.

[19] Choucri and North (1972) for example, looking at data from 1870-1914, argue that increased wealth produces increased needs for goods and resources, and that these resource shortages produce a need to have more direct control over resources in poorer economies. They expect then, and find, a relationship between the growth of strong nations and their belligerence. In criticism of their argument, Zuk (1985) noted that in fact the conflict-oriented states of the period *were* able to provide for their own resource needs or were able to access needed resources through trade with sovereign states. While not undermining the relationship between wealth, growth and bellicosity, Zuk's argument questions the notion that growth provides an economic *motivation* for conflict rather than simply providing the means for conflict.

[20] See Thompson (1982) for support for this claim deriving from a study of war outbreaks involving Britain, America, France and Germany, over the period 1792-1973. The contrary hypothesis had previously been forwarded by Macfie (1938).

[21] See for example Claude (1962).

[22] See for example Organski (1958).

[23] The most common measure of income inequality is the "Gini coefficient" – an index between 0 and 1 where 0 implies an egalitarian distribution and 1 indicates that all wealth is concentrated in the hands of a single person. Other measures include the ratio of the wealth of the richest 10 or 20% to that of the poorest 10 or 20%.

[24] See also Auvinen and Nafziger (1999). This piece finds a positive relation between inequality and "complex humanitarian emergencies," although this relationship is reversed for fixed and random effects models.

[25] One technical reason is that the existence of measurement error in explanatory variables such as inequality is known to make it less likely that significant relationships will be discovered between variables. Yet, among economic variables, indices of income inequality data are measured with particularly high levels of error (see for example Cramer 2001), hence we should expect any relationships that exist to be dampened. This first

of the most important reasons, however, may be conceptual. Case study work suggests that it is not inequality between individuals that matters for conflict but rather inequality between ethnic groups or between regions – sometimes referred to as "horizontal inequality"[26] or "categorical inequality."[27] Some of the studies also suggest that policies to counteract horizontal inequality (as for example implemented in Côte d'Ivoire) may reduce the likelihood of conflict.[28] In econometric work using sub-national data, Gurr and Moore (1997) find that horizontal inequality produces grievances which, though not associated directly with conflict, facilitates mobilization, which in turn increase the chances of rebellion.[29] However, econometric work such as that by the World Bank, that uses measures of "overall" inequality fails to capture these effects.[30]

NATURAL RESOURCES AND CIVIL WAR

Leading research by Paul Collier and Anke Hoeffler at the World Bank[31] suggests that countries whose wealth is largely dependent on the exportation of primary commodities – including agricultural produce and natural resources – are highly prone to civil violence. In their research, Collier and Hoeffler argue that conflict may be explained either by grievance or by greed. They conclude (in large part based on the correlation between resources and conflict) that if we want to understand the causes of contemporary civil wars we should ignore explanations based on grievances and look instead at the greed of rebel groups.[32]

The decision to use such morally charged terms to structure and package this research, has shifted the debate in an unusually normative direction. Other academics have had difficulties responding to this shift, in part perhaps because neither of the terms "greed" nor "grievance" has been clearly defined either by proponents or critics of this literature.[33] Nonetheless, the relationship and the Bank's explanation for it have a number of implications. One is practical: it suggests that developing countries should broaden their export bases. This prescription seems to follow easily from the relationship, without the need for much understanding of the mechanisms that may lie behind it. Another results more directly from the moral tone of the argument. By claiming that war is a result of the greed of rebels, the research promotes a bias against rebel groups, suggesting that there is no way of checking (or reason to check) the validity of their claims. In doing so it may lead to less attention being paid to alternative explanations for conflict[34] and to divert attention from the role that states play in promoting political violence. This despite much evidence from case study work that points to the role governments play in fostering conflicts.[35] The resulting policy prescriptions can be simplistic, focusing on cutting off the financing of rebel groups.[36]

In fact, because the evidence fails to distinguish between different mechanisms that could underlie the relationship, it does not provide the support needed for this response. There are at least eight rival mechanisms that could explain the relationship between natural resources and war onset and duration.[37] As quantitative work has not yet distinguished between these different mechanisms have different implications for policy, I list all eight.

- Natural resources could provide a way to finance rebellions that have been started for other reasons, thereby increasing the prospects of success.[38] If so, then there should be reasons to take these other reasons into account when responding to conflicts.

- If natural resources are concentrated in a particular region of a country this may ground beliefs among

effect will make us less certain about the relationship. Add to this that for many countries we do not have any income inequality data at all. If we are less likely to have data for countries where there are civil wars, then in econometric work, this will bias the estimated effect of inequality downwards. This second effect will make us believe that the relationship is quantitatively weaker than it is.

[26] See for example Stewart et al. (2001a) and Klugman (1999).

[27] See Tilly (1999).

[28] For example, Azam and Koidou (2002) argue that Houphouet-Boigny's policies of redistributing from South to North are what spared Côte d'Ivoire from civil conflict for so long.

[29] Fearon and Laitin (1999), however, using the same data, find only weak evidence of a link between horizontal inequality and conflict, a weakness due, they argue, in part to multicollinearity and in part to poor measurement (See www.apsanet.org/new/nsf/research/laitin.cfm).

[30] Horizontal inequality can be measured by the share of total inequality that is captured by "between group" rather than within group inequality (this for example has been proposed by Zhang and Kanbur (2001) as a measure of polarization). In fact there need be no correlation whatsoever between between-group inequality and overall inequality..

[31] See especially Collier and Hoeffler 2000a, 2002a, and 2002b.

[32] Different versions of this research vary in the extent to which evidence for "greed" simply means evidence for opportunity. Collier and Hoeffler (2002b) argue that: "We test a 'greed' theory focusing on the ability to finance rebellion, against a 'grievance' theory focusing on ethnic and religious divisions, political repression and inequality. We find that greed considerably outperforms grievance." (Quotation marks in original.) Collier and Hoeffler (2000a) suggests furthermore that the relevant 'opportunity' is in fact the opportunity *for predation*, arguing: "Our model suggests that what is actually happening is that opportunities for primary commodity predation cause conflict." See Collier and Hoeffler (2002b).

[33] It is not even clear whether or not greed and grievance necessarily describe different phenomena: grievances, for example, may well have a material motivation to them.

[34] Collier (2000a) for example writes that "In the economist's view of conflict, grievance will turn out to be neither a cause of conflict, nor an accidental by-product of it. Rather, a sense of grievance is deliberately generated by rebel organizations. The sense of grievance may be based upon some objective grounds for complaint, or it may be conjured up by massaging prejudices. However, while this distinction is morally interesting to observers– is the cause just? – *it is of no practical importance*." (Emphasis added.) Rebellion is sometimes described as "quasi-criminal activity" (Collier 2000c)

[35] Sierra Leone is often pointed to as a case that illustrates rebellion motivated by rebel greed, yet even here scholarly work (while rarely sympathetic to the rebel groups) documents the part played by governments in the weakening of state structures (see for example Reno (1995)). Furthermore, many of the worst cases of ethnic cleansing and genocide have been organized and perpetrated by states.

[36] See for example Collier, Hoeffler and Söderbom (2001).

[37] For an excellent discussion of a number of these mechanisms, as well as case study evidence supporting them, see Ross 2002b.

[38] As noted above, this interpretation of resources providing "opportunity" (as opposed to motivation) is indeed a "softer" interpretation of the result that is sometimes suggested by Collier and Hoeffler.

dissatisfied groups that a seceding state could be viable or even prosperous.[39]

- Natural resource dependence could in fact be associated with grievances rather than greed. Countries with middling levels of dependence on natural resources may be experiencing transitory inequality as part of the development process.[40] Alternatively, extraction may produce grievances through forced migration. Or finally, natural resource wealth may be seen as more unjustly distributed than other wealth – as is claimed in Sierra Leone[41] and Nigeria.[42]

- Governments that rely on natural resources rather than taxation for their survival do not need to create strong institutions. Such states have little compulsion to respond to the demands of their citizens. The result may be a state such as Mobutu's Zaire that is divorced from the domestic economy.[43]

- Changes in the value of natural resources can weaken the manufacturing sector of an economy – an effect sometimes referred to as "Dutch Disease." If the manufacturing sector is itself more intensive in internal trade, then the collapse of manufacturing may prevent the economy from benefiting from the conflict-mitigating effects of trade.[44]

- Economies that are dependent on natural resources may be more vulnerable to terms of trade shocks. These could cause instability and dissatisfaction within groups that suffer from the shocks. In this case, the problem is not with dependence on natural resources *per se* but that natural resource-dependent economies are likely to be dependent on a small number of commodities for their export earnings.[45]

- Rebels may not hold a monopoly on greed. The existence of natural resources may be an incentive for third parties—states[46] and corporations[47]—to engage in or indeed foster civil conflicts.

- Finally, we might observe this correlation in the data even if natural resources do not cause conflict. Rather a conflict, or even expectations of a conflict, may have caused other economic activities, such as tourism and manufacturing, to cease, leaving only extractive industries to function. If so, then there will be an observed correlation between primary resource dependence and conflict even if those resources have no causal impact on conflict.

There are then many possible explanations for the relationship between natural resources and conflict that do not imply that civil war is typically a result of greed. Some of these have been identified in qualitative work. Different explanations require different sorts of policy responses, beyond export diversification and cutting off rebel financing. In some cases rebel financing does need to be addressed, in other cases international corporations and their relations with domestic governments is the key, in other cases aid policy, fiscal policy or price stabilization policies are important. But knowing what response is most appropriate requires more systematic work to uncover which of these mechanisms are most relevant in different contexts. This can be done using econometric techniques

[39] Such arguments have been made for the cases of Biafra in Nigeria, Katanga in Congo, Cabinda in Angola, Casamance in Senegal, Bougainville in Papua New Guinea, and southern Sudan.

[40] This may follow for example from a hypothesis regarding transitory inequality known in economics as the Kuznets curve hypothesis which predicts transitory inequality resulting simply from the fact that different parts of an economy may develop at different rates.

[41] These indeed are the claims of many rebel and insurgent groups: hence the Anthem of Sierra Leone's RUF goes "Where are our diamonds, Mr. President? / Where is our gold, NPRC? […] Our people are suffering without means of survival / All our minerals have gone to foreign lands." The RUF Anthem appears in the RUF's key ideological document "Footpaths through the Forest."

[42] The mounting tensions in the Niger Delta in Nigeria presently also focus on the justice of the distribution of resource revenues. Ijaw Youth Council have mounted opposition to the activities of multilateral oil corporations because of the failure of local populations to benefit from oil revenues. For a recent report see IRIN, 21 May 2002, "Nigeria: Security Reinforced in Oil Region."

[43] See Moore (2001) on the role of "unearned state income" on political development and Sørli (2002) on the relationship between oil and "rentier" states.

[44] This effect takes its name from the impact of the discoveries of oil by the Netherlands on the Dutch manufacturing sector. It occurs because a rise in the value of exportable natural resources may result in an expansion of that sector and of sectors that are not traded (such as construction) and in a corresponding contraction of the export-oriented manufacturing sector. The "Dutch Disease" may also result in lower growth if manufactures are more growth-enhancing than non-tradables. Since growth is negatively associated with conflict it could be that natural resources effect conflict via their impact on growth. This channel, however, does not account for the finding that natural resources affect conflict even after growth rates have been controlled for.

[45] Vulnerability will also be more likely if the risks associated with the commodities are highly correlated – either in terms of price fluctuations or in terms of production conditions, such as the weather. There is no reason to expect that an economy exporting a diversified portfolio of natural resources will be particularly susceptible to income shocks.

[46] Hence for example the escalation of the civil war in the Democratic Republic of Congo has resulted in part from the involvement of neighboring states seeking raw materials. Members of the Zimbabwean army and cabinet have reportedly benefited from trade in mineral assets (Dashwood 2000, Meldrum 2000) and this was possibly a motivation for entering the conflict. (Although see Nest (2001) for the counterargument.) Considerable plundering by the government of Rwanda of minerals (chiefly coltan) has also been documented (see Willum 2001) and is used to explain Rwanda's motivations for its on-going campaign in the country.

[47] The secessionist bid in Katanga in Congo was supported if not instigated by the Belgian firm *Union Minière du Haut Katanga.* And evidence suggests that the French oil corporation Elf took actions that led to an escalation of the conflict in the Republic of Congo (Brazzaville) in a bid to protect its oil interests in the region. On this, Jos Havermans (2000), writes "According to Belgian and French press reports (see: De Standaard, October 18, 1997, and Le Monde, October 17, 1997), Elf [...] decided to support his [Nguesso's] militia when the elections were aborted and fighting erupted in June 1997. Le Monde quotes 'sources in the French secret service' as saying that Elf helped the Cobra militia to get supplies from Europe through the financing circuits of the oil company. Sassou Nguesso is reported not only to have enjoyed the support of Elf Aquitaine, but also of a much larger informal group of French businessmen with economic interests in Africa."

and remains an open research agenda.

THE IMPACTS OF DIFFERENT TYPES OF NATURAL RESOURCES ON VIOLENT CONFLICT. There are many different types of natural resources that are extracted and marketed in different ways and in different political contexts. Yet much econometric research approaches the question as if the impact of natural resources does not depend either on the form of the natural resources or on the nature of the political system in place. Recent work by political scientists suggests that in fact both the form of the resource and the political context systematically affect the ways that natural resources relate to violence.

Considering first the effects of different types of resources, a new and fruitful line of research, spearheaded by political geographer Philippe Le Billon and political scientist Michael Ross suggests that there are a number of dimensions along which resources can be usefully distinguished. First, natural resources may vary in the extent to which their production is centralized[48] – with concentrated resources, such as oil, requiring more organizational cohesion and allowing for more hierarchical organizational structures than diffuse resources such as cattle.[49] The same logic holds for centralization of marketing.[50] Second, whether resources are located close to or distant from centers of government power is also likely to affect the ability of rebel groups to control them.[51] It may also affect the value of taking the capital city. Le Billon has taken the two dimensions, the concentration of production and location, to create a typology of conflicts. He shows that if resources are diffuse and distant from the seat of power then warlordism is likely; if production is concentrated and proximate to the capital then bids to control the state, such as *coups d'etat*, are likely. Then if resources are diffuse but proximate, rebellions and rioting are likely; while if they are concentrated but distant, secessionist struggles are more likely.

Some types of resources may benefit one side more than another. Michael Ross argues that, while legal assets may benefit both governments and rebels, illegal assets are more likely to benefit rebels than governments.[52] A similar argument may be made with respect to the extent to which global markets are regulated and are transparent. Commodities such as diamonds that are sold on international markets with little transparency or regulation may help finance rebel groups or governments alike while commodities, such as oil, that are sold on more regulated markets tend to benefit governments only.[53]

Turning to the interactions between natural resources and political systems, political scientist Richard Snyder argues that the impacts of natural resources on conflict will depend on the ability of a state to manage its resources – an ability that may vary over time.[54] He points to states with natural resources, notably Sierra Leone and the Democratic Republic of Congo that were previously stable and only recently began under-going resource motivated conflicts. Siaka Stevens, he notes, was able to hold power in Sierra Leone for close to 20 years; Mobutu lasted for 30 years.[55] Then there is Botswana, among the fastest growing and least violent countries in Africa even though its economy depends on diamonds, copper and nickel. The evidence from Botswana suggests that natural resources, if managed well, may even reduce the chances of violent conflict.[56]

ECONOMIC POLICIES AND CIVIL WAR

What kinds of policy choices make conflicts more or less likely? Research that attempts to answer this question generally takes as a starting point those features of economies that are believed to increase the likelihood of conflict and then points to the failure of governments to address them. Indeed, many of the structural factors that are associated with conflict – low levels of education and high dependence on natural resources – are themselves in part a function of government policies. For these the responses – export diversification, increased investment in human capital, greater job opportunities and so on – are obvious, if difficult to achieve in practice.

Some of these failures to resolve economic problems result from government negligence. Political scientist William Reno for example describes ways in which political leaders take deliberate actions to undermine their economies (and their governments) in order to enrich themselves personally.[57] By weakening state institutions (in some cases signaled by fiscal collapse) and destroying infrastructure for production, leaders may make rebellion

[48] Le Billon uses the terms "point" versus "diffuse" resources to distinguish between these.

[49] More hierarchical structures may lead to longer wars because the leadership is less likely to suffer personally from the costs of the conflict and is more likely to gain a large share of benefits. However, if a settlement can be negotiated that benefits the leadership, more hierarchical organizations may be better able to guarantee the adherence of the organization to the terms of the settlement.

[50] Some goods, particularly bulky goods destined for export to a well structured international market will have more centralized marketing channels than less bulky goods sold in less structured markets. These qualities can be described as variations in a resource's "obstructability."(see Ross 2002).

[51] Le Billon (2001).

[52] Ross 2002a. Illegality may also have implications for war duration, with groups that traffic in illegal goods more likely to benefit from the cover of conflict and more likely to face sanctions in the event of peace. See below.

[53] The role that international corporations play is likely also to depend on the amount of capital or expertise that is needed in order to extract resources. Insofar as corporate relations function more smoothly with governments, more capital intensive industries are more likely to benefit governments more – unless, that is, rebel groups can convince corporations that they will soon have a more legitimate claim to access to resources.

[54] Snyder (2002).

[55] Although Stevens' rule in Sierra Leone was characterized by a "hollowing out" of the State (Reno 1995).

[56] The implication for econometric researchers from Snyder's historical critique is that they should look for interactive effects between resource wealth and state strength. State strength itself, however, is likely to be a function of the types of resources. Indeed the features Snyder expects to determine the degree of control over the resources are akin to those postulated by Ross (2002) and Le Billon (2001) above. In this regard it is worth noting that Botswana's diamonds, contained in Kimberlite pipe deposits, are more difficult to access than the alluvial diamonds in Sierra Leone.

[57] Reno (1995, 2000a).

more attractive: they reduce the direct costs as well as the opportunity costs of violence. Beyond this, states may be deliberate and active in the organization of violence, and often with economic motivations. This is evident for international wars as well as state-sponsored genocide.[58]

The impact of government policies, however, may be more contentious when they are undertaken with the express intention of fostering economic development. There is for example much anecdotal evidence that the structural adjustment (or "austerity") programs implemented throughout the 1980s and 1990s spawned civil conflicts.[59] These policies, while formally implemented by governments, were strongly promoted by international financial institutions such as the World Bank and the IMF, who made the granting of loans conditional upon the adoption of their policies. In a number of countries – such as Venezuela and Morocco – they led directly to street violence.[60] But can the rise in civil wars also be put down to these policies? Surprisingly, when the World Bank turned to study civil wars it did not attempt to study the role of the structural adjustment programs it helped impose. Work that has attempted to address the question points to a number of mechanisms that may link structural adjustment programs to violence. These range from the undermining of social services to the weakening of entrenched elites.[61] Simply by increasing efficiency economic policies can worsen horizontal inequality: While horizontal inequality may often result from state policies that favor segments of society because they form the relevant support base for the government, it may also result from the belief that some groups are more efficient than others.[62] However, if, as claimed by the Bank and the IMF, these policies are indeed growth enhancing, then, at some stage, we would expect the rise in wealth to reduce the likelihood of violence.

The evidence for the generality of the link between structural adjustment and conflict is mixed. While IMF adjustment has reduced military spending, whether or not this increases or reduces the likelihood of conflict is not known.[63] Studies by the World Bank to look at the effects of policies consistent with structural adjustment have found no direct relationship between these policies and conflict.[64] Studies undertaken by the WIDER research group[65] has also failed to find a systematic link.[66] Nevertheless, the research has helped to identify ways in which structural adjustment programs could be altered to reduce the risk of conflict by reducing horizontal inequality. It recommends free universal education, regional integration programs, affirmative action and the creation of political institutions that guarantee political representation to members of all regional, ethnic or religious groupings.[67]

TRADE AND WAR

Researchers have put some effort into trying to find out whether international trade increases or decreases the likelihood of conflicts (so far no comparable work has been done to find links between internal trade and civil war). The results of this research matter for foreign policy. If, for example, the US increases trading relations with China will this lead to a greater risk of conflict – perhaps by strengthening China and giving it commercial power over the US or, by introducing interdependence and stronger mutual interests, will it reduce risks? Both positions have been put forward by political scientists and advocated by policy makers.

The belief that trade increases conflict, now associated with the "realist" school of international relations theorists,[68] has historically been associated with mercantilism, a notion that implicitly denies the existence of gains from importing goods. Mercantilism, while still seemingly popular among some policy makers, is generally considered by economists to be based on a misunderstanding of how benefits from trade actually get distributed.[69] Even so, such a misunderstanding could itself lead to conflict.[70] More consistent with contemporary realists is the argument that in the *absence* of optimal trading conditions, potential beneficiaries of trade may use force to access foreign markets. Hence Marxist theorists, amongst others, have explained colonial wars as being for control of world markets, while international political economists

[58] Genocide indeed may indicate not state failure, as is assumed for example by the State Failure Task Force, but state capacity. See for example des Forges (1999) on the organization of genocide in Rwanda.

[59] In Guinea Bissau for example it is suggested that the austerity measures put in place to allow access to the CFA zone led to the arms selling activities of army officers and to the rising unpopularity of the government that eventually led to the civil war of 1998.

[60] For work on "IMF riots" see Walton and Seddon (1994) and Woodroffe and Ellis-Jones (2000).

[61] See for example Woodward (1996) for a discussion of the case of the former Yugoslavia

[62] Hence, for example Mali was for long *de facto* divided into two economic regions: the south – "Mali utile" – and the North, with aid and investments that were intended for the North being redirected to the more productive south. The resultant horizontal inequality was likely largely responsible for the rebellion in the North.

[63] See for example Davoodi et al. (2001).

[64] See Collier and Hoeffler 2000b. In this study Collier and Hoeffler use a measure of policy that is a composite of policy choices and macroeconomic outcomes. The measure does not capture whether the policies were adopted as part of a program with loan conditionality or whether they simply reflect policy choices of the country. The work suggests however that these policies may reduce conflict risks indirectly, for example through their impacts on growth.

[65] This work is undertaken jointly with the United Nations University and Oxford's Queen Elizabeth House.

[66] See Nafziger et al. (2000) and Klugman (1999). Auvinen and Nafziger (1999) find no effect for a dummy variable indicating the presence of a World Bank structural adjustment program; they find however that high levels of IMF support are negatively associated with humanitarian emergencies.

[67] See the 2001 WIDER Annual Lecture on "Horizontal Inequality" by Frances Stewart . Given the centrality of land in a series of civil wars – Guatamala, El Salvador, Ghana – scholarship emphasizes policies to reduce land inequality. See Klugman (1999).

[68] For a discussion of the realist view of trade and conflict see Copeland (1996) and Waltz (1970).

[69] See for example Anderton (2002).

[70] As argued by Edgeworth (1915): "Misconceptions about commerce have led to war. With the irrational purpose of promoting the influx of money, treaties used to be imposed under threat of hostilities. An imaginary opposition of interests was created by the erroneous notion [...] that in trade 'one country cannot gain without another losing'" (Quoted in Anderton 2002).

have highlighted the desire of capitalists to put in place, by force, the conditions for profitable foreign direct investment.[71] These arguments for conflict-inducing effects of trade rely then on the beliefs that trade relations are harmful to one party or that trade and investment routes are or are likely to become blocked.[72]

Liberal theorists focus more on the gains to both parties from trade. They argue that where trade is mutually beneficial, to fight with a trading partner would be committing "commercial suicide."[73] Related arguments claim that, through exchange, trading partners develop greater understanding for each others' cultures. Political philosophers, meanwhile, suggest that trade reduces the risk of conflict because trade alters cultures: that there is something about trade that makes people less violent.[74]

At some levels the views of liberals and of realists may be reconciled: interdependence may provide occasions for conflict and may even provide a means for striking, but it may also produce the incentives for resolving disputes peaceably. This belief that the net effects of trade and cross-investment will be to reduce violent conflicts has found considerable support among policy makers.[75] In Europe for example the view motivated the creation of the European Coal and Steel Community in 1951, later to develop into the European Union. The logic is also supported by empirical research that demonstrates that once proximity is taken into account, states that trade with each other are indeed less likely to fight each other.[76]

[71] According to political economist Jeffry Frieden, for example, the latter motivation is especially strong when the assets in a country are site-specific and easily appropriated and hence where there are likely to be problems enforcing property rights. This argument clearly parallels the explanation put forward by the World Bank for the relationship between resource wealth and civil wars and suggests that the same phenomena may help to explain both colonialism and post-colonial civil wars. Hence a Dutch envoy wrote to his directors in 1614 "Trade in India must be conducted and maintained under the protection and favour of your weapons, and the weapons must be supplied from the profits enjoyed by the trade, so that trade cannot be maintained without war or war without trade." (quoted in Toussaint 1966; for more on trade with India and conflict, see History of India: The British East India Company and Colonization). For an empirical critique of the thesis that interventionist behavior can be explained by "economic imperialism" see Hammarström (1986).

[72] On the role played by expectations of blocked trade, see Copeland (1996).

[73] Angell (1933).

[74] The classic statement is that "wherever there is commerce, manners are gentle" (Montesquieu 1749, quoted in Hirschman 1982). Recent experimental evidence also suggests that market relations are associated with greater "fair-mindedness." See Ensminger (2001).

[75] The First World War provides an important counterexample to the claim that a high level of trade is sufficient to prevent war.

[76] See Oneal and Russett (1999), Russett (2002) and Doyle (1997) for explanations of the source of the dispute between liberals and realists and evidence that, when variables such as geographic proximity are controlled for, trade reduces conflict.

III The Economics of War and War Termination

AGGREGATE COSTS AND BENEFITS OF WAR

Calculating the economic costs of war is necessary to determine the relative economic benefits of investing in war avoidance rather than in post-conflict operations.

NGOs and aid agencies argue that avoiding war makes economic sense. They point to cases where, *ex-post*, the cost of inaction considerably outweighs the costs of conflict prevention.[77] However, such straight-forward cost-benefit comparisons, while striking, are misleading. One reason for this is that the results of inaction are not known in advance and so the expected costs are likely to be considerably lower than the actual costs. Another reason is that the benefits of preventative action are not known – preventive deployments may be unsuccessful in preventing atrocities or may succeed only in delaying them. While certainly *successful* prevention is better than cure, and while more resources are needed for prevention *and* for peace-building, the economic argument for investing in war prevention rather than peace-building requires more careful studies than those undertaken to date—studies that will have to make use of models that predict probabilities of conflict onset, expectations of the cost of wars, and estimates of the probability of success of preventative action.[78]

In what follows I focus on impacts of war for economies within zones of conflicts. I ignore the impacts in zones that are removed from the conflict, noting simply that in areas (or countries) that supply a conflict, war may lead to substantial rises in income[79] while countries that neighbor countries at war typically suffer negative impacts.[80] I also shift away from the focus on the most publicized and the most dramatic war economy activities – namely the looting of private and public assets and the pilfering of aid. While some recent research places much emphasis on these activities, acts of looting do not directly affect the aggregate income of an economy (except to the extent that they divert the looters' labor away from productive activities). Rather, they represent transfers between parties. What matters more in terms of aggregate effects is the reaction to looting and expectations of looting by economic producers.

[77] Renner (1994) for example cites the case of the Rwandan genocide where a six-month peace-keeping force would have cost $115 million whereas, in the event, emergency humanitarian relief over the same period was to cost $552 million. See also Brown and Rosencrance (1999) for a series of studies on successes and failures in conflict prevention.

[78] See for related work Doyle and Sambanis (2000) on determinants of successful peace-building.

[79] Perhaps the best-known example of a war boom is that of the US economy during the Second World War, where, by some estimates, incomes rose by approximately 75%. In fact, the US experienced expansions in wartime during the Civil War, both World Wars, the Korean War, and the Vietnam War (Source: NBER).

[80] A country may be affected by the wars of its neighbors through a number of channels including domestic destabilization, refugee flows, or spillover effects on the attitudes of investors towards the risks in a region. These spillover effects increase with the intensity of conflicts in neighboring countries. See Murdoch and Sandler (2001a and 2001b).

ESTIMATING THE COSTS AND BENEFITS OF CONFLICT. Studies of the effects of conflict on income and growth can be undertaken using a framework developed for the empirical study of economic growth.[81] In this framework, four variables are considered: physical capital, the labor force, "human capital"[82] and "total factor productivity."[83] The last feature, total factor productivity, includes disparate features such as the level of technology, the efficiency of markets or the climatic characteristics of an economy. At any moment an economy has some quantity of each of these four variables. Typically these quantities change over time, with each one having a rate of accumulation (a savings rate, or a rate of technological progress) and a rate of destruction (a rate of depreciation). Together, these quantities and their rates of change determine both the expected wealth and the growth rate of an economy. The ways in which a conflict affects an economy can be described in terms of its impact on each of these variables.

1. Physical Capital.

DESTRUCTION OF PHYSICAL CAPITAL. Violent conflicts result in the destruction or removal of physical capital, including bridges, buildings, and communications and energy sector infrastructure. This lowers standards of living in ways that may not be captured by GDP measures. Hence for example, five years after the war in Liberia ended, the capital Monrovia still did not have electricity or running water. Similar long term damage is done deliberately during international wars.[84] Such losses of physical capital are not yet well accounted for and do not figure in most cross-national estimates of the costs of war.

REDUCED INVESTMENT IN PHYSICAL CAPITAL. A fall in investment (especially private rather than public investment) has also been found by researchers.[85] Indeed, rather than money coming into a country for investment, war is likely to produce capital flight.[86] A rise in interest rates, resulting both from increased levels of uncertainty and crowding-out due to government deficit spending is also likely to reduce investment levels. Indeed, some work has found that the mere *expectation* of conflict is associated with lower personal savings rates, which typically corresponds to lower investment.[87] The magnitude of these effects depends on how severe the war is. For one, it depends on how much of a country is affected – researchers Kosuke Imai and Jeremy Weinstein for example find that the share of investment in GDP falls by over 4 percentage points when conflicts extend to about half the territory of a country. Paul Collier has found that these investment effects depend also on the length of a war and continue after wars end.[88]

2. Population.

Population levels change during war. They go down most obviously because of battle deaths, though in fact more deaths tend to occur due to famine, disease and the destruction of health services.[89] Frances Stewart and researchers at Oxford University record that between 1960 and 1995 approximately 18.5 million people died from internal conflicts with almost half of these occurring in Africa and over 80% occurring in low-income countries generally.[90] Conflict, is, however, also likely to increase fertility rates.[91] The implications of these war-induced demographic changes for growth rates are not clear and have not yet been a focus for scholarly research.[92]

Beyond demographics, conflict may affect the role of labor in production through distortions of labor markets. In Mozambique for example Mozambican National Resistance (RENAMO) used forced labor[93] while in Sierra Leone "civil commanders" in the Revolutionary United Front (RUF) forced labor into "state farms."[94] In the extreme, slavery may be introduced, as for example in Germany during the Second World War[95] and recently reported in Burma, Liberia and Sudan.[96] As well as human suffering, the

[81] See Solow (2000) for a theoretical overview; for surveys see Durlauf and Quah (1998) and Temple (1999), for resources, see Jonathan Temple's portal on economic growth.

[82] Human capital, broadly, is meant to capture the productivity of workers and not simply the number of workers. It typically includes, at the least, levels of education and health.

[83] This formulation is represented in the empirical literature by the work of Mankiw, Romer and Weil (1992). Recently Bernanke and Gürkaynak (2001) showed that the Mankiw, Romer and Weil framework can be used for any growth model with a balanced growth path.

[84] During the Gulf War, for example, US forces, employing a strategy referred to as "Bomb Now, Die Later," targeted an estimated one third of all cruise missiles at electrical power infrastructure. This destroyed not just grids (which may have a short run effect of benefit to US strategy) but power plants (whose destruction has more long term humanitarian implications). See Washington Post, 1998. "The Fog of War: Bomb Now, Die Later."

[85] Knight et al. (1996) and Imai and Weinstein (2000).

[86] See Collier (1999a).

[87] Russett and Slemrod (1993).

[88] Surprisingly, Collier (1999a) finds that investments are particularly slow in returning subsequent to short wars, rather than long wars.

[89] The destruction of physical capital such as power or health infrastructure also kills indirectly; and evidence indicates that such destruction is in fact on the rise. King and Martin (2001).

[90] Stewart et al. (2001a p. 71). Their figure includes deaths from the Iran-Iraq and Vietnam wars.

[91] See WHO 2000. This may in fact be due to the fall in a child's life expectancy – it is very common for lower life expectancy to result in higher birth rates and often with net increases in population sizes.

[92] The theoretical predictions are not clear in this instance. In neo-classical growth models, lower population growth rates are associated with higher *per capita* income. And conditional upon a given level of capital, a fall in the size of the labor force will lead to a short run increase in per worker productivity. On the other hand, a rise in fertility may reduce the worker/dependent ratio and lower *per capita* income.

[93] Brooke, James. 1988. "Visiting State Department Official Condemns Mozambique's Rebels." New York Times, April 27, 1988.

[94] Abdullah, Ibrahim and Patrick Muana (1998).

[95] According to the Nuremberg Judgment, not only did German authorities force labor in occupied territories, they deported "at least 5,000,000 persons to Germany to serve German industry and agriculture" Steiner and Alston (2000, p. 119).

[96] In using forced labor these groups are repeating practices established under colonial rule (Mamdani 1996) and used by post-independence governments (such as at present by the Burundian army (See for example

undermining of labor markets is likely to have adverse effects on economic efficiency.

3. Human Capital.

DESTRUCTION OF HUMAN CAPITAL. The skills and abilities of a labor force alter as a result of conflict. As with physical capital, human capital flees a country during a conflict through migration. This could be because educated workers may have more means to quit a country. Or it may be because they specifically are targeted for ideological (as in Cambodia under Pol Pot) or tactical reasons (as for example in Sierra Leone[97]). Human capital is also lost through declines in health through the spread of diseases such as malaria and tuberculosis. Worsening health conditions, like declines in investment, affect economies well after war ends. One recent study reported that "the additional burden of death and disability incurred in 1999, from the indirect and lingering effects of civil wars in the years 1991-97, was approximately equal to that incurred directly and immediately from all wars in 1999."[98]

REDUCED INVESTMENT IN HUMAN CAPITAL. During war, schools close and are destroyed and students and often teachers join rebellions and armies. These effects reduce investment in human capital. However, wars are also likely to occur in countries where schooling levels are already low and where, possibly, efforts are underway in any case to raise the level of investment in human capital. If so, war may slow the rate of growth in human capital rather than actually causing declines. To understand the magnitude of the effects due to conflict we need estimates of the expected enrollment rates in the absence of war. Researchers have not focused on developing such measures.[99]

4. Total Factor Productivity

TECHNOLOGICAL INNOVATION. Although no cross-national studies gauge the impacts of contemporary civil wars on technology, there has been a long-standing belief that war induces technological innovation that will benefit the economy generally.[100] And there are many prominent examples of innovations arising during war (or as part of defense programs), from the improvements in metalworking arising from the invention of firearms, to the development of the Internet.[101] The argument that war improves civilian technology requires that increased demand for military equipment leads to investment in new technology and enhanced productivity.[102] It also requires that military innovations have non-military applications. Economist Joel Mokyr suggests however that in fact few of the military innovations from major periods of war – from Roman aggression to the Napoleonic wars – produced economic benefits and that military campaigns delayed rather than spurred the industrial revolution.[103] The chances that technological innovation will provide economic benefits in the context of contemporary civil wars seems more remote. The economic benefits that arise from military technological innovation derive primarily from discoveries and production processes rather than from the *use* of the new military technology. Whereas the technological change that has taken place – particularly during international wars – has relied on innovation by countries that are economic leaders, contemporary civil wars are fought largely by poorer countries, far from the technological frontier. For these countries, adoption of military technology is more efficient than innovation, with the result that they are left with stocks of Kalashnikovs and not the technology or skills needed to make them.

INTERRUPTION OF PRODUCTION AND MARKET TRANSACTIONS. The most obvious way in which production and trade is interrupted is by blocking freedom of movement. People become less productive when they are displaced or unable to access their workplaces due to landmines and other threats. Expectations of looting have implications for economic production, much like taxation; and the responses to looting, such as reduced travel, the closure of markets (as for example in Liberia[104]) or the imposition of curfews (as, for example, in Palestinian territories) hit production and trade. Trade also requires trust and social institutions (often referred to as "social capital"), which, for many, may be destroyed by violent conflict.[105]

Conflicts also alter the level of regulation of trade and production. To bestow favors on economic allies, government or rebel groups often create monopolies.[106]

Human Rights Watch, June 2000, "Burundi: Emptying the Hills." Human Rights Watch Report, Volume 12, Number 4(A)) and often indeed by the governments they are fighting against (such as by FRELIMO in Mozambique).

97 Keen (2001, p. 161) for example reports accounts of targeting of white-collar workers in Sierra Leone for tactical reasons. In one interviewee's account : "They (the RUF) were only brutal to those they thought were a threat – if you looked intelligent, a post office worker, a bank clerk, a policeman. But those people left. The government people left."

98 Ghobarah, Huth, and Russett (2001).

99 Stewart et al. (2001a p. 90) report trends. They note that over the course of their conflicts, education levels fell in Angola, Mozambique and Sierra Leone. In contrast there were gains in Burundi, Guatemala, Afghanistan and Cambodia. While they provide no estimates of the magnitude of shortfalls due to conflict, Stewart et al. suggest that the levels of investment were lower in war countries than in non-war countries.

100 Sombart (1913).

101 See Mokyr (1992, pp. 183 – 186) for a listing of war technologies of more general economic benefit.

102 A related argument suggests that warfare provides benefits by promoting a greater spirit of competition. Sombart (1913).

103 Mokyr (1992).

104 The Ministry of Defense in Liberia for example has moved to cancel all market days for the duration of the war (IRIN, "Liberia: rebels take Gbah." 19 June 2002).

105 Azam et al. (1994).

106 William Reno for example has described the business-military relations that underpin the involvement of Uganda and Rwanda in Congo, where allegedly until recently the commander of the Congo contingent of the Uganda People's Defence Force distributed cobalt and diamond concessions while officers conducted trade in merchandise and invested in cell-phone networks and cyber cafés (Reno 2000b). Similarly Mwanasali (2001) describes how the Rwandan-backed RCD introduced licenses to Eastern Congo to regulate wholesalers.

> Regulating trade routes is also a weapon of war. In a secessionist struggle for example, seceding areas may attempt to limit exchange with the center in a bid to realize autarky.[107] Similarly, scorched earth policies or the forced displacement of people can be used to alter the material supplies to opposition groups,[108] resulting, in extreme cases such as Sudan[109] or Biafra, in famine. Regulation may also be imposed to *increase* production to support a conflict, as for example in the United States during the First and Second World Wars when government intervention increased dramatically. By the same token the *weakening* of unified control over territories may reduce effective market regulation with possible beneficial effects for production and trade (as has been argued recently by Peter Maass for the case of Somalia). While researchers have stressed ways in which rises in regulation re-distribute resources, there has been no systematic study of how the rise (or fall) of regulation alters incentives for production and for trade in contemporary civil wars.

There exists then a wide range of channels through which conflict may affect economies. Some studies have attempted to capture the impact of conflict on some of these channels, notably on investment in physical capital and on population levels. Yet no studies have succeeded in measuring the aggregate costs of conflict through all these different channels.

One difficulty for researchers is that estimating the costs of war—beyond the direct costs due to the destruction of capital—requires some best guess of how the economy would have functioned in the absence of war.[110] Econometric models, however, are well suited for dealing with this problem.[111] The models produce estimates of a growth path based on characteristics of an economy, its history and the performance of other peaceful and conflict-ridden economies, controlling for their differences. Actual growth paths can then be compared with the predicted paths had there not been a conflict. Using this approach scholars find that on average economies in conflict grow at annual rates of between 1% and 2% lower than economies during peacetime.[112] However, even econometric approaches tend to provide only a very partial accounting of the impacts of civil war. One reason for this is that attempts that have been made to date make very strong simplifying assumptions – for example by imposing the assumption that the depreciation rates of physical and human capital are the same. A second, more important reason, is that econometric growth models tend to take the levels of human capital and savings or investment as given, without taking account of the fact that these levels are themselves a result of violence.[113] In this way, they fail to attribute to conflict costs that occur because of changes in the factors described above.

DIFFERENT SECTORS ARE AFFECTED DIFFERENTLY. The costs of war are borne differently by different sectors of economies. Research documents the asymmetric impact for different categories of individuals, finding especially onerous impacts on the landless and urban poor[114] and on women and children.[115] There are also asymmetric impacts on different sectors of an economy. Paul Collier has distinguished systematically between "war-invulnerable" (arable subsistence and agriculture) and "war-vulnerable" sectors (construction, transport, distribution, finance, and manufacturing) of an economy.[116] The distinction is based largely on the extent to which different sectors depend on capital and internal trade. In a study of Uganda, he found that, as a share of GDP, war invulnerable activities doubled in output while war vulnerable activities halved during the war. Notably, the contraction of the war-vulnerable sectors may make economies more dependent on natural resource-dependence – this indicates one economic path through which a history of conflict increases the probability of future conflict.

ECONOMIC ACTIVITIES OF REBEL GROUPS

There is considerable variation across conflicts in the ways that rebel groups operate in the economy. Sometimes they act as economic producers, providing public goods; often however they act as extractors. Such variation in their behavior has implications for the economic well-being of populations as well as for the course of the conflict.

HOW DO REBELS FINANCE THEMSELVES? Researchers at the World Bank argue that the ability of groups to control lucrative economic sectors determines whether they can launch and sustain a campaign. There are, however, counterexamples that indicate that the material

[107] In some cases, as during the Irish War of Independence this may take the form of a general boycott of flows to and from the center – hurting the consumers of goods originating from the center and benefiting "import-substituting" industries.

[108] It is reported for example that government forcibly airlifted peasants out of the Moxico, resettling them to refugee camps, in order to reduce food production that could benefit UNITA fighters. IRIN, 10 December 2001. "IRIN Focus on Moxico conflict."

[109] ICG, (2002).

[110] Many studies ignore the problem of a counterfactual and simply document changes in economies during conflicts. There are for example many careful attempts to calculate costs for single economies (see for example the collection of studies in Stewart et al. 2001b, Amirahmadi 1990 or Fitzgerald and Grigsby 2000) and studies that compare the performance of economies at war to the performance of their neighbors (e.g. Stewart et al. 2001a). This last approach exaggerates the extent to which neighbors are similar, but also may underestimate the impact of war insofar as it fails to recognize the economic impacts of wars on neighboring countries. A recent innovative approach uses data on neighboring regions within Spain to generate a "synthetic" Basque region whose economic performance, estimated as an average of the performance of other regions, may then be compared with actual performance (Abadie and Gardeazabal, 2001).

[111] See for example studies by de Melo et al. (1996), Collier (1999a), Murdoch and Sandler (2001a) and Imai and Weinstein (2000).

[112] See Imai and Weinstein (2000) and Collier (1999a). For a review of papers introducing conflict within the new growth tradition see Gyimah-Brempong and Corley (2002).

[113] This is done for example in Murdoch and Sandler (2001a), Collier (1999a) also conditions on human capital.

[114] See for example FitzGerald (1997)

[115] Ghobarah, Huth, and Russett (2001).

[116] See Collier (1999a)

requirements needed to sustain a rebellion may be very low: The Mayi-Mayi in the Democratic Republic of Congo provides one example of a low-tech, low-cost but long-lasting rebel movement. As a recent report in Scientific American demonstrated, small arms can be very cheap – sometimes as little as $15 for an AK-47.[117] And so can labor. In cases where there is local support for the actions of rebel groups, as with Chechyan rebels, the Viet Cong, and the IRA, it may be possible for people with regular employment to serve as "part time guerillas."[118] In other cases, particularly where rebel groups do not benefit from local support, high levels of financing may be required.

The primary means of financing considered by econometric research and in policy responses is wealth derived from control over valuable natural resources such as drugs, oil, timber and "conflict diamonds." However, case study research indicates that this is too narrow a focus: in fact rebel groups also rely heavily on agricultural products – such as cashew nuts, tangerines, hazelnuts or bananas – to finance their campaigns.[119] Such agricultural goods require continued production, often over extended territories, and have different implications for the ways that rebels interact with local economies and for policy responses aimed at stemming financing.[120] As yet however agricultural products remain largely ignored.

A second means for funding is money collected from nationals based overseas. Econometric work has found a relationship between the size of a county's emigrant population and its propensity to have civil wars, from which it has been deduced that emigrants must be funding conflicts. The relationship has sometimes been used to conclude that tougher immigration policies are needed in rich countries. Neither conclusion is in fact supported by the evidence. The relationship between conflict and the size of emigrant populations could arise for a number of reasons that have nothing to do with rebel financing. For one, diasporas may be larger because a country has had a history of shocks such as smaller conflicts or droughts that could produce or signal longstanding grievances. High emigration rates may also be the result of few job opportunities (and high levels of dissatisfaction) at home. Alternatively, high levels of emigration could alter the characteristics of the residual population – possibly resulting in a disproportionately low amount of "entrepreneurs" and a disproportionately high amount of frustrated people left behind. Or, the direction of causality may run in the opposite direction: emigration may result from expectations of future conflict.[121] Any or all of these effects could lead to the correlation that we observe between the size of emigrant populations and conflict without producing any evidence that emigrants typically fund wars.[122] Yet statistical research has not yet distinguished between them. And of course, even if it were the case that emigrants are an important source of finance for wars, the implications for policy-makers will depend on who is being financed - there is no systematic cross-national evidence to indicate that diasporas are funding rebels rather than governments or civilian militias.[123]

Another source of rebel financing is sponsorship from third party sources. Remarkably, recent econometric work fails to probe the extent or impact of financing resulting from Cold War politics or of local geopolitics.[124] This is particularly surprising given the fact that the civil wars being studied in this research took place largely over the period of the Cold War and there are numerous well-documented cases of financing of rebel groups by Cold War powers (such as US support for UNITA and the USSR's support for the MPLA[125]), by local major powers (such as the funding of RENAMO by South Africa) or by religious sympathizers.

A final source of financing is voluntary transfers (notably "subscriptions") and involuntary transfers (notably looting) from civilian populations. Such transfers may determine the viability of a rebel organization, and may condition its need for cash from other external sources. The form of these transfers is likely to have implications for the relations between rebel groups and civilian populations, with both military and humanitarian consequences. However, since most econometric work relies on macro-economic data, it fails to record any information about these exchanges. Gathering cross-nationally comparable information on the forms of financial relations between rebel groups and civilian populations should become a research priority.

REBELS AS ECONOMIC PRODUCERS. It is easy to find cases of economic destruction by warring groups; however it is also important to understand the extent to which rebel groups also engage in economic production. In some instances, by functioning as service providers and as organizers of economic activity, rebel groups may act as surrogate states, underscore the irrelevance of the government and develop support among civilian populations. In the War of Independence in Ireland (1916-

[117] See Boutwell and Klare (2000).

[118] The BBC report that Russian troops have been confronting part-time guerillas in Chechnya: 3 July 2000, "Chechen bombers haunt Russians." Part-time guerillas in Vietnam are described in "The US Army in Vietnam." American Military History, Army Historical Series, United States Army Center of Military History. Eamon Collins (1998) meanwhile describes in his autobiography his years working both for the British security services by day and for the IRA by night.

[119] Examples include cashew nuts in Casamance (Evans 2002), tangerines and hazelnuts in Abkhazia (King 2001) and bananas in Somalia (Clarke and Herbst 1997).

[120] The implications for the duration of conflicts that arise from variations in the resources used for financing are discussed below.

[121] Attempts have been made to capture these reverse causality effects. They are however difficult to measure in part because start dates for a conflict often reflect points at which battle deaths reach large numbers rather than points at which civilian populations are severely effected (or expect to be effected).

[122] For earlier more qualitative work see Angoustures and Pascal (1996).

[123] See Sambanis (2001).

[124] These are also difficult relations to test. Collier and Hoeffler (2001) use a dummy variable for the cold war; this dummy however simply test whether there was more violence during the cold war period rather than testing for relationships between stances of foreign governments – neighbors or superpowers – towards different countries and the likelihood of war.

[125] See Stockwell (1978).

1921), Sinn Féin and the IRA created a parallel structure of public goods provision to rival that provided by London. Similar structures have been provided by the EPLF who have supplied medical, veterinary and judicial services in Eritrea[126] and by Maoist rebels supplying banking services and courts in Nepal.[127] There is, however, considerable variation in the extent to which and the form in which rebel groups provide services. While in some places groups imitate states as service providers, elsewhere, they imitate states as extractors, using forced labor to manage local economies. This variation in the extent to which rebel groups provide public goods is of substantive importance, it is also likely to have implications for the forms of violence, for whether a war is sustainable and for options for peace settlements. Nonetheless, as yet, scholarship has not concentrated on explaining (or even measuring) this variation.

POLICIES OF GOVERNMENTS DURING WAR

CHANGES IN EXPENDITURE ALLOCATIONS. Like other protagonists of conflict, governments use economic tools as a weapon of war. For governments, the most important weapon is the re-organization of expenditure across regions and across sectors. In secessionist conflicts governments reallocate expenditure strategically either to punish (as in northern Mali) or to appease (as in southern Senegal) the secessionist areas. Governments allocate budget expenditure to promote particular industries – steel, technology, energy, armaments. Also, as might be expected, defense expenditure may come to constitute extremely high shares of total expenditure.[128] The rise in defense expenditure during conflict is typically paid for by cuts in social expenditure – and from the health sector in particular.[129] With a drop in expenditure on health and a rise in demand for health services, the health sector typically gets hit hard, with long-lasting effects.[130] As suggested for example by Frances Stewart and her colleagues,[131] if rises in defense expenditure are inevitable, then maintaining social expenditure at levels that can protect poor populations requires fiscal expansion. The implication is that if international financial institutions require fiscal contraction as part of structural adjustment programs put in place in wartime, they are likely to cause especially extreme hardship for the poor.

IMPLICATIONS FOR TAXATION. In some instances, conflict has helped to strengthen taxation systems as a result of the state's increased need for revenues, its inability to access revenues from external sources and its enlarged mandate to intervene in the economy. Canada for example introduced income taxes in 1917 to help pay for its war efforts and succeeded in maintaining this revenue source after the end of the war.[132] Similarly, wars fought by Britain in the 18th century and by the United States in the 19th and 20th centuries are often held to explain the development of institutions of domestic taxation.[133] Conversely, some scholars argue that the lack of a military threat to contemporary developing nations helps to explain the weakness of those states.[134] One implication is that the present rise in civil wars may be what is needed to strengthen states, and in Edward Luttwak's phrase we should give war a chance.[135] This conclusion, however, is problematic. While there is considerable evidence for relations between international war and state formation, particularly in Europe, there is little evidence that the logic holds for contemporary civil wars. Possible reasons for the differences are suggested by sociologist Miguel Angel Centeno's study of war and taxation.[136] Drawing on the Latin American experience, Centeno suggests that conflict does not lead to developments in institutions of taxation when state administrative capacity is low, when state control over its own territory is weak and when states have access to "external" sources of revenue. All three conditions are likely to hold for poor, natural resource-dependent states undergoing civil war. It is inappropriate then to expect that states presently undergoing civil war will repeat the European experience and become stronger as a result of their conflicts.

OTHER MACROECONOMIC POLICIES. In countries that fail to develop their institutions of taxation and that also face a falling tax base, the rise in defense expenditure results in a squeezing of other sectors. If governments also lose control over export commodities or face a suspension of aid there may be a more severe loss of foreign exchange. In response, government actions to pay for ensuing deficits include issuing war bonds or, simply, printing money. The latter increases domestic inflation while the rise in domestic debt will compound the effects of increased risk to push up domestic interest rates and crowd out private investment.

INTERNATIONAL CORPORATIONS DURING WAR

International corporations that function in conflict situations, particularly those working with natural resource extraction, are likely to find themselves having to take strategic choices that will have implications for warring groups. If corporations control stocks of lootable assets, then they may be one of the targets of conflict and may

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[126] See Pool (1998).
[127] See for example Harding, Luke 2001. "Nepal army kills 390 Maoists." The Observer. Sunday May 5, 2002.
[128] In the late 1990s for example, Angola defense expenditure averaged around 35% of all expenditure, peaking in 1999 with a 41% allocation to defense (HRW 2001).
[129] Stewart et al. (2001a, p. 85). Stewart et al. (2001a p. 88) report decreases in social expenditure per head in Angola, Ethiopia, Liberia, Somalia, Uganda, El Salvador, Iran and Iraq, and rises Mozambique, Nicaragua and Sudan. While it is useful to have such records of trends, I have found no cross-national work that attempts to quantify the expected effect of conflict on social expenditure using estimates of predicted trends in the absence of conflict.
[130] Ghobarah, Huth, and Russett (2001).
[131] Stewart et al. (2001a, 2001b)
[132] See the description of the process offered by the government of Canada.
[133] See for example Mann (1993), Tilly (1990), and Rosenthal (1998).
[134] See for example Bates (2001, p. 83).
[135] Luttwak (1999).
[136] Centeno (1997).

have to choose between providing for their own security through the use of mercenary groups or, at least tacitly, entering into deals with one side or another in a conflict.[137] These conditions raise difficult questions: Can corporations function during conflicts without making things worse? Does the presence of corporations affect the type or levels of violence employed, or the chances for one side or other to win? Does it facilitate the flow of finances or weapons to fighting groups, or does it affect the way the economy responds to a conflict? Sadly, despite some careful work on the activities of particular industries in particular countries, these comparative questions have been largely ignored by scholars, particularly those engaged in econometric research.[138]

In contrast to the relative silence from academics, many non-governmental groups have paid considerable attention to the economic roles of corporations during conflicts. In the process, corporations have faced criticism for working in conflict zones and in countries where human rights are being abused (see for example: Global Witness, Business & Human Rights and Project Underground). NGOs have called for campaigns against companies supporting governments during conflicts (see for example the report by Christian Aid on the activities of oil companies in Sudan). In addition, actions taken against business activities that foster low intensity conflict or environmental damage[139] also have implications for war contexts. NGOs for example are pushing for legislation for disclosure by corporations of their relations with military and police forces (see the International Right to Know Campaign) which, if successful, could have broad application. NGO lobbying extends now also to corporations that are not located in conflict areas but that trade with those that are. Hence for example, the Danish firm DLH has been targeted by Global Witness[140] and Greenpeace for trading with corporations in Liberia.[141]

Oil Corporations During Conflicts

Oil companies have sided with governments in a number of conflicts. In Sudan, for example, revenues from oil operations by firms from Canada (Talisman) Sweden (Lundin AB), China (China National Petroleum Corporation's PetroChina), Malaysia (Petronas) and Austria (OMV) have allowed the government to increase its offensive capabilities. The government of Sudan now possesses attack helicopters, purchased using oil revenues from the Greater Nile Petroleum Operating Company, a company jointly owned by these Canadian, Malaysian and Chinese corporations. It uses airfields maintained by the oil company to launch its attacks. Evidence also suggests that the helicopter attacks have killed civilians indiscriminately.[142] Similarly, oil revenues have funded the government of Angola during its wars against the diamond-funded UNITA.[143] And the French oil company, Elf, has also been severely criticized.[144] Elf has recently been indicted, along with President Sassou Nguesso of the Republic of Congo, for war crimes committed October 1997 in Congo,[145] standing accused of direct involvement in the war subsequent to claims that massacres were carried out by Elf's helicopters in a bid to preserve contracts for the corporation.[146] One feature that appears to make the involvement of oil corporations in Angola and the Republic of Congo particularly problematic is that, by signing deals with fighting groups for options on assets not yet controlled, they provide further incentives for groups to capture war booty.[147]

POLICY RESPONSES. In response to these criticisms some corporations have begun to publish "social responsibility reports."[148] The Social Responsibility Reports by Talisman Oil for example have been made publicly available on-line. In addition, a number of forums for coordinating corporate policies have been established, including the Corporate Social Responsibility Forum, the UN initiated Global Compact and *ad hoc* consultative groups. In December 2000 one set of such meetings between companies (Chevron, Texaco, Freeport MacMoran, Conoco, Shell, BP, Rio Tinto), NGOs and the governments of the US and UK, produced a set of guidelines for corporate action, the Voluntary Principles

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[137] Take the example of diamonds. Domestic diamond assets have played an important role in promoting conflict in three diamond producing African countries (Angola, Sierra Leone and the Democratic Republic of Congo). Trade in diamonds has also played a role in conflicts involving neighboring states, in particular in Liberia and in Zimbabwe. Diamond corporations, if they do not withdraw, have tried either to strike deals with governments, or, when states are weak, to continue mining using private military (mercenary) groups for security. Hence for example DiamondWorks and Branch Energy in Sierra Leone worked with Sandline (Smillie et al. 2000) and Executive Outcomes. The latter group was also employed by the government of Sierra Leone.

[138] For a non-econometric policy-oriented study of the role of corporations in conflict, see Haufler (2001).

[139] Notably the focus on Shell subsequent to the execution of Ken Saro Wiwa and the impacts of Freeport-McMoRan Copper and Gold Inc. on indigenous communities in Indonesia (Abrash 2001).

[140] See Global Witness's briefing to the UN.

[141] The case concerns links with the Oriental Timber Company (OTC). DLH trades with the company despite evidence that OTC's activities are linked to arms trafficking, to the conflict in neighboring Sierra Leone and to gross human rights violations, as well as environmental destruction. On links between timber firms and the arms trade in Liberia, see the Report of the UN Panel of Experts: S/2001/1015.

[142] In one incident in February 2002, helicopter attacks struck a World Food Program food distribution point in the Upper Nile Region killing 24 people.

[143] See Cilliers and Dietrich (2000).

[144] In complaints lodged with the UN, The International League for the Rights and Liberation of Peoples (2000) complained that: "ELF and the French state are responsible for systematic and repeated violations of the right of people to peace. The French oil magnates encouraged the secession of Biafra. In Angola, they intervened preventing Savimbi and Dos Santos' victory thus further prolonging the suffering of the Angolan people. They supported in arms and finance all the warring parties present in Congo Brazzaville, in Mobutu's Zaire, in Central Africa, in Rwanda, in Sudan. They utilized Gabon as a platform for arms sale and mercenaries in Biafra, in Benin. They contributed through civil wars and interventions to general and continued destabilization of Africa."

[145] "Elf est poursuivie pour son soutien au président congolais Sassou Nguesso." Le Monde, 18. October 2001. AFP , 12/10/2001, "Plainte collective déposée contre Sassou Nguesso et TotalFinaElf"

[146] The fact that the helicopters bore ELF's logo seems not to be in dispute. ELF claims, however, that the helicopters, hired on previous occasions by ELF, belong to another firm that failed to remove ELF's logo.

[147] This hypothesis is suggested and finds support in Ross (2002c).

[148] See, for a book length treatment, Bomann-Larsen (2002).

On Security And Human Rights. The principles require investigation of allegations of human rights abuses, greater dialogue with local communities, and standards for the use of private security firms. While the principles carry no legal weight they provide a basis for monitoring corporate action.

Other responses include more formal bans on trade, notably relating to the diamond industry.[149] Diamond bans, however, have proven to date largely ineffective. Bans against exports from particular countries have already been in place without great success in large part due to the complicity of African leaders, international corporations and trading institutions in wealthy nations.[150] After sustained whistle blowing, fears that sanctions and the publicity concerning the role of diamonds in fuelling conflicts will hurt the entire industry have now resulted in a number of initiatives involving corporations and governments to allow for the separation of conflict diamonds (an estimated 4% of global production) from non-conflict diamonds. These include notably the recent Kimberley Process that requires a "chain of warranties" linking individual diamonds to their mine of origin.[151]

ACTIONS BY THE INTERNATIONAL COMMUNITY

Aid agencies stand accused of making matters worse in war zones. By functioning during conflicts they become agents in war economies. To deliver relief to priority areas they may, as was the case in Sierra Leone in the mid-1990s, have to decide whether to pay rebel groups for right of passage through their roadblocks or to look for more costly or less efficient alternatives. In Sierra Leone, many chose to pay off the rebels.[152] Elsewhere, aid agencies pay armed groups for protection and provide the lootable commodities that groups fight for.[153] And by supporting refugee camps they may (as with Malian Tuaregs camped in Mauritania) provide material resources that are transmitted to fighting groups[154] or (as was the case for the Rwandese *Interahamwe* camped in Goma) they may provide the security needed for fighting groups to regroup.

Such unintended consequences of humanitarian intervention have received much attention, which has resulted in the establishment of a number of codes of conduct.[155] The problem, however, may run deep. Edward Luttwak, for example, argues that since, after all, an intended effect of humanitarian aid is to provide the means to survive, it may result in a perpetuation of conflict.[156] In support of this discomforting thesis, it has indeed been the case that not only has there been a rise in humanitarian activity over time but the average duration of wars has been increasing over time.[157] Causal arrows probably run in both directions. It does not follow however, as suggested by warring parties, and, occasionally by academics, that the starvation or massacre of one side is either an acceptable or a necessary price to pay for peace.

Added to this there are economic arguments that may link aid to prolonged conflict: aid activity that is centered primarily on import and distribution may produce economic enclaves that prevent the generation of the economic ties that can lead to conflict resolution.[158]

While such debates over whether aid does more harm than good are morally complex,[159] this is an area where as yet there has been little systematic research.

Hence, aid agencies have been criticized for providing humanitarian relief that may serve to exacerbate conflicts. They have also been criticized for suspending development operations during conflicts.[160] It may seem unfair to criticize aid agencies both for doing too much and for doing too little. However, both criticisms relate to a failure of agencies to develop an understanding of the economics of conflict and the political nature of their own interventions. These interrelations should push donors to continue more development-oriented rather than simply relief-oriented programs and should encourage them to be more conscious of the political ramifications of their actions. Hence for example, in a bid to maintain some minimal level of expenditure on public goods and social services, Frances Stewart and her colleagues focus on the need to provide fiscal support to governments who divert funds towards military expenditure. In doing so, however, the donor community is likely to liberate more resources for military action and possibly prolong the conflict.[161] In some cases, for aid agencies to evaluate whether or not this makes sense they will need to decide which side, if any, they want to win. Alternatively they will need to develop economic interventions that support peace processes.[162]

SANCTIONS. One economic weapon that can be used by the international community to alter the policies of foreign governments and stem the financing accruing to rebel

[149] See for example the UN resolution on conflict diamonds (A/RES/55/56) of December 2000.
[150] Hence UN Resolutions 1173 and 1176 that limit the export of Angola's easily-recognized diamonds have simply resulted in the re-routing of the diamonds through Israel or the Ukraine for a first round of polishing before being sold onwards (Gamba and Cornwell in Berdal and Malone 2000). The Fowler Report, released in December 2000 criticizes institutions in the north – particularly in Belgium for facilitating the trade. See for example Human Rights Watch's "Backgrounder."
[151] See also suggestions by De Beers: "De Beers calls for firm diamond industry action on 'conflict diamonds'"
[152] Interviews with aid agencies in Sierra Leone, April 1996.
[153] See Compagnon (1998), Rufin (1995) and de Waal and Omar (1993).
[154] Supplies from refugee camps in Mauritania were transmitted to fighters in Mali during the "second Tuareg rebellion." Interviews with MFUA leaders, Mali 2001.
[155] A notable example is the Red Cross / NGO code of conduct.
[156] Luttwak (1999).
[157] Fearon (2002). See Footnote 1.
[158] Richards (1996) argues that this mechanism was plausibly at work in the Sierra Leone case.
[159] We do well nonetheless to be reminded by David Shearer (2000), who writes that in this area most analysis tends to rely heavily on anecdotal evidence. Shearer argues that the impacts of aid are likely to be much more modest that we believe – and aid agencies would have us believe.
[160] Stewart et al. (2001a).
[161] Indeed this argument is made for the case of Mozambique (Brück 2001, p. 87) in the same volume in which Stewart et al argues for increased fiscal support for government services during conflict.
[162] The International Crisis Group for example recommend maintaining local development initiatives and integrating them into community peace processes (International Crisis Group 2002, p. 21).

groups is sanctions. To date however, sanctions have proved to be a blunt weapon of policy; with most attempts at coercion through sanctions ending in failure.[163] If groups finance activity though trading illegal commodities – such as drugs – and buying commodities illegally – such as arms – the existence of sanctions is likely to be irrelevant. Even if commodities are otherwise legal, the ability to transship through neighboring states may severely reduce the impact of sanctions. Attempts to limit diamond exports from Sierra Leone have been largely frustrated by the ability of diamond traders to transship through Liberia, the Gambia and Côte d'Ivoire.[164] Even when sanctions have real impacts it is not just intended targets that suffer.[165] Indeed it is wrong to think of sanctions as a non-violent weapon: they often result quite directly in the deaths of large numbers of civilians.[166] As with trade protectionism, sanctions have distributive implications, hurting producers of export commodities and benefiting producers of import substitutes. By acting like market regulation that protects domestic monopolies and limits distribution channels, sanctions may also increase opportunities for corruption. This arguably was the case in Haiti[167] and in former Yugoslavia where sanctions have allegedly benefited Milosevic and a small clique of élites.[168] And if the rationale for traditional sanctions is that they work by inflicting pain on civilians so that they in turn put pressure on their leaders, then sanctions seem especially inappropriate in war contexts, where mechanisms of accountability are particularly weak.[169]

Nonetheless during the 1990s, there was an explosion in the use of United Nations Security Council imposed sanctions.[170] Sanctions policies have however become more sophisticated, with the recent development of more targeted sanctioning. New approaches freeze the assets or block the freedom of movement of particular individuals. The development of these new "smart" sanctions has been promoted by the Swiss Government through the Interlaken Process, which focused on financial sanctions, and by the German government whose project focused on arms embargoes and travel bans. This work continues with support from the Swedish government. However, because of their lack of comprehensiveness, targeted sanctions may lead to the exemption of particular commodities through either successful lobbying by industries with economic interests in the commodities or because of increased complexity of political or bureaucratic processes for determining the coverage of sanctions. As a case in point it is striking that despite the existence of sanctions against the Taylor regime in Liberia, the timber industry – which provides financing for the Taylor government and which has been linked to arms deals by the United Nations Panel of Experts – is not covered by the sanctions regime.[171]

MILITARY AID AND MILITARY TRADE. A second area in which the international community can take direct action to alter the incentives or capabilities of fighting groups is through the production and distribution of arms. While much recent work by scholars has concentrated on commodities produced in warring countries, often for consumption in wealthy nations, the arms that are used to do the killing are largely produced in, and sold by, wealthier countries; and often with the support of governments of these countries.[172]

These arms make their ways to warring countries through two channels: as aid or through trade. Military aid (often classified as development aid) is used systematically, and with some success, to alter the policies of foreign governments and has often been used to support one side or other in a civil war.[173] As yet however there is little evidence that it has been successful in promoting peace and indeed econometric evidence suggests that increases in military aid are associated with increased future levels of conflict.[174] One reason is that military aid, by providing the means for increased violence, can heighten tensions rather than leading simply to a clarification of power asymmetries; in some situations it may indeed lead to increases in aid to the other side from rival donors. Another reason is that the motivations for military aid derive from the economic and security concerns of the

163 Hufbauer, Schott and Elliot (1990) find that two thirds of 115 cases of sanctions imposed between the first world war and 1990 failed to meet even with partial success. See also Mack and Khan (2000).

164 Davies and Fofana (2002).

165 Weiss (1999).

166 See Mack and Khan (2000).

167 Gibbons (1999).

168 See for example BBC, 10 July 2000, "Yugoslavia sanctions failing" and 5 October, 2000, "Clinton pledge on lifting sanctions."

169 For a discussion on when general sanctions are likely to work, See Mack and Khan (2000).

170 Sanctions have been imposed against Iraq (1990), the former Yugoslavia (1991, 1992 and 1998), Libya (1992), Liberia (1992), Somalia (1992), Haiti (1993), Rwanda (1994), Sudan (1996), Sierra Leone (1997) and Afghanistan (1999). Sanctions have also been imposed on parts of Cambodia (1992) parts of Angola (1993, 1997 and 1998) and parts of the former Yugoslavia (1999). And there has been a sharp rise in sanctions imposed by individual governments or groups of governments. The most comprehensive work has been produced by Cortright and Lopez (2000) for the IPA. Reports on particular sanctions are available from the Global Policy Forum.

171 Rather than aiming to stem the industry, the UN calls instead for the Liberian government to put revenues from the industry to use for "legitimate social, humanitarian and development purposes" (UN Security Council Press Release, SC/7392).

172 Although developing countries are also weapons producers and suppliers, especially China and Brazil. Other developing countries include South Africa, Israel, Egypt, and India (see Bitzinger (1992) and Brzoska, et al. (1986)).

173 Hence, for a recent example, in August 2002 the US moved with broad bipartisan support to allow for the withdrawal of military aid to all countries that become members of the International Criminal Court but do not pledge to protect Americans in their countries from the court (See for example, the International Herald Tribune, "U.S. warns that backers of tribunal may lose aid." 12 August 2002. As an example of more direct use of aid for economic advantages, the Bush administration announced in April 2002 planned expenditure of $98 million in aid to support a Colombian army brigade in order to protect the Caño Limón pipeline, used to service California-based Occidental Petroleum. (See for example Newsweek April 8 Issue). Other recent actions to support governments in oil rich states against rebel groups are recorded in Foreign Policy Focus, 18 June 2002.

174 Econometric work by Sylvan (1976) on the impacts of sharp increases in military aid suggests that these are generally associated with a rise in international conflict after a lag of approximately two years. A word of caution on these models: plausibly such sharp rises in aid occur in anticipation of future conflict, in which case causality may run in part in the opposite direction.

donor country rather than from the needs of citizens in the recipient countries. Research finds that historically these motivations have rarely been humanitarian.[175] Add to this the fact that providing aid, while bolstering allies, does not guarantee influence. Econometric studies in fact suggest that military aid is most effective in influencing foreign policy rather than domestic policy and has greatest impacts on civilian administrations – conditions that are not met in many civil war contexts.[176]

When arms that have been produced in wealthier countries are traded, there is less control over where they end up and an even lower probability that they will reduce conflict. The trade in small arms and light weapons[177] has grown dramatically since the end of the Cold War with falling prices and a massive proliferation of arms resulting from the changing economic situations and security concerns of producer countries.[178] While arms sales in the 1980s were led by the USSR, the US, the UK and France[179] many of the small arms (as well as attack helicopters) used in civil wars in the 1990s are traced to Eastern European and former Soviet Union countries – Bulgaria in particular.[180] Small arms flows from Eastern Europe[181] for example have made their way smoothly to West African conflicts despite various arms embargoes thanks to poor regulation by exporting countries as well as the complicity by governments of countries neighboring civil war zones, notably Cote d'Ivoire and Burkina Faso.[182] There are two approaches to limiting the trade in arms, one treats it essentially as a policing problem and focuses on the illicit market; the other focuses on the roles states play in promoting and facilitating arms sales to warring areas. These different approaches are a point of contention between governmental and non-governmental groups. While NGOs call for greater regulation of sales by governments (Human Rights Watch for example calls for a standardized end-user certificate, and for the UN to compile and publish information on violations of end-user certificate provisions[183]), governmental attempts to stem the proliferation of small arms have focused narrowly on illegal trafficking rather than on governmental responsibility.[184]

Other responses focus on particular weapons such as cluster bombs and especially the production, distribution and use of land mines.[185] Land mines, by making productive areas inaccessible well after a conflict ends, have particularly severe economic consequences. Costing as little as $3 to purchase they can cost thousands of dollars to clear.[186] The greatest advances in land mines policy have taken place through the 1997 Convention on the Prohibition of the Use, Stockpiling, Production, and Transfer of Anti-Personnel Mines and On their Destruction. Yet support for land mine prohibitions has been uneven. While the convention has been ratified by 121 states[187] and has been closely monitored by non-governmental groups,[188] to date the ban has not been supported by the U.S., China or Russia. The U.S. is now one of just fourteen countries that continues to allow the production of antipersonnel mines.[189]

WAR DURATION AND TERMINATION

REBEL FINANCING AND CONFLICT DURATION. Economic features help to explain the duration of wars. Studies find for example that wars last longer in poorer countries than in wealthier ones, although the reasons for this are not well understood.[190] Research has focused especially on the implications of sources of financing for war duration. Two approaches try to relate financing to duration. Both are problematic.

One approach stresses the military implications of financing, arguing that aid or natural resource financing creates longer wars by enabling rebel groups to keep fighting. However, the likelihood of a military victory will depend not simply on the level of assets available to rebels, but on the relative strength of the fighting groups. Hence,

[175] Schoultz (1981) for example claims that "United States aid tended to flow disproportionately to the hemisphere's relatively egregious violators of human rights." (Quoted in Blanton 2000). Blanton (2000), using econometric techniques finds that a good human rights record does appear to improve the chances of receiving US military assistance but that the amount received is not related to a country's record on human rights. It should also be noted that there has been important variation over time. In the mid to late 1970s there was a significant decline in Military Assistance Programs, and the delivery of weaponry through the Excess Defense Articles program in response to human rights abuses in Latin America. Military aid grew again under the Reagan administration. Meernik et al. (1998) meanwhile argue that since the end of the cold war, US foreign assistance priorities have become less focused on US security concerns and now focus more on ideological values.

[176] More generally, academic research has found that "Successful influence attempts [by the U.S using arms transfers] are more likely when the United States used promises or rewards, focused on altering the recipient's foreign policy, made the attempt on civilian regimes, supplied more of the recipient's arms, and made attempts in the first half of the cold war era, when the United States was generally more powerful" (Sislin 1994).

[177] On small arms and light weapons see Boutwell (1995); for general references see this Light Weapons Bibliography and Resource List..

[178] See for example Laurence (1998).

[179] See Grimmett (1990).

[180] See the Human Right Watch (1999).

[181] See Human Rights Watch (2001b).

[182] Formally, according to Human Rights Watch, many of these transfers were conducted using documents reporting Guinea to be the end user.

[183] Insofar as a coordinating body exists it is the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Technology. The arrangement is informal and involves twice annual sharing of information regarding transfers of dual use technologies. The secretariat notes however that that "the decision to transfer or deny transfer of any item will be the sole responsibility of each Participating State. All measures undertaken with respect to the arrangement will be in accordance with national legislation and policies and will be implemented on the basis of national discretion."

[184] See Hilterman (2001). Notably however governments in developing countries have taken actions to better coordinate the small arms markets in their regions. A key example of this kind of initiative is the moratorium introduced by 16 West African ECOWAS states. See the Moratorium on the Importation, Exportation and Manufacture of Light Weapons.

[185] See Human Rights Watch reports on Landmines as well as resources at website of the International Campaign to Ban Landmines (ICBL).

[186] See the Canadian government reports: Landmines and Development and Landmines: The Hidden Barrier to Development .

[187] This Figure is as of November 2001. For updates see the ICRC.

[188] See Landmine Monitor reports for 1999, 2000, and 2001.

[189] Although the US no longer appears to be actively producing antipersonnel mines See the Human Rights Watch Report "Exposing the Source: U.S. Companies and the Production of Antipersonnel Mines."

[190] See Fearon (2002) and Collier, Hoeffler and Söderbom (2001).

if rebel groups have the upper hand, then reducing their resources may make a decisive victory less likely. We would expect then that more financing to a given group will make conflict termination more difficult only if that group was weaker in the first place.

A second approach argues that groups that benefit during conflict may prefer to fight than to win.[191] Indeed a surprisingly broad set of actors may do well out of war. However, to provide a convincing case for the idea that the benefits of war explain duration, these authors need to show not just that individuals benefit in wartime but that they benefit *more than they would in times of peace*. To do this they need to confront a paradox studied by economists who focus on the material, rather than the psychological or political, gains from war: since (assuming that war entails some destruction) any material gains that accrue to either side from conflict *could* be achieved more efficiently through a peaceful process, then there always exists an alternative peaceful arrangement that could, in principle, leave everyone better off. The logic of the argument should push proponents of an economic agendas approach to demonstrate not simply that people do well out of war but that there are factors that prevent these parties from doing equally well or better during peacetime.

Doing well out of the Algerian conflict

"The military leaders manipulate the atmosphere of fear and violence to accumulate funds, especially through commissions on trade, which they use to support an extensive political patronage system that buttresses their hold on power. The Islamists use the state of emergency to fund their activities through extortion and the black market. In between, both private and public sector interests exploit the gaps in an officially sanctioned culture of corruption and profiteering to make personal gains from the privatisation process and prevent genuine competition in key sectors such as construction and pharmaceuticals. The mass of the population continues to be excluded from the benefits that market liberalisation promised."

Source: International Crisis Group, "Algeria's Economy: The Vicious Circle of Oil and Violence."

Why then can peaceful settlements not always be reached that leave rebel groups at least as well off as they would be fighting? Paul Collier suggests two impediments to peaceful agreements.[192] The first is that groups are not able to guarantee that they will adhere to the agreement after the deal is made. Individuals may have different strengths in times of peace and in times of conflict. If those who are powerful in times of peace are not able to guarantee to those that are benefiting during conflict that they will honor peace settlements, then beneficiaries of conflict may do better to rely on the benefits they can guarantee themselves using violence. This problem is often surmountable by introducing third parties to oversee the application of accords or by providing positions to protagonists within institutions of state – the army and the administration. The second impediment suggested by Collier is that it may not be defensible to grant some protagonists of conflict compensation for laying down their arms – notably human rights violators. In fact some agreements, such as the South African peace agreements and the Lomé Accord for Sierra Leone, do give compensation and prestige to human rights violators in a bid to end conflict. Hence for many conflicts these two impediments may be overcome.[193] The problem may, however, be more difficult if compensation requires the pursuit of illegal activities during peacetime that protagonists succeed in undertaking during war. This it seems is what leads to the special relationship between illegal economic activities, the illegal drug trade in particular, and protracted conflicts.[194] This distinction finds empirical support: while the presence of natural resources, broadly defined, does not affect the duration of conflict,[195] countries that export contraband do appear to have longer wars on average.[196] In these instances, unless states are willing to turn a blind eye to trade in illegal goods by protagonists of conflict, settlements will be difficult to achieve.[197] In the absence of alternative forms of compensation, peace in such conflicts then may require victory rather than negotiation.

ECONOMIC POLICIES DURING TRANSITIONS TO PEACE. Economics is central to transitions to peace. Many of the links are straightforward: if economic issues were in part responsible for the initial war outbreak then addressing the original economic issues will likely help to avoid war re-occurrence. And whatever the origins of the conflict, the destruction brought about by war will produce the need for economic reconstruction, for the re-organization of production and trade, for the retraining and reintegration of ex-combatants and possibly for provisions for distributing resources to winners or losers. All of these require extraordinary financing; yet governments are likely to be in financial straits after a conflict, in part because in the short run, security budgets are likely to remain high (especially if the conflict does not end definitively), the tax base is likely to remain low, and coercive means used to collect taxes during a conflict may have to be foregone in peacetime.[198] Unless there is ready access to aid or foreign debt high interest and inflation rates are likely to persist.

The economic compensation for winners or losers takes a central position at the end of a conflict. Before the Second World War, economist John Maynard Keynes argued that all sides need to benefit from a settlement to

[191] See Keen (2000) and Collier (2000c).

[192] Collier (2000b p. 104)

[193] The Lomé Accords did not stick, in part it seems because Foday Sankoh felt he could profit more from the smuggling of diamonds than he could through overseeing their sale through the organs of state.

[194] For empirical evidence on the relationship between war duration and illegal commodities see Fearon (2002).

[195] Collier, Hoeffler and Söderbom (2001).

[196] See Fearon (2002).

[197] The Government of Senegal for example appears to have been willing to tolerate marijuana production and sale by the *Front Nord* of the MFDC in return for peace in the zones of Casamance that it controls.

[198] See Azam et al. (1994).

prevent grievances being rekindled.[199] For international wars at least, Keynes' position finds support in the theory that the reparations imposed on Germany after the First World War was in part responsible for the Second World War.[200] The principle is, however, applied unevenly at the end of civil conflicts. The peace accords in Mali included clauses to provide jobs for the ex-combatants within the national army and in the Malian administration. It also provided for increased investment in the north, notably funds for small to medium sized enterprises. The accords were successfully implemented in 1995 and since then there have been no further outbreaks of conflict. In contrast in Liberia the accords contained no substantial economic provisions and resulted in a further concentration of economic and political power in the hands of Charles Taylor; Liberia is now again facing civil war. The implications of different re-distributive clauses for the return to civil war is an important and open research question.

DONOR ECONOMIC INVOLVEMENT IN CONFLICT TERMINATION. Does it make sense to provide aid in post conflict situations? And if so, how should it be spent? There are fears that in post-conflict situations any aid resources may be misdirected or misspent. Work by Paul Collier and Anke Hoeffler at the research section of the World Bank indicates nonetheless that, on average, the returns on aid in countries emerging from large scale civil war are particularly high.[201] Research also points to priority areas. Social policies are put at the top. Helping rebuild the health sector subsequent to conflicts should be a high development priority in order to limit the longer term impacts of a conflict.[202] The Conflict Prevention and Reconstruction Unit at the World Bank also stresses the regeneration of local economies and local social structures through the sponsoring of community-led economic initiatives that engage parties on both sides of a conflict.[203] They argue that attempts at macro-economic reform require heightened consciousness of their social and political implications, noting that "in some African countries, the overall economic program has undermined the peace process by forcing too many budget cuts."[204] Collier and Hoeffler also find that aid is most effectively invested in improving social and governance policies and argue that addressing macro-economic imbalances, while growth-enhancing, should be at the bottom of donor priority lists in post-conflict situations. As indicated above demands on central revenues are likely to be particularly high and there is a heightened need for fiscal support and for capital investment through Marshall Plan-style programs.[205]

In the past, however, the performance of the international community in aiding transitions to peace has been mixed. In the case of Mali discussed above, for example, the peace agreement was originally signed in April 1992. Economic provisions were central to the accords; yet the assets of the government of Mali that would have been required to implement the accords were run down. According to a UN study, "supposedly in favor of democracy, the Western donors played a curiously negative role at this stage, providing virtually no financial support for the democratic regime, expressing nothing but skepticism."[206] In the event, the lack of funding resulted in frustration among ex-combatants, a rise in banditry and eventually, by 1994, a collapse into an inter-communal conflict that was more intense than the original conflict.[207]

The difficulty for donors is in knowing when a peace settlement is sufficiently robust to merit financial support. Financing a non-starter is not just costly, it may have adverse effects. But failing to provide financial support can damage a peace process.[208] If, however, they participate in negotiations, even as observers, donors may know when to move to sustain a peace and can better update signals sent to the investor community regarding conflict risks. This is of especial importance since investors are slow to engage in conflict areas even as these are most acutely in need of their investments.

[199] Keynes (1934). See for more recent discussions, Azar and Burton (1986).

[200] See Craig and George (1983, Chapter 6). Craig and George also argue that evidence that reparations increase the likelihood of renewed conflict considerably predates the interwar years.

[201] Collier and Hoeffler 2002c suggest that optimal aid allocations would involve post-conflict situations receiving about twice as much aid as would countries with similar characteristics but not emerging from conflicts.

[202] Ghobarah, Huth, and Russett (2001).

[203] See for example the Unit's "Best Practice in War-to-Peace Transition: The Uganda Veterans Assistance Program." See also World Bank (1998).

[204] Coletta et al. (1998). Some particular macroeconomic policy reforms have, however, been emphasized. By some researchers. Based on a comparative study of peace processes in Cambodia, El Salvador, Mozambique, and Nicaragua, Nicole Ball (1996) stresses currency stabilization and the bolstering of financial institutions.

[205] Lake (1990).

[206] Poulton and ag Youssouf (1998, pp. 66-67).

[207] Renner (1994) notes a similar dynamic in Nicaragua where the government received only $5.8 million of the estimated $40.8 million needed to demobilize Sandinista Army soldiers.

[208] By signaling their lack of faith in an agreement to combatants and to investors, donor fears may turn out to be self-fulfilling prophecies.

IV Conclusions and Recommendations

Research into the relations between economics and conflict is still in early stages. Many areas remain unexplored or only partly explored and the tasks that researchers have set for themselves do not always correspond with the questions that concern policy makers. Nevertheless, research has reached a rough consensus on many core questions. The box below highlights a number of these.

FINDINGS

- Poverty makes civil wars more likely; civil wars in turn worsen poverty. These relations are stronger for very poor countries than for developing countries generally.
- Countries that rely heavily on primary commodities are more vulnerable to conflict.
- Countries with severe inequality between ethnic or regional groups are more vulnerable.
- Countries that trade with each other are less likely to fight each other.
- Short term fluctuations in GDP do not make international conflicts more likely.
- Domestic investment collapses during conflicts; it does not recover until long after they end.
- Health infrastructure is especially hard hit; the damages endure well after conflicts end.
- Economic sectors that depend on capital and high levels of internal trade (for example, construction, finance, manufacturing) are likely to be hit hardest.
- Wars last longer if rebels finance themselves using illegal commodities.
- Wars last longer in poorer countries.
- Aid is especially effective in post-conflict situations.

A central aim of this review has been to examine evidence from research that is used to guide policy. To this end the review has pointed to areas where policies have been recommended without the required evidence to support them. The most important of these more "negative" findings are summarized in the box below.

NEGATIVE FINDINGS

- The greed of rebels is just one of many mechanisms that can account for a correlation between natural resources and conflict. Policy responses to alternative explanations include: broader distribution of resource profits, price stabilization policies, more transparent relations with corporations, and the promotion of industries that are more intensive in internal trade.
- Despite some claims to the contrary, inequality probably matters for conflict. Case study work suggests that horizontal inequality (not "overall" inequality) is likely to lead to conflict.
- Cutting rebel group financing will not necessarily lead to shorter wars, particularly if rebel groups have an upper hand or benefit from popular support.
- Evidence does not support the argument that contemporary civil wars strengthen the institutions of taxation of developing states.
- Evidence does not support the idea that contemporary civil wars lead to important technological innovations.
- There is no support for the claim that "giving war a chance" leads to longer-term peace.
- There is no support for the claim that tougher immigration policies in rich countries will reduce conflicts overseas.
- The fact that some groups do well out of war is not sufficient to explain war duration.

The new research does however provide direction for policy choices in a number of areas. The box below summarizes policy lessons supported by this research.

POLICY IMPLICATIONS

Economic policies to reduce risks of violent conflict

- Development policies need to take account of linkages between development and conflict. Despite evidence of important linkages, key development projects, such as the Millennium Development Goals still fail to focus explicitly on the risks and effects of conflict.
- The greatest gains in conflict prevention are likely to be made by focusing development efforts on the very poor rather than on countries of intermediate wealth.
- Policies should target horizontal inequality. Options include expanded access to education, regional integration programs, affirmative action and political systems that provide institutional guarantees of more broad based political representation.

Economic policies during periods of conflict

- Donors should, where possible, continue development-oriented programs rather than focusing simply on relief.
- Health and social services need special support during conflicts, as these are likely to be hit as governments divert funds for war efforts.
- Development aid and relief work need to take account of their impact on conflict dynamics. Assistance is likely to liberate more resources for military action for one side or the other. Engagement may require that agencies decide which side they want to win.

Actions to shorten conflicts and support peace

- Present policies to tackle illicit arms sales are failing. Besides normal police work, research by non-governmental groups suggests there is a need for better monitoring of the sale of arms by producer countries via standardization of end user certificates.
- Attempts to stem commodity financing (by rebels or governments) need to broaden their focus beyond natural resources to look at the role played by agricultural produce.
- Post conflict economic policies should focus on social reconstruction more than on macroeconomic imbalances.

This review has also highlighted a number of areas where research is not yet sufficiently developed to guide policy. In many instances research has discovered correlations between variables of interest, but has not tested between alternative mechanisms that may underlie these correlations. This limits the usefulness of such research for policy since policy choices need to respond to mechanisms that explain outcomes rather than to statistical correlations.

RESEARCH AGENDAS I: FOCUSING ON MECHANISMS

- Qualitative work suggests that different mechanisms linking natural resources and conflict matter for different conflicts. Evaluating the roles of rival mechanisms econometrically will require using data on illegally trafficked goods, the value of un-mined reserves,[209] the geographic concentration of resources, the importance of manufacturing in the domestic economy, fluctuations in resource prices, the identities of those controlling the extraction of the resources and the distribution of revenues accruing from them.
- Case study evidence suggests that the mechanisms through which natural resources affect conflict are also systematically linked to the form of political system in place and to the form of the natural resources. Insights from this literature can now be used to improve cross-national econometric work.
- Although there is a robust negative correlation between wealth and conflict, little work has aimed to distinguish between the rival mechanisms linking the two.
- There is a correlation between the size of emigrant populations and the onset of conflict. A number of rival mechanisms may account for this. Evaluating the roles played by each remains an open research agenda.

I end by noting six open areas for the comparative study of contemporary civil wars. In each case the research area either bridges findings from qualitative work and findings from quantitative work or points to areas where approaches in the study of international wars could inform the quantitative study of civil wars.

RESEARCH AGENDAS II: NEW RESEARCH AREAS

- **Inequality**. Addressing disagreements between case study research and econometric work on the role of inequality in conflict onset requires a cross-nationally comparable measure of "horizontal inequality." This presents hard conceptual as well as data problems.[210]
- **Domestic Trade**. International trade lowers conflict risks. Econometric work has not yet focused on whether this is also true for domestic trade. Studying this question will require cross-nationally comparable measures of the density of internal exchanges.
- **Costs of Conflict**. This review argues that studies fail to capture the simultaneous effects of the multiple channels through which conflicts impose costs on economies. Better accounting requires estimating the destruction of human and physical capital, changes in levels of investment, scholarization, technological innovation and market interruptions. Better estimates of costs are needed in order to produce estimates of the economic value of conflict prevention.
- **Fighter-Civilian Relations.** In some cases rebels act as service providers and receive moral and material support from populations. In others they are engaged primarily in extraction. This variation has implications for the economic impacts of conflict, for the financial requirements of fighters and for the resolution of conflicts, yet cross national research has not focused on explaining it.
- **Businesses in Conflict**. Non-governmental research and qualitative academic research has studied the implications of corporate involvement in war zones for the form and duration of conflict, often in the context of isolated conflicts. As yet however the role of corporations has been largely ignored in cross-national econometric work.
- **Peace Agreements.** The study of international wars termination suggests that demands for reparations lead to greater risks of future conflict. End of civil war agreements vary in how far they compensate different sides yet no cross-national work has uncovered the relations between these terms and prospects for peace.

[209] See de Soysa (2000) for an example of a study that uses sub-soil assets to good effect. In recent work Ross (2002a) has used data from Interpol to study the effects of narcotics production and Ross (2002c) introduces the concept of "booty futures" to describe the incentives induced by reserves not yet controlled by fighting groups.

[210] Perhaps the greatest problem in specifying a cross-nationally comparable measure is in knowing what constitutes a group. What dimensions define groups? Is it ethnicity, race, religion, geography? If geography is it administrative regions or climatic zones? Why are some dimensions more salient in some polities than in others?

V References

Abadie, Alberto and Javier Gardeazabal. "The Economic Costs of Conflict: A case control study for the Basque country" NBER Working paper 8478.

Abdullah, Ibrahim and Patrick Muana. 1998. "The Revolutionary United Front of Sierra Leone" in Clapham, (1998).

Abrash, Abigail. 2001. "The Amungme, Kamoro and Freeport: How Indigenous Papuans Have Resisted the World's Largest Gold and Copper Mine." Cultural Survival Quarterly, Spring 2001

Amnesty International, 2000. "Human rights - is it any of your business?" Report. London: Amnesty International.

Amirahmadi, H. 1990. "Economic Reconstruction of Iran: Costing the War Damage." Third World Quarterly 12(1): 26-47.

Anderton, Charles H. 2001. "Economic Theorizing of Conflict: Historical Contributions, Future Possibilities" in Brauer (2002).

Angell, Norman. 1933. The Great Illusion. 2nd ed. New York: 1933.

Angoustures, Aline and Valérie Pascal. 1996 "Diasporas et financement des conflits" in Jean and Rufin (1996).

Auvinen, J and EW Nafziger. 1999. "The Sources of Humanitarian Emergencies" Journal of Conflict Resolution 43(3): 267-90.

Azam, Jean-Paul. 1995. "How to Pay for Peace? A Theoretical Framework with Reference to African Countries." Public Choice, 83, 173-84.

Azam, Jean-Paul and Constant Koidou. 2002. Working Paper on Côte d'Ivoire. World Bank / Center for United Nations Studies at Yale. Yale. April 12-15.

Azam, Jean-Paul, David Bevan, Paul Collier, Stefan Dercon, Jan. W. Gunning and S. Pradhan. 1994. Some Economic Consequences of the Transition from Civil War to Peace, Policy Research Working Paper 1392. The World Bank.

Azar, Edward E., and John W. Burton. 1986. International Conflict Resolution: Theory and Practice. Boulder: Lynne Rienner.

Barnaby, Frank 1991. "The Environmental Impacts of the Gulf War." The Ecologist. Vol. 21. No. 4, pp. 166-172.

Ball, Nicole. 1996. "Making Peace Work - Lessons For The International Development Community" Conference Report Washington: Overseas Development Council.

Bates, Robert H. 1973. "Ethnicity in Contemporary Africa" Program in Eastern African Studies, Working Paper XIV, Maxwell School, Syracuse University.

Bates, Robert H. 2001. Prosperity and Violence. New York: Norton.

Bates, Robert H., Avner Greif, and Smita Singh. 2001. "Organizing Violence." CID Working Paper No. 71, September 2001

Ball, Nicole. 1996. Making Peace Work, ODC Policy Essay No. 18.

Berdal, Mats, and David Malone. 2000. Greed and Grievance: Economic Agendas in Civil Wars. Ottawa: IDRC.

Bitzinger, Richard A. 1992. "Arms to Go: Chinese Arms Sales to the Third World." International Security, Vol. 17, No. 2. (Autumn) pp. 84-111.

Blomberg, S. Brock, Gregory D. Hess and Sidharth Thacker. 2000. "Is there evidence of a poverty-conflict trap?" Paper presented at the World Bank DEC-RG conference on the Econonomic of Political Violence.

Bomann-Larsen, Lene, ed. 2002. Corporate Social Responsibility in the Norwegian Petroleum Sector - proceedings from the INTSOK 2001 conference. Oslo: Intsok.

Boutwell, Jeffrey and Michael T. Klare. 2000. "A Scourge of Small Arms" Scientific American.

Boutwell, Jeffrey, Michael T. Klare, and Laura Reed, eds. 1995. Lethal Commerce: The Global Trade in Small Arms and Light Weapons. Cambridge, MA: American Academy of Arts and Sciences.

Brauer, Jurgen. 2000. "The Effects of War on the Natural Environment." Entry for the Encyclopedia of Life Support Systems, Paris: UNESCO (forthcoming).

Brauer, Jurgen. 2001. "War and Nature: The Problem of Data and Data Collection." Paper presented at PRIO/Uppsala University/World Bank-DECRG High-Level Scientific Conference Identifying Wars.

Brown, Michael E and Richard N Rosencrance (Ed.) 1999. The Costs of Conflict: Prevention and Cure in the Global Arena Oxford: Rowman & Littlefield/Carnegie Commission on Preventing Deadly Conflict.

Brauer, Jurgen. 2002. A Millennial View On Defence And Peace Economics, Special Issue of Defence and Peace Economics. April.

Brzoska, M. and T. Ohlson. 1986. Arms Production in the Third World, SIPRI, Taylor and Francis: London and Philadelphia.

Brück, Tilman. 2001. "Mozambique: The Economic Effects of the War." In Stewart et al. (2001b).

Centeno, Miguel Angel. 1997. "Blood and Debt: War and Taxation in Nineteenth-Century Latin America." American Journal of Sociology. Vol. 102:6, pp. 1565-1605.

Choucri, Nazli and Robert C. North. 1972. "Dynamics of International Conflict: Some Policy Implications of Population, Resources, and Technology." World Politics, Vol. 24, Supplement: Theory and Policy in International Relations. (Spring, 1972), pp. 80-122.

Cilliers, Jakkie and Christian Dietrich (editors). 2000. Angola's War Economy: The Role of Oil and Diamonds. Pretoria: Institute for Security Studies.

Clapham, Christopher. 1998. African Guerrillas. Indiana: Indiana University Press.

Clarke, Walter and Jeffrey Herbst. 1997. Learning from Somalia: The Lessons of Armed Humanitarian Intervention. Boulder: Westview Press.

Claude..Inis L. 1962. Power and International Relations. New York: Random House.

Colletta, Nat J., Michelle Cullen, and Johanna Mendelson Forman, "Conflict Prevention and Post-Conflict Reconstruction: Perspectives and Prospects." Workshop Report, World Bank, August 1998.

Collier, Paul. 1999a. "On the Economic Consequences of Civil War." Oxford Economic Papers. 51, pp. 168-83.

Collier, Paul. 1999b. "Doing Well Out of War." Conference Paper. World Bank.

Collier, Paul. 2000a. "Economic Causes Of Civil Conflict and their Implications for Policy" World Bank. Working Paper. Forthcoming in Crocker, Chester A. and Fen Osler Hampson with Pamela Aall (eds.) Managing Global Chaos. Washington DC: US Institute of Peace.

Collier, Paul. 2000b. "Doing Well out of War: An Economic Perspective." in Berdal and Malone (2000).

Collier, Paul. 2000c. "Rebellion as a Quasi-Criminal Activity." Journal of Conflict Resolution. 44: 839-53.

Collier, Paul and Jan Gunning. 1995. "War, Peace and Private Portfolios." World Development, Vol. 23, No. 2, pp. 233-241.

Collier, Paul and Anke Hoeffler. 2000a. "Greed and Grievance in Civil Wars." Working Paper. World Bank. WPS 2000-18.

Collier, Paul and Anke Hoeffler. 2000b. "Aid, Policy and Peace." Working Paper. World Bank.

Collier, Paul and Anke Hoeffler. 2002a. "On the Incidence of Civil War in Africa" Journal of Conflict Resolution. Forthcoming.

Collier, Paul and Anke Hoeffler. 2002b. "Greed and Grievance in Civil Wars." Working Paper, Centre for the Study of African Economies, Oxford. WPS 2002-01.

Collier, Paul and Anke Hoeffler. 2002c. "Aid, Policy and Growth in Post-Conflict Countries." Working Paper, World Bank.

Collier, Paul, Anke Hoeffler and Måns Söderbom. 2001. "On the Duration of Civil War." World Bank, Working Paper.

Collins, Eamon. 1998. Killing Rage. London: Granta.

Collinson, S. (forthcoming) "Toward politically informed humanitarian action: implementing a political economy approach." HPN Network paper. London: Overseas Development Institute.

Colson, Elizabeth. 1974. Tradition and Contract Chicago: Aldine.

Compagnon, Daniel. 1998. "Somali Armed Units: The Interplay of Political Entrepreneurship and Clan-based Factions." In Clapham (1998)

Copeland, Dale C. 1996. "Economic Interdependence and War: A theory of trade expectations." International Security. Vol. 20: 4, pp. 5-41.

Cortright, David and George A Lopez. 2000. The Sanctions Decade: Assessing UN strategies in the 1990s. Boulder : Lynne Rienner.

Coulomb, Fanny and Jacques Fontanel. 2001. "Disarmament: A Century of Economic Thought" in Brauer (2002).

Craig, Gordon and Alexander George. 1983. Force and Statecraft. New York: Oxford University Press.

Cramer , Christopher. 2001. "Economic Inequalities and Civil Conflict" CDPR Discussion Paper 1501.

Davies, Victor and Abie Fofana. 2002. "Diamonds, Crime and Civil War in Sierra Leone." Working Paper on the Economics of Crime and Violence in Sierra Leone, World Bank / Center for United Nations Studies at Yale. Yale. April 12-15.

Davoodi, Hamid , Benedict Clements, Jerald Schiff, and Peter Debaere. 2001. "Military Spending, the Peace Dividend, and Fiscal Adjustment" IMF Staff Papers Vol. 48, No. 2

Dashwood, Hevina S., 2000. Zimbabwe, The Political Economy of Transformation, University of Toronto Press.

de Melo Martha, Cevdet Denizer and Alan Gelb. 1996. "From Plan to Market." Policy Research Working Paper 1564, World Bank, Washington DC.

de Soysa. 2000. "The resource curse: Are Civil Wars Driven by Rapacity or Paucity." In Berdal and Malone (2000).

de Waal, Alex and Raakiya Omar. 1993. "Doing harm by doing good? The International Relief Effort in Somalia." Current History (May) pp. 198-202.

des Forges, Alison. 1999. Leave None to Tell the Story: Genocide in Rwanda. New York: Human Rights Watch.

Doyle, Michael and Nicholas Sambanis. 2000. "International Peacebuilding: A Theoretical and Quantitative Analysis." American Political Science Review. 94 (4): 779-801 (December).

Drèze, J. and H. Gazdar. 1992. "Hunger and Poverty in Iraq, 1991." World Development, vol. 20, no. 7, pp. 921-945.

Doyle, Michael . 1983. "Kant, Liberal Legacies and Foreign Affairs." Philosophy & Public Affairs 12 (Summer): 205-35.

Doyle, M. 1997. Ways of War and Peace: Realism, Liberalism, and Socialism. New York: Norton.

Dufield, Mark 2002. "Aid and complicity: the case of war-displaced Southerners in the Northern Sudan." Journal of Modern African Studies, 40, 1 Cambridge University Press

Durlauf, Steven N. and Quah, Danny T. 1998. "The new empirics of economic growth." CEP discussion paper no. 384.

Ensminger, Jean. 2001. "Market Integration and Fairness: Evidence from Ultimatum, Dictator and Public Goods Experiments in East Africa." Working Paper, California Institute of Technology.

Evans, Martin. 2002. "The Political Economy of War in the Casamance." Working Paper. SOAS, London.

Fearon, James. 2002. "Why do some civil wars last so much longer than others?" Working Paper, Stanford University. Presented at the Harvard Seminar on Positive Political Economy, May 2002.

Fearon, James and David Laitin. 2002. "Ethnicity, Insurgency and Civil Wars." American Political Science Review (forthcoming).

Fearon, James and David Laitin. 1999. "Weak States, Rough Terrain, and Large-scale Ethnic Violence Since 1945" Working paper presented at APSA 1999.

Fitzgerald, Valpy. 1997. "Paying for the War: Macroeconomic Stabilization in Poor Countries Under Conflict Conditions." Oxford Development Studies. 15:1. pp. 43-64.

Fitzgerald, Valpy and Arturo Grigsby, 2000. "Nicaragua: the Political Economy of Social Reform and Armed Conflict." in War and Underdevelopment: Case Studies of Countries in Conflict, vol. 2 F. Stewart & V. Fitzgerald, eds., Oxford University Press, Oxford.

Frieden, Jeffry. 1994. International investment and colonial control: a new interpretation" International Organization 48, no. 4 (Autumn).

Garver , John W. 1991. China-India Rivalry in Nepal: The Clash over Chinese Arms Sales Asian Survey, Vol. 31, No. 10. (October), pp. 956-975.

Ghobarah, Hazem , Paul Huth, and Bruce Russett. 2001. "Civil Wars Kill and Maim People—Long after the Shooting Stops." Yale University. Working Paper, Harvard.

Gibbons, Elizabeth. 1999. Sanctions in Haiti: Human Rights and Democracy Under Assault. Center for Strategic and International Studies, Washington. Westport, CT: Praeger.

Grimmet, Richard F. 1988. Trends in Conventional Arms Transfers to the Third World by Major Suppliers 1981-1988. CRS Report No. 9-434 F. Washington DC: CRS.

Grossman, Herschel.I. 1991. 'A General Equilibrium Model of Insurrections.' American Economic Review. 81, pp. 912-21.

Grossman, Herschel I. 1995. "Insurrections," in Hartley and Sandler (1995)

Gurr, Ted Robert and Will H. Moore. 1997. "Ethnopolitical Rebellion: A Cross-Sectional Analysis of the 1980s with Risk Assessment for the 1990s." American Journal of Political Science, 41: 4 1079-1103.

Guyer, Jane I. 2002. "Briefing: The Chad-Cameroon Petroleum and Pipeline Development Project." Africa Affairs. Volume 101: 402.

Gyimah-Brempong, Kwabene and Marva Corley. 2002. "Civil Wars and Economics Growth in Sub-Saharan Africa." Working Paper. University of South Florida.

Hammarström, Mats. 1986. "Securing Resources by Force. The Need for Raw Materials and Military Intervention by Major Powers in Less Developed Countries." Report No. 27. Uppsala: Department of Peace and Conflict Research, Uppsala University.

Hartley, Keith and Todd Sandler, eds., 1995. Handbook of Defense Economics, vol. 1. Amsterdam: North Holland

Haufler, Virginia. 2001. "Is There a Role for Business in Conflict Management?" In Chester A. Crocker, Fen Osler Hampson, and Pamela Aall. 2001. Turbulent Peace The Challenges of Managing International Conflict. USIP.

Hendrickson, Dylan and Nicole Ball. 2002. "Off-budget Military Expenditure and Revenue: Issues and Policy Perspectives for Donors." CSGD Occasional Papers 1. London.

Hilterman, Joost. 2001. "U.N. Conference on Small Arms Trafficking" Press statement delivered at IANSA Press Conference, New York, July 9, 2001

Hirsch, John. 2001. Sierra Leone: diamonds and the struggle for democracy. London: International Peace Academy Occasional Paper Series and Boulder, CO: Lynne Rienner Publishers, 2001, pp. 175.

Hirshleifer, Jack. 1995. "Theorizing about Conflict." in Handbook of Defense Economics, ed. Hartley, K. and Todd Sandler, 165-89. Vol.1, Amsterdam, Elsevier Science.

Hirshleifer, Jack. 2001. The Dark Side of the Force: Economic Foundations of Conflict Theory. Cambridge, UK: Cambridge University Press.

Hirschman, Albert. 1982. "Rival Interpretations of Market Society: Civilizing, Destructive, or Feeble." Journal of Economic Literature XX: 1463-1484.

Holsti, K. J. 2000. 'Political Causes of Humanitarian Emergencies.' In Nafziger, Stewart, and Väyrynen (Eds.)., vol. 1, pp. 239-281.

Homer-Dixon, Thomas. 1994. "Environmental Scarcities and Violent Conflict: Evidence from Cases." International Security. Vol 16, No. 1, pp. 4-40.

Hufbauer, Gary C., Jeffrey J. Schott & Kimberley Ann Elliot. 1990. Economic Sanctions Reconsidered: History and Current Policy, 2nd Edition. Washington, DC: Institute for International Economics.

Human Rights Watch. 1999. Bulgaria: Money Talks - Arms Dealing with Human Rights Abusers. Human Rights Watch Report. New York (April).

Human Rights Watch. 1997. "Exposing the Source: U.S. Companies and the Production of Antipersonnel Mines." New York: Human Rights Watch Report, (April).

Human Rights Watch. 2001a. The Oil Diagnostic in Angola: An Update, March 2001.

Human Rights Watch 2001b. "No Questions Asked: The Eastern Europe Arms Pipeline to Liberia." Human Rights Watch Briefing Paper. (November 15).

Hunt, W. Ben. 1990. "Port Access and Arms Sales: The Unspoken Quid Pro Quo" The Journal of Conflict Resolution, Vol. 34, No. 2. (June), pp. 335-365.

International Crisis Group. 2002. God, Oil and Country. Report.

International League for the Rights and Liberation of Peoples. 2001? "The Right to Development." UNHCR Website. .

Imai, Kosuke and Jeremy Weinstein. 2000. "Measuring the Economic Impact of Civil War." CID Working Paper No. 51, Harvard University.

Jean, François and Jean-Christophe Rufin 1996 Économie des guerres civiles Paris: Hachette.

Kaldor, Mary. 1999. New and Old Wars: Organized Violence in a Global Era. Cambridge: Polity Press.

Keen, David. 1998. The Economic Functions of Violence in Civil Wars. Adelphi Paper 320, Oxford: Oxford University Press, for the International Institute of Strategic Studies.

Keen, David. 2000. "Incentives and Disincentives for Violence." Chapter 2 in Berdal and Malone, 2000.

Keen, David. 2001. "The Political Economy of War." Chapter 3 in Stewart et al. (2001a).

Keynes, John Maynard. 1982 [1934]. "The New Statesman and Nation." p. 34 in Elizabeth Johnson and Donald Moggridge (eds.) Collected Writings of J.M. Keynes. Vol. 28. Cambridge: Cambridge University Press and The Royal Economic Society.

King, Charles. 2001. "The Benefits of Ethnic War: Understanding Eurasia's Unrecognized States" World Politics. July. Vol. 53, No. 4.

King, Gary and Lisa Martin. 2001. "The Human Costs of Military Conflict." Paper presented at Conference on Military Conflict as a Public Health Problem.

King, Gary and Christopher Murray. 2001. "Rethinking Human Security." Political Science Quarterly. Volume 116: 4.

Klugman, Jeni. 1999. "Social and Economic Policies to Prevent Complex Humanitarian Emergencies: Lessons from Experience." Policy Brief No.2. Helsinki: UNU/WIDER.

Knight Malcom., Norman Loayza, and Delano Villanueva. 1996. "The Peace Dividend: Military Spending Cuts and Economic Growth." IMF Staff Papers. Vol.43, pp. 1-37.

Lake, A., ed. 1990. After the Wars: Reconstruction in Afghanistan, Indochina, Central America, Southern Africa and the Horn of Africa, New Brunswick, NJ, Transaction Publishers.

Laurence, Edward J. 1998. "Small Arms, Light Weapons, and Conflict Prevention: The New Post-Cold War Logic of Disarmament" In Cases and Strategies for Preventive Action, edited by Barnett R. Rubin, The Century Foundation Press.

Le Billon, Philippe. 2001. "The political ecology of war: Natural resources and armed conflict." Political Geography 20 (2001), pp. 561-584.

Luttwak, Edward. 1999. "Give War a Chance." Foreign Affairs, July/August. On-line at

Macfie, A. L. 1938. "The Outbreak of War and the Trade Cycle." Economic History. 3 (Feb. pp. 89-97.

Maas, Peter. 2001. "Ayn Rand Comes to Somalia." The Atlantic Monthly. May 2001.

Mack, Andrew and Asif Khan. 2000. "The Efficacy of UN Sanctions." Security Dialogue, 31(2).

Mack, Andrew. 2002. "Civil War: Academic Research and the Policy Community." Journal of Peace Research. (Forthcoming.)

Mamdani, Mahmood. 1996. Citizen and Subject: Contemporary Africa and the Legacy of Late Colonialism. Princeton: Princeton University Press.

Mankiw, N Gregory, David Romer and David N Weil 1992 "A contribution to the empirics of economic growth." Quarterly Journal of Economics 407-437.

Mann, Michael. 1993. The Sources of Social Power. Vol. 2. New York: Cambridge University Press.

Marsden, Peter and Emma Samman. 2000. "Conflict in Afghanistan: The Economic and Social Impact." in War and Underdevelopment: Case Studies of Countries in Conflict, F. Stewart & V. Fitzgerald, eds., Oxford University Press, Oxford.

Meernik, James, Eric Krueger and Steven Poe. 1998. "Testing Models of US Foreign Policy: Foreign Aid During and After the Cold War." The Journal of Politics. Vol 60: 1 (February), pp. 63-85.

Meldrum, Andrew "Good-bye." New Republic On-Line. 17 April 2000.

Mokyr, Joel. 1992. The Lever of Riches: Technological Creativity and Economic Progress. Oxford: Oxford University Press.

Moore, Mick. 2001. "Political Underdevelopment: What Causes 'Bad Governance." Working Paper. Sussex: Institute for Development Studies.

Murdoch, James C. and Todd Sandler. 2001a. "Economic Growth, Civil Wars, and Spatial Spillovers." Working Paper. The World Bank.

Murdoch, James C. and Todd Sandler. 2001b. "Civil Wars and Economic Growth: A regional comparison." Working Paper. The World Bank.

Mwanasali, M 2000 "The View from Below" In Berdal and Malone (2000).

Nafziger, E.Wayne., Frances Stewart and Raimo Väyrynen (eds). 2000. "The origins of humanitarian emergencies: war and displacement in development countries." in War, Hunger and Displacement: The Origins of Humanitarian Emergencies. Vol. 1. Oxford: Oxford University Press.

Nest, Michael. "Ambitions, Profits and Loss: Zimbabwean Economic Development in the Democratic Republic of the Congo." African Affairs 100:469-490 July 2001.

North, Robert, and Nazli Choucri. 1983. "Economic and Political Factors in International Conflict and Integration." International Studies Quarterly, Vol. 27, No. 4, Special Issue: The Economic Foundations of War. (Dec., 1983), pp. 443-461

North, Douglass and Barry Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth Century England", Journal of Economic History, vol.49 no.4, pp. 803-832.

Oneal, John, and Bruce Russett. 1997. "The Classical Liberals Were Right: Democracy, Interdependence, and Conflict, 1950-1985." International Studies Quarterly, 41: 267-294.

Oneal, John, and Bruce Russett. 1999. Assessing the Liberal Peace with Alternative Specifications: Trade Still Reduces Conflict. Journal of Peace Research 36(4): 423-32.

Organiski, A.K.F. 1958. World Politics, New York, Knopf.

Pool, Davis. 1998. "The Eritrean People's Liberation Front." In Clapham (1998.)

Poulton, Robin-Edward and Ibrahim ag Youssouf. 1998. A Peace of Timbuktu: Democratic Governance, Development and African Peacemaking. New York: UNIDIR.

Renner, Michael. 1994. "Budgeting for Disarmament: The Costs of War and Peace." WorldWatch, Washington, DC, WorldWatch Paper 122.

Reno, William. 1995. Corruption and State Politics in Sierra Leone. Cambridge University Press, Cambridge.

Reno, William. 2000a. "Shadow States and the Political Economy of Civil Wars." (Ch.3 of Berdal and Malone 2000)

Reno, William. 2000b. "War, Debt and the Role of Pretending in Uganda's International Relations." Occasional Paper, Center for African Studies, University of Copenhagen.

Richards, Paul. 1996. Fighting for the Rainforest London: Heinemann.

Rosenthal, Jean-Laurent. 1998. "The political Economy of Absolutism Reconsidered." In Analytic Narratives, edited by R. H. Bates, A. Greif, M. Levi, J.-L. Rosenthal and B. R. Weingast. Princeton, N.J.: Princeton University Press.

Ross, Michael. 2002a. "Oil, Drugs, and Diamonds: How Do Natural Resources Vary in their Impact on Civil War?" Working paper: UCLA.

Ross, Michael. 2002b. "How does natural resource wealth influence war?" Working paper: UCLA.

Ross, Michael. 2002c. "Booty Futures." Working paper: UCLA.

Rufin, Jean-Claude. (1995). "L'économie de guérilla et les trafics." Problèmes économiques, No. 2470, pp. 19-23.

Russett, Bruce. 2002. "Violence and Disease: Trade as Suppressor of Conflict When Suppressors Matter." in Edward Mansfield and Brian Pollins, eds., 2002. Economic Interdependence and International Conflict: New Perspectives on an Enduring Debate. Ann Arbor: University of Michigan Press.

Russett, Bruce, and Joel Slemrod, 1993. "Diminished Expectations of Nuclear War and Increased Personal Savings: Evidence from Individual Survey Data," American Economic Review, Vol. 83, No. 4, pp. 1022–33.

Sambanis, Nicholas. 2001. "A Review Of Recent Advances and Future Directions In the Literature On Civil War." Working Paper. Washington DC: The World Bank.

Sislin, John. 1994. "Arms as Influence: The Determinants of Successful Influence." The Journal of Conflict Resolution. Vol. 38, No. 4. (Dec.), pp. 665-689.

Skaperdas, Stergios. 2001. "An Economic Approach to Analyzing Civil Wars" Paper presented at World Bank Conference on Civil Wars and Post-Conflict Transitions. U.C. Irvine. May 2001.

Smillie, Ian, Lansana Gberie and Ralph Hazleton. 2000. "The Heart of the Matter – Sierra Leone, Diamonds and Human Security."

Snyder, Richard. 2002. "Does lootable wealth breed civil war? Resource extraction and political order in comparative perspective." Working Paper resented at the American Political Science Association Meetings, Boston.

Solow, Robert M. 2000. Growth Theory: an Exposition (2nd edition). Oxford University Press, Oxford.

Sombart, Werner. 1913. Krieg und Kapitalismus. Munich and Leipzig 1913.

Sørli, Mirjam E., 2002. "Resources, Regimes and Rebellion" Paper presented at the 43rd Annual International Studies Association Convention. New Orleans, Louisiana, 22-27 March.

Steiner, Henry and Philip Alston. 2000. International Human Rights in Context. 2nd edition. Oxford: Oxford University Press.

Stewart, Frances. 1993. "War and Underdevelopment: Can Economic Analysis Help to Reduce the Costs." Journal of International Development. 5:4. 357-380

Stewart, Frances, Frank Humphreys and Nick Lea. 1997. "Civil Conflict in Developing Countries Over the Last Quarter of a Century: An Empirical Overview of Economic and Social Consequences." Oxford Development Studies, vol. 25,no. 1, pp. 11-41.

Stewart, Frances, Valpy FitzGerald and Associates. 2001a. War and Underdevelopment. Volume 1: The Economic and Social Consequences of Conflict. Oxford: Oxford University Press.

Stewart, Frances, Valpy FitzGerald and Associates. 2001b. War and Underdevelopment. Volume 2: Country Experiences. Oxford: Oxford University Press.

Stockwell, John. 1978. In Search of Enemies. New York: W.W. Norton.

Sylvan, Donald A. 1976. Consequences of Sharp Military Assistance Increases for International Conflict and Cooperation." The Journal of Conflict Resolution. Volume 20:4 (December) pp.609-636.

Tamm, Ingrid J. 2002. "Diamonds In Peace And War: Severing The Conflict- Diamond Connection" World Peace Foundation Report 30.

Temple, Jonathan. 1999. "The New Growth Evidence." Journal of Economic Literature. 37(1), March, 112-156.

Thompson, William R. 1982. "Phases of the Business Cycle and the Outbreak of War." International Studies Quarterly. Volume 26: No. 2. (June), pp. 301-311.

Thompson, William R. 1983. "Uneven Economic Growth, Systemic Challenges, and Global Wars." International Studies Quarterly, Vol. 27, No. 3. (September), pp. 341-355.

Tilly, Charles. 1990. Coercion, Capital and European States, A.D. 990-1990. Cambridge: Blackwell.

Tilly, Charles. 1999. Durable Inequality. Berkeley: University of California Press.

Toussaint, Auguste. 1966. History of the Indian Ocean. London: Routledge and Kegan Paul.

van Tuyll, Hubert and Jurgen Brauer. 2002. "Colonizing Military History: A Millennial View on the Economics of War" in Brauer (2002).

UNDP. 1994. Human Development Report 1994: New Dimensions of Human Security. New York: United Nations.

Wallensteen, Peter and Margareta Sollenberg. 2000. "Armed Conflict, 1989-99," Journal of Peace Research, Vol. 37, No. 5, pp. 635-649.

Waltz, Kenneth N. 1970. "The Myth of Interdependence." in Charles P. Kindelberger (ed.) The International Corporation, Cambridge: MIT Press.

Walton, John and David Seddon. 1994. Free markets and Food Riots: The Politics of Global Adjustment. Cambridge: Blackwell Publishers.

Weiss, Thomas G. 1999. "Sanctions as a Foreign Policy Tool: Weighing Humanitarian Impulses." Journal of Peace Research. September. Vol. 36, no.5.

Willum, Bjørn. 2001. Foreign Aid to Rwanda: Purely Beneficial or Contributing to War? Dissertation.

Woodroff, Jessica and mark Ellis-Jones. 2000. "States of Unrest: Resistance to IMF policies in poor countries." World Development Movement Report: London.

Woodward, Susan. 1996. Balkan Tragedy: Chaos and Dissolution after the Cold War. Washington: The Brookings Institute.

World Bank. 1998. The World Bank's Experience with Post-conflict Reconstruction. Volume 1: Synthesis Report. Operations Evaluation Department, World Bank, Washington, D.C.

World Health Organization. 2000. Reproductive Health During Conflict and Displacement. Geneva: WHO.

Zhang, Xiaobo and Ravi Kanbur. 2001. "What Differences Do Polarization Measures Make? An Application to China." Working Paper. World Bank.

Zuk, Gary. 1985. "National Growth and International Conflict: A Reevaluation of Choucri and North's Thesis." The Journal of Politics. Vol. 47, No. 1. (Feb.) pp. 269-281.

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The New Geography of Conflict

Michael T. Klare

VITAL INTERESTS

IN OCTOBER 1999, in a rare alteration of U.S. military geography, the Department of Defense reassigned senior command authority over American forces in Central Asia from the Pacific Command to the Central Command. This decision produced no headlines or other signs of interest in the United States but nevertheless represented a significant shift in American strategic thinking. Central Asia had once been viewed as a peripheral concern, a remote edge of the Pacific Command's main areas of responsibility (China, Japan, and the Korean Peninsula). But the region, which stretches from the Ural Mountains to China's western border, has now become a major strategic prize, because of the vast reserves of oil and natural gas thought to lie under and around the Caspian Sea. Since the Central Command already controls the U.S. forces in the Persian Gulf region, its assumption of control over Central Asia means that this area will now receive close attention from the people whose primary task is to protect the flow of oil to the United States and its allies.

The new prominence of Central Asia and its potential oil riches is but one sign of a larger transformation of U.S. strategic thinking. During the Cold War, the areas of greatest concern to military planners were those of confrontation between the U.S. and the Soviet blocs: central and southeastern Europe and the Far East. Since the end of

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the Cold War, however, these areas have lost much strategic significance for the United States (except, perhaps, for the demilitarized zone between North and South Korea), while other regions—the Persian Gulf, the Caspian Sea basin, and the South China Sea—are receiving increased attention from the Pentagon.

Behind this shift in strategic geography is a new emphasis on the protection of supplies of vital resources, especially oil and natural gas. Whereas Cold War–era divisions were created and alliances formed along ideological lines, economic competition now drives international relations—and competition over access to these vital economic assets has intensified accordingly. Because an interruption in the supply of natural resources would portend severe economic consequences, the major importing countries now consider the protection of this flow a significant national concern. In addition, with global energy consumption rising by an estimated two percent annually, competition for access to large energy reserves will only grow more intense in the years to come.

Accordingly, security officials have begun to pay much greater attention to problems arising from intensified competition over access to critical materials—especially those such as oil that often lie in contested or politically unstable areas. As the National Security Council observed in the White House's 1999 annual report on U.S. security policy, "the United States will continue to have a vital interest in ensuring access to foreign oil supplies." Therefore, the report concluded, "we must continue to be mindful of the need for regional stability and security in key producing areas to ensure our access to, and the free flow of, these resources."

FAULT LINES

CONCERN OVER access to global resources has, of course, long been an important theme in U.S. security policy. In the 1890s, for example, the nation's preeminent naval strategist, Captain Alfred Thayer Mahan, won widespread support for his argument that the United States required a large and capable navy in order to bolster its status as a global trading power. This perspective also shaped the geopolitical thinking of Presidents Theodore Roosevelt and Franklin Delano

Roosevelt. During the Cold War, however, resource concerns were often subordinated to the political and ideological dimensions of the U.S.-Soviet rivalry. It is only now, with the Cold War safely over, that securing access to vital materials has again assumed a central position in American security planning.

Evidence of this revival of interest in resources was especially plentiful during last year's global shortage of petroleum and natural gas. President Bill Clinton flew to Africa in August 2000 with the hope of obtaining additional oil from Nigeria—currently one of America's leading suppliers—and prodded the Caspian states to accelerate the construction of new pipelines to Europe and the Mediterranean. Meanwhile, then Governor George W. Bush used the presidential campaign debates to call for oil and gas exploration in U.S. wilderness areas in order to reduce the nation's dependence on foreign supplies. Once elected, he made one of his earliest foreign policy initiatives a meeting with Mexican President Vicente Fox to discuss proposals for increasing the flow of energy from Mexico to the United States.

A similar focus on the acquisition or protection of energy supplies is evident in the strategic thinking of other powers. Large energy importers, such as China, Japan, and the major European powers, have made ensuring the stability of their supplies a top priority. Russia is placing greater foreign policy emphasis on energy-producing areas of Central Asia. Although Moscow continues to worry about developments on its western frontiers in the areas facing NATO, it has devoted considerable resources to strengthening its military presence in the south, in the Caucasus (including Chechnya and Dagestan), and among the former Soviet Central Asian republics. Similarly, the Chinese military has shifted its concentration from the northern border with Russia to Xinjiang in the west (a potential source of oil) and to offshore areas of the East and South China Seas. Japan has followed China to these seas and has boosted its own ability to operate there, procuring and deploying new warships and a fleet of missile-armed P-3C Orion patrol planes. Securing access to sufficient supplies of oil and gas is also a great concern of the newly industrializing nations of the developing world, such as Brazil, Israel, Malaysia, Thailand, and Turkey—many of which are expected to double or triple their energy consumption rates over the next 20 years.

Although obtaining sufficient supplies of energy is becoming the foremost resource priority for some states, the pursuit of adequate water will be the central focus for others. Water supplies are already insufficient in many parts of the Middle East and Southwest Asia; continued population growth and the increased likelihood of drought from global warming will likely create similar scarcities elsewhere. To further complicate the problem, water supplies do not obey political boundaries, and so many of the countries in these regions must share a limited number of major water sources. With all the states that touch these waters seeking to increase their allotted supplies, the danger of conflict over competition for these shared supplies will inevitably grow.

About four-fifths of the world's known petroleum reserves lie in politically unstable or contested areas.

In other parts of the world, localized conflicts have broken out for control of valuable timber and minerals. Typically, these conflicts entail a struggle between competing elites or tribes over the income derived from commodity exports. In Angola and Sierra Leone, for instance, rival groups are battling for control of lucrative diamond fields; in the Democratic Republic of the Congo (D.R.C.), the conflict concerns copper as well as diamonds; and in parts of Southeast Asia, various groups are fighting over valuable stands of timber. The recent bloodshed on Borneo arose from clashes between the indigenous Dayak, who have long occupied Borneo's extensive forests, and settlers from Java and Madura who were brought in by the Indonesian government to harvest all this timber. Although not a direct threat to the security of the major powers, these conflicts can lead to the deployment of U.N. peacekeeping forces—as in Sierra Leone—and thus impose significant demands on the world's capacity to manage ethnic and regional violence.

All of these phenomena—increased competition over access to major sources of oil and gas, growing friction over the allocation of shared water supplies, and internal warfare over valuable export commodities—have produced a new geography of conflict, a reconfigured cartography in which resource flows rather than political and ideological divisions constitute the major fault lines. Just as a map showing the world's tectonic faults is a useful guide to likely earthquake zones, viewing the international system in terms of unsettled resource deposits—contested oil and gas fields, shared water systems, embattled diamond mines—provides a guide to likely conflict zones in the twenty-first century.

A MAP OF THE WORLD

POLITICAL ANALYSTS have yet to devise a model that accurately represents the global power dynamic of the post–Cold War world. A comprehensive and predictive explanation of this dynamic must account for a variety of shifts in power politics and conflict zones. The bipolar face-off of the Cold War has been reconfigured to leave one global superpower—the United States—facing a group of smaller power centers, from western Europe to Russia, China, and Japan. In the early 1990s, violence in the former Yugoslavia, Kashmir, and Central Africa made the world community concentrate on preventing ethnic and intercommunal conflict, but this focus on ethnicity could not predict or address the violence in Africa over control of diamond fields, copper mines, and farmlands. Economic globalization is turning some poor areas into centers of prosperity and growth but leaving others behind in abject poverty, sparking conflicts that have more to do with resources than with nationalism. In short, contemporary world affairs defy exclusively political, security-related, and economic definitions.

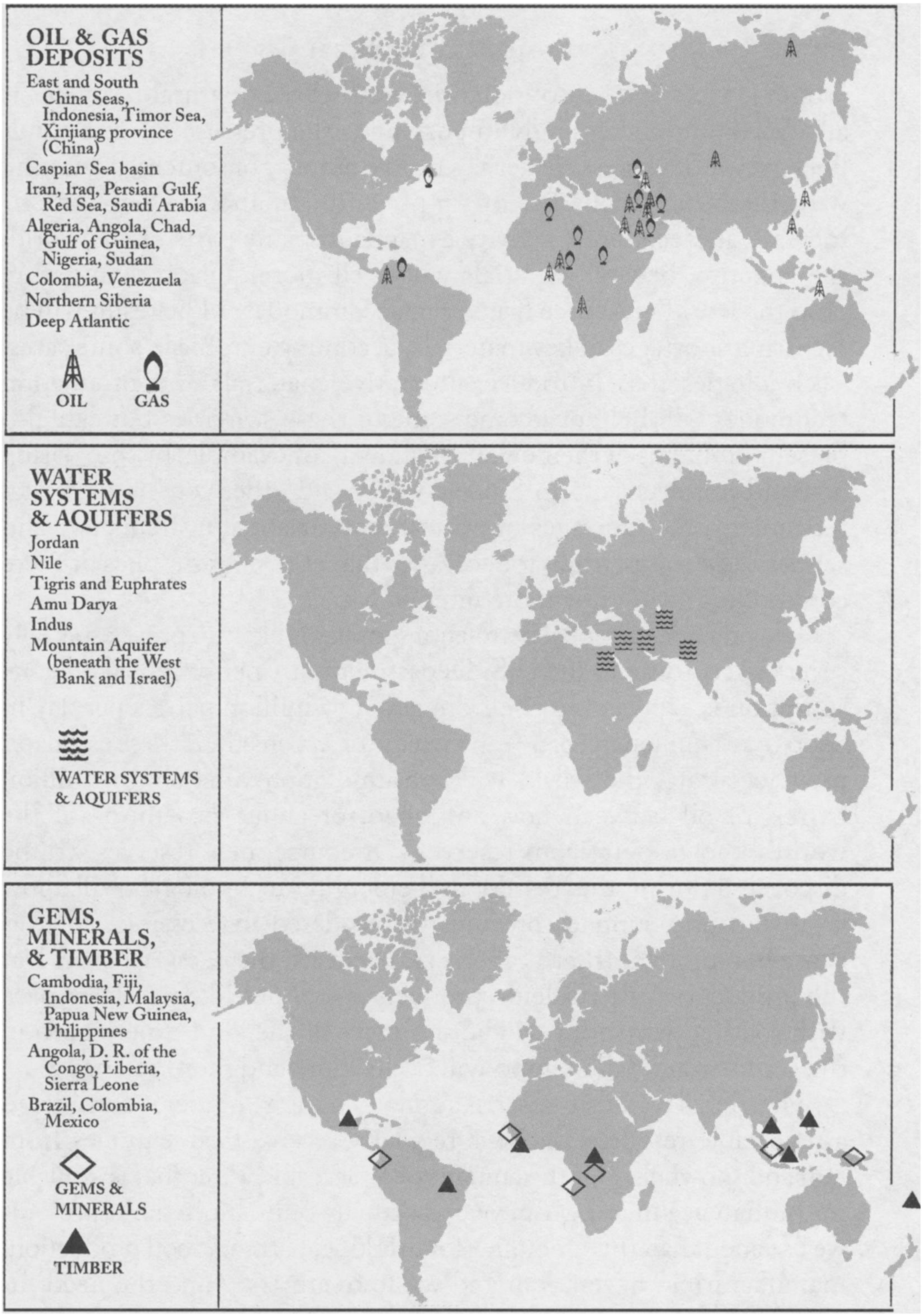
A better analysis of stresses in the new international system, and a better predictor of conflict, would view international relations through the lens of the world's contested resources and focus on those areas where conflict is likely to erupt over access to or the possession of vital materials. The analysis would begin with a map showing all major deposits of oil and natural gas lying in contested or unstable areas. These zones of potential trouble include the Persian Gulf, the Caspian Sea basin, and the South China Sea, along with Algeria, Angola, Chad, Colombia, Indonesia, Nigeria, Sudan, and Venezuela—areas and states that together house about four-fifths of the world's known petroleum reserves. The map would also trace the pipelines and tanker routes used to carry oil and natural gas from their points of supply to markets in the West; many of these routes pass through areas that are themselves subject to periodic violence. The energy supplies of the Caspian region, for example, must cross the troubled Caucasus (encompassing Armenia, Azerbaijan, Georgia, and parts of southern Russia) before reaching a secure outlet to the sea.

A map of contested resource zones would also show all major water systems shared by two or more countries in arid or semi-arid areas. These would include large river systems such as the Nile (shared by Egypt, Ethiopia, and Sudan, among others), the Jordan (shared by Israel, Jordan, Lebanon, and Syria), the Tigris and Euphrates (shared by Iran, Iraq, Syria, and Turkey), the Indus (shared by Afghanistan, India, and Pakistan), and the Amu Darya (shared by Tajikistan, Turkmenistan, and Uzbekistan). Also included would be underground aquifers that similarly cross borders, such as the Mountain Aquifer lying beneath the West Bank and Israel.

Finally, this map would indicate major concentrations of gems, minerals, and old-growth timber in the developing world. These precious assets include the diamond fields of Angola, the Democratic Republic of the Congo, and Sierra Leone; the emerald mines of Colombia; the copper and gold mines of the D.R.C., Indonesia, and Papua New Guinea; and the forests of Brazil, Cambodia, the D.R.C., Fiji, Liberia, Mexico, the Philippines, and Brunei, Indonesia, and Malaysia on the island of Borneo.

Such a map, if properly designed, would truly delineate the places where armed combat is most likely to erupt in the years ahead. The mere presence of valuable resources in a particular area does not, of course, mean that conflict is likely to break out there. Other factors—including the relative stability of the countries or regions involved, the history of relations between them, and the local military balance—must also be considered. Israel and Syria, for example, fight over the Golan Heights because of a sovereignty dispute dating back to the 1967 war, in addition to the fact that some sources of the Jordan River lie there. Conflict over valuable materials is a significant feature in this and most other conflicts around the world today, so a map of contested resource zones is a more reliable indicator of potential violence than any other single factor.

Possible Flash Points for Resource Conflict



MAP BY IB OHLSSON FOR FOREIGN AFFAIRS

PREMONITORY TREMORS

IDENTIFYING AREAS of potential conflict over natural resources is also becoming increasingly important as the pressure on these fault lines grows. The pressure derives from a number of sources, beginning with the basic mechanics of supply and demand. As populations increase and economic activity expands in many parts of the world, the appetite for vital materials will swell more quickly than nature (and the world's resource firms) can accommodate. The result will be recurring shortages of key materials, becoming chronic in some cases. Technologies that introduce alternative materials and production techniques will help overcome some of these scarcities but can also present problems of their own—as shown, for example, by the soaring demand for electricity in Silicon Valley and other centers of digital technology. As shortages of critical materials rise in frequency and severity, the competition for access to the remaining supplies of these commodities will grow more intense.

The pressure on global petroleum supplies is likely to prove especially severe. According to the U.S. Department of Energy, global oil consumption is expected to rise from about 77 million barrels per day in 2000 to 110 million in 2020—an increase of 43 percent. If these estimates prove accurate, the world will consume approximately 670 billion barrels of oil between now and 2020, or about two-thirds of the world's known petroleum reserves. Of course, new reserves will be discovered during this period, and emerging technologies will allow us to tap into supplies previously considered inaccessible, such as those in remote northern Siberia and beneath the deep Atlantic. But the production of petroleum products is still not likely to keep pace with soaring demand; periodic shortages of the kind experienced in the summer and fall of 2000 will occur more and more often.

The global water situation is similarly fraught. Water is considered a renewable resource since we regularly receive fresh supplies from rain and snowfalls. But the amount of replaceable water that is available for human use in any given year is actually quite limited. At present, we use about half this amount—for drinking, bathing, food production, manufacturing, navigation, and waste treatment—and the need for additional supplies is growing all the time. Already, many areas of the

Middle East and Asia suffer from persistent water scarcity, and the number of countries experiencing such conditions is expected to double over the next 25 years as the world population rises and more people settle in urban areas. By 2050, the demand for water could approach 100 percent of the available supply, producing intense competition for this essential substance in all but a few well-watered areas of the planet.

Environmental trends such as global warming will also affect the worldwide availability of many resources, including water and arable land. Although higher temperatures will produce increased rainfall in areas located near oceans and other large bodies of water, inland regions will generally experience drier conditions, with prolonged drought a recurring phenomenon. Higher temperatures will also increase the rate of evaporation from rivers, lakes, and reservoirs. It is likely, therefore, that many important farming areas will be lost, either to drought and encroaching desert inland, or to coastal flooding and the rise of global sea levels in maritime regions.

Market mechanisms can alleviate most of the increased pressures on the world's existing supply of vital materials. Rising demand, coupled with higher prices, will stimulate the development of new materials and processes that allow resource firms to search for new deposits and bring those that were once considered inaccessible within reach. But technology cannot completely reverse demographic and environmental pressures, and some countries and regions will be unable to afford the higher costs of alternative technologies. In these circumstances, global supply and demand will become increasingly unbalanced.

DANGEROUS NEIGHBORHOODS

What makes this trend so worrisome is the fact that many important sources of vital materials are located in contested or chronically unstable areas. Some of the most promising sources of oil and natural gas lie in offshore areas whose ownership is a matter of fierce dispute. The five coastal states of the Caspian Sea, for example, have yet to agree on a plan for dividing up its offshore resource zones; the situation in the South China Sea is even more chaotic, with seven states claiming all or part of the region. Major disagreements over the ownership of oil-bearing border regions and offshore fields are also found in the regions of the Persian Gulf, the Red Sea, the Timor Sea, and the Gulf of Guinea.

Even when the ownership of particular reserves is not in dispute, as in the major onshore fields in Colombia, Iran, Iraq, Saudi Arabia, and Venezuela, the future availability of these supplies cannot be taken for granted; political and social unrest that may be completely unrelated to resource issues could nevertheless endanger the supplies. Although the Saudi regime has so far succeeded in suppressing all expressions of antigovernment sentiment, opposition to the monarchy appears to be growing (as reflected, for example, in the frequency of terrorist attacks), and there is no guarantee that it can be contained forever. The internal strains in Iran and Iraq are more evident, and in neither case do the tensions appear to be diminishing. Colombia is in the midst of a civil war, and political conditions in Venezuela have become highly volatile. Many other countries with significant supplies of oil and gas—Algeria, Angola, Indonesia, Nigeria, Sudan—are also prone to political and social disorder.

In just 50 years, global demand for water could nearly exhaust the available supply.

The threats to water supplies are roughly similar. Because many of the important sources of water in the Middle East and Asia are shared by two or more countries, it is essential that these states reach mutually acceptable agreements for the allocation of the available supplies. Few governments have chosen to do so, however. Egypt and Sudan agreed to divide up the Nile's flow in 1959 but declined to provide any supplies for Ethiopia and the other states that depend on the river's waters—an obviously unstable arrangement. Iraq and Syria have reached agreement on their respective appropriations from the Euphrates, but the river itself arises in Turkey, which has heretofore refused to sign a water-sharing agreement. Israel has yet to reach agreement with Syria over the Jordan River's headwaters and has not carried through with promises made to Jordan in 1994 regarding cooperative water projects in the Jordan River valley. The only major water-sharing arrangement that has demonstrated any degree of durability is the Indus Waters Treaty of 1960 between India and Pakistan—and even this pioneering agreement remains hostage to the future stability of these two countries' relations. There and elsewhere, international disputes over the allocation of existing supplies will grow more intense as populations increase and the greenhouse process accelerates global warming.

STAND AND DELIVER

Devising ways to peacefully resolve the increasing competition over natural resources is all the more urgent because many states continue to view controlling certain natural resources as a national security requirement—and something worth fighting for. In the United States, for example, President Jimmy Carter declared in 1980 that any attempt by hostile powers to cut off the flow of Persian Gulf oil would "be regarded as an assault on the vital interests of the United States of America," which the United States would repel "by any means necessary, including military force." Subsequent presidents have made similar statements, and substantial U.S. forces are now permanently deployed in the Persian Gulf to enforce this policy.

Other nations have been less explicit about their resource-protection policies, but there is no doubt that they hold similar views. China, for example, has declared the South China Sea part of its national maritime territory and has asserted its right to employ force to protect it. Although not mentioning China by name, Japan has warned of a threat to its vital trade routes (approximately 80 percent of Japan's oil supply comes by tanker through the South China Sea) and vowed to take appropriate protective measures. China's assertive posture has also spurred other neighboring countries, including Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, to beef up their own air and naval capabilities.

Water, like oil and natural gas, has prompted talk of national security. "Water for Israel is not a luxury," the nation's second prime minister, Moshe Sharett, once declared. "It is not just a desirable and helpful addition to our natural resources. Water is life itself." In a similar vein, Boutros Boutros-Ghali, when he was Egypt's minister of state for foreign affairs, dramatically claimed in 1988 that "the next war in our region will be over the waters of the Nile, not politics." Some governments have also threatened to use their control over water supplies as an instrument of coercion: in 1989, for example, then President Turgut Özal of Turkey warned Syria that his government would cut off the flow of the Euphrates unless Syria curbed the activities of Kurdish terrorists operating from Syrian bases. The actual use of force in resolving water disputes—the Middle East war of 1967, for example, was sparked in part by the Arab states' plan to divert the headwaters of the Jordan River around Israel to Jordan—has been relatively rare. But the growing pressure on vital supplies, combined with the paucity of viable water-sharing agreements, will create more frequent clashes.

Finally, the protection of valuable mines, fisheries, and timber stands has become a matter of vital interest to poor countries that have few other sources of wealth. The governments of Angola and Sierra Leone, for example, have devoted much of their national incomes to protracted efforts to reassert control over diamond fields now occupied by rebel organizations. Similarly, the government of Papua New Guinea has launched several campaigns to reconquer the island of Bougainville—a rebellious territory that houses the world's largest copper mine. Contests of this sort will continue to arise so long as warlords and other internal factions in these countries perceive a potential benefit from seizing and exploiting major deposits of valuable materials.

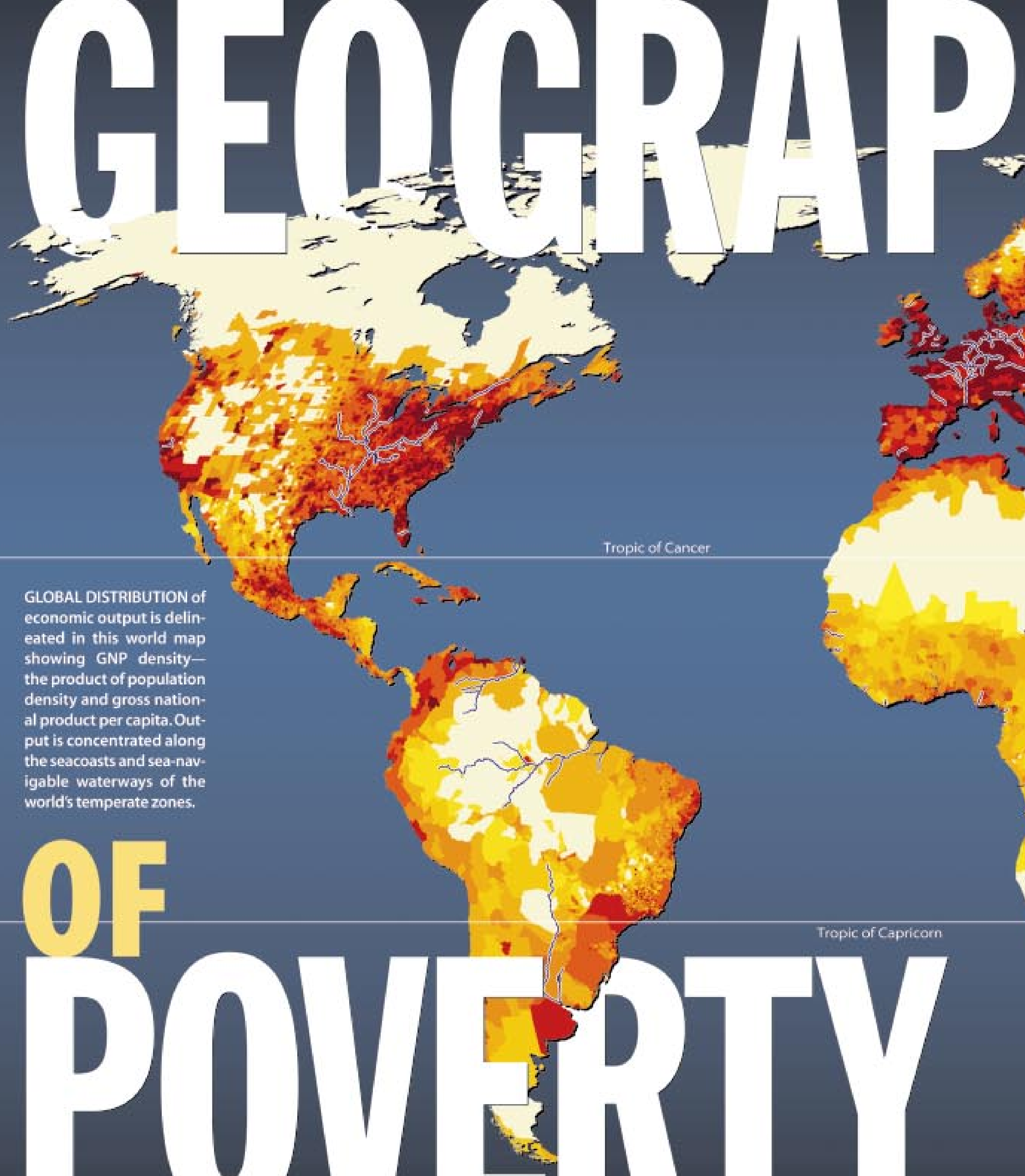
SUITABLE ACCOMMODATION

RESOURCE SHORTAGES and conflicts represent only a small part of international policymakers' crowded agenda. But these disturbances often tie into other problems such as environmental degradation, economic disorder, population growth, and transnational crime. Resource issues also figure in many conflicts that are characterized in other ways—for example, as ethnic wars or political rivalries. An analysis of global resource trends and their associated political and geographic phenomena would, therefore, provide policymakers a powerful lens through which to examine the larger array of world security problems.

An analysis of this sort would also help leaders to craft broad policy prescriptions. Governments must devote greater effort to the development of alternative fuels and transportation systems, whether through increased financial support for research and development or via incentives for the private sector to invest in these areas. To ensure an adequate supply of water, moreover, more money should go toward exploring new desalination techniques and more-efficient crop irrigation. Efforts to negotiate a new international regime for the protection of tropical forests also require increased support.

But these endeavors must be accompanied by multilateral initiatives specifically aimed at reducing the risk of violent conflict over the use of shared or contested sources of vital materials. For example, the world community should bring pressure on the states bordering the Caspian and South China Seas to peacefully resolve all outstanding disputes over the ownership and development of offshore resources. International organizations and institutions could also urge that similar disputes around the Persian Gulf, the Red Sea, and the Gulf of Guinea be settled in this fashion. At the same time, the world community needs to persuade the states bordering on the Nile, Jordan, and Tigris-Euphrates river systems to negotiate a cooperative regime for the distribution of shared water supplies. On another front, multilateral cooperation could implement plans for the certification of diamonds from Africa, so as to exclude any originating in rebel-held areas of Angola and Sierra Leone.

This is by no means a definitive list of policy prescriptions, but it suggests the sort of steps that officials might take to prevent future crisis and conflict. Progress of this sort, however, can occur only if policymakers pay greater attention to global resource issues and address these matters in a coordinated, comprehensive manner. This means, at the very least, mapping global resource trends and identifying problem areas requiring international attention. Moreover, it means developing plans at the highest level to avert future resource emergencies and ensure the continued availability of vital materials. Only in this fashion can we have any confidence that the planet will safely accommodate the nine or ten billion people expected to inhabit it by 2050.

THE GEOGRAP


GLOBAL DISTRIBUTION of economic output is delineated in this world map showing GNP density—the product of population density and gross national product per capita. Output is concentrated along the seacoasts and sea-navigable waterways of the world's temperate zones.

OF POVERTY

ILLUSTRATION BY SAMUEL VELASCO; SOURCES: THE WORLD BANK, THE WORLD FACTBOOK (CIA, 1996 AND 1997), THE GLOBAL DEMOGRAPHY PROJECT AND THE ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE

HY AND WEALTH

Tropical climate and lack of access to sea trade have hurt the poorest nations. But new aid programs can point the way to prosperity

by Jeffrey D. Sachs, Andrew D. Mellinger and John L. Gallup

Why are some countries stupendously rich and others horrendously poor? Social theorists have been captivated by this question since the late 18th century, when Scottish economist Adam Smith addressed the issue in his magisterial work *The Wealth of Nations*. Smith argued that the best prescription for prosperity is a free-market economy in which the government allows businesses substantial freedom to pursue profits. Over the past two centuries, Smith's hypothesis has been vindicated by the striking success of capitalist economies in North America, western Europe and East Asia and by the dismal failure of socialist planning in eastern Europe and the former Soviet Union.

Smith, however, made a second notable hypothesis: that the physical geography of a region can influence its economic performance. He contended that the economies of coastal regions, with their easy access to sea trade, usually outperform the economies of inland areas. Although most economists today follow Smith in linking prosperity with free markets, they have tended to neglect the role of geography. They implicitly assume that all parts of the world have the same prospects for economic growth and long-term development and that differences in performance are the result of differences in institutions. Our findings, based on newly available data and research methods, suggest otherwise. We have found strong evidence that geography plays an important role in shaping the distribution of world income and economic growth.

Coastal regions and those near navigable waterways are indeed far richer and more densely settled than interior regions, just as Smith predicted. Moreover, an area's climate can also affect its economic development. Nations in tropical climate zones generally face higher rates of infectious disease and lower agricultural productivity (especially for staple foods) than do nations in temperate zones. Similar burdens apply to the desert zones. The very poorest regions in the world are those saddled with both handicaps: distance from sea trade and a tropical or desert ecology.

A skeptical reader with a basic understanding of geography might comment at this point, "Fine, but isn't all of this familiar?" We have three responses. First, we go far beyond the basics by systematically quantifying the contributions of geography, economic policy and other factors in determining a nation's performance. We have combined the research tools used by geographers—including new software that can create detailed maps of global population density—with the techniques and equations of macroeconomics. Second, the basic lessons of geography are worth repeating, because most economists have ignored them. In the past decade the vast majority of papers on economic development have neglected even the most obvious geographical realities. Third, if our findings are true, the policy implications are significant. Aid programs for developing countries will have to be revamped to specifically address the problems imposed by geography. In particular, we have tried to formulate new strategies that would help nations in tropical zones raise their agricultural productivity and reduce the prevalence of diseases such as malaria.

The Geographical Divide

The best single indicator of prosperity is gross national product (GNP) per capita—the total value of a country's economic output, divided by its population. A map showing the world distribution of GNP per capita immediately reveals the vast gap between rich and poor nations [*see map on page 74*]. Notice that the great majority of the poorest countries lie in the geographical tropics—the area between the tropic of Cancer and the tropic of Capricorn. In contrast, most of the richest countries lie in the temperate zones.

A more precise picture of this geographical divide can be obtained by defining tropical regions by climate rather than by latitude. The map on page 75 divides the world into five

R. JANKE *Argus Fotoarchiv/Peter Arnold, Inc.*

R. GILING *Lineair/Peter Arnold, Inc.*

ECONOMIC DISPARITIES can be partly attributed to geography. Coastal temperate-zone countries such as Germany (*opposite page*) have lower transportation costs and higher farm productivity than landlocked tropical-zone countries such as Uganda (*above*).

broad climate zones based on a classification scheme developed by German climatologists Wladimir P. Köppen and Rudolph Geiger. The five zones are tropical-subtropical (hereafter referred to as tropical), desert-steppe (desert), temperate-snow (temperate), highland and polar. The zones are defined by measurements of temperature and precipitation. We excluded the polar zone from our analysis because it is largely uninhabited.

Among the 28 economies categorized as high income by the World Bank (with populations of at least one million), only Hong Kong, Singapore and part of Taiwan are in the tropical zone, representing a mere 2 percent of the combined population of the high-income regions. Almost all the temperate-zone countries have either high-income economies (as in the cases of North America, western Europe, Korea and Japan) or middle-income economies burdened by socialist policies in the past (as in the cases of eastern Europe, the former Soviet Union and China). In addition, there is a strong temperate-tropical divide within countries that straddle both types of climates. Most of Brazil, for example, lies within the tropical zone, but the richest part of the nation—the southernmost states—is in the temperate zone.

The importance of access to sea trade is also evident in the world map of GNP per capita. Regions far from the sea, such as the landlocked countries of South America, Africa and Asia, tend to be considerably poorer than their coastal counterparts. The differences between coastal and interior areas show up even more strongly in a world map delineating GNP density—that is, the amount of economic output per square kilometer [*see illustration on pages 70 and 71*]. This map is based on a detailed survey of global population densities in 1994. Geographic information system software is used to divide the world's land area into five-minute-by-five-minute sections (about 100 square kilometers at the equator). One can estimate the GNP density for each section by multiplying its population density and its GNP per capita. Researchers must use national averages of GNP per capita when regional estimates are not available.

To make sense of the data, we have classified the world's regions in broad categories defined by climate and proximity to the sea. We call a region "near" if it lies within 100 kilometers of a seacoast or a sea-navigable waterway (a river, lake or canal in which oceangoing vessels can operate) and "far" otherwise. Regions in each of the four climate zones we analyzed can be either near or far, resulting in a total of eight categories. The table on the next page shows how the world's population, income and land area are divided among these regions.

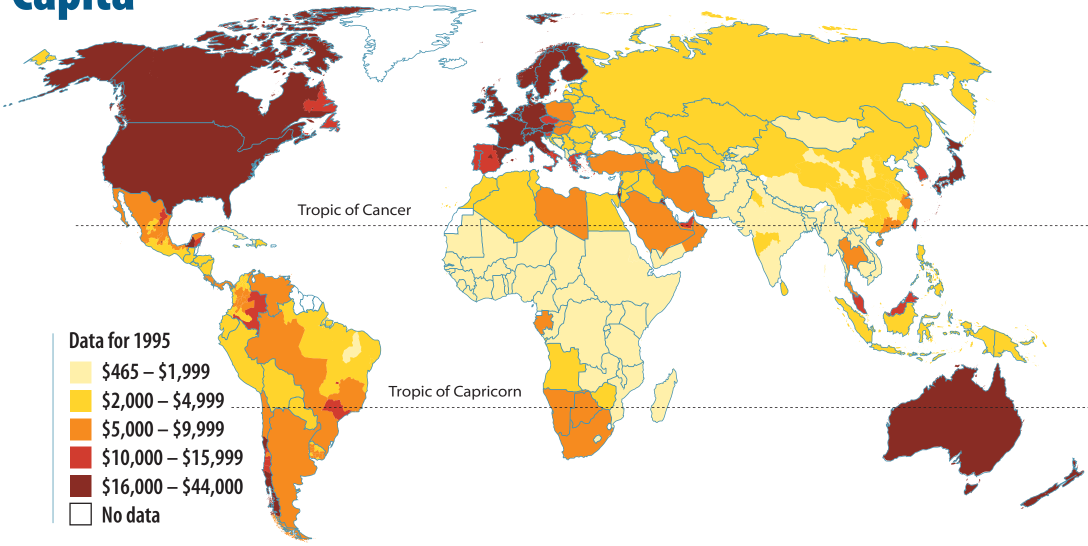
The breakdown reveals some striking patterns. Global production is highly concentrated in the coastal regions of temperate climate zones. Regions in the "temperate-near" category constitute a mere 8.4 percent of the world's inhabited land area, but they hold 22.8 percent of the world's population and produce 52.9 percent of the world's GNP. Per capita income in these regions is 2.3 times greater than the global average, and population density is 2.7 times greater. In contrast, the "tropical-far" category is the poorest, with a per capita GNP only about one third of the world average.

Interpreting the Patterns

In our research we have examined three major ways in which geography affects economic development. First, as Adam Smith noted, economies differ in their ease of transporting goods, people and ideas. Because sea trade is less costly than land- or air-based trade, economies near coastlines have a great advantage over hinterland economies. The per-kilometer costs of overland trade within Africa, for example, are often an order of magnitude greater than the costs of sea trade to an African port. Here are some figures we found recently: The cost of shipping a six-meter-long container from Rotterdam, the Netherlands, to Dar-es-Salaam, Tanzania—an air distance of 7,300 kilometers—was about $1,400. But transporting the same container overland from Dar-es-Salaam to Kigali, Rwanda—a distance of 1,280 kilometers by road—cost

GNP per Capita

WEALTH AND CLIMATE are inextricably linked. By comparing world maps showing GNP per capita (*right*) and climate zones (*opposite page*), one notices that temperate-zone countries are generally much more prosperous than tropical-zone nations. And in each climate zone, the regions near seacoasts and waterways are richer than the hinterlands (*table below*).



about $2,500, or nearly twice as much.

Second, geography affects the prevalence of disease. Many kinds of infectious diseases are endemic to the tropical and subtropical zones. This tends to be true of diseases in which the pathogen spends part of its life cycle outside the human host: for instance, malaria (carried by mosquitoes) and helminthic infections (caused by parasitic worms). Although epidemics of malaria have occurred sporadically as far north as Boston in the past century, the disease has never gained a lasting foothold in the temperate zones, because the cold winters naturally control the mosquito-based transmission of the disease. (Winter could be considered the world's most effective public health intervention.) It is much more difficult to control malaria in tropical regions, where transmission takes place year-round and affects a large part of the population.

According to the World Health Organization, 300 million to 500 million new cases of malaria occur every year, almost entirely concentrated in the tropics. The disease is so common in these areas that no one really knows how many people it kills annually—at least one million and perhaps as many as 2.3 million. Widespread illness and early deaths obviously hold back a nation's economic performance by significantly reducing worker productivity. But there are also long-term effects that may be amplified over time through various social feedbacks.

For example, a high incidence of disease can alter the age structure of a country's population. Societies with high levels of child mortality tend to have high levels of fertility: mothers bear many children to guarantee that at least some will survive to adulthood. Young children will therefore constitute a large proportion of that country's population. With so many children, poor families cannot invest much in each child's education. High fertility also constrains the role of women in society, because child rearing takes up so much of their adult lives.

Third, geography affects agricultural productivity. Of the major food grains—wheat, maize and rice—wheat grows only in temperate climates, and maize and rice crops are generally more productive in temperate and subtropical climates than in tropical zones. On average, a hectare of land in the tropics yields 2.3 metric tons of maize, whereas a hectare in the temperate zone yields 6.4 tons. Farming in tropical rain-forest environments is hampered by the fragility of the soil: high temperatures mineralize the organic materials, and the intense rainfall leaches them out of the soil. In tropical environments that have wet and dry seasons—such as the African savanna—farmers must contend with the rapid loss of soil moisture resulting from high temperatures, the great variability of precipitation, and the ever present risk of drought. Moreover, tropical environments are plagued with diverse infestations of pests and parasites that can devastate both crops and livestock.

The Wealth of Regions

Climate Zone (percent of world total)		Near*	Far*
Tropical			
Land area	19.9%	5.5%	14.4%
Population	40.3%	21.8%	18.5%
GNP	17.4%	10.5%	6.9%
Desert			
Land area	29.6%	3.0%	26.6%
Population	18.0%	4.4%	13.6%
GNP	10.1%	3.2%	6.8%
Highland			
Land area	7.3%	0.4%	6.9%
Population	6.8%	0.9%	5.9%
GNP	5.3%	0.9%	4.4%
Temperate			
Land area	39.2%	8.4%	30.9%
Population	34.9%	22.8%	12.1%
GNP	67.2%	52.9%	14.3%

* *"Near" means within 100 kilometers of seacoast or sea-navigable waterway; "far" means otherwise.*

SOURCE: ANDREW D. MELLINGER

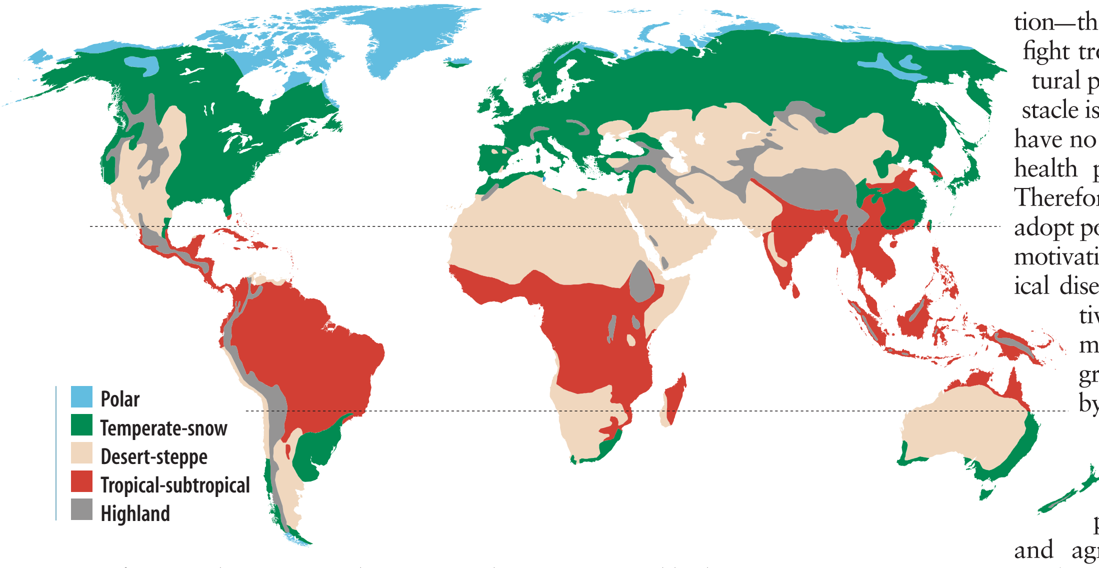
Many of the efforts to improve food output in tropical regions—attempted first by the colonial powers and then in recent decades by donor agencies—have ended in failure. Typically the agricultural experts blithely tried to transfer temperate-zone farming practices to the tropics, only to watch livestock and crops succumb to pests, disease and climate barriers. What makes the problem even more complex is that food productivity in tropical regions is also influenced by geologic and topographic conditions that vary greatly from place to place. The island of Java, for example, can support highly productive farms because the volcanic soil there suffers less nutrient depletion than the nonvolcanic soil of the neighboring islands of Indonesia.

Moderate advantages or disadvantages in geography can lead to big differences in long-term economic performance. For example, favorable agricultural or health conditions may boost per capita income in temperate-zone nations and hence increase the size of their economies. This growth encourages inventors in those nations to create products and services to sell into the larger and richer markets. The resulting inventions further raise economic output, spurring yet more inventive activity. The moderate geographical advantage is thus amplified through innovation.

In contrast, the low food output per

ILLUSTRATIONS BY SAMUEL VELASCO; SOURCES: THE WORLD BANK, *THE WORLD FACTBOOK* (CIA, 1996 AND 1997) AND *MODERN PHYSICAL GEOGRAPHY*, BY ALAN H. STRAHLER AND ARTHUR N. STRAHLER (JOHN WILEY & SONS, 1992)

Climate Zones



farm worker in tropical regions tends to diminish the size of cities, which depend on the agricultural hinterland for their sustenance. With a smaller proportion of the population in urban areas, the rate of technological advance is usually slower. The tropical regions therefore remain more rural than the temperate regions, with most of their economic activity concentrated in low-technology agriculture rather than in high-technology manufacturing and services.

We must stress, however, that geographical factors are only part of the story. Social and economic institutions are critical to long-term economic performance. It is particularly instructive to compare the post–World War II performance of free-market and socialist economies in neighboring countries that share the same geographical characteristics: North and South Korea, East and West Germany, the Czech Republic and Austria, and Estonia and Finland. In each case we find that free-market institutions vastly outperformed socialist ones.

The main implication of our findings is that policymakers should pay more attention to the developmental barriers associated with geography—specifically, poor health, low agricultural productivity and high transportation costs. For example, tropical economies should strive to diversify production into manufacturing and service sectors that are not hindered by climate conditions. The successful countries of tropical Southeast Asia, most notably Malaysia, have achieved stunning advances in the past 30 years, in part by addressing public health problems and in part by moving their economies away from climate-dependent commodity exports (rubber, palm oil and so on) to electronics, semiconductors and other industrial sectors. They were helped by the high concentration of their populations in coastal areas near international sea lanes and by the relatively tractable conditions for the control of malaria and other tropical diseases. Sub-Saharan Africa is not so fortunate: most of its population is located far from the coasts, and its ecological conditions are harsher on human health and agriculture.

The World Bank and the International Monetary Fund, the two international agencies that are most influential in advising developing countries, currently place more emphasis on institutional reforms—for instance, overhauling a nation's civil service or its tax administration—than on the technologies needed to fight tropical diseases and low agricultural productivity. One formidable obstacle is that pharmaceutical companies have no market incentive to address the health problems of the world's poor. Therefore, wealthier nations should adopt policies to increase the companies' motivation to work on vaccines for tropical diseases. In one of our own initiatives, we called on the governments of wealthy nations to foster greater research and development by pledging to buy vaccines for malaria, HIV/AIDS and tuberculosis from the pharmaceutical companies at a reasonable price. Similarly, biotechnology and agricultural research companies need more incentive to study how to improve farm output in tropical regions.

The poorest countries in the world surely lack the resources to relieve their geographical burdens on their own. Sub-Saharan African countries have per capita income levels of around $1 a day. Even when such countries invest as much as 3 or 4 percent of their GNP in public health—a large proportion of national income for a very poor country—the result is only about $10 to $15 per year per person. This is certainly not enough to control endemic malaria, much less to fight other rampant diseases such as HIV/AIDS, tuberculosis and helminthic infections.

A serious effort at global development will require not just better economic policies in the poor countries but far more financial support from the rich countries to help overcome the special problems imposed by geography. A preliminary estimate suggests that even a modest increase in donor financing of about $25 billion per year—only 0.1 percent of the total GNP of the wealthy nations, or about $28 per person—could make a tremendous difference in reducing disease and increasing food productivity in the world's poorest countries. SA

The Authors

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Further Information

An Inquiry into the Nature and Causes of the Wealth of Nations. Adam Smith. Reprint. Modern Library, 1994.

Guns, Germs, and Steel: The Fates of Human Societies. Jared Diamond. W. W. Norton, 1997.

The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor. David S. Landes. W. W. Norton, 1998.

Additional data and research papers are available at www.cid.harvard.edu and sedac.ciesin.org on the Web.