Defining Peace Industries and Calculating the Potential Size of a Peace Gross World Product by Country and by Economic Sector

Confidential Report for

Economists for Peace and Security,
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by Jurgen Brauer*
and John Tepper Marlin**

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* Jurgen Brauer, PhD, is Professor of Economics, James M. Hull College of Business, Augusta State University, Augusta, GA, USA. He is co-editor of *The Economics of Peace and Security Journal* and co-editor of the Studies in Defense and Peace Economics book series with Routledge, London, UK. He may best be reached at brauer.jurgen@gmail.com.

** Until March 2009, John Tepper Marlin, PhD, was Principal, CityEconomist, New York City, and is Adjunct Professor at the Stern School of Business, New York University, New York City. Since April 2009, he is Senior Economist at the Joint Economic Commission, United States Congress, Washington DC. He may best be reached at John_Tepper_Marlin@jec.senate.gov. We gratefully acknowledge research assistance by Ms. Deanna Liderman and Mr. Ian Scheffer. Dr. Brauer also wishes to acknowledge the hospitality of Prof. J. Paul Dunne, a fellow peace economist, at whose home in Bristol, United Kingdom, much of the research for, and most of the writing of, this Report was conducted and completed.

SUMMARY
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Terms of reference. Precise terms of reference were not laid down in writing. Through email, phone calls, and in-person meetings, several research objectives emerged and evolved.

1. In January 2009, we understood this to be a feasibility study to learn whether, and if so, how one can: (a) define peace industries (economic sectors whose market size tends to increase with increasing peacefulness and decrease with decreasing peacefulness) in a systematic, readily measurable, and replicable way, thus (b) begin to estimate the economic effects of the cessation of violence and the universal, if utopian, occurrence of peace, and (c) break down these effects not only by state ("countries") but also by economic sectors and subsectors ("industries"). Although we have carried out certain computations — and arrived at what we believe is a plausible, even conservative, number of a world peace divided of about a 9 percent gain over 2007 gross world product — this is primarily a study in regard to concepts, computational methods, and data assessment. It does not involve mathematical or statistical modeling. By mid-February 2009, it had become clear that all industries benefit directly or indirectly from violence as well as from peace and that the way in which global, state, and sector-specific economic statistics are recorded, collected, kept, and disseminated makes it as yet infeasible to cleanly separate out one from the other. As an alternative, a roundabout method to arrive at the desired study objectives needed to be invented.
2. It was decided to proceed with a two-pronged approach. The first would attempt to approximate a peace gross world product based on Global Peace Index measures of internal and external violence. Inasmuch as violence suppresses economic activity (the value of actual gross world product), the aim would be to compute business **opportunities forgone** by the presence of violence. The second prong would extract from the empirical literature estimates of the economic damage violence brings to particular economic sectors, define violence industries, and subtract out the monetary effects of violence from currently measured GDP to arrive at the monetary size of current peace industries. The goal was to approximate **damage done**, and to allocate this value to broad sectors of the economy (agriculture, industry, services) and to finer sectoral gradations where it was possible to do so.

Principal investigators. The principal investigators were Dr. John Tepper Marlin and Dr. Jurgen Brauer. Dr. Marlin led the research team and conducted the applied work. The theoretical and computational framework was developed by Dr. Brauer, who also carried out much of the calculations. We were ably aided by research interns, Ms. Deanna Liderman and Mr. Ian Scheffer. Unexpectedly, Dr. Marlin was asked to serve as Senior Economist at the Joint Economic Committee, United States Congress, necessitating that he relinquish completion of the research and the writing of this Report. Dr. Brauer stepped into this role as of April 3, 2009. The Report was delivered by email to Economists for Peace and Security, Annandale-upon-Hudson, New York, on April 19, 2009.

Important acronyms.

GDP, GWP	gross domestic product; gross world product (the sum of GDP across states)
aGDP, aGWP	actual GDP; actual GWP as conventionally measured
fx-based GDP/GWP	GDP or GWP measures based on foreign-exchange (fx) conversion into US dollars
ppp-based GDP/GWP	GDP or GWP measures based on purchasing power parity (ppp) measures
pGDP, vGDP, pGWP, vGWP	GDP or GWP, apportioned into peace industries and violence industries shares
PGDP, PGWP	peace GDP or peace GWP if there were no violence
spd, dpd	static peace dividend; dynamic peace dividend
GPI	Global Peace Index

Main findings.

1 FEASIBILITY. In principle, it is feasible to arrive at a computational method and to obtain data to study empirically and compute "order of magnitude" estimates of what might be the economic effects when violence ceases and peace obtains.

2 APPROXIMATION. Although we believe that our numbers are plausible (and conservative), we made a number of assumptions that make our computations approximate. Our quantitative results should be used in an illustrative and suggestive manner only, not as firm or definitive. When appropriate, we carried out scenario analyses to learn how sensitive the results are to changes in certain assumptions.

3 TOTAL, STATIC, AND DYNAMIC EFFECTS. For 2007, the total effect of peace might have been on the order of US$7.2 trillion (in nominal foreign-exchange based 2007 US$). About one-third of the total effect (US$2.4 trillion, or 4.4 percent of 2007 gross world product) is due to static peace dividend effects that accompany the reallocation of resources from violence to peace. Static means that the overall economic pie remains constant so that gains to some industries are offset by losses to other industries. No new economic activity is generated. However, the remaining two-thirds (U$4.8 trillion) are due to dynamic peace dividend effects that accrue when, due to peace, previously unharnessed economic resources are released. This US$4.8 trillion net economic gain amounts to an addition of 9 percent to the world economy.

4 PERSPECTIVE. To put the US$4.8 trillion number in perspective, it amounts to about one-third of the current economic heft of the United States (US$13.8 trillion in 2007). As this would go far beyond the research request, no attempt has been made to suggest the energy and environmental follow-on effects of adding this much economic activity to the world economy.

5 COUNTRY ANALYSIS. The estimated economic gains vary widely across countries. For states that are relatively peaceful to begin with, the effect is smaller than for states suffering from larger-scale internal or external violence, or both. For Japan, for instance, the dynamic peace dividend effect, measured in purchasing power parity terms, is a relatively modest plus 3 percent over its 2007 GDP. In contrast, Zimbabwe's economy would be expected to more than double. For a number of states (Cambodia, Guatemala, Haiti, Honduras, Jamaica,

Kenya, Latvia, Mauritania, and Trinidad and Tobago), internal peace generates 80% or more of the overall peace dividend we compute, in some cases much larger than would be expected on the basis of their internal GPI measures. For other states (Australia, Canada, Denmark, Iceland, Japan, New Zealand, Norway, Sweden, and the United Kingdom), less than 50% of the overall peace dividend would come from internal peace, in some cases much smaller than would be expected from their internal GPI.

6 **SECTOR ANALYSIS**. Of the world's 2007 fx-based aGWP of US$54.7 trillion, the agricultural sector accounted for US$2.1 trillion, industry for US$16.3 trillion, and services for the remaining US$36.3 trillion. Across all economic sectors, violence-based economic activity amounts to 4.6%, or US$2.4 trillion out of the US$54.7 trillion. Although world military expenditure accounts only for about 2.5 percent of fx-based aGWP, we suggest that 6.2% (or US$1.0 trillion) of world industrial activity depends in one way or another on violence and is, in principle, available for reallocation. For the service sector, we suggest that 3.9% (or US$1.4 trillion) depends on violence and is, in principle, available for reallocation. Reallocation does not release nor generate new economic activity. Due to data constraints, dynamic peace dividend analysis by subsectors was carried out for the United States only but is, in principle, feasible across all states.

7 **COUNTRY-SECTOR ANALYSIS**. When static country effects are studied by economic sector, some surprises emerge. In Angola, for example, in 2007 industry accounted for 75.9% of the combined economic value-added of industry and services (based on purchasing power parity GDP). Yet only 58.6% of the static gain from peace would accrue to industry. The service sector thus would stand to gain disproportionally from a reallocation of resources from violence to peace industries. Other states where the difference in favor of the service sector exceeds 15 percentage points are Iraq and Qatar. Conversely, states where industry would benefit disproportionately are Cuba, Ethiopia, France, Greece, Lebanon, Rwanda, and the United States of America. Although feasible in principle, with one exception it proved too time-consuming to try to push the analysis beyond the top-level economic sectors into subsectors within agriculture, industry, and services. The (important) exception concerns the United States and this is detailed in the Main Report, where we also discuss what might be required to carry out this subsectoral analysis for states other than the United States.

Limitations. Important limitations of this Report, especially with regard to its calculations, include how GDP (or GWP) itself is currently measured by authorities; that a part of the calculations is founded on foreign-exchanged based conversion of state currencies into US dollars and that, as an alternative, the use of purchasing power parity values is not always appropriate; that this Report carries out its computation only for a single year (2007) rather than for a series of years; and that the study of the economic causes, costs, and consequences of violence is neither advanced among economists nor addressed in systematic ways in the relevant literatures.

Recommendations. Despite limitations of concepts, methods, data, and scope, the exercise of computing a peace GWP (both static and dynamic) and to extend this to states and economic sectors and subsectors is, in principle, feasible. The obstacles encountered during this feasibility study do not appear insurmountable. A full study of this kind would assist the business community, the research community, and the world community at large, especially if it helped to bring about peace.

MAIN REPORT

Defining Peace Industries and Calculating the Potential Size of a Peace Gross World Product by Country and by Economic Sector

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1. Introduction

Violence interferes with education, health, and personal safety and thus with personal productivity, the pursuit of business opportunities, commerce and trade, economic development and growth, and human material well-being and subjective happiness. Business leaders might make different decisions if they knew, even approximately, not only the current cost of violence (or its credible threat to the global business environment) but also the extent of business opportunities forgone by continuous violence (or the threat thereof) that in some cases renders entire states largely unfit for business.[1]

We distinguish between economic activity that is criminal as opposed to that which is violent or, at any rate, related to violence. For this Report, we are not interested in estimating a non-criminal ("ethical") gross world product (GWP) but in estimating a peace-based GWP as distinct from a violence-based GWP. The Report does not argue that it is feasible to eliminate violence, nor that military forces and violence-related law and order functions are or will become unnecessary; it does argue that societies have choices between spending money on conflict-transformation, for example, as opposed to locking up people for individual or collective violent behavior. Businesses, in particular, have both the resources and the incentives to affect how societies respond to violence. Our purpose is therefore to show how overall society, including businesses, might benefit by a reduction in violence. Quantifying the benefits for each state and economic sector makes clear that with few exceptions businesses — their shareholders, executives, employees, suppliers, customers, and the communities in which they operate — have a considerable stake in peace.

The Stockholm International Peace Research Institute (SIPRI) estimates that world military expenditure as a share of actual gross world product (aGWP, or the sum of individual countries' aGDPs) was 2.5 percent in 2007.[2] Thus, only a minority of businesses has a direct stake in war. If one adjusts this number for the typical underreporting of military expenditure and for the economic activity involved in violent activities such as the prosecution of war, civil war, political repression, piracy, and activities in conjunction with criminal violence, it can be argued that the combined effect directly or indirectly implicates a conservatively estimated 4.4 percent or more of aGWP in violence.[3] The mere reallocation of economic activity from violence to peace would shift this 4.4 percent from violence industries to peace industries but would not, by itself, add to the overall economic pie. We therefore refer to this as the static peace dividend (spd) effect, meaning that aGWP itself remains at first unchanged (static). Although some industries would decline precipitously (e.g., military aircraft manufacture), others would decline only slightly (e.g., sport and hunting firearms manufacture, by far the largest part of the manufacture of firearms), and still others would probably see no decline in economic activity at all (e.g., a law firm doing business in criminal and civil law might merely see less business in its violent crime case load but more business in its corporate law cases as economic activity shifts).

Beyond the static economic effect lies the realization that by suppressing economic activity, violence suppresses GWP below what otherwise it could have been. For example, some studies of the economic effects of terror suggest that GWP might have been up to 11 percent higher in the absence of terrorist events. If violence ceases and peace is obtained, otherwise idle, underused, or misdirected labor and capital resources can be liberated and enter into the economy in productive ways. We refer to this as the dynamic peace dividend (dpd) effect. Combined, the static and the dynamic effects account for the total economic effect of the cessation of violence and the utopia of peace. For 2007, this total effect could have been, in foreign-exchange based nominal terms, as much as US$7.2 trillion. One-third of that would have come from the static reallocation of resources but a net gain of about US$4.8 trillion, or 8.7 percent, over the actual 2007 gross world product of about US$54.7 trillion could have been realized from the dynamic effects of peace.

The remainder of this Report is arranged as follows. Section 2 summarizes the prior literature, focusing on economy-wide rather than business-specific effects of violence. Section 3 focuses on business-specific effects by selective business activities and selected business sectors, or industries. The objective is to gain from the very disparate and highly case-specific literature a sense of the likely global percentages across all states and all economic sectors that would then guide our assumptions to be used in the computations to follow. Section 4 discusses our concept of a peace gross world product (PGWP). Section 5 takes the 2007 economic pie per state and for the world as a whole as given and discusses how we compute shares of actual GDP and actual GWP that accrue to peaceful and to violent activity, respectively. Because we assume that GWP is given, the estimates of the current share of economic activity accruing to violent activity therefore constitute a first cut at estimating a static peace dividend when economic activity is reallocated from violence to nonviolence. Dynamic effects would enlarge the economic pie, and this is discussed in Section 6. The combined static and dynamic effects give an estimate of the overall peace dividend that might be realized if violence ceased.

Section 7 presents results of a country by country analysis and, for reasons explained there, is based on purchasing power parity or so-called international dollars (ppp-$) rather than on nominal US dollars (US$). Section 8 is a peace dividend analysis by sector (agriculture, industry, services) and subsectors within sectors. An analysis of the interaction of country and sector effects is carried out in Section 9. Section 10 discusses limitations of the calculations underlying this Report. Section 11 lists recommendations for business outreach, public outreach, and academic outreach (research). Appendix A contains some data tables. A selective bibliography, selectively annotated, on the economics of violence and peace is provided in Appendix B. A Microsoft Excel spreadsheet ("Peace GDP and Industries") is an integral part of this Report.

2. Prior literature

2.1 Forms of violence

The World Health Organization (WHO, 2002) classifies violence into the rubrics of self-harm (including suicide), interpersonal violence (e.g., violence between intimate partners and other forms of family violence, rape and sexual assault by strangers, violence committed in institutional settings such as schools, prisons, and work places), and collective violence (e.g., armed conflict within and between states, violent political repression and genocide, violent acts of terror, and organized crime) and speaks of an "ecology of violence" that progresses from individual to personal relationship-related violence (personal violence) to communal and broad societal levels of violence (collective violence). Violent behavior can be categorized by who commits the act of violence, who the victim is, and what kind of violence has been committed.

Violence, however, is rarely costed, neither economy-wide nor business-specific, and we are not aware of any sustained effort to pull all the available information together to tell a consistent, complete, and regularly updated "story" on the cost of violence and the beneficial promise of peace.

We summarize here findings from a somewhat haphazard selection of studies, the main objective being to gain a sense of the magnitude of economy and industry-wide costs of violence. No attempt has been made to conduct a comprehensive review; instead we relied on Dr. Brauer's academic expertise in the field of the economics of conflict, war, and peace as well as on Dr. Marlin's practical expertise as former Chief Economist of the City of New York and principal of the CityEconomist consultancy firm. A selective bibliography, selectively annotated, is attached to this Report as Appendix B. If it were desired to carry the study methods invented for the computational part of this Report forward we would then recommend that a comprehensive literature review be conducted and maintained (see Section 11, Recommendations).

A general observation is that few studies approach the question from a business perspective.[4] Like individual victims, business simply adapts to violence and rarely speaks up against violence, for peace, even though it has the resources and the economic incentives to do so. We find that prior studies have tended to focus, on the one hand, on war, military expenditure, and (anti)terror effects, and, on the other, on the economics of public health effects of interpersonal violence, especially sexual violence and the use of firearms. Rarely are the two literatures brought together. To our knowledge, a focused program of study on "security economics" — on the direct cost of antiviolence and security-related measures and of the indirect cost of violence against employees, business partners, suppliers, and customers — does not exist and could be hugely valuable to the business community.

2.2 Violence: interstate war or preparation therefor

There are many studies of the economy-wide costs of military spending budgets (for a sample, see Table A2 in Appendix A). These range from under 1 percent to well over 10 percent of country-specific GDP. As for the United States, its military budget is variously described as between 20 and 70 percent of the US budget or, for 2008, between US$500 billion and US$1 trillion.[5] We believe that the higher numbers are the more accurate measures, so that a peace GDP for the United States would release US$1 trillion for civilian use from the military sector alone, or over 7 percent of US GDP. Estimates of the cumulative cost of the Iraq war to the United States, let alone to Iraq,[6] have varied between a few million dollars to US$3 trillion and more.[7]

Since 1991, interstate wars have become rare or, at any rate, short-duration events. Examples include the 3-week long, US-led war against Iraq in March 2003 (which became a civil war thereafter), the Israeli-Lebanon war in July and August of 2006 and the Russian-Georgian war in August 2008. The Israeli war is said to have cost US$20 billion for about one month of fighting, or about 12 percent of Israeli GDP.[8]

As mentioned, in 2007 average world military expenditure, as measured by SIPRI, amounted to 2.5 percent of GWP that year. This number serves as a minimum guide of violence-related costs that, in a utopian world, could be converted and applied to an economy of peace.

2.3 Violence: transnational and domestic terror events

We reviewed 23 studies that included estimates of the effect of terror events on the economies of various states (see Table A1 in Appendix A).[9] Among those, Crain and Crain examine macroeconomic consequences of terror events using data from 147 countries from 1968 to 2002. Estimates for the economic effect of terror events on GDP, GDP growth, investment, consumer spending, and tourism suggest that reduction in terror could yield large economic benefits, depending on a country's demographics, base level of output, and investment. The study provides a foundation for computing the costs of terror and the benefits of antiterror activities by analyzing 11,723 terrorist acts that killed or wounded 37,137 people. The authors use data series compiled by the ITERATE project. For the United States, the study concludes that a reduction in incidents from 3 to 2 per year would be associated with a GDP increase of about US$40 billion and add nearly US$5 billion in fixed capital investment to the US economy. For the world as a whole, the authors estimate that without terror incidents, GWP would have been US$3.6 trillion higher in 2002. This is 10.9 percent of the US$33 trillion GWP that year. Carrying this percentage forward to 2008 would result in a US$6 trillion number. Since terror is only one of several kinds of violence, the total GWP effect of violence, and therefore the GWP potential from peace, would be larger still.

2.4 Violence: other collective and personal violence

Although interstate war and transnational terror loom large in the world's public attention, transnational terror events are relatively rare and no major interstate armed conflict — defined as involving at least 1,000 battle-related deaths during at least one calendar year of a conflict and at least 25 battle-related deaths in other calendar years — has been recorded since 2004 (SIPRI, 2008, p. 73). Instead, in economic terms some of the worst violence occurs in sovereign countries that are poor or to individuals in wealthy countries who are poor. The poor lack voice, and violence to them is, on the global communications network, often noiseless.

There are at least two ways to arrive at estimates of nonwar and nonterror costs of violence. One is to collect estimates from specific case studies on war, human rights violations, violent crime, and so on. The World Health Organization, in a 2002 report, summarizes some economic research on the cost of violence as follows:

> "For example, studies sponsored by the Inter-American Development Bank between 1996 and 1997 on the economic impact of violence in six Latin American countries calculated that expenditures on health services alone amounted to 1.9% of the gross domestic product in Brazil, 5.0% in Colombia, 4.3% in El Salvador, 1.3% in Mexico, 1.5% in Peru and 0.3% in Venezuela. A 1992 study in the United States put the annual cost of treating gunshot wounds at US$126 billion. Cutting and stab wounds cost an additional US$51 billion."[10]

A later WHO report in 2004 on the economic dimensions of interpersonal violence states that for the United States alone, the cost is approximately 3.3 percent of GDP. Intimate partner violence in Nicaragua was estimated at 1.6 percent of GDP, and in Chile at 2.0 percent of GDP (see WHO, 2004, p. x). Cook and Ludwig (2000) estimate the cost of gun-related crime in the United States at US$115 billion in nominal 1997 dollars (US$148 billion in nominal 2008 dollars, or about 1 percentage point of US GDP). The methods underlying these studies are diverse and not necessarily consistent and focus, understandably, on personal costs to the victims and on public sector costs. Costs to business — direct, indirect, and in terms of forgone opportunities — are rarely mentioned. One important implication of these studies is that the health-care sector would suffer economically, and probably dramatically, if interpersonal violence stopped.

The United Nations Development Programme (UNDP) summarizes recent studies estimating the economic cost of civil war, especially for Africa, as lying somewhere between 2.2 and 3.3 percent of GDP per country per conflict year prior to 1990 and as perhaps much more than 10 percent of GDP post-1990, that is, in the post-cold war era (UNDP, 2008, p. 35). Figure 1 provides an impression, in per capita ppp-$ terms, of the drastic cumulative cost of violence in selected civil war countries. At the same time, the figure provides evidence that post-violent

conflict economic recovery is possible (all the lines turn upward) but that policy plays a role in the strengths of the recovery (SGR and WGR stand for "strong" and "weak" growth recovery, respectively).
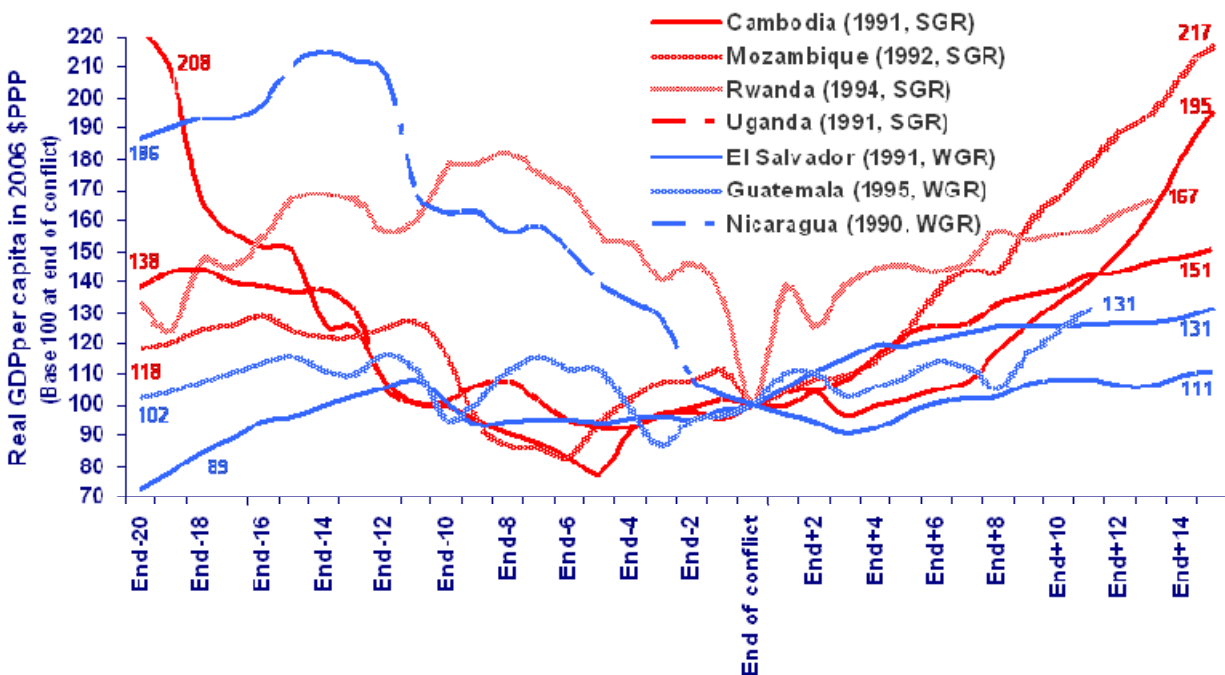
A Small Arms Survey review study done for the Geneva Declaration on Armed Violence and Development on the cost of lost productivity due to criminal violence estimates annual costs on the order of US$95 billion to US$163 billion, or about 0.14 percent of (2004) GWP.[11] The same study suggests that the consequence of armed conflict "decreases the GDP growth of an average economy by at least two per cent per year" and that the subjective cost of insecurity generated by armed violence results in costs of US$400 billion annually. Of course, many war-torn African countries hardly reach 2 percent GDP growth to begin with, let alone in per capita terms. Losses stem from "fiscal effects, loss of productive capital, depleted financial capital, eroded human capital, rising transaction costs, and reallocation of development assistance (to less risky environments)."[12]

This state-by-state approach demands a painstaking — but eventually inevitable — trekking through the literature to arrive at a complete listing of these sorts of estimates. Although expensive in labor resources, this would be a hugely worthwhile undertaking because it would result in a specific and detailed shared resource and staring point for outcomes-oriented, collaborate research in violence and peace economics.

In the absence of state-by-state estimates, another, and necessarily cruder, approach is to look only at the easily identified business costs of violence, especially from the terrorism-related studies, and assume for instance that terror or the threat thereof accounts for 80 percent of all violence-related costs. One could then argue that the Crain and Crain estimate of terror costs of

10.9 percent of GWP be boosted by the "missing" 20 percent to take account of nonterror-related costs of violent conflict. The total would come to 13.6 percent of foreign exchange-based actual GWP (fx-based aGWP) of US$54.7 trillion. For 2007, this would be about $7.4 trillion, very close to the headline estimate we first arrived at by different means. Alternatively, if the terror-related costs in the Crain and Crain estimates are only 50 percent rather than 80 percent of all violence costs to business, the total suppressed fx-based aGWP would come to 21.8 percent, or US$12 trillion, of GWP.

2.4 In sum

Although the numbers vary widely across countries and studies, figures of annual costs of violence of up to 10 percent of GDP are not uncommon, certainly not for cases of acute mass violence. Even in cases of "routine" violence, estimates run to 2 to 5 percent of GDP as the cost of perpetrated interpersonal violence, let alone for defending against perceived, implied, or explicitly stated threats of violence. Taking these results, we calibrated the base scenario coefficients used in our "Peace GDP and Industries" spreadsheet to arrive at what we believe is a plausible, indeed conservative, estimate of 4.4 percent of GWP as the current cost of violence and of 9 percent *in addition to* current GWP (the dynamic peace dividend) if violence were to cease. In 2007 fx-based dollars terms the combined effect would be an annual US$7.2 trillion, no small sum of money for business to consider.

3. Economic effects of violence on specific business activities and sectors

In this section, we illustrate how violence affects specific business *activities* such as trade or foreign direct investment, and specific business *sectors* such as insurance or tourism. As in Section 2, the object is not to attempt a comprehensive literature review but merely to gain a sense of the order of magnitude of the effects of violence on business. Our main finding is that on the whole the literature is far too selective — on the effects of specific terror attacks and on tourism in particular — as to permit statements any more specific than to claim generally adverse effects of violence on business.

3.1 Business activities

FOREIGN DIRECT INVESTMENT. Several studies estimate the effect of terrorist incidents on foreign direct investment (FDI). Abadie and Gardeazabel (2007) estimate the effect on worldwide FDI at a negative 5 percent. For Greece and Spain, Enders and Sandler (1996) estimate a negative 11.9 to 13.5 percent, and for Israel Eckstein and Tsiddon (2004) estimate a negative 10 percent a year. The associated decrease in GDP was 0.5 percent worldwide, with a range of 0.04 percent to 0.15 percent per year in the three countries. The largest impact by far occurred on Israel (see Table A3 in Appendix A). But the effects are not uniform. For the United States, for example, Enders,

Sachsida, and Sandler (2006) find a negative, but not long-lasting, effect. In contrast, in Turkey, FDI effects of terror attacks are long-lived. Much of the effect comes through uncertainty by businesses about where to invest. Investment may eventually be undertaken but perhaps not in the initially preferred location, probably resulting in nonoptimal investment decisions.

SHARE PRICES. A specific firm targeted by a terrorist attack suffers an average drop of 0.83 percent in the price of its share for each attack, according to Karolyi and Martell (2006), a study based on a global sample of 75 publicly traded companies. The authors also found that a firm targeted by a terrorist attack suffers an average decrease in market capitalization of US$401 million (0.83 percent). This is significant because incorporated businesses are by far the most frequent terrorist targets, representing nearly two-thirds of all attacks between 1998 and 2003. With 1,534 attacks over that period, the loss in market value was in the order of US$615 billion (see Table A4 in Appendix A).[13]

PROPERTY DAMAGE. Navarro and Spencer (2001), in a back-of-the-envelope analysis immediately following the September 11, 2001 terror attack on the United States, calculated property damage at approximately US$10 to US$13 billion. Loss in economic output was valued at US$47 billion, loss in market capitalization at US$1.7 trillion, losses of US$41 billion in various forms of taxation (e.g., sky marshals on airplanes, more stringent airport and airplane security requirements), losses of US$100 billion in psychological costs, and so on. Not all of these are true economic net costs as some of these amounts either are not necessarily realized (e.g., losses in market capitalization are losses only when shareholders sell, in which case some buyers snap up shares cheaply) or simply transfers from one economic sector to another (e.g., from the private sector to the government sector).

Property damage to crops and livestock, schools and health clinics has been documented in developing countries. Such destruction would lead to depletion of natural resource assets, lower productivity, exacerbate food insecurity, and lead to ensuing violence. For example, in Angola, following independence in 1975, potato production "stagnated during the ensuing 27 years of civil war but boomed once peace was restored."[14] We are not aware of a thorough review of the literature in this regard, let alone with specific connections to the businesses that serve the agricultural markets worldwide. One would imagine that industry engaged in making and selling agricultural implements such as irrigation systems, seed technology, mechanized harvesting, general agricultural tools, and so on, would stand to benefit from peace. A search even of the United Nation's Food and Agricultural Organization (FAO) did not yield much specific information on violence and agriculture.

TRADE. Trade is disrupted by all kinds of obstacles, from taxes to violence, whether domestically or internationally. Conversely, the removal of obstacles increases levels of trade and expands markets, and hence GDP. A number of scholars have begun to view violence and war as if they were import or export taxes (tariffs). Just as tariffs impede trade, so does violence, which is a form of "insecure" trade. Anderson and Marcouiller find "that a 10% rise in a country's index of transparency and impartiality leads to a 5% increase in its import volumes, other things equal,"[15] of which violence in the form of terrorism is one part. Pasteels, Fontagne, and Brauer (2003) arrive at a more explicit estimate of the cost of war on trade. Using bilateral trade data for a set of 96 countries for 1999 and 2000, they find that, on average, each step up a conflict ladder — from latent nonviolent conflict to a nonviolent crisis to irregular use of violence to war with systematic, collective use of force — is equivalent to a 33 percent increase in average tariffs. Along similar lines, Nitsch and Schumacher estimate for a sample of more than 200 countries for 1960 to 1993 that "terrorist actions reduce the volume of trade; a doubling in the number of terrorist incidents is associated with a decrease in bilateral trade by about 4 percent."[16]

An important finding in the literature is not only that violent conflict reduces trade and therefore the benefits from trade, but that trade itself reduces conflict, including violent conflict between states (Polachek, 2007). In a similar vein, Li and Schaub (2004) find that economic openness is associated with a decreased number of terror events. In regard to specific business sectors, Professor David Throsby of Macquarie University, Sydney, has conducted computations to the effect that for every 10-place improvement in the Global Peace Index, average consumer spending increases on food and nonalcoholic beverages by US$166 per capita, on clothing and footwear by US$79 per capita, on communications by US$371 per capita, and on household goods and services by US$50 per capita.[17]

3.2 Business sectors

AGRICULTURE. Apart from the comments already made with regard to property in the agricultural sector, agriculture itself is not a violence industry but can engender severe violence, for example, when related to the trade in illicit narcotics, as widely noted for the case of Afghanistan. Brauer and Gomez-Sorzano (2004), writing about Colombia, concluded "... that trade balance improvements derive from commodity booms (coffee, cocaine) that make land more valuable and the contest over land more severe." For some narcotics, precursors are extracted from plant-based material. But that this industry generates much violence is not the same as saying that the industry will grow its market on account of violence. The illicit narcotics industry is not, at any rate, represented in measured actual gross world product (fx-based aGWP). Thus, although agriculture can stimulate severe violence, it is not a violence industry itself. But it has been documented that violence adversely affects the industry in that it makes long-term investment riskier, essentially monetizing the risk of effective appropriation in

violence and war (e.g., Dinar and Keck, 1997, again for the case of Colombia). Similarly, some literature has appeared on agriculture as the specific actual or potential target of war or terror. Inevitably, as defensive measures become necessary this increases the cost of business, if only in lobbying costs to shift costs to taxpayers or, through higher prices, to customers.

COMMERCIAL AVIATION. The effects of terrorist threats on commercial aviation are well known. Direct costs include ever more stringent security measures; indirect and usually unmeasured costs include increased inconvenience and waiting times for customers at airports and airlines that lead to substitution into other forms of travel with their usually higher incidence of casualties (car travel for example having a much higher probability of injury and death than air travel). There is a constant battle of cost shifting between and among customers, airports, airlines, and governments. Well-documented substitution (or transference) effects also incur in that more effective antiterror measures "push" terror organizations into alternative locations or types of terror. For example, instead of attacking commercial passenger aircraft, attacks are directed against subway and railway systems (e.g., London and Madrid).

As to the industry itself, a 2005 draft report on the impact of terrorism on commercial aviation states:

> "The direct cost for [a] downed aircraft and lives lost would be about $1 billion per aircraft. The indirect cost would result from operating losses to the airlines and loss of consumer welfare as some people would not fly. These amounts would depend on the length of any interruption in air travel and the public's long term reaction to terrorist threat to flying. The indirect economic cost would be greater then the direct cost and would depend on how the government reacts (investing in countermeasures and/or closing airports) and how the public reacts (measured in reduction in travel demand)."[18]

In a different vein, companies that make private commercial airplanes are entwined with military production. At the end of January 2009, Norway's state investment fund divested and blacklisted the US firm Textron, owner of the manufacturer of the Cessna airplane brand. The fund is an ethical investor and sold out its shares in the firm because Textron is, in part, in the violence industry as a producer of cluster bombs.[19]

INSURANCE. Insurance may have mixed interests, as the demand for the insurance industry may seem to increase with violence. However, it is important to note that premiums do increase along with an increase in risk (impacting the demand) and the number of insurance payouts increases with increasing violence (increasing costs for the industry). The long-term interest of the

insurance industry is in peace because peace lengthens both the asset base and the time horizons of individuals and businesses and therefore payment of premiums for life insurance, theft, injury, and retirement-related products. The perfect profit scenario for insurance is one in which violence levels fall over a long period of time, with premiums initially rising after an event and then falling during periods of peace, as in a Poisson-type curve with a long tail. For illustration, the Office of the Comptroller of the City of New York City issued a study on the effect of the September 11, 2001 terror attack on the city, one year after the event. The study found that "premiums for large accounts ... increased by an average of 73.3% per policy compared with 11.4% the previous year. Medium-sized accounts experienced an average 49.5% increase after the attack, compared with 9.4% in 2000-2001, and premiums for small accounts went up by 39.0%, compared with 9.7% during the previous year. The agents and brokers consistently reported that the greatest increase in premiums were for businesses located in high-rise buildings in Manhattan, particularly those in, or even near, landmark or 'trophy' properties considered by insurers to be at risk of becoming terrorist targets." For comparison, the Insurance Information Institute estimated that "premiums across the country rose by 30% in 2002, and stated that approximately half of that increase was related to the terrorist attack." In addition to a spike in rates, the survey-based study found that "the percentage of respondents who reported that coverage was either 'readily available' or 'somewhat available' for large accounts fell from 84.1% for the year before September 11th to 20.2% for the following year. Medium-sized accounts also became significantly harder to insure, with 87.1% of respondents finding coverage 'readily available' or 'somewhat available' before September 11th and only 28.0% making that assessment afterward. Similarly, the number of respondents reporting that coverage for small accounts was 'readily available' or 'somewhat available' decreased from 85.2% for the year before September 11th to 34.3% for the period after the attack." The report is explicit about the diversion of productive resources into defense (or insurance) against potential violence. What is clear is that, in the very short-run, the insurance sector appears to benefit from violence but, in the medium to long run, violence actually drives customers away and, indirectly, depresses economic activity, through a run-up in insurance rate and reductions in coverage availability.[20]

TOURISM. The effect of war and terror on the tourism industry is fairly well studied. For example, Neumayer (2004) statistically tests for "the impact of various forms of political violence on tourism ... [the] models show strong evidence that human rights violations, conflict, and other politically motivated violent events negatively affect tourist arrivals. In a dynamic model, even if autocratic regimes do not resort to violence, they have lower numbers of tourist arrivals than more democratic regimes. Results also show evidence for intraregional, negative spillover, and cross-regional substitution effects." For example, after September 11, 2001, tourist arrivals in Bali, Indonesia, dropped. This adversely affected not only the official economy but also

businesses in the informal economy, such as street vendors who depended on tourists for their livelihoods. When Bali itself became a target of a terror attack on October 12, 2002, tourist arrivals fell drastically, and those tourists that did come stayed for shorter periods and spent less, creating income losses for vendors, and inducing "greater stress and insecurity, while increasing crime, religious tensions, and competition."[21] A good number of such studies are available but, to our knowledge, have not been systematically reviewed to gain more than anecdotal, case-by-case, incident-by-incident insight into the specific economic damage done.[22]

International tourism can be displaced by domestic tourism as happened within the United States following September 11, 2001 when many US citizens stayed in the United States and thereby benefited US tourism sites. Sample companies in the tourism (hotel and restaurant chains) industry include McDonalds, Marriott, Starwood, Hyatt, Hilton, and Trump. Marriott Hotels sales flattened out in 2001 and turned down in 2002. This suggests that comparing hotel sales with levels of violence in each country could be a fruitful area of industry-specific research. We would expect increased violence to reduce sales, increase costs, and reduce profits. Even when sales revert to trend, the "dip" in the intervening time period amounts to a permanent loss for the firm and the industry.

3.3 Summary

In sum, in spite of an apparent abundance of studies on the impact of violence on business, we find that it is highly selective and pertains for the most part to terror, airlines, and tourism. Subsequent effects on secondary industries are rarely studied: for example, from a terror attack on airlines, to tourism and the hospitality industry, and from there to the industries that, in turn, would have benefited from the purchases of household items by workers in the tourism industry. Other secondary effects on financial institutions would be seen as tourism workers, pushed out of jobs, remit fewer funds to families back home. In principle, input-output tables would permit such studies to trace the effects of specific instances of violence, but we are not aware of any of studies of this kind.

Also, the effects of violence on business are by no means straightforward. Every humanitarian emergency generates millions of dollars of business for the transportation sector as emergency relief suppliers are shipped around the globe, private security services are hired, and consultants, aid workers, and diplomats jet from place to place. Every incident of domestic violence that results in hospitalization "helps" the medical industry, including hospitals, pharmaceuticals, rehabilitation, and other subsectors. Every gun-murder "helps" the firearms industry sell more weapons. Every terror attack "helps" security consultants and product sales. Neatly separating "peace sales" from "violence sales" will be an impossible task in most cases. That, in rare case, a specific business gains from violence is beyond question; that, in most cases, an industrial sector loses from violence and lost productivity and income of potential customer

also is, for the most part, beyond question. That some industries suffer particularly harshly from violence, especially air transport and tourism and hospitality, is clear and is the reason why these industries should find it the easiest to engage in a concerted effort against violence.

4. The concepts of peace gross world product, and static and dynamic peace dividends

A growing number of economists, members of civil society, and even public officials have taken issue with an uncritical use of gross domestic product (GDP) data as a measure of human well-being. Rather than mere production, throughput, and income, for example, alternative measures have aimed at measuring consumption, environmental sustainability, and happiness.[23] In a similar vein, this Report asks what portion of GDP may be attributable to violence. This includes not only the obvious instance of weapons manufacture, but also the institutions devoted to responding to violence, which consume resources that could otherwise be used for satisfaction of the needs for food, shelter, and personal care. We wish to arrive at a method by which to estimate how much violence detracts from productive activity, i.e., how much the portion of GDP devoted to violence reduces GDP below what otherwise might obtain. To appreciate how we approach this task, we start with a hypothetical four-person economy. The persons are:

- A farmer (F) who produces tangible goods.
- A military officer (M) who patrols the perimeter of the state to protect F's fields from external threat.
- A thief (T) who threatens F's and M's unguarded residences left vulnerable to predation during the workday.
- A police office (P) who is in charge of preventing T from succeeding with theft.

In this economy, it may be said that two persons produce protection services (M and P), one person produces tangible goods (F), and one person produces disservices (T). The survival of all four depends solely on the product of F. Suppose that T becomes a farmer as well so that the economy now has two farmers, F1 and F2. Evidently, the need for P's services ceases and s/he may become farmer F3. On the assumption that all are equally productive, GDP can be tripled on account of internal peace. Alternatively, inhabitants can make do with the prior GDP, share the work load of farming, and enjoy more leisure. With external peace, M can also become a farmer (F4) and the economy (or time for leisure) could be larger still.

In real economies, the ratio of peace to violence-based economic activity is not 1 to 3 (F as against M, P, and T) of course.

4.1 Terminology

As we put numbers on the concepts we have been discussing, it will be helpful to develop some terminology for use in the subsequent discussion. We start with actual GDP (or, in the aggregate, gross world product, GWP) and then consider what GDP (or GWP) might be in a utopian peaceful world.

$$(1) \quad aGDP = \text{actual GDP}$$

in current or nominal dollars as presently measured by international convention. Our calculations use IMF data for the year 2007. GDP is measured in US dollars, with other countries' GDPs converted to dollars on the basis of foreign exchange rates (fx-based aGDP). Alternatively, countries' GDP is converted to their purchasing power parity equivalent (ppp-based aGDP), also readily available from the IMF and other international organizations.

Equation (1) breaks down into

$$(2) \quad aGDP = pGDP \text{ (peaceful)} + vGDP \text{ (non-peaceful, or violent GDP)}.$$

In principle, both pGDP and vGDP contain agricultural (ag), industry (ind), and services (sv) components of aGDP. Thus,

$$(3) \quad aGDP = [pGDPag + pGDPind + pGDPsv] + [\, vGDPag + vGDPind + vGDPsv]$$

where ag = agricultural share, ind = industry share, sv = services share in aGDP. The vGDP part is what is available for conversion to pGDP and reflects what we earlier referred to as the static peace dividend. Finally,

$$(4) \quad PGDP = \text{peace GDP} = aGDP + dpdGDP,$$

where aGDP already includes the static effect and dpdGDP is the dynamic peace dividend, that is, the gain as resources are not merely reallocated between violence and peace but freed up to participate in peaceful economic production and voluntary exchange in the first place.

This is the first attempt, to our knowledge, to look at the peace component of GDP and peace industries as a collective unit. Some very broad assumptions must be made in order to undertake an estimate of this kind. The thinking behind our estimates is not that military expenditure and violence-oriented production have no value in imposing order and preventing disorder and further violence. Rather, we argue that if there were a way to achieve order with less violence production, or to reduce expenditure on violence industries, resources for peace

industries would rise and generate more GWP. As economists from Adam Smith on have observed, production of weapons does not by itself add to the quality of our lives. Education and health care do. High spending on military and police and prisons are manifestations of our collective failure at educating our children and organizing our governments.

4.2 Violence and peace industries

Violence industries are defined as the beneficiaries of war, terror, and other forms of violence. This includes military goods manufacturers, of course, and suppliers to military bases. Also, other industries that benefit from conflict and fear, such as security guards, alarm systems manufacturers, gun manufacturers, other weapons manufacturers, logistics specialists, detective and threat-assessment firms, manufacturers of survival goods (dried food, gas masks, etc.), even political risk analysts, would be included in the violence industries. Peace industries are beneficiaries of peace. Peace industries do better during peace and when the levels of violence are decreased; they get the peace dividend. War and violence-dependent industries and firms do better during times of high violence, such as wars, when they get the violence dividend. Peace and violence variables affect business variables, but the effect depends on the nature of the business.

Substitution effects catch some of the production that is displaced by violent industries. However, substitution imposes losses. From the perspective of orthodox economics, if buyers' first choice cannot be had there must be a loss by switching to the second-best option. Spending on the violent sector thus displaces spending on peace industries. Also, avoidance and defensive costs are incurred in a violent environment. Moving to safer neighborhoods is an avoidance cost. Private security guards, fences, and alarm systems are defensive costs. These industries may be misread as peace industries but they are, in part, a reflection of violence. They thrive when threats rise.

4.3 Assets and income

GDP is a flow measure of income generated from assets. GDP could be increased any year by using up assets (e.g., paying people an income to cut down every tree in a country) but this reduces the stock of wealth from which future income is derived. The crux of the matter lies in asset building, and therefore the (economic) crux of violence lies in destroying assets or preventing asset use, or preventing asset maintenance or preventing asset build-up. If a farmer in Colombia decides not to invest in irrigation because of the threat of confiscation, appropriation, destruction, etc., his/her income, and thus GDP, will be permanently reduced. In contrast, peace industries build income-generating assets. Violence industries either prevent this or help erect avoidance and defensive assets and thereby misdirect economic resources. Thus, it is likely that peace brings not only static effects of reallocating resources from violence to peace but brings

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dynamic effects by injecting resources previously held hostage to violence into the economy. On account of peace itself, the economic pie grows. However, although income is necessary, it is not sufficient for human well-being and happiness. At some point, income is sufficiently high for people to substitute pleasure and leisure for income-generating work. Thus, any peace dividend may well be taken not in the form of opportunities for more work hours and increased incomes (GDP) but in the form of more nonwork (leisure). To focus on GDP — even if it be a peace GDP — can be misleading.

5. Static analysis

5.1 Results (summary)

Given certain general assumptions, detailed in section 4.2, we compute in nominal 2007 terms a static peace dividend of US$2.4 trillion, or 4.4% of actual GWP. Of the total sum, US$1.0 trillion would be contributed by industry and the remaining US$1.4 trillion by the service sector and evidently presents great opportunities for business to compete over shares of the reallocation of resources from violence to peace. We develop a spreadsheet setup that permits future refinement of the calculations as our general assumptions are gradually replaced by country-specific information. As regards country-specific results, see section 5.4 and section 7.

5.2 Method and details

We refer to certain sheets, rows, columns, or cells of the "Peace GDP and Industries" spreadsheet that is an integral part of this Report. Static effects are computed both in terms of fx-based aGDP and ppp-based aGDP across 140 countries (sheets fx-pGDP and ppp-pGDP, respectively). For now, we refer only to the fx-pGDP sheet. According to the International Monetary Fund's *World Economic Outlook* data base, nominal aGWP (the sum of individual countries' aGDP) in 2007 was $54.7 trillion in fx-based dollars (cell C143). The United States accounts for about 25 percent of that; the non-US G7 (Canada, France, Germany, Italy, Japan, and the United Kingdom) for about 30 percent; and the BRIC countries (Brazil, Russia, India, and China) for about 13 percent (cells D171 to D173).[24] Columns G, H, and I contain a break down of aGDP into percentage shares contributed by the primary, secondary, and tertiary sectors, that is, agriculture, industry, and services. The data are from the World Bank. Column K lists military expenditure, with data taken from the Stockholm International Peace Research Institute (SIPRI). Note that data for some countries are missing. Column L converts military expenditure into a percentage of aGDP and the missing data in column K are filled here by recourse to CIA World Factbook data. Columns M, N, and O convert the sectoral shares of aGDP into their US dollar equivalents. Cells M143, N143, and O143 show aggregate worldwide dollar values for agriculture (US$2.1 trillion), industry (US$16.3 trillion), and services (US$36.4 trillion). Column Q converts the military expenditure as a percentage of aGDP into US dollar values. Cell Q143

shows world military expenditure in 2007 as about US$1.4 trillion. Cell Q144 shows this as a percentage of GWP, namely 2.5 percent which, in spite of missing data for some countries, corresponds exactly to the SIPRI estimate.

We now assume that all of agriculture counts as a peace industry. Its violence share, and therefore the associated dollar value, is zero. With regard to industry, in column R we now assume that on the average across all countries one-half of military expenditure goes to purchase inputs from industry and that an additional 2 percent of industry produce for or benefit from other violence-related activities. If this assumption be correct, the worldwide violence industry-related output would amount to US$1.0 trillion (cell R143) or 6.2 percent of all industrial activity (cell R144). As to services, we assume that the remaining one-half of military expenditure buys service inputs and that an additional 2 percent of services is violence related. We believe that this is a mild assumption, especially as it is important to recognize that all of government is part of the service category. Thus, all government functions at municipal, provincial, and federal levels related to violence prevention, administration of justice, rehabilitation, and restoration are part of the service category. If our assumption be warranted, US$1.4 trillion worldwide is spent on violence service-related activity (cell S143), or 3.9 percent of all service activity.

As mentioned, we assume that agriculture itself is not a violence industry. It is wholly a peace industry. Column U, entitled pGDPag, therefore lists in cell U143 US$2.1 trillion as agriculture's contribution to peace. As to industry, column V (pGDPin) subtracts the violence-related part of industry from the overall dollar value of industry (columns N minus R). Cell V143 sums the result. The peaceful part of industry amounts to US$15.3 trillion, or about 93.8 percent of all industrial activity worldwide (cell V144). Column W (pGDPsv) repeats the exercise for the service sector with the finding that about US$34.9 trillion are peace-related (cell W143), or about 96.1 percent of all service activity (cell W144).

Column X calculates the peaceful part of aGDP, called pGDP (hence the name of the sheet, fx-pGDP). In the aggregate, this sums to US$52.3 trillion (cell X143). This, plus the violent part of aGWP (US$2.4 trillion) sums, as it should, to overall aGWP of US$54.7 trillion. (To guard against spreadsheet errors, the fx-pGDP sheet contains various "check" columns as well.) In a final step, it is assumed that if all violent activity stopped, then all of vGDP would be costlessly converted into pGDP (peaceful activity) so that the converse of vGDP becomes the static peace dividend of US$2.4 trillion. Cell C145 calculates that, for the year 2007, this would have amounted to 4.4 percent of aGWP.

5.3 Scenario analysis and simulations

The spreadsheet in hand, it is now a simple matter to change the formulas in columns R and S in particular (that is, those that assign assumed coefficients to the violence share of the industry and service sectors) and compute the effects on the size of the static peace dividend. For illustration,

we present the result of a single example. Suppose that the service sector formula is changed to the assumption of one-half of military expenditure plus 5 (instead of 2) percent of all other service activity, still a conservative assumption given that the government sector and virtually all private household and business functions related to violence prevention or treatment of its effects are captured in the service category. The dollar value of worldwide violence-related business would then amount to US$3.5 trillion, or 6.4 percent of aGWP.

Because the spreadsheet is country-based, systematic future research may make it possible to insert country-specific coefficients into the relevant cells. To speculate for illustrative purposes, future research may establish that there are systematic differences among high-income, middle-income, and low-income countries, or between countries in acute violent social conflict (e.g., war, civil war, ongoing terror) and those that are not. In that case, it would be a simple matter to change the country coefficients in the spreadsheet and recompute the static peace dividend. Indeed, the point of setting up the spreadsheet on a country-by-country basis in the first place is precisely to permit this future development.

5.4 Country-specific results

The fx-based calculations are serviceable if one is interested in dollar-values on the global industrial and service sectors only. If, instead, one wishes to study static peace dividend effects by country, it is necessary to switch from fx-based to ppp-based calculations. The reason for this is that fx-based GDPs convert all countries' currencies into US dollars at the average exchange rate prevailing for the reference year, such as 2007. For instance, Ukraine's nominal 2007 aGDP thus is given as about US$142 billion. But if the average exchange rate changes from year to year, Ukraine's aGDP may be drastically lower or higher, not because its underlying productive capacity and output have changed but merely because of currency market fluctuations. All subsequent sector-specific dollar and percentage share computations would change accordingly. In contrast, purchasing power parity, or ppp-based, calculations have the advantage that they avoid the problem of currency exchange fluctuations, and in that sense they make the results more stable. However, although the global peace dividend effects are about the same in percentage terms, ppp-based calculations arrive at size effects in terms of "artificial" dollars. In assessing ppp-based computations, it is important not to look for the magnitude of the dollar numbers (sometimes referred to as international dollars), but at how countries and sectors stack up relative to each other. Indeed, the very point of ppp-based calculations is to permit this sort of comparison. For more specific discussion of country peace dividend effects, see Section 7.

6. Dynamic analysis

6.1 Results (summary)

According to our assumptions and calculations, peace gross world product (PGWP) might be approximately 9 percent larger than current actual GWP (aGWP). Actual GWP, measured in nominal US dollars, was$54.7 trillion in 2007. A peace GWP might result in a (fx-based) gain of about US$4.8 trillion (cell S143 in the "IntExt GPI" sheet). When specific allowance is made for effects attributable to internal as opposed to external peace, the calculations change slightly — more information yielding more precise results — and the PGWP amounts to US$4.7 trillion, US$2.8 trillion of which would accrue to peace internal to countries, and the remaining US$1.9 trillion to peace between and among them (cells X143, T143, and V143, respectively). This dynamic peace dividend effect is an addition to the static effect discussed in Section 5.

6.2 Method and details

Figures 2 and 3 show on the vertical axes Global Peace Index (GPI) scores for 140 countries against, respectively, foreign-excha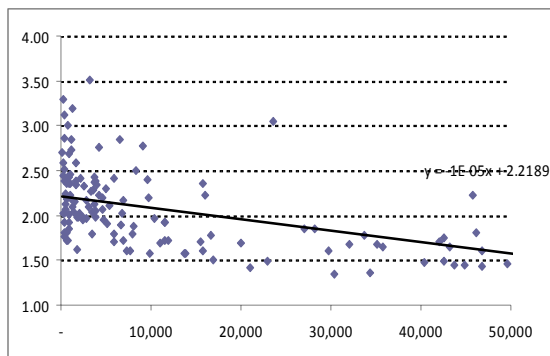nge and purchasing-power parity measured actual per capita GDP on the horizontal axes. Per construction, the lower is the GPI score, the more peaceful the country. Thus, the superimposed downward-sloping linear trend line shows an association to the effect that more peaceful countries on average also obtain higher per capita GDP or income levels. (A curvilinear line would show a more pronounced effect, especially for lower-income countries.) The causal effects run both ways: peace makes capital investment safer than otherwise would be the case, and it thereby stimulates growth and higher living standards. But this, in turn, makes investing in peace more critical as well in order to safeguard the economic achievements. Thus, a virtuous cycle between peace and prosperity can emerge. The World Economic Forum's Business Competitiveness Index and the World Bank's Ease of Doing Business index correlate with the GPI in a similar way. Thus, basing our dynamic projections of PGDP on the GPI itself seems to

Figure 2: GPI 2008 (y-axis) vs 2007 per capita fx-based GDP (x-axis) for 140 countries, with trend line.
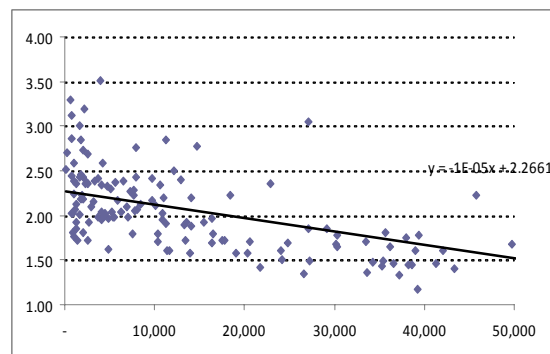
Figure 3: GPI 2008 (y-axis) vs 2007 per capita ppp-based GDP (x-axis) for 140 countries, with trend line.

be a reasonable first approach to take.

The "Peace GDP and Industries" spreadsheet contains several "PGDP" sheets. The "PGDP x1" sheet contains our base scenario. The other "PGDP" sheets contain additional scenarios, the results of which are summarized in the "Ranges" sheet. The "IntExt GPI" sheet splits the overall dynamic peace dividend into the part due to achieving internal peace and the part due to external peace. All calculations are always carried out both in fx-terms as well as in ppp-terms. The fx-based results are employed to gain a sense of the global effects of peace; the ppp-based results are used to gain a sense of country-specific effects of peace.

Because the "IntExt GPI" sheet itself is based on the base scenario in sheet "PGDP x1.0," it is best to use it to explain the spreadsheet setup and the computational methods employed there. Column A lists 140 countries, column B records the 2008 GPI rank, and column C the 2008 GPI score. Columns D and E contain the internal and external GPI sub-scores. (When these are weighted by 60% for the internal and 40% for the external peace categories, and then summed, the overall GPI score in column C results. But the 60/40-weighting is arbitrary and does not reflect the implied weights given by the raw internal and external scores. We chose to work with the implied rather than the arbitrary weights.)

Column F expresses the raw internal score as a percentage of the sum of the raw internal and external scores. As may be seen, for the United Kingdom the percentage in column F is 40 percent. This means that its internal peace score is small relative to its external peace score (the remaining 60 percent). Put differently, the UK scores better on internal than on external peace. In contrast, Zimbabwe's percentage in column F is, at 62 percent, relatively high. This means that its internal peace score is worse than its external peace score. Consequently, we would expect that the economic effects of peace for a specific country depend on whether that country is primarily at internal or at external peace (or not), or both, or in what mixture. For example, if state-on-state wars were abolished and the need for military forces disappeared, the United Kingdom would gain relatively much, whereas Zimbabwe would gain relatively little. If, in contrast, civil strife ceased, the United Kingdom would gain relatively little and Zimbabwe would gain relatively much. (This expectation is borne out by the calculations, on which more in a moment.)

Columns N and O contain the fx-based and ppp-based aGDP data. Columns H to K and columns P and Q convert the raw data into logarithms, a mathematical trick to eliminate country size effects (larger countries necessarily having a larger aGDP than smaller countries even if of equal general development status). Columns S to AF contain our crucial base scenario assumption, expressed as a peace multiplier of size 1. For example, column S proceeds in three steps. First, it adjusts a country's fx-based aGDP for 2007 for the size of its economy by using the logarithmic form of the raw data. Second, it multiplies the result by the country's size-adjusted overall GPI. The reason for this is that, by construction, a small GPI score means that

the country is relatively peaceful to begin with and that the cessation of violence therefore cannot add much to its already existing aGDP. In contrast, a larger GPI score reflects a large upside economic potential to be obtained from peace. And third, a peace multiplier of size 1 is applied. This multiplier reflects an arbitrary assumption about how much of a "boost" may be expected from peace. This assumption is based on the literature review summarized in Section 2 of this Report. Although we believe it to be plausible, reasonable, and conservative, it remains an assumption and is the principal reason why we varied it in the scenario sheets from a factor of 0 to a factor of 2 an increments of 0.5. We discuss this in detail in Section 6.3.

Columns T, V, and X repeat the calculations but applied to the internal and external GPI scores rather than to the overall score. Note that cells U143 and W143 arrive, across all countries, at the 60/40 percent weights that the overall GPI is based on. However, our splitting of the calculations permits us to see how much each country individually might gain from pursuing internal as opposed to pursuing external peace. For example, for the United Kingdom about 43 percent of any gain would come from internal peace (cell U134), whereas for Zimbabwe about 73 percent of any gain would stem from internal peace (cell U142).

Columns AA to AF repeat the setup for ppp-based aGDP rather than fx-based aGDP. Columns AI and AJ as well as AL and AM compare the calculations based on the unweighted (or overall) GPI with those of the (internal/external) weighted GPI, both for fx-based and ppp-based aGDP. The differences, across all countries (row 143) should be slight, which indeed they are. The difference per country, however, can be large, and this is discussed in Section 7.

Columns AO to AS calculate the percentage gain of PGDP relative aGDP (for fx and ppp-based aGDP). Under the assumption of a peace multiplier of size 1, when the world changes from violence to peace this results in a 9 percent economic gain over current aGDP (with respect to the 2007 reference year used throughout).

6.3 Scenario analysis and simulations

Table 1: PGWP scenarios

Factor	FX-based	PPP-based
	(US$bn)	(ppp$bn)
x 0.0	54,727.40	65,479.67
x 0.5	57,116.38	68,480.75
x1.0	**59,505.35**	**71,481.83**
x1.5	61,894.33	74,482.90
x2.0	64,283.31	77,483.98

Table 1, to the left, copied from the "Ranges" sheet, shows the result of scenario analyses carried out in the various "PGDP" sheets wherein the peace multiplier size ranges from a factor of 0 ("PGDP x0.0") to a factor of 2 ("PGDP x2.0"). The first line assumes that if there were peace there would be no economic benefit whatsoever and therefore returns the current actual fx-based and ppp-based GDP numbers. The base case, discussed in Section 6.2, is highlighted in **bold type font**. The base case should not be interpreted as our preferred case. Indeed, we express no preference; our intent was to produce a general method of

computation of PGDP, and one that appears to return a result in line with the established case-study literature. As research progresses, it will be possible either (1) to choose a proper weight to be applied across all countries or (2) to apply country-specific factors for individual countries and sum up the resulting returns.

That a peace multiplier of size 1 is a plausible number might be illustrated with the example of the United States. From 1991 to 2000 — the Clinton-era years following the end of the cold war — inflation-adjusted GDP in the United States grew at the high rate of an average of 3.7 percent per year, or roughly US$300 billion annually (base year 2000). During this time, inflation-adjusted US military expenditure fell from US$730 billion to US$607 billion, or about 16 percent. Projecting this to a military expense of zero dollars, in 2008 terms, generates a nominal US$1 trillion available for reallocation between economic sectors right away, and it is not unrealistic to believe that an additional US$ 1.2 trillion (cell S135) could be generated through economy-wide follow-on effects, the way the post-cold war peace dividend appears to have worked in the 1990s.

Note, in passing, that because of both the military and the economic size of the United States, 24.3 percent of the dynamic peace dividend effects comes from the United States (cell S135 divided by cell S143).

A complementary type of scenario analysis — not pursued in this Report, but relatively easy to accomplish — would involve setting up the underlying spreadsheet in such a way that the economic effects of cuts in GPI (that is, more peace, less violence) by 10, 20, or 30 percent could be simulated. This would provide a useful check on our approach. If, for example, a US$4.8 trillion dynamic peace dividend number could not be reached even with a 100 percent improvement in GPI (that is, the utopian state of a complete absence of violence), then we would know that the x1.0 factor in our base scenario was off the mark. In this fashion, the two methods would hold each other in check. Moreover, to reduce the GPI experimentally and to calculate what the dynamic peace dividend effects would be would generate measurable policy goals. For example, policymakers could deliberately set the goal of reducing their country's GPI score by ten percentage points over one election cycle and hold themselves accountable in terms of how much measurable progress will have been made.

7. Country analysis

Although primarily interested in devising and implementing a feasible computational method to arrive at global numbers, for data reasons both the static and the dynamic peace dividend analysis spreadsheets are set up on a country-by-country basis (as is the Global Peace Index). This has the unintended but useful side-benefit of being able to put in and to pull out of the analysis country-specific information. For example, the dynamic peace dividend calculations in the "IntExt GPI" sheet are based on the GPI which, for 2008, used weights of 60 percent for

internal peace and 40 percent for external peace. Consequently, averaged across countries our computations arrive at virtually the same allocation (for the fx-based calculations, it is 59 percent and 41 percent, respectively, and for the ppp-based calculations, it is 62 percent and 38 percent, respectively). But even though the average across countries matches the GPI weights, drastic differences among countries emerge. For a number of states, internal peace generates 80 percent or more of the overall peace dividend (Cambodia, Guatemala, Haiti, Honduras, Jamaica, Kenya, Latvia, Mauritania, and Trinidad and Tobago, all indicated by those column AC cells that are shaded in light blue in the "IntExt GPI" sheet).[25] This is larger, sometimes much larger, than would have been expected on account of these states' internal GPI alone. For example, for Cambodia, the internal GPI is 65.3 percent of the combined GPI. But almost 81 percent of the dynamic peace dividend would be due to internal peace. For other states, less than half of the dynamic peace dividend would come from internal peace (Australia, Canada, Denmark, Iceland, Japan, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom; indicated in column AC with cells shaded in purple). In some cases this is much smaller than would be expected from their internal GPI. For example, Iceland's internal GPI is 44.7 percent of its combined GPI. But of the dynamic economic gains of peace, only 27.4 percent would accrue due to internal peace.

8. Sector analysis

In this section, we spell out how a peace GWP would benefit particular economic sectors. This is done in two ways. The first is a top-level analysis conducted simply by splitting aGDP into its primary, secondary, and tertiary sectors (i.e., agriculture, industry, and services). The second way looks at subsectors, that is, sectors within agriculture (such as forestry or fisheries), within industry (such as chemicals or scientific instrument building), and within services (such as the financial or tourism subsectors). The first is easy and straightforward to carry out. Because of the underlying data requirements, the second way is more demanding to carry out.

8.1 Top-level analysis

Worldwide, in terms of fx-based 2007 US dollars, agriculture accounts for 3.8 percent of aGWP, industry for 29.8 percent, and services for 66.4 percent (cells M144, N144, and O144 in the "fx-pGDP" sheet). The aGWP figures and the sector percentages are taken from the IMF *World Economic Outlook* and World Bank online data services, and are available by country.[26] Earlier we argued that although agriculture can engender severe violence, it is not itself a violence industry. Therefore a shift from violence to peace will reallocate resources within and between industry and services only. Agriculture will benefit from the dynamic peace dividend: as economies grow on account of peace, it becomes safe again to invest in land, livestock, irrigation, farming tools, etc., and so that sector would be expected to benefit and grow. In

contrast, the violence portion of industry and services would be converted to peace. Therefore, the current dollar value associated with violence industries and services also is the potential static peace dividend for these sectors, about US$1.0 trillion for industry (cell R143) and US$1.4 trillion for services (S143) worldwide, both in 2007 nominal US$.

On a country-by-country basis, we look at the ppp-based calculations and, for example, find that of the static peace dividend of ppp-$6.9 billion available to Venezuela, ppp-$3.8 billion (55.1 percent) would accrue to industry and the remainder of ppp-$3.1 billion (44.9 percent) to the services sector. In terms of the dynamic peace divided, the gains projected for each country also are allocated across sectors. For example, from cell AL24 in sheet "IntExt GPI" we learn that the expected dynamic peace dividend for Canada is a ppp-based US$1.336 trillion. We know from cells G24, H24, and I24 in sheet "ppp-pGDP" that the respective shares of agriculture, industry, and services are 2.0 percent, 28.4 percent, and 69.6 percent so that Canada could expect dynamic peace dividend effects of ppp-$26.7 billion, ppp-$379.4 billion, and ppp-$929.9 billion, respectively, on these sectors. Because the calculations assume that sector shares do not change as a peace economy develops, this is no more than a first approximation. A second approximation would require far more complex mathematical and statistical modeling, an exercise we recommend be undertaken for a small set of sample countries so that one can begin to get a sense for what would be the research cost and practical benefit involved in attempting more precise predictive outcome modeling.

8.2 Subsector analysis

A subsector — or sectors-within-sectors — analysis requires data on subsector percentage shares in overall aGDP. Importantly, the data would be required in a uniform and consistent basis across all countries before it can be aggregated to the global level. We have been unable to find a uniform, consistent, reliable, and regularly updated data source for this purpose. Presumably, the World Bank's top-level sector share data is aggregated from subsector information but we were unable to determine the source of this data. The World Bank is a specialized agency of the United Nations system. Other agencies, such as the United Nations Industrial Development Organization (UNIDO), keep data on manufacturing activity only. Yet others have coded data on international trade activity. The UN Statistics Division appears to collect and maintain the relevant data we need but we have as yet been unable to procure the data, inspect it for completeness and detail, and run it through our spreadsheets.[27] We are, however, confident that such universal and uniform data exist and therefore believe that subsector analysis by country is feasible.

Meanwhile, for purposes of illustration we downloaded aGDP information by economic sector and subsector for the United States from the Bureau of Economic Analysis, US Department of Commerce, website.[28] The sectoral data is coded according to the North

American Industrial Classification (NAICS) coding scheme. Before we discuss this, a word on sector-coding is necessary. For many years, the so-called Standard Industrial Classification (SIC) code was used in many countries across the world. This was changed in the late 1990s, and the prevailing standard today is the International Standard Industrial Classification (ISIC) code, now in version 4 (Revision 4, or Rev. 4, as it is called in the UN system). The Paris-based OECD employs ISIC, Rev. 3 coding (at the 4-digit level).[29] In North America, as mentioned, the NAICS code is used.[30] The coding systems can go into quite some detail from a top-level, 1-digit listing, to 2, 3, 4, and more digit levels, that is, to ever finer sector gradations. The UN Statistics Division and some national statistics offices maintain a set of so-called correspondence tables so that different classification systems, and different versions within and across systems, can be compared. Thus, if data across countries are based on different coding systems, it would be tedious, time-intensive, and expensive work to convert data into a common format before processing. Hence the urgent need to search for a uniform data base that, although not perfect in all respects, will be sufficient and suitable for the purposes at hand.

To demonstrate the proof of concept, we processed the NAICS data from the Bureau of Economic Analysis for the United States actual GDP in 2007 (see the "US Table" sheet in the "Peace GDP and Industries" spreadsheet). The nominal dollar value of US GDP was US$13.8 trillion. This breaks down into 2-digit sectors and subsectors as shown in Table 2. Sector 11 is the agricultural sector (which consists of farms, forestry,

Table 2: United States Economic Sectors (nominal US$ million, 2007)

	2-digit NAICS code	(US$ m)	(%)
Agriculture	11	$ 167,907.1	1.2%
Mining	21	$ 275,012.2	2.0%
Utilities	22	$ 281,424.2	2.0%
Construction	23	$ 610,841.9	4.4%
Manufacturing	31 32 33	$ 1,616,825.8	11.7%
Wholesale trade	42	$ 805,319.0	5.8%
Retail trade	44RT	$ 892,522.3	6.5%
Transportation and warehousing	48 49	$ 407,187.9	2.9%
Information	51	$ 586,269.2	4.2%
Finance and insurance	52	$ 1,091,415.6	7.9%
Real estate, rental, leasing	53	$ 1,719,801.8	12.5%
Professional, scientific, technical services	54	$ 1,007,780.5	7.3%
Management of companies and enterprises	55	$ 271,251.2	2.0%
Administrative and waste management services	56	$ 415,113.0	3.0%
Educational services	61	$ 129,531.4	0.9%
Health care and social assistance	62	$ 957,440.4	6.9%
Arts, entertainment, recreation	71	$ 133,846.7	1.0%
Accommodation and food services	72	$ 379,488.5	2.7%
Other services, except government	81	$ 315,633.7	2.3%
Government	GS	$ 1,742,926.2	12.6%
Total Final Uses (GDP)	**T004**	**$ 13,807,538.6**	**100.0%**

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fishing, and related activities) and accounted for 1.2 percent of US aGDP in 2007. Sectors 21 through 33 are mining, utilities, construction, and manufacturing industries (20.2 percent), and the remainder are services (78.6 percent).[31] The corresponding percentages in our fx-pGDP sheet for the United States are 1.2 percent, 22.8 percent, and 76.0 percent, respectively, but these actually are CIA data for 2005, not World Bank data for 2007, so that there is a good likelihood that we are tracking the correct numbers.

If it now were believed that the total available dynamic peace dividend to the United States were US$1.14 trillion (cell AF135 in the IntExt GPI sheet), with US$0.579 trillion stemming from internal peace and US$0.564 trillion from external peace, then this can be allocated to the sector percentages in Table 2 (cells I92 to K115 in the "US Table" sheet). For example, because the wholesale trade sector (NAICS code 42) accounted for 5.8 percent of US GDP, the spreadsheet allocates that percentage to the dynamic peace dividend and says that the wholesale trade sector could stand to gain US$33.76 billion from internal peace and another US$32.89 billion from external peace, for a total of US$66.66 billion per year in nominal 2007 US dollars, an 8.3 percent increase over its 2007 business volume of US$805 billion.

By design, every sector and subsector would stand to gain the same 8.3 percent over its current business volume. This is because we do not have information on the violence/peace percentages within each sector or subsector. In time, these may become available as country-by-country analysis reveals actual or estimated percentages. For example, it is a fair guess that the dollar volume devoted to private sector legal services regarding criminal violence is higher in the United States than it is in New Zealand. But whether or not a shift from violence to peace would merely reallocate dollars within private sector legal services, say for more business formation and corporate law, or out of legal services into other sectors is difficult to say at this time. (For New Zealand, however, we estimate an available dynamic peace dividend of only 6 percent because in terms of the Global Peace Index measures it is a more peaceful country to begin with than is the United States.)

9. Country-sector analysis

In regard to the static peace dividend analysis, based on readily available World Bank and supplementary data, it is easy to split fx-based aGDP or ppp-based aGDP into the main economic sectors of agriculture, industry, and services. Under the assumption that all of agriculture is treated as a peace industry, some country-specific surprises emerge. For example, in Angola industry accounts for 75.9 percent of the combined ppp-value of industry and services. Yet only 58.6 percent of pGDP would accrue to industry, a 17.3 percentage point difference from what might be expected. In other words, the service sector would stand to gain disproportionally from a reallocation of current ppp-aGDP from violence to peace. Other states where this difference in favor of the service sector exceeds 15 percentage points (indicated in sheet ppp-pGDP, column

W, with yellow-shaded cells) are Iraq and Qatar. Conversely, states where industry would benefit disproportionately relative to the service sector (indicated with orange-shaded cells) are Cuba, Ethiopia, France, Greece, Lebanon, Rwanda, and the United States of America.

As mentioned, with one exception — important, as it concerned the United States — it proved not possible within the time available to push the analysis beyond the top-level economic sectors into subsectors within agriculture, industry, and services, such as, say, forestry or fisheries within agriculture, or chemicals or machinery in the industry sector, or transportation or hospitality in the services sector. As explained in Section 8, the difficulty lies in locating, acquiring, and processing readily available global and uniformly coded data, by country, that would break top-level sectors into subsectors. Doubtlessly, it is feasible to do this work, pending only the cost and time needed for data acquisition and (probably) time-intensive processing.

10. Limitations

There are several important limitations of this Report. First, among economists it is well-known and acknowledged that measurement of GDP, and hence of GWP, is far from being a settled matter. For example, a long-standing and regularly updated study by Professor Friedrich Schneider of Johannes Kepler University, Linz, Austria, estimates that in 2008 the average size of the shadow-economy in 21 of 30 OECD countries equaled 13.3 percent of measured aGDP. This refers to unreported rather than illegal economic activity.[32] This percentage varies from year to year and is likely to be higher in non-OECD countries. In addition to non-measurement, there is mis-measurement. As mentioned in Section 4, GDP even if comprehensively measured is no more than a measure of income and expenditure flows, or throughput. Thus, paying people to cut down every tree in the land or harvest every fish from the sea generates wage expenditures on the workers who earn an income. Focusing on GDP, and GDP growth, can therefore be misleading, and this is part of the reason of questioning the portion of GDP related to violence in the first instance.

Also related to questions regarding measurement is a second limitation of this Report, namely that a part of its calculations is based on foreign exchange (fx) based dollars. For comparability across states, any one country's currency is used as the standard of comparison, or *numeraire*. In practice, this is the US dollar. Non-numeraire countries' GDPs are converted to the numeraire currency at the average of the prevailing exchange rates for a given time period, usually a calendar year. Annual exchange rate fluctuations can greatly affect the resulting US dollar value of non-US economic output. One way economists address this is by converting countries' currencies into purchasing power parity values (called ppp or international dollars, ppp-$). Thus, a haircut that in New York might cost US$20 and in India US$1 (at foreign-exchange rate conversion) are equally valued under ppp-measurement so that both are valued at ppp-$20. The activity itself is valued rather than its monetary equivalent. India's ppp-$20 haircut

GDP therefore is an "artificial" number and cannot be taken at face value. Using ppp-$ permits comparability across currencies but at the disadvantage that the monetary values are value placeholders rather than actual dollar numbers by which business could gage the size of potential markets. Therefore, a dynamic peace dividend for India of ppp-$321 billion (cell AA58 in the "IntExt GPI" spreadsheet) is, in US$-terms, only US$135 billion at the exchange rates of 2007 (cell S55).

A third measurement-related limitation is that military expenditure, or milex, the one violence-related variable for which numbers for all states are available, also is mismeasured. Indeed, it is a fair assumption that milex is undermeasured. Other violence-related variables such as the cost of civil war, violent crime, administration of state's justice systems, and so on, likewise are inadequately measured. The very study of the economic causes, costs, and consequences of violence is not much advanced and is addressed in very disparate ways in the literature. There are no universal numbers available, let alone recorded to a uniform standard. We addressed this limitation by using coefficients in our spreadsheet that we regard as plausible, yet conservative.

Fourth, this Report examines numbers for only a single year, 2007, the most recent year for which reasonably complete data were available. It would be worth the effort to expand our spreadsheet to capture the other years for which the GPI has been produced and to keep both the GPI and the PGDP exercises going for some time to come to learn what variations occur in PGDP as the GPI changes.

11. Recommendations

The short-term case for war and violence is easily made based on some threat or grievance or both. The long-term business case for peace therefore needs to be made as strongly and broadly as possible. Intuitively, most businesses know that they have a stake in peace. But the general stake in peace of a majority of businesses can be overwhelmed by myopic profit opportunities, by competitive pressure, and in the political process by the rhetoric of the moment. Politicians can gain advantage by raising tensions. In a tense environment, calls for moderation may be interpreted as calls for capitulation against a perceived enemy. Military contractors have a direct stake in military spending that tends to override the general business case for peace, and jail operations have a vested interest in increasing the number of people in jail. Political leaders also have a stake in increased levels of violence and in maintaining a fear element between citizens of different states. A threat from inside or outside the state boosts the case for incumbents being reelected. The strong interest of a minority of businesses and sometimes of political leaders that benefit from increasing levels of internal or external violence can obscure the broader interest by businesses, suppliers, employees, customers, and investors in living and working in peaceful environments. If the impact on business of reducing the levels of violence (both internal and

external to a country) can be properly measured, more industry leaders might be encouraged to be more vocal against maintaining or creating violent environments or increasing the threat of war.

In sum, several recommendations emerge.

11.1 Recommendation for commercial society and civil society outreach

This Report was commissioned by a business leader to influence other business leaders to put their powerful resources and influence behind policies that promote nonviolence and peace industries. The country-based data will be helpful to business leaders within each country. The sector data will be helpful for leaders within relevant industries. *The overriding message is that business has nothing to fear from peace. For business as a whole, there only are upsides to peace. If 4.4 percent of business derives gains from violence, the other 96.6 percent derives gains from peace. Moreover, the 4.4 percent suppress the scope of peaceful business by at least another 9 percent of gross world product (GWP). This alone should convince business leaders to be much more vocal and active in discouraging violence and promoting peace.*

THE E20: A COALITION OF PEACE ENTREPRENEURS. In conjunction with the G8, G20, and other such political meetings, it is now commonplace to see civil society organizations mob the streets of the locations where such meetings are held. Business is largely absent. Here is an opportunity to create an "E20" and a "B20" — one group of 20 highly successful global entrepreneurs, and one of 20 traditional global businesses — and have them issue a common, evidenced-based statement and research update on the economics of violence and peace. This should be careful to include not merely "western" entrepreneurs but draw them from across the globe such as Mo Ibrahim in Africa and the Tata family in South Asia. We imagine that media coverage would be huge, and practical influence-wielding to turn the world away from violence toward peace could be of epoch-making significance. In practical terms, of course, one would start with the E20 only and take things from there.

THE P20. We also recommend giving serious thought for the E20 to form a coalition with the "P20," that is, 20 renowned academically-focused peace institutes, and perhaps even with an "S20," leaders of social movements and civil society organizations. This would ally entrepreneurs and business with a very credible subset of civil society. Business is often looked at askance. To be able to form a credible alliance or coalition with 20 (or some other number) renowned, academically-based, globally distributed peace institutes would provide consistent civil society input into business and vice versa. A coalition for nonviolence and peace would permit previously disparate and often antagonistic groups to pull in the same direction. This Report takes up a civil society interest in peace but links it to overt business and economic interests. It could be a natural starting point for discussion.

THE BPI-100. Another idea is to annually rank, not countries, but businesses by their peacefulness, the *Business Peace Index* (BPI) — and let customers choose which businesses to support. In other words, undertake a research effort that would stipulate criteria and assess companies not by some "corporate social responsibility" notion but by the degree to which specific companies tolerate (or are implicated in) violence or promote peace. We surmise that this sort of research may well be easier to do than to classify whole economic sectors or subsectors as benefiting from violence or from peace. For convenience and impact, the BPI-100 could be linked to the Forbes Global 100 and put them in the spotlight, exactly the same way that such rankings already are done on environmental or labor standard criteria. If the publication of this list could be coordinated with the annual World Economic Forum meeting, the effect ("name and shame") could be highly effective. Of course, the BPI itself wants to be peaceful and should give the affected corporations advance notice, as well as confront them with data on the benefits of peace and with alternatives about how peacefulness would improve their business prospects. One would imagine that before long business will begin to pursue peace almost "automatically."

SECTOR OUTREACH. More mundanely, the most obvious case to be made is for the tourism, airlines, and international trade sectors. As more compelling cases can be assembled for other sectors and subsectors, these can then gradually be roped into a Business Coalition of Peace (BcoP) or perhaps a Business Rally Against Violence (BRAV). Meanwhile, we recommend that business outreach at first focus on tourism associations, such as the World Travel and Tourism Council (http://www.wttc.org/) and the UN's World Tourism Organization (which reports that tourism is growing as a percentage of GDP and in some countries exceeds 10 percent of GDP); air travel, through the International Air Transport Association (www.iata.org) and the associated UN organization, the International Civil Aviation Organization (ICAO); international trade, through the 450-member Federation of International Trade Associations (www.fita.org) in Brooklyn, New York or the networking Washington International Trade Association (www.wita.org), and other such organizations.

COUNTRY CAMPAIGNS. Once firmed up, the Peace GWP results for each country and business sector should be publicized to remind voters and political leaders that they have more to gain from peace than from violence. Too often, local interest in spending on violence industries drives public policy decisions rather than reasoned debate about what is necessary and sufficient. At other times, emotional considerations prompt unwise responses. When local interest, industry interest, or emotional appeals are carrying the day, a general case for nonviolent policy responses is crucial. This Report can help make the general case in the media and with political leaders at the national and local levels, especially if it is emphasized that it is evidence-based. In some cases, such as in that of the United States, the available data is probably rich enough to produce a GPI and peace gross state product (PGSP) for each of the 50 states in the United States. This may be an interesting research exercise on its own terms but would likely generate debate within

a country on relative proneness to violence or peacefulness. In the United States, this just may help convince business to be more vocal about the misuse and abuse of firearms.

REGIONAL AND GLOBAL CAMPAIGNS. The country and sector data lend themselves to regional and global summaries. For example, a European media effort could be launched in Brussels, an East-Asian one in Shanghai, an Arab/African one in Dubai and Cape Town, a Central European/Central Asian one in Budapest or Istanbul, a South American one in Rio de Janeiro and Bogotá, and a global effort focused on those who cover the United Nations in New York, Vienna, Geneva, and Nairobi.

11.2 Recommendations for research

As leaders of commercial, civil, and political society increasingly turn to theoretically informed and evidence-based decision making, basic and applied research becomes more necessary. In this regard, our recommendations for research focus on (1) firming up the data and computations underlying this Report, (2) suggesting ways to link up with existing research efforts elsewhere, and (3) more broadly addressing the needs of the research community as well. *The overriding message is that even as businesses, civic leaders, increasing numbers of students and even some politicians clamor for evidence-based research on violence and peace in regard to business and economics, the business and economics research community has no institutional home anywhere in the world to gather experts, collect data, conduct analyses, train students, and disseminate basic and applied research findings in response to these demands.*

COVERAGE AND COMPLETENESS. The pGDP and PGDP (that is, the static and dynamic peace dividend) calculations should be carried out for the other years for which the GPI is already available and then continued each year so that, along with a measure of relative peacefulness, an economic measure can be reported as well. The cost of maintaining our spreadsheet will be comparatively minor.

The spreadsheet we constructed for this Report is aimed at providing a foundational structure that is logical, coherent, and substantive. It should permit one to produce systematic, feasible, replicable, spreadsheet-based computations by country, by sector, by subsector, and by year, and have them tie in to the existing annual production of the Global Peace Index. But although the structure now exists, the "sharing down" of the static and dynamic peace dividend calculations into sectors and subsectors still needs to be completed.

More important, and more costly, is the need to gradually replace the assumed coefficients underlying our computations with country and sector-based specific information on the cost of violence. At the moment, for example, we assume a reasonable but uniform peace multiplier of size 1 and applied it across all countries. Self-evidently, differences across countries imply differences in the multiplier to be used. Specifically commissioned studies could over time replace the single peace multiplier value with a range of country and sector-specific values. It

might, at first, be easier to apply differentiated multipliers for groups of countries, but the ultimate goal should be to aim at country-specific multipliers, regularly reviewed and updated.[33]

Likewise, little sector and subsector-specific information is available in the literature that would inform us as to the monetary degree to which a sector or subsector is violence or peace-related. If one is serious about violence and peace industries, correspondingly serious work will need to be commissioned sector by sector and subsector by subsector to chip away at the measurement problems. A useful start would be to commission a truly comprehensive, critical review of the literature with an eye to decipher, for example, not just the economic cost of crime per se but of the monetary degree to which a particular sector benefits or suffers from crime. In a way, what is needed is the violence and peace equivalent of a Leontief-style input-output table, truly a revolutionary bit of work. Less ambitious but still very serious work needs to be done on industries such as air travel, tourism, and hospitality but also on extractive and other raw materials-related industries. It may be advisable to coordinate this with other business leaders and business and industry associations to obtain non-overlapping, synergistic effects. Unfortunately, these associations themselves are not always interested in serious, academically-based studies. We find instead that the work of these associations is often too narrowly focused on scoring lobbying points with governments, promoting vested interests over larger public interests. But an initiative such as the Institute for Economics & Peace may be well-placed to ask industry associations for data and research assistance to relate specific industries to issues of violence and peace.

PROJECT LINK. We have a spreadsheet to compute a dynamic peace dividend. However, there is in fact no mathematical or statistical model here that tells us anything about the time-path involved in realizing the peace dividend, or about the mechanics of just how peace translates into higher economic growth and well-being, or about how peace in one country or sector is connected to peace in another country or sector. In this regard, we recommend commencing communication with Project LINK. Initiated in 1968 by future economics Nobel-Laureate Lawrence Klein (also a founding member of Economists for Peace and Security), the project has evolved to include quantitative modelers from more than 60 countries with econometric models of 72 countries and 7 regions, all linked to each other, to track, simulate, and forecast variables of economic interest. The effort is now jointly coordinated by the UN's Department of Economic and Social Affairs and the Project LINK Research Center, University of Toronto. Because many of the econometric models are large-scale, they usually include highly detailed sector and subsector-specific information. Discussion with Project LINK strikes us as urgent in order to determine the feasibility of including aspects of violence and peace. The cost of preparation and talking is small; the potential benefit could be huge.[34]

WORLD INSTITUTE OF BUSINESS AND PEACE ECONOMICS. The creation of a well-endowed, purpose-driven, academically credible World Institute of Business and Peace Economics

(WIBPE) should be a near and long-term objective of business leaders. The International Institute for Strategic Studies (IISS), London, the Stockholm International Peace Research Institute (SIPRI), the Small Arms Survey (SAS) project in Geneva, and others like them are populated for the most part by "narrative" scholars, not quantitative peace scientists. The very many war colleges and specialized defense and defense-technology universities around the world, such as the NATO Defense College in Rome, Italy, the National Defense University in the United States, or the several institutions and campuses of like purpose in China are, at present, not complemented by peace colleges. The only exceptions we know of are the congressionally chartered United States Institute of Peace (USIP) in Washington DC; the International Peace Institute (formerly the International Peace Academy), a formally independent but strongly UN-associated outfit in New York City; and various direct United Nations institutes such as the United Nations Institute for Disarmament Research (UNIDIR) in Geneva, or the UN-mandated (and very small) University for Peace near San Jose, Costa Rica. Like other peace institutes, all tend to be staffed predominately by non-quantitative scholars, and almost none trained in business or economics.

Establishing a new institute of appropriate heft is not beyond the resources of the global business community. Already businesses sponsor and take great pride in named business schools that train students for the specific purpose of corporate management. But as this Report shows, business also has a collective interest in minimizing violence and maximizing peace. If Mr. Jim Balsillie (co-founder of Research in Motion and the Blackberry line of mobile telephones) can generate an endowment of CAN$100 million for the establishment of the Balsillie School of International Affairs and further fund the Centre for International Governance Innovation (CIGI) at the University of Waterloo and Wilfrid Laurier University, Canada,[35] surely it is possible for the global business community — the E20 and B20 to start with? — to provide for an equally well endowed World Institute of Business and Peace Economics (WIBPE) at an established university of appropriate caliber and global renown.

A BUSINESS AND PEACE ECONOMICS YEARBOOK. We further recommend that a sustained effort be funded to systematically review and assess the relevant economics literature on the economics of violence and peace, perhaps in the form of an annual Violence and Peace Review or Yearbook, with topical chapters, similar to the annual SIPRI *Yearbook*, or IISS's *Military Balance*, or SAS's *Small Arms Survey* yearbook. None of these, however, is geared toward peace business and peace economics.

Notes

1. For convenience, we henceforth employ the term violence without indicating each time that we include in this the credible threat of violence or of defending against perceived, implied, threatened, or actual violence. For example, most of the time the world military sector is on stand-by status. It represents a threat (or counter-threat) rather than actual perpetration of violence. Similarly, private security forces, alarm systems, and body guards represent, in part, deterrence measures meant to lower the incidence of violence, e.g., of assault, robbery (which by definition includes the use or threat of use of force) rather than larceny (nonviolent theft from a person) or burglary (nonviolent theft from a building).

2. SIPRI (2008, p. 175).

3. For the United States of America, for example, US Department of Defense outlays in 2008 understate overall national defense-related outlays by at least 78%. This is so, in part, because some military-related spending occurs through the Department of Energy (e.g., military-nuclear activities) and other departments, in part because some legacy costs of past military readiness and activity are budgeted for the Department of Veterans Affairs, and in part because a properly apportioned share of the interest payment due on the national debt (the cumulative annual budget deficits) should be attributed to military activity. For 2008, these adjustments alone would bring military expenditure as a percentage of US GDP to 7.3% rather than to the widely reported 4.1%, where the later is based solely on US Department of Defense outlays (see Brauer, 2007; 2009).

4. International Alert and the International Business Leaders Forum maintain programs on business and conflict. See http://www.international-alert.org/peace_and_economy/index.php and http://www.iblf.org/ [accessed April 15, 2009].

5. Brauer (2007; 2009).

6. On the war cost to Iraq see, e.g., Yousif (2006).

7. Iraq war estimates: see John Tepper Marlin, "Why Estimates of the Cost of the War in Iraq Have Been Rising," www.huffingtonpost.com/john-tepper-marlin/why-estimates-of-the-cost_b_
74026.html. For comparison, estimates of the benefits of trade liberalization range from as low as US$4 billion to more than 100 times that, US$500 billion. Low end ($4-$16 billion): USITC (2004); higher estimates from The Global Trade Analysis Project at Purdue University (US$8 billion) (see https://www.gtap.agecon.purdue.edu/) and the World Bank's LINKAGE model (US$16.2 billion). High end (US$500 billion): 3-4% of US GDP as estimated by US Trade Representative, Testimony to the Senate Finance Committee, February 15, 2007 (see http://www.ustr.gov/assets/Document_Library/USTR_Testimony/2007/asset_upload_file144_10532.pdf   [accessed April 9, 2009]).

8. Phillips (2006, p. 21).

9. Worldwide, transnational terror events account for only a small part of all terror-related violence. In fact, domestic terror events occur with a frequency up to 10 times that of transnational terror events (Anderton and Carter, 2009, pp. 128-129). The studies listed in Table A1 in Appendix A include transnational and domestic terror studies.

10. See WHO (2002). The quoted passage is taken from page 8 of the Summary of the report which is available at http://www.who.int/violence_injury_prevention/violence/world_report/en/summary_en.pdf   [accessed April   15, 2009].

11. See http://www.genevadeclaration.org/resources-armed-violence-report.html (GD, 2008). A number of the set of authors of the SAS/GD study are colleagues and personal friends of Dr. Brauer's and an introduction is easy to arrange.

12. GD (2008, pp. 89-90).

13. Karolyi (2006, p. 11).

14. See http://www.potato2008.org/en/world/africa.html [accessed April 15, 2009].

15. Anderson and Marcouiller (2002, p. 351).

16. Schumacher and Nitsch (2003). See Mirza and Verdier (2006) for a review of the terrorism and international trade literature.

17. http://www.visionofhumanity.org/business-peace/defining-peace-industry/retail.php [accessed April 12, 2009].

18. Balvanyos and Lave (2005).

19. See http://www.regjeringen.no/en/dep/fin/press-center/Press-releases/2009/cluster-weapons-manufacturer-excluded-fr.html?id=543105 [accessed day/mth/yr]. Based on a recommendation from the Council on Ethics for the Government Pension Fund, the Norwegian Ministry of Finance excluded Textron because: "The company produces cluster weapons, which are banned pursuant to the Convention on Cluster Munitions. We cannot participate in the funding of this type of production" (Norwegian finance minister Kristin Halvorsen). Since the Ethical Guidelines came into force, the Ministry of Finance has divested and blacklisted nine producers of cluster weapons.

20. See NYC (2002). All quotes taken from the study.

21. See Baker and Coulter (2007).

22. For, e.g., Bandara (1997); Buesa, Valino, Heijs, Baumert, and Gonzalez Gomez (2007).

23. For a listing and discussion of some alternative measures, see, e.g., http://www.beyond-gdp.eu/ [accessed April 4, 2009]. On consumption, see Summer and Heston's (1995) SLpop measure.

24. In ppp-terms, the shares are rather different: US 21%, non-US G7 22%, and BRIC 21% (cells F171 to F173).

25. As mentioned, as a rule, fx-based calculations may be appropriate for certain global statements, but country-by-country analysis is better done on a ppp-basis.

26. Certain data gaps have been filled by recourse to the CIA World Factbook and are documented in the spreadsheet.

27. See http://unstats.un.org/unsd/snaama/selectionbasicFast.asp. Contact: United Nations Statistics Division, Attn: National Accounts Section, United Nations, New York, NY 10017, USA, Phone: +1 (212) 963-4978; Fax: +1 (212) 963-1374, E-mail: sna@un.org [accessed April 11, 2009].

28. http://www.bea.gov/industry/gdpbyind_data.htm [accessed April 11, 2009].

29. See http://oberon.sourceoecd.org/vl=1212015/cl=12/nw=1/rpsv/~4021/v165n1/s8/p1 [accessed April 12, 2009]. The OECD has a document called "Structural Statistics for Industry and Services: ISIC Rev. 3 Vol 2006 Release 01," and is available by subscription only. The abstract reads: "The Structural Statistics for Industry and Services (SSIS) database contains information relating to the economic activity, including employment, of industries at a very detailed level (International Standard of Industrial Classifications, Revision 3, 4-digit level). Variables include: turnover, value-added, investment, wages and salaries, employees and number of enterprises to name but a few. Monetary variables are typically, although not always, presented in millions of national currency, and employment variables in numbers of persons employed; hours worked are typically expressed in thousands, and number of enterprises/establishments in units. YEARS COVERED: 1995 onward. COUNTRIES COVERED: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak

Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States."

30. Frequently asked questions (FAQs) and answers regarding NAICS are available at http://www.census.gov/eos/www/naics/faqs/faqs.html [accessed April 12, 2009]. There was a NAICS 2002 version. The current version is called NAICS 2007. Correspondence tables to make data comparable across versions exist.

31. As an example, the mining subsector (NAICS code 21) within industry is itself sub-divided into oil and gas extraction (code 211), mining, except oil and gas (code 212), and support activities for mining (code 213). These amounted to US$164.6 billion, US$45.3 billion, and US$65.0 billion, respectively. Similar sub-divisions are made in the other industry and service top-level categories, so that the overall detail available is considerable.

32. *The Economist*, April 2, 2009, or http://www.economics.uni-linz.ac.at/schneider/ [accessed April 9, 2009].

33. Note that the dynamic peace dividend is computationally tied to the GPI already. The GPI itself thus cannot be used as a multiplier. Instead the function of the peace multiplier is to "translate" how relative peacefulness multiplies into economic benefits, and this translation will vary from country to country even when 2 countries have identical GPIs.

34. http://www.un.org/esa/policy/link/index.html and http://www.chass.utoronto.ca/link/ [accessed April 13, 2009]. Professor Klein is still actively involved with LINK, as are a number of other Economists of Peace and Security-related economists, e.g., Prof. Kanta Marwah, long-time chair of EPS Canada, and Prof. Manas Chatterji, also a long-time EPS board member and well-connected on the Indian subcontinent as well as in China and Europe.

35. See http://www.cigionline.org/cigi/Announcements/pressrel/100milli [accessed April 16, 2009].

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Appendix A: Tables

Table A1: Studies of the cost of terror events (billions of 2008 US$)

Country (event)	Cost	GDP loss (%)	Source
Argentina (cost of a terrorist act)	0.30	0.14	Crain, 2005:335
Colombia (cost of a terrorist act)	0.10	0.06	Crain, 2005:335
Colombia (annual cost of terror)	14.47	8.60	Karolyi, Martell 2006:12
Egypt (costs of terrorist attacks, July 2005)	1.42	1.45	Negus, 2005:35
Egypt (cost of a terrorist act)	0.26	0.25	Crain, 2005:335
France (cost of a terrorist act)	1.37	0.05	Crain, 2005:335
France, Ireland, US, Singapore (cost of a terrorist act)	64.00	0.36	Crain, 2005:329
Germany (cost of a terrorist act)	1.90	0.07	Crain, 2005:318
India (cost of a terrorist act)	1.34	0.23	Crain, 2005:335
Indonesia (cost of a terrorist act)	1.81	0.78	Crain, 2005:335
Israel (costs of terrorism per year, 2000-2003)	low: 13.69 high: 20.53	low: 10 high: 15	Eckstein, 2004:29
Israel (annual cost of terror)	2.36	2.00	Eckstein, 2004:23
Italy (cost of a terrorist act)	1.54	0.11	Crain, 2005:335
Countries > 250 million pop. (cost of a terrorist act)	36.03	0.20	Crain, 2005:335
Nigeria (annual cost of terror)	11.84	7.60	Karolyi, Martell, 2006:12
Philippines (cost of a terrorist act)	0.14	0.16	Crain, 2005:335
Russia (annual cost of terror)	2.75	0.26	Karolyi, Martell, 2006:12
Spain (costs of ETA terror, Basque country)	low: 7.7 high: 10.2	low: 12 high: 16	Abadie, 2003
Spain (cost of a terrorist act)	108.77	13.36	Crain, 2005:335
Sri Lanka (costs of LTTE terror to tourism)	0.18	0.93	Bandara, 1997:272
United Kingdom (cost of a terrorist act)	0.98	0.04	Crain, 2005:335
United States (cost of a terrorist act)	48.03	0.33	Crain, 2005:335
World (global costs of terror, 2002)	4,300.00	10.91	Crain, 2005:336

Table A2: Cost of war and defense (billions of 2008 US$ and % change)

Country (event)	Cost	GDP	Source
Eastern Europe (no military spending)	333.2	9.8	Knight, *et al*, 1996:31
Middle East, Asia, North Africa (no military spending)	116.0	0.6	Knight, *et al*, 1996:31
Israel (cancel defense increase of NIS3)	9.4	8.2	Barzilai 2006:1
Israel (end Israel's war spending, annually)	24.1	12.8	Barzilai 2006: 1

Table A3: Impact of terror events on foreign direct investment and GDP (billions of 2008 US$ and % change)

Country, measure	Decrease in FDI (%)	Decrease in FDI ($)	Decrease in GDP	Source
World, one standard deviation risk	5.0	2.80	0.5	Abadie and Gardeazabal, 2007:1
Spain, Annual impact of terrorism	13.5	0.67	4.0	Enders and Sandler, 1996:332, 336
Greece, Annual impact of terrorism	11.9	0.13	4.0	Enders and Sandler, 1996:332, 336
Israel, Annual impact of terrorism	10.0	1.10	low: 10.0 high: 15.0	Eckstein and Tsiddon, 2004:23

Table A4: Lost values by firms targeted in terror events (billions of 2008 US$ and % change)

Targeted firms	Lost value per hare per attack ($)	Lost markets capitalization (%)
Royal Dutch Shell	10.9	1.14
British Petroleum-Amoco	7.7	0.20
Coca-Cola	4.5	0.02
McDonalds	3.9	0.02
American Airlines	2.4	0.01

Source: Karolyi and Martell, 2006:22.

Appendix B: Selective annotated bibliography on the economics of violence and peace

Abadie, Alberto and Javier Gardeazabal. 2003. "The Economic Costs of Conflict: A Case Study of the Basque Country." The American Economic Review 93(1): 113-132.

> Abstract: Analyzes the effects of conflict on the economy of the Basque region of Spain. It concludes that terrorist incidents caused GDP per capita in the region to decline by about 10 percent.

> Annotation: ETA has emerged since the 1960s as the main terrorist group in the Basque region. In the early 1970s, the region was one of the richest in Spain but after 30 years of terror aimed specifically at the business sector, the Basque country has been experiencing economic decline directly related to terrorism activity, as the region's industrial share of Spain's GDP declined 17 percent during the 1964-1993 period. Compared with neighboring regions, GDP in the region has been 12-16 percent lower than it would have been in the absence of terrorism.

Abadie, Alberto and Javier Gardeazabal. 2007. "Terrorism and the World Economy." European Economic Review 52(1): 1-27.

> Abstract: Examines the economic effects of terrorism on the world economy. The study found that, on average, a one standard deviation increase in terrorist risk is associated with a fall in the net foreign direct investment position of about 5 percent of GDP. The magnitude of the estimated effect is large, which suggests that the "open-economy channel" impact of terrorism may be substantial.

Baker, Kathleen and Alex Coulter. 2007. "Terrorism and Tourism: the Vulnerability of Beach Vendors' Livelihoods in Bali." Journal of Sustainable Tourism 15(3): 249-268.

> Abstract: Tourism has been encouraged in many of the world's poorer countries as a means of stimulating development. However, tourism is vulnerable to external shocks, which can damage a host country's economy, especially where reliance on tourism is high. This paper focuses on Bali, Indonesia where tranquility was shattered by terrorist bombs in October 2002, and again in October 2005. It examines the impact of the 2002 bombings on the island's beach vendors, members of the informal sector who work at the margins of tourism. The UK's Department for International Development's (DFID) model of sustainable development is used as a guide to assess notional changes in vendor livelihoods and reveals the sharp reduction in their access to financial capital once tourism had collapsed. Fieldwork showed that livelihoods were sustained with difficulty after the terrorist attacks and that social capital played a major role in survival. Although visitor numbers to Bali are recovering, the research reveals significant changes in vendors' livelihood patterns. Social capital remains strong though it has changed in certain respects as a consequence of terrorist activity, one of the most negative changes being an increase in local religious tensions. The authors question the wisdom of encouraging tourism as a major vehicle for development without simultaneously promoting alternative income-generating opportunities to offer a safety net against external shocks to a vulnerable tourism industry.

> Comment: Looks at the impact on the informal economy - not normally measured. It is useful primarily for methodology.

Bandara, Jayatilleke S. 1997. "The Impact of the Civil War on Tourism and the Regional Economy." South Asia Special Issue 20(1): 269-279.

> Abstract: Measures the impact of the civil war between LTTE (Liberation Tigers of Tamil Eelam) and the Sri Lankan government forces on the tourism industry. The effects of the war and the terrorist tactics used by LTTE have been disastrous for the tourism industry. In 1996 alone, the industry lost 145 million USD and 42,000 jobs because of a decrease in tourist arrivals. The effects of the war have been deleterious for the economy as a whole, with losses in tourism as well as fish exports and agriculture. With the conflict spilling over the borders

of Sri Lanka and terrorist attacks by LTTE launched in other countries, it is bound to have negative effects on the economies of those countries as well.

Bar-on, Raphael Raymond. 1996. "Measuring the Effects on Tourism of Violence and of Promotion Following Violent Acts." Tourism, Crime and International Security Issues: 158-174.

Abstract: The article highlights various reasons terrorists target tourists, namely the publicity this tactic creates. It analyzes the effects of violence on tourist trends, using Israel, Spain, Egypt and Turkey as case studies. The effect of terrorism on tourism is cancellations or postponing of reservations or switching the itinerary to an alternative destination deemed less dangerous at the time.

Bartel, Richard. 1992. "Interview with John Tepper Marlin: Tell the Pentagon: The War is Over." Challenge 35(4): 24-29.

Abstract: In the interview, Dr. Marlin discusses the diminished threat from the Soviet Union since Mikhail Gorbachev came to power and the end of the Cold War. Due to this, he argues, defense spending should be cut drastically; current decreases in defense spending are miniscule compared to what they need to be. Also, lack of proper media coverage of this important issue leaves the American public in the dark when they need to be properly informed.

Barzilai, Amnon. 2006. "Terrorism, War Cost Economy NIS 108b a Year." Knight Ridder Tribune Business News. December 19, 2006, p. 1.

Abstract: Den Peled, a Professor of Economics at the University of Haifa, estimated that the war in Israel costs the economy NIS 108 billion (shekels) a year. So Israel's GDP per capita could now have been $22,500 instead of the current $18,700. Moreover, Israel's defense spending supplement of NIS 3 billion reduced Israel's GDP by a cumulative NIS 40 billion.

Basuchoudhary, Atin and Laura Razzolini. 2006. "Hiding in Plain Sight - Using Signals to Detect Terrorists." Public Choice 128(1-2): 245-255.

Abstract: This paper looks at the relationship between terrorist organizations and government security agencies aimed at stopping them. It develops the optimal strategy for a security agency to recognize a terrorist based on certain visible attributes.

Berrebi, Claude and Esteban F. Klor. 2005. "The Impact of Terrorism across Industries: An Empirical Study." Rand Corporation, CEPR Discussion Paper No. 5360.

Abstract: Identifies and assesses the differential effect of terrorism across economic sectors of the Israeli economy. The study finds that defense and security-related firms prosper while "peace industries" suffer greatly due to terrorism.

Comment: The study has excellent data, a complete list of Israeli stocks traded in the United States, a separation of firms by defense/security related products vs. "peace industries," and effects of terrorist attacks on the value of stocks.

Blomberg, Brock S., Gregory D. Hess, and Athanasios Orphanides. 2004. "The Macroeconomic Consequences of Terrorism." Journal of Monetary Economics 51(5): 1007-1032.

Abstract: The authors examine macroeconomic consequences of international terrorism in 177 countries from 1968 to 2000. The study uses cross-sectional and panel growth regression analysis to demonstrate that terrorism has a negative effect on growth but considerably smaller and less persistent than external wars or internal

conflict. It also finds that spending is diverted from investment toward government expenditures on security measures.

Annotation: The data indicate that terrorism has a strong and negative impact of about half of a percentage point on the investment to GDP ratio, while other types of conflict do not. Also, both terrorism and internal conflict tend to make the government spending rate rise in relation to overall economic activity, with the effect of internal conflict being twice as large as that of terrorism. Moreover, the study finds that economic consequences of terrorism are visible only in the short term and dissipate quickly, even after one year, while the effects of external wars take up to three years and internal conflict takes up to six years to dissipate.

Brauer, Jurgen and John Tepper Marlin. 1992. "Converting Resources from Military to Non-Military Uses." The Journal of Economic Perspectives 6(4): 145-164.

Abstract: US military spending has declined steadily since the mid-1980s. Any substantial changes in military expenditures imply a "conversion" of physical and human resources from military to non-military uses. This paper explores various ways in which resources used by the military establishment, directly or indirectly, can be converted for use in the civilian sector. The authors have found that due to the scope of the structural adjustment programs at the time of economic slowdown, regions of the country heavily connected to the military sector will be hit severely. Also, the difficulty of converting specialized military skills to civilian uses will exacerbate the problem. The authors recommend taking this opportunity to debate the gains and costs of explicit federally guided medium-run structural adjustment and long-run growth policies.

Brauer, Jurgen and William Gissy, eds. 1997. Economics of Conflict and Peace. Aldershot, UK: Avebury Press.

Abstract: Collection of articles on war and peace economics. Includes econometric paper by Lawrence Klein, Tom Scheetz, and Kanta Marwah on Guatemala.

Brauer, Jurgen and Alejandro Gustavo Gomez-Sorzano. 2004. "Homicide Cycles in Colombia 1950-1999." International Journal of Applied Econometrics and Quantitative Studies 1(1): 29-50.

Abstract: Study seeks to explain homicide rates in Colombia 1950-1999 with a cyclical model using inflation-adjusted trade balance, real social expenditure, and the size of Colombia's military forces.

Annotation: Finds that increases in real social expenditure on health and education reduce murder cycles; while increases in the size of armed forces coincide with an increase in murder cycles. The authors find support for the hypothesis that an increase in real trade balance resulting from commodity booms also increases murder rates since it makes the land more valuable.

Comment: The study begins by noting that two primary risk factors account for the high murder rates-alcohol consumption and possession of firearms. Most murders take place on weekends or holidays and are not politically related. Both the murderers and the victims are most likely to be poor people.

Brauer, Jurgen. 2007. "Data, Models, Coefficients: The Case of United States Military Expenditure." Conflict Management and Peace Science 24(1): 55-64.

Abstract: This article is an exercise in economic methodology. It replicates two published models of the effect of military expenditure on the United States economy but, in order to study variations in the relevant estimated parameters, applies two different military expenditure data sets to the models (budget vs. National Income and Product Accounts (NIPA) data). In an extension, the article examines coefficient stability when the economically preferred NIPA data are applied across varying time-periods. Two major findings are that economic models should avoid the use of budget data and that even when the preferred NIPA data are used, estimated parameters are highly unstable across time.

Comment: investigates the improper use of models and data in defense and peace economics. The article reminds the research community that empirical results can change if the underlying data changes in sample size, composition, or time period. In particular, government budgets should not be used in economic modeling as they do not measure the full scale of resources devoted to a state's defense function, their purposes is administrative.

Brinkerhoff, Derick W. 2008. "The State and International Development Management: Shifting Tides, Changing Boundaries, and Future Directions." Public Administration Review 68(6): 985-1001.

Abstract: Discusses the evolution in the international political landscape and the changing ideology from state to market driven economic development. It examines the changing roles of the state, citizens, and management in international development and how these roles are linked to international security issues.

Comment: The business sector is missing. "Peace industries" might be seen as part of a larger evolution, changing the nexus between development and security issues.

Brown, Jeffrey R., David J. Cummins, Christopher M. Lewis and Ran Wei. 2004. "An Empirical Analysis of the Economic Impact of Federal Terrorism Reinsurance." Journal of Monetary Economics 51(5): 861-898.

Abstract: This paper examines the role of the federal government in the market for terrorism reinsurance. It analyzes the stock prices of industries affected by terrorism that led to the TRIA (Terrorism Risk Insurance Act) of 2002.

Annotation: The industries most affected by terrorism experienced decreasing prices-banking, insurance, real estate investment trusts, and transportation firms. Market value data is used as the most accurate and immediate assessment of new information following new legislation. TRIA limits insurer losses from terrorism and provides an opportunity for insurers to increase their revenues. However, the markets responded negatively to TRIA since it required insurers to provide terrorism insurance but they insurers were unable to purchase private reinsurance to cover their deductible and co-payment losses.

Comment: TRIA had the opposite effect. Instead of inducing the insurance industry with confidence; the markets reacted negatively as stock prices declined.

Buesa, Mikel, Aurelia Valino, Joost Heijs, Thomas Baumert, Javier Gonzalez Gomez. 2007. "The Economic Cost of March 11: Measuring the Direct Economic Cost of the Terrorist Attack on March 11, 2004 in Madrid." Terrorism and Political Violence 19 (4): 489-509.

Abstract: Evaluates the direct cost of the terrorist attacks of March 11, 2004 on the economy of Spain. The evaluation has been made by applying conservative criteria and the results obtained have been considered a minimum. The results indicate that the immediate damage caused a loss of nearly 212 million euros to the regional economy of Madrid, equivalent to 16 percent of regional GDP and 3 percent of national GDP. However, direct costs are much larger, over 220 million euros in 2004 and long term costs would be exponentially larger still.

Burd-Sharps, Sarah, Kristen Lewis, and Eduardo Borges Martin. 2008. The Measure of America: American Human Development Report 2008-2009. USA: Columbia University Press and Social Science Research Council.

Abstract: Presents a compilation of indicators in economic, social, and political trends in the United States and how countries compare. Introduces a new statistical framework that measures human progress, not just opulence. This report aims to start a new discussion of how far US citizens still have to go to improve health care, education, and standard of living.

Cam, Marie-Anne. 2008. "The Impact of Terrorism on US Industries." Economic Papers 27(2): 115-134.

Abstract: Assesses the effects of 9/11, the Bali bombing (2002), and the Madrid bombing (2004) on 135 US industry equity indices to determine if terrorism has an industry-specific effect. The results show that airline, hotel and leisure, gambling and transport industries exhibit the most severe negative returns while water, defense, and telecom experience positive returns. It also shows little impact on US industry returns after the Bali and Madrid attacks.

Annotation: The study asks two questions: Does terrorism have industry-specific effects and does the US stock market react to overseas terrorist attacks? Abnormal returns post- 9/11 in airline and hotel/leisure industries reflect the fears of the consumers at the perceived danger, while looking at post-Bali and Madrid terror attacks points to a much lesser sensitivity of US industries to foreign terrorist attacks.

Clark, Geoffrey. 2004. "Insurance as an Instrument of War in the 18th Century." The Geneva Papers on Risk and Insurance 29(2): 247-257.

Abstract: Discusses the history of insurance and war as well as the opportunity to gamble through insurance policies on the outcome of war. To curtail use of insurance policies for enrichment, English Parliament passed a ban on marine policies in 1746 since ships were being destroyed to collect on insurance but the law was subsequently repealed.

Comment: This paper shows how long ago insurance was abused. It raises but does not resolve some important questions.

Cohen, Ben and Jerry Greenfield, 1997. Ben & Jerry's Double-Dip: Lead with Your Values and Make Money Too. New York: Simon & Schuster.

Abstract: How Ben & Jerry's Homemade sold values along with its ice cream. But the company had difficulty when it (see pp. 203-208) introduced the idea of supporting the One Percent for Peace project and called the new ice cream bar the Peace Pop.

Comment: The authors are frank in reporting the hostility of some managers, who said: "Customers are going to protest. They're not going to buy our products. The conservatives are going to picket our stores. It's not right to take a stand against the government. Businesses don't do that." The Peace Pop idea went through, but at a cost in company management harmony.

Cohen, Mark A. 1988. "Pain, Suffering, and Jury Awards: A Study of the Cost of Crime to Victims." Law & Society Review 22(3): 537-555.

Abstract: Attempts to develop a new approach to measuring the cost of crime. Previous approaches have focused on out-of-pocket expenses incurred by victims, but that approach significantly underestimates the cost of crime by ignoring pain, suffering, and fear. Actual victim injury rates are combined with jury awards in personal injury accident cases to estimate monetary values of pain. Estimates the aggregate annual cost of crime to victims of FBI index crimes is $92.6 billion a year (equivalent to $166 billion in 2009 dollars).

Cook, Philip J. and Jens Ludwig. 2000. Gun Violence: The Real Costs. New York: Oxford University Press.

Abstract: Evaluates the effect of gunshot injuries and deaths on the standard of living in the US Aims to incorporate indirect costs and social costs into the total economic burden of guns on the society.

Annotation: Seeks to put an accurate price tag on what society pays for gunshot injuries and deaths in order to increase gun prevention. The book addresses important issues in order to have better policy towards gun ownership and control. Using surveys, the authors estimate the value of preventing gun violence in the US in

1997 was around $115 billion a year or $1 million per gunshot injury (p. 194). However, the authors prefer more conservative estimates of value per gunshot injury of around $170,000-$430,000 (p. 195).

Cooper, Malcolm. 2006. "The Pacific War Battlefields: Tourist Attractions or War Memorials." International Journal of Tourism Research 8(3): 213-222.

Abstract: Violent conflict areas serve as tourism attraction once peace ensues. This paper explores the tourism of war and peace in Japan and how places with the most violence become hot spots for tourism.

Comment: Battlefields become tourist destinations, just as air force bases become airports. Like the Lee 2006 paper on war and tourism in South Korea (see that entry), these are easy cases for conversion.

Crain, Mark W. and Nicole V. Crain. 2006. "Terrorized Economies." Public Choice 128(1-2): 317-349.

Abstract: Authors estimate macroeconomic consequences of terrorism on GDP, investment, consumer spending, and tourism. Extensive data series is used from 147 countries from 1968 to 2002. The results show that a reduction in terrorism could potentially yield large economic benefits, although it depends on the country's demographics, base level of output, and investment.

Annotation: Data sets provide the foundation to compute the costs of terrorism and the benefits of anti-terrorism activities by analyzing 11,723 terrorist acts that killed or wounded 37,137 people. They use data series compiled by the ITERATE project. For the US, the study concludes that a reduction in incidents from 3 to 2 would lead to GDP increase of roughly $40 billion and add nearly $5 billion in fixed capital investment to the US economy. For the world as a whole, they estimate that without terrorist events, world GDP would be $3.6 trillion higher in 2002, in other words terrorism costs the world more that the GDP of the UK, Italy, and Argentina combined.

Comment: The paper is an extension of Blomberg, Hess, and Orphanides 2004 research (see that entry). Very important paper for purposes of estimating Peace GDP.

Cummins, David J. 2007. "Reinsurance for Natural and Man-Made Catastrophes in the United States: Current State of the Market and Regulatory Reforms." Risk Management and Insurance Review 10(2): 179-220.

Abstract: Reviews the response of the world reinsurance industry to recent natural and man-made mega-catastrophes of 2004-2005 and provides recommendations for regulatory reforms that would improve efficiency of reinsurance markets.

Annotation: Finds that reinsurance markets responded efficiently to the catastrophe losses of 2004-2005, losses were paid with minimal disruption of insurance and reinsurance markets, with substantial amounts of new capital entering the reinsurance industry very quickly.

Comment: The insurance industry has functioned well in handling its traditional role. Other studies have shown that premiums have increased following catastrophes, so that costs have risen prospectively.

D'Amore, Louis and Teresa E. Anuza. 1986. "International Terrorism: Implications and Challenge for Global Tourism." Business Quarterly 51(3): 20-29.

Abstract: The article discusses increase incidents of terrorism and its impact on global tourism. While terrorism is on the rise, it will continue to have devastating affects on the tourism industry. However, the author believes terrorism could be the world's first "peace industry," "an industry which recognizes, promotes and supports the belief that every traveler is potentially an 'Ambassador for Peace'."

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Comment: The article, written in 1985, is extremely pertinent to today's discussion on terrorism. The author identifies the causes of terrorism as poverty, malnutrition and lack of opportunities for many people in the developing world. He also sites that in 1985, the US spent $1 trillion on weapons and warfare.

Davies, Victor A. B. 2008. "Postwar Capital Flight and Inflation." Journal of Peace Research 45(4): 519-537.

Abstract: Establishes a direct positive relationship between postwar inflation and capital flight. The study uses regression analysis to find that postwar inflation rate is associated with a differential increase in annual capital flight flows of about 0.005 to 0.01 percentage points of GDP.

Comment: Conflict causes inflation, which increases capital flight.

Dinar, Ariel and Andrew Keck. 1997. "Private Irrigation Investment in Colombia: Effects of Violence, Macroeconomic Policy, and Environmental Conditions." Agricultural Economics 16(1): 1-15.

Abstract: The article identifies and estimates the effects of violence, macroeconomic policies, and environmental conditions on private investment in agriculture in general and irrigation in particular. It finds that violence negatively effects private agricultural investment.

Doherty, Neil A., Joan Lamm-Tennant, and Laura T. Starks. 2003. "Insuring September 11: Market Recovery and Transparency." The Journal of Risk and Uncertainty 23(2-3): 79-199.

Abstract: Examines the post-9/11 market performance. It tries to measure the effects of the terrorist attacks on the financial markets by looking at the relationship between net losses and leverage as well as stock price performance after 9/11.

Annotation: Post-9/11 losses created uncertainty regarding the value of insurance firms, allowing for opportunistic behavior of some investors and a demand for transparency. A strong correlation was found between net losses and leverage with stock price performance.

Comment: Very important study of insurance firms with detailed statistics important for our purposes.

Donahue, John J. and Peter Siegelman 1998. "Allocating Resources among Prisons and Social Programs in the Battle against Crime." The Journal of Legal Studies 27 (1): 1-43.

Abstract: This article evaluates the cost and crime-reducing potential of prisons and social spending, setting forth the conditions under which a shift in resources from an expanding prison population into social spending would lead to a reduction in total crime. Presents preschool enrichment programs with family intervention as a way of reducing crime. Targeting resources towards children who are most at risk of crime may generate a more cost-effective crime reduction. Explains the elasticity of crime with respect to incarceration is about .15.

Comment: Information regarding crime statistics may be a bit dated.

Drakos, Konstantinos and Ali M. Kutan. 2003. "Regional Effects of Terrorism on Tourism in Three Mediterranean Countries." The Journal of Conflict Resolution 47(5): 621-641.

Abstract: This paper evaluates effects of terrorism on tourism in three Mediterranean economies highly dependent on tourism: Greece, Israel, and Turkey. Results: significant effects and regional spillover effects of terrorism on tourism market shares. Net effect in Greece is a loss in market shares of 9.02 percent from domestic terrorism and a loss of 2.23 percent from regional terrorism. Israel shows a loss of 0.67 percent of market share while Turkey shows a loss of 5.21 percent.

Eckstein, Zvi and Daniel Tsiddon. 2004. "Macroeconomic Consequences of Terror: Theory and the Case of Israel." Journal of Monetary Economics 51(5): 971-1002.

Abstract: Analysis of the effects of terror on the economy. Finds that terrorism reduces investment, long-run income, and consumption.

Annotation: Authors conceptualize economic costs of terrorism. When faced with insecurity, individuals spend less and consumption decreases, while government expenditures on defense increased.

Comment: Important estimate that if Israel did not suffer from terror in the past three years, its output per capita would have been 10-15 percent higher that it is currently. Another important section is devoted to impact of terrorism on tourism. The results are similar to findings in Fleischer et al 2002 (see that entry), that foreign tourists and businessmen are extremely sensitive to threats and violence while local tourists are not. Especially when terror occurs in city centers, local demand for remote tourist locations such as Eilat and the Dead Sea can even increase.

Enders, Walter, Todd Sandler and Gerald F. Parise. 1992. "An Econometric Analysis of the Impact of Terrorism on Tourism." Kyklos 45(4): 531-554.

Abstract: Econometric analysis of the impact of terrorism on Greece, Austria, Italy, and continental Europe as a whole. Finds a strong transnational externality, where an attack in France will not have a large effect on tourism revenues within France but will deter tourists from visiting neighboring nations.

Annotation: Uses an ARIMA model to estimate the effects of terrorism through a transfer function to approximate the receipts of a nation from tourism. IMF's Balance of Payments Statistics data tapes are used to get travel credits and passenger services credit.

Enders, Walter and Todd Sandler, 1996. "Terrorism and Foreign Direct Investment in Spain and Greece." Kyklos 49(3): 331-353.

Abstract: Focuses on losses in net foreign direct investment from terrorist attacks. It finds that losses in NFDI from terrorism are significant, 13.5 percent annual decrease in Spain and 11.9 percent annual decrease in Greece. In 1990 dollars, the decline was $488.9 million for Spain and $383.5 million for Greece.

Comment: The paper (p. 335) lists all the terrorist groups in Spain and Greece, when they formed, their targets and objectives.

Enders, Walter and Todd Sandler. 2002. "Patterns of Transnational Terrorism, 1970-1999: Alternative Time-Series Estimates." International Studies Quarterly 46(2): 145-165.

Abstract: This paper uses alternative time-series methods to investigate patterns of transnational terrorist incidents with one or more deaths for the period of 1970-1999. The findings are presented in a standard linear model as well as autoregressive TAR model to suggest policy applications in light of the 9/11 attacks.

Annotation: Evaluating effectiveness of policy approaches: retaliatory raids, UN conventions, and resolutions as well as media reporting on future events.

Comment: The study finds a reduction in the resources of terrorists or an increased difficulty associated with all modes of attack will decrease the threat of terrorism. Also, the study uses data on terrorism incidents, date, location, and casualties from ITERATE (International Terrorism Attributes of Terrorist Events).

Enders, Walter, Adolfo Sachsida, and Todd Sandler. 2006. "The Impact of Transnational Terrorism on US Foreign Direct Investment." Political Research Quarterly 59(4): 517-531.

Abstract: Quantifies the extent to which terrorism has altered the level or composition of US FDI abroad. Finds that post-9/11, US FDI flows were not altered except for Turkey, and each US-directed terrorist attack abroad reduced capital stock by over $1 million. Also finds that effect of terrorism on FDI is more pronounced in developing countries.

Fajnzylber, Pablo, Daniel Lederman, Norma Loayza, Peter Reuter, John Roman, and Alejandro Gaviria. 2000. "Crime and Victimization: An Economic Perspective with Comments." Economia 1(1): 219-302.

Abstract: Evaluates factors that are associated with increased crime to propose solutions. It contains an overview of the costs and causes of crime, survey of the literature, and presentation of main determinants of violent crime rates in developed as well as developing countries.

Annotation: Extends the model along five dimensions: deterrence factors, activities related to illegal drugs, demographic issues, income, and ethnic polarization and social capital. Reviews case studies from Latin America based on crime perpetrators and victims' surveys and formulate policy recommendations. Costs of crime include forgone opportunity costs of lost resources, which are difficult to calculate. The most common categories in calculating costs associated with crime are costs of policing, courts, prisons, private security expenditures, value of potential years of life lost due to murder or crime-related disabilities, and health-care costs associated with traumas caused by violence. Indirect costs of crime are more difficult to capture; they include the underinvestment in the legal sector, reduced productivity of businesses, reductions in the rates of human and social capital accumulation, lowering of labor force participation rates, and intergenerational transmission of violent behaviors.

Comment: The paper does not mention costs of psychological damage to victims and their families, such as PTSD (post-traumatic stress disorder).

Fielding, David. 2003. "Counting the Cost of the Intifada: Consumption, Saving and Political Instability in Israel." Public Choice 116(3-4): 297-312.

Abstract: Measures the effect of political instability on macroeconomic performance in Israel from 1987-2002. It shows that a high degree of political insecurity and violence prevents macroeconomic stability and growth, even if all other prerequisites to growth are in place.

Annotation: While Israel has gone through macroeconomic stabilization and liberalization in the early 1990s, its savings rate has been very low compared with other countries. The paper finds that a low savings rate is associated with a high degree of political violence or threat. That suggests that peace is a necessary prerequisite to macroeconomic stability and growth.

Fielding, David. 2003. "Modeling Political Instability and Economic Performance: Israeli Investment during the Intifada." Economica 70(277): 159-186.

Abstract: Constructs a model of investment in Israel to measure the effect of political instability on investment.

Annotation: Estimates a statistically robust quarterly time-series model of investment in Israel for the period 1988-1998 separating investment into three categories: non-residential construction, machinery, and equipment. The most important economic factors affecting investment were found to be real wage rate and aggregate demand.

Comment: The study also finds that building and construction will decrease as it is linked to the land, while more geographically mobile investments may not decrease with the threat of violence.

Fleischer, Aliza and Steven Buccola. 2002. "War, Terror, and the Tourism Market in Israel." Applied Economics 34(11): 1335-1343.

Abstract: The authors develop a supply and demand model of the Israeli hotel industry separated by domestic and foreign sectors in order to determine the effects of war and terrorist activities on hotel revenues. They find that domestic demand is price-inelastic, income-elastic and terror-insensitive, while international demand is price-elastic. Hotels reduce their prices to encourage domestic demand after a terrorist attack to compensate for losses from the international tourists.

Annotation: Provides a detailed study of the hotel industry's response to demand shifts by lowering the prices for domestic tourists since its costs of accommodating domestic tourists are lower than those of international clientele. However, it has had little success in countering terrorism's negative impact on hotel incomes and tourist revenue.

Comment: Israel's domestic tourists' terror-insensitivity could be from many years of experience living with conflict. This might not translate to other countries.

Frey, Bruno S., Simon Luechinger, and Alois Stutzer. 2007. "Calculating Tragedy: Assessing the Costs of Terrorism." Journal of Economic Surveys 21(1): 1-25.

Abstract: Analyzes utility losses from terrorist activities using the life satisfaction approach. It finds that losses in utility are much larger than economic losses.

Annotation: Uses country data for economic losses as a result of terrorism, losses in tourism revenue (p. 5), reduced FDI and savings and consumption (p. 8), estimates a "peace dividend" in investment in a conflict free environment, construction investment would be 27 percent higher and machinery and equipment investment would be 4.6 percent higher (p. 9). Other data include the effect of terrorist acts on stock prices (pp. 9-11), foreign trade and urban economy (p. 11).

Garin-Munoz, Teresa and Teodosio Perez Amaral. 2000. "An Econometric Model for International Tourism Flows to Spain." Applied Economics Letters 7(8): 525-529.

Abstract: Analyzes the economic determinants of the international demand for tourist services in Spain. The study finds that income, price, exchange rate, and the Gulf War were important determinants of international tourist flows to Spain.

Annotation: Tourism is an important industry in Spain. In 1997, it generated 10.5 percent of GDP and 9.5 percent of total employment. The estimated values for the static models are income elasticity at +1.41; own-price elasticity at -0.30, exchange rate elasticity at +0.50, and the negative effects of the Gulf War at -0.15. Factors other than conflict, particularly income and exchange rate elasticity, have a large effect on the tourism industry.

Gold, David. 2008. "How Much Defense Can We Afford?" Challenge 51(5): 65-69.

Abstract: While US defense spending is around 4 percent of GDP, many people, especially in the military establishment, would like that number to increase. Government spending in education and infrastructure needs to increase as that is more important to long-term economic growth, while military spending should not.

Comment: The author is arguing that military spending crowds out private resources more than is acknowledged. This point is important to note. Also, according to Dr. Jurgen Brauer's calculations, actual military expenditure of the US is over 6% of GDP.

Goldsmith, Benjamin E. 2003. "Bearing the Defense Burden, 1886-1989: Why Spend More?" The Journal of Conflict Resolution 47(5): 551-573.

> Abstract: Presents analyses of research done on factors that influence military expenditures, correlates of the defense burden using domestic factors, such as economic growth and international factors, such as security threats.

> Comment: This is one of many studies that attempt to predict milex. Other studies attempt to predict growth based on milex.

Guzhva, Vitaly S. 2008. "Applying Intervention Analysis to Financial Performance Data: The Case of US Airlines and September 11." Journal of Economic Finance 32(3): 243-259.

> Abstract: Using intervention analysis the study assess the effect of the September 11 terrorist attack on the performance of the US airline industry. The estimated initial effect supports the US federal government decision to provide a $5 billion cash compensation to the airlines. However, the long-run effect is found to be much smaller than the losses reported by the industry in 2001 and 2002. Also, the analysis suggests that not all of the airlines were equally affected by the terrorist act and that investors were fairly rational pricing major airline stocks, but were less accurate with the stocks of smaller regional carriers.

> Annotation: Despite the government's interventionist policy of providing $5 billion in cash compensation and up to $10 billion in loan guarantees, the airlines industry still posted total losses of $17.7 billion in 2001 and 2002. The initial effect of the attack is found to be around $1.5 billion a month, while the long-run effect is estimated to be $5.13 billion.

Hubbard Glenn R, Bruce Deal and Peter Hess. 2005. "The Economic Effects of Federal Participation in Terrorism Risk." Risk Management and Insurance Review 8(2): 177-209.

> Abstract: Insurance plays an important part in protecting against risk from terrorist attacks. The Terrorism Risk Insurance Act (TRIA) serves as an important backdrop to limit losses and continuation of TRIA is necessary to ensure against greater instability, job loss, and bankruptcy in the event of another attack.

> Annotation: The paper by Michel-Kerjan, 2006 (see that entry) discuses similar aspects of TRIA. However, the paper by Brown, et al., 2004 (see that entry) claims that TRIA only increased instability in the insurance and reinsurance markets.

IATA. 2007. "Estimating Air Travel Demand Elasticities." InterVistas Consulting Inc. Prepared for IATA - International Air Transportation Association. http://www.iata.org/NR/rdonlyres/0E7F6834-2506-498B-9CB9-8DCA198FA3BC/0/Intervistas_Elasticity_Study_2007.pdf [accessed March 2, 2009].

> Abstract: Summarizes demand elasticity function in the passenger aviation market, finds that demand for air fare is both price and income elastic, air transport has the characteristics of a luxury good.

> Comment: This would relate to conflict if we had demand elasticity with respect to fear or an event.

IATA. 2005. "Industry Positions on Security Issues." Global Aviation Security Action Group (GASAG) 10: 1-7. http://www.iata.org/NR/ContentConnector/CS2000/Siteinterface/sites/ps/file/GASAG_Flyer_Issue_10.pdf [accessed March 2, 2009].

> Abstract: Discusses security measure taken by the Global Aviation Security Action Group.

> Annotation: Another IATA paper on aviation security. See also "Estimating Air Travel Demand Elasticities" (2007).

Ioannides, Dimitri and Yiorgos Apostolopoulos. 1999. "Political Instability, War, and Tourism in Cyprus: Effects, Management, and Prospects for Recovery." Journal of Travel Research 38: 51-56.

> Abstract: the article examines the divergent fortunes of the tourist industries on the divided island of Cyprus. While the Greek-Cypriot state has witnessed rapid tourism development, the Turkish-Cypriot part has struggled due to international boycotts. The author argues for demilitarization on the island and efforts to unite both sides in a single Cypriot tourism product to bring in revenues and ensure continued peace and prosperity for both sides.

Ito, Harumi and Darin Lee. 2005. "Comparing the Impact of the September 11 Terrorist Attacks on International Airline Demand." International Journal of the Economics of Business 12(2): 225-249.

> Abstract: The article looks at the impact of 9/11 and uses a variety of time-series data to compare its effects on airline demand in Australia, Canada, Europe, Japan, and the United States.

> Annotation: Finds that all countries in the analysis suffered significant declines in the demand for international air travel as a result of the attacks, measures the downward shift in demand through the end of 2003, at between -15 percent and -36.5 percent, with the most significant impact in Europe and Japan. Finds a stronger correlation between the terrorist attacks on 9/11 and the declining demand in airline sales than Lui, 2007 (see that entry), and helps explain the huge losses incurred by the airline industries in Guzhva, 2008 (see that entry).

Karolyi, Andrew G. and Rodolfo Martell. 2006. "Terrorism and the Stock Market." Working papers, Ohio State University Department of Finance and Barclays Global Investors: 1-26.

> Abstract: Examines the impact of terrorist attacks on the stock price index. Data is gathered from 75 terrorist attacks that occurred between 1995 and 2002 in which publicly traded firms were targets. Losses in the prices of stocks are measured. In general, stock prices dropped by -0.83 percent. This corresponds to an average loss per firm per attack of $401 million in firm market capitalization.

> Annotation: The results show that the impact of terrorist attacks on the firms' stock prices differ based on the country where the attacks occur. Also, the losses in stock prices do not spill over to firms in the same industry and the effects on stock prices are larger when the executives are kidnapped as opposed to terrorist attacks that only damage the facilities. The firms that have cumulatively lost the most market value from terrorist attacks are Royal Dutch Shell ($10.2 billion dollars), British Petroleum ($7.2 billion), and Coca-Cola ($4.2 billion). The countries where the largest cumulative losses have been experienced are: Colombia ($13.7 billion), followed by Nigeria ($11.2 billion), and Russia and the United States ($2.6 billion each). Finally, the losses caused by the different groups that have claimed responsibility for the attacks, such as the National Liberation Army ($11.7 billion) and al-Qaida ($2.6 billion).

> Comment: The losses in market value are a good benchmark but do not incorporate the full costs of terrorism as well as the long term losses to firms' revenue.

Kidron, Michael and Ronald Segal. 1981. The State of the World Atlas. London: Pan Books.

> Abstract: A political atlas focusing on wars and conflict, military spending, resource allocation, labor force, etc.

Kirchhoff, Sue. 2008. "Debate Rages About Impact of War: Some Lawmakers Blame Downturn on Defense Spending." USA Today: B4 http://www.usatoday.com/money/economy/2008-04-09-iraq-war-economy-cost-obama_N.htm [accessed March 2, 2009].

Abstract: Including current White House requests, the price tag for US military action in Iraq and Afghanistan and associated costs of the "war on terror" since 2001 is on track to exceed $750 billion, according to the non-partisan Congressional Budget Office.

Klein, Zeev. 2007. "Eckstein: Palestinian Terrorism Cost Israeli GDP 12 Percent in 2002-2003: Deputy Bank of Israel Governor Prof. Zvi Eckstein: Fiscal Stability will Support Four to Five Percent Long-Term Annual Growth: Knight Ridder Tribune Business News: April 1, 2007, p. 1.

Abstract: Deputy Governor of Israel's Central Bank, Zvi Eckstein, said that Palestinian terrorism cut Israel's GDP by 12 percent in 2002-2003.

Knight, Malcolm, Loayza, Norman, and Delano Villanueva. 1996. "The Peace Dividend: Military Spending Cuts and Economic Growth." International Monetary Fund Staff Papers 43(1): 1-37.

Abstract: Military spending imposes costs on the economic welfare. This paper analyses the adverse effects of military spending on total stock of resources and efficiency of resource allocation. Reducing military spending will increase economic growth through capital formation and more efficient resource allocation.

Annotation: The study extends a standard growth model and comes up with a "peace dividend" if military expenditures were reduced. It concludes that military spending has an unambiguously negative and large effect on per capita output growth. If military spending ratios were reduced, it would result in higher GDP growth and increased output per capita.

Kozak, Metin, John C. Crotts, and Rob Law. 2007. "The Impact of the Perception of Risk on International Travelers." International Journal of Tourism Research 9(4): 233-242.

Abstract: The primary objective of this paper is twofold: (i) to investigate the impact of perceived risk on the tendency to travel internationally; and (ii) to explore if there is any difference in the perception of risky places among three clusters segmented based on the Hofstede's uncertainty avoidance index. The sample population of the study consists of 1180 international travelers visiting Hong Kong in the fall of 2003. The research findings show that the majority of travelers are more likely to change their travel plans to a destination that has elevated risk while the minority reports they are more unlikely. These findings suggest that international travelers appear to be sensitive towards the occurrence of any type of risk in their evoked destinations. Differences were also observed from one continent to another in terms of the influence of perceived risks. The final note is that travelers from different national cultures may have varying degrees of the perceived risk. Implications both for theory and practitioners are also discussed. Investigates the impact of perceived risk on the tendency to travel internationally.

Lee, Young-Sook. 2006. "The Korean War and Tourism: Legacy of the War on the Development of the Tourism Industry in South Korea." International Journal of Tourism Research 8(3): 157-170.

Abstract: Uses qualitative research methods to trace the causes of the Korean War and its impacts on the tourism industry and on people's perception of tourism in South Korea. It examines how war or the memory of war fosters tourism.

Comments: Analyzes how postwar propaganda is used to reinforce patriotism and convince the public that tourism is essential for rebuilding the economy and generating revenue.

Leslie, David. 1999. "Terrorism and Tourism: The Northern Ireland Situation - A Look behind the Veil of Certainty." Journal of Travel Research 38: 37-40.

Abstract: The article argues that while many argue that Northern Ireland has seen a decrease in tourist arrivals due to terrorism, the decrease in terrorism in recent decades has not brought an increase in tourism. The author

calls for the Northern Ireland Tourist Board to have a better plan of development of tourist areas and activities, as the country is primarily known for its rural areas which are abundant in Britain and do not attract the attention of great many tourists.

Liu, Haoming and Jinli Zeng. 2007. "Airline Passenger Fatality and the Demand for Air Travel." Applied Economics 39(14): 1773-1781.

Abstract: The 9/11 terror attacks led to a 20 percent cancellation rate of scheduled US airline flights and the passenger load factor was down 56 percent from 66.6 percent a year ago. The study finds that demand for air travel falls due to high fatality rate but not due to terrorism specifically, a large proportion of the decline in demand is still unexplained.

Annotation: Demand for air travel falls as fatalities increase. Moreover, consumers' perception might have changed as a result of the tragedy, not only due to the rate of fatalities but the scale of tragedy as a whole.

Lutz, James M. and Brenda J. Lutz. 2006. "International Terrorism in Latin America: Effects on Foreign Investment and Tourism." The Journal of Social, Political and Economic Studies 31(3): 321-338.

Abstract: Authors analyze the effects of terrorist attacks in Latin America on the economy. It finds that three variables of terrorism − incidents, injuries and deaths − have a direct impact on tourism but no direct correlation with the flows of FDI.

Comment: Review of old data, useful as a benchmark.

Lutz, James M. and Brenda J. Lutz. 2006. "Terrorism as Economic Warfare." Global Economy Journal 6(2): 1-21.

Abstract: Views terrorism as a tactic aimed at destabilizing the economy of a particular country. It analyzes the choice of targets along the lines of foreign investments, trade, foreign aid, and tourism and concludes that terrorists choose targets because of the economic value as well as the possible costs of disruption.

Comment: General discussion of well-known examples, no concrete numbers.

Marlin, John Tepper. 1990. "Economic Adjustment after the Cold War." Hearings before the Joint Economic Committee Congress of the United States. One Hundred First Congress. First and Second Sessions. December 12 and 19, 1989 and March 20, 1990. US Government Printing Office: 1-314.

Abstract: Defense appropriations have been declining since 1985 when Congress effectively capped the military buildup initiated by President Reagan; actual outlays adjusted for inflation have been declining gradually for the past 3 fiscal years and will decline again in the current year. The current period of lessened superpower and East-West tensions are described as a winding down of the cold war. The recent actions of the Soviet Union to unilaterally withdraw some forces from Eastern Europe and its border with China, and the apparent evidence that Soviet Defense spending is being cut back, are encouraging signs that it may be possible to reduce military expenditures to something like peacetime levels. The Congressional Hearing discusses how the budgetary savings should be allocated, which portion of reduced milex should be used to reduce the budget deficit, and what the Federal Government should be doing to facilitate economic adjustment from defense cutbacks.

Annotation: Dr. Marlin's testimony contains tables of companies, regions ands states most severely affected by the defense cutbacks, expected surge in unemployment and various programs to ease the pain of structural adjustment.

Marlin, John Tepper. 2006. "The 'No Dirty Gold' Campaign: What Economists Can Learn from and Contribute to Corporate Campaigns." The Economics of Peace and Security Journal 1(2): 58-64.

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Abstract: Economists can have more impact on policy by studying NGOs that had successful campaigns against corporate actors. NDG- "No Dirty Gold" campaign is given as an example of one such successful battle organized by Oxfam America and Earthworks NGOs to educate consumers on where the gold comes from and force major retailers to sign on to their rules. Their efforts were so successful that the NDG campaign expanded into Council for Responsible Jewelry Practices campaign that included manufacturing, mining and industry associations as well. While the success of the NDG campaign remains to be seen, the overwhelming attention and response it has received from the business community could serve as an example to other NGOs working to campaign the private sector. This campaign methodology could also be applied when approaching policy decisions. While most firms have an interest in peace making and peace keeping, the ideology guiding national security policy seems be counter instinctual through increased military expenditure. Economists can provide their analytical tools for invaluable analysis to NGOs and donors, but should also include the business community with the slogan: "World Peace through Commerce."

Marwah, Kanta, Lawrence R. Klein and Thomas Sheetz. 1999. "The Military-Civilian Trade-off in Guatemala: An Economic Analysis." ECAAR Papers: 1-36.

Abstract: This article examines the effect of militarization on economic advancement. It studies supply/demand as well as short/long run effects of military spending on economies, particularly Guatemala.

Comment: Good resource for understanding the link between military expenditure and its impact on Central American economies both in the short and in the long term.

Mason, David T. and Dale A. Krane. 1989. "The Political Economy of Death Squads: Toward a Theory of the Impact of State-Sanctioned Terror." International Studies Quarterly 33(2): 175-198.

Abstract: Finds that repressive violence is used by the state due to its weakness and for the lack of other options, such as weak institutions, lack of economic resources, or political will.

Annotation: Combines a rational-choice model to escalating levels of state-sanctioned violence (expressed as death squads in case of El Salvador) and finds that the violence is actually counterproductive to putting down the opposition.

Comment: State-sanctioned violence is used as an instrument of control but the study finds it actually has the opposite effect of increasing popularity of the opposition. Could business leaders play a role in a situation like this, to try to curb the violence and bring parties to a negotiating table?

Michel-Kerjan, Erwann. 2006. "How Does the Corporate World Cope with Mega-Terrorism? Puzzling Evidence from Terrorism Insurance Markets." Journal of Applied Corporate Finance 18(4): 60-76.

Abstract: This paper examines key challenges in the global insurance market. It focuses on the United States, UK, and Germany with respect to the evolution of terrorism insurance prices and market penetration in the face of evolving terrorist threats.

Annotation: Four out of five US financial institutions have some kind of terrorism insurance, the highest take-up rate across all industries. The US TRIA (Terrorism Risk Insurance Act of 2002) requires that insurers offer terrorism coverage to commercial enterprises up to $100 billion. The law was extended to Dec. 2007 with TRIEA (Terrorism Risk Insurance Extension Act of 2005).

Mooney, Dennis, Richard Zuber, John Gandar and Reinhold Lamb. 2006. "The Reaction of Stock Returns to Department of Homeland Security Threat Level Changes." Applied Financial Economics 16(5): 361-369.

Abstract: Explores the relationship between changes in the "threat level" (orange, red) by the Department of Homeland Security and changes in asset prices in the airline and insurance industries, finding no discernible link.

Annotation: Unless new information is communicated along with a change in the threat level, asset prices of airline and insurance industries did not change.

Negus, Steve. 2005. "Egyptian Investors Take Red Sea Attacks in Their Stride." Financial Times London (UK.) London Edition 1. August 2, 2005, p. 35.

Abstract: Shows the effects of terrorist attacks on Egypt's tourist sector and the overall economy. Based on massacres at Luxor in 1997 where 62 people were killed, and car bombings at the Sinai where 34 people were killed in 2004, the triple bombings in country's premier beach resort that killed 88 people in July 2005 will cost Egypt around 1.3 billion USD in tourist receipts and decreased GDP growth by one percent from 5 to 4.

Comment: The author claims that 2005 attacks will not have as severe economic consequences as the ones in 1997 because the international climate is different now and people are more used to the idea of terrorist attacks.

Okuyama, Yasuhide. 2007. "Economic Modeling for Disaster Impact Analysis: Past, Present, and Future." Economic Systems Research 19(2): 115-134.

Abstract: Reviews past modeling studies for economic impact analysis of disasters.

Annotation: Has economic modeling for disaster impact. Okuyama is looking at natural disasters. He defines disasters, then explores various economic modeling frameworks previously used and their limitations, such as input-output models, including both natural and man-made disasters date back to strategic bombing studies during WWII. Okuyama points out that I-O models are used for their simplicity and in order to estimate higher-order effects that are more sensitive to the changes in physical destruction. An example of I-O would be HAZUS - a comprehensive disaster assessment model. However, I-O limitations include its linearity and rigidity with respect to input and import substitutions, a lack of explicit resource constraints and a lack of responses to price changes. For this reason, CGE models - computable general equilibrium - are more flexible since they are non-linear, can respond to price changes, can incorporate input and import substitutions and can explicitly handle supply constraints but are only intended for long-run equilibrium analysis and provide lower impact estimates than I-O models. The SAM (social account matrix) modeling framework has been used to examine higher-order effects of disasters across different socio-economic agents, activities, and institutions. However, all three (I-O, CGE, and SAM) can derive the distributional impacts of a disaster in order to evaluate equity considerations for public policies against disasters. Okuyama goes further incorporating time factor into I-O model and putting more emphasis on production chronology and production modes by integrating SIM (sequential inter-industry model), creating a quarterly I-O model with the SIM modification.

Ospina, Guillermo Andres. 2006. "War and Ecotourism in the National Parks of Colombia: Some Reflections on the Public Risk and Adventure." International Journal of Tourism Research 8(3): 241-246.

Abstract: Explores relationship between conflict and ecotourism, conflict in national parks reduces ecotourism because of risk in Colombia.

Annotation: Many other countries face similar problems where armed conflict reduces potential for tourism and ecotourism growth, long term effects of conflict can reduce sustainability. In Colombia, many National Parks have been closed as a result of armed conflict and only conflict-free zones enjoy tourism revenues.

Comment: I.e., battlegrounds are not popular tourist destinations.

Pizam, Abraham and Ginger Smith. 2000. "Tourism and Terrorism: a Quantitative Analysis of Major Terrorist Acts and Their Impact on Tourism Destinations." Tourism Economics 6(2): 123-138.

   Abstract: This paper analyzes the effects of terrorist events on tourist destinations and the tourism industry as a whole. It finds that terrorist attacks on tourist destinations have been numerous and frequent. The study uses a sample of 14 years from 1985 to 1993, and finds that 70 terrorist acts fit the criteria of targeting tourist destinations. From the sample it was determined that terrorist acts caused substantial destruction of property, resulted in death of 830 men and women and caused injuries to 1,465 people. Furthermore, terrorist acts decreased tourism demand to the destination for many months after it has occurred, negatively affecting the tourism industry as a whole.

Polachek, Solomon W. 2007. "How Trade effects International interactions." The Economics of Peace and Security Journal 2(2): 60-68.

   Abstract: This article proposes that if a target country, the recipient of conflict, retaliates by cutting its trade ties with the instigator, then a portion of the cost of conflict born by the instigator is the lost gains from trade. The opportunity costs of conflict are higher the more losses it stands to incur from lost trade. This article summarizes some of the empirical work testing this proposition.

   Comment: Article is useful in that it examines the effect of conflict on trade and conversely one could then understand the links between peace and trade.

Poutvaara, Panu and Andreas Wagener. 2007. "Conscription: Economic Costs and Political Allure." The Economics of Peace and Security Journal 2(1): 6-15.

   Abstract: In this article, the authors survey some recent literature on the benefits and costs of the military draft. Covering: static inefficiency, dynamic costs, non-economic and thus allegedly "higher" values, as well as the use of mercenaries. Authors conclude that military conscription derives its political allure from the specific statutory incidence on young males.

   Comment: Sections on dynamic costs of the draft and Intertemporal tax incidence of the draft may be the only ones useful throughout the entire article. This is an interesting look into conscription and its effects on society.

Reno, William. 2002. "Uganda's Politics of War and Debt Relief." Review of International Political Economy 9(3): 415-435.

   Abstract: Explores the patterns of conflict in Uganda and neighboring nations as a form of predatory economic behavior. Military and political leaders use their power and military strength to line their pockets with profits through exploitation, export and contraband of natural resources. Alliances are made between various military groups for the sake of profit, which leads to increasing instability in the whole region. Also, increased militarization serves to undermine the power of the political institutions and create a state of chaos. However, this does not deter creditors, such as the IMF, from supplying the countries with loans, even when evidence exists that those loans are not used for humanitarian purposes but to sustain the military groups. This happens because war-related private commerce, organized through various militias, is seen as a sign of development. Moreover, the creditors are willing to extend loans as long as some group presents enough control and willingness to stay somewhat solvent and at least try to repay some of the debt.

   Comment: The article outlines that creditors view solvency above any development goals and are willing to support the military groups as long as they remain in control and repay the loans.

Rosen, George. 1953. "Japanese Industry Since the War." The Quarterly Journal of Economics 67(3): 445-463.

Abstract: This study views Japanese industry before World War II, changes during the war and post- war recovery. It includes important data on Japanese industrial production between the years of 1930-1951. It also finds that Japanese industry after World War II was operating at a comparative disadvantage.

Comment: Although quite dated, the article illustrates that Japanese industry has decreased tremendously due to the war and shrunk considerably in 1945, only beginning to recover slightly during 1951. It is in line with our hypothesis that war has a negative effect on industry and this paper proves this hypothesis in a case study of Japan during WWII.

Rossi-Hansberg, Esteban. 2004. "Cities under Stress." Journal of Monetary Economics 51(5): 903-927.

Abstract: Short term and long term effects of terrorist attacks on cities are studied; it is found that the short term results are much more devastating than long term.

Annotation: Examines the actual destruction of physical capital as well as expectation of future terrorist attacks. The perceived threat of future attacks is more damaging to the economic structure of cities; it can increase the cost of living and create a permanent effect on the urban space.

Rubio, Mauricio. 1997. "Perverse Social Capital - Some Evidence from Colombia." Journal of Economic Issues 31(3):805-816.

Abstract: Examines the social capital formation in Colombia and its effects on economic growth.

Annotation: Social capital is often cited as a prerequisite to economic growth. However, in the case of Colombia, prevalence of violence and economic instability has destroyed the productive social capital and created "perverse" social capital that entrenches corruption and criminal behavior through the power relations, the legal system, the informal norms of behavior and the political activities. "Perverse" social capital creates powerful and unproductive institutions that restrict economic growth.

Comment: Looks at the negative effects of criminal activity on economic growth.

Rupp, Nicholas G., George M. Holmes and Jeff DeSimone. 2005. "Airline Schedule Recovery after Airport Closures: Empirical Evidence since September 11." Southern Economic Journal 71(4): 800-820.

Abstract: Due to airport closures following 9/11, many airlines have decreased operating costs which negatively affected service quality.

Comment: Higher operating costs from security precautions need to have offsetting cutbacks in other areas. Delays and declines in service quality are the security costs passed on to the consumer.

Sandler, Todd, John T. Tschirhart, and Jon Cauley. 1983. "A Theoretical Analysis of Transnational Terrorism." The American Political Science Review 77(1): 36-54.

Abstract: Analysis using the rational-actor model of negotiation process between terrorism and government stakeholders. Models account for the objective and constraints of both sides. Implications are extracted from the comparative static analysis as the models' parameters are changed.

Comment: Uses government utility function to map out the spectrum for negotiations from no-negotiation strategy to meeting the demands of the terrorists.

Sandler, Todd and Walter Enders. 2007. "Applying Analytical Methods to Study Terrorism." International Studies Perspectives 8(3): 287-302.

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Abstract: Studies terrorism using theoretical and empirical methods to get informed policy-making decisions. Focuses on trends, cycles and forecasting, evaluates policy effectiveness and quantifies economic impact of terrorism.

Santos, Joost R., and Yacov Y. Haimes. 2004. "Modeling the Demand Reduction Input-Output (I-O) Inoperability Due to Terrorism of Interconnected Infrastructures." Risk Analysis 24(6): 1437-1451.

Abstract: Effects of terrorist attacks are examined through an Input-Output model to identify the ripple effects carried from one sector to another.

Annotation: Interdependency analysis encompasses the important issues of identifying, assessing, and managing risks arising from the interconnectedness inherent in today's industry sectors.

Comment: Important to our input-output model.

Selvanathan, Saroja. 2007. "The Effect of War and Other Factors on Sri Lankan Tourism." Applied Economics Letters 14(1): 35-38.

Abstract: Focuses on factors that affect tourism in Sri Lanka, particularly the impact of the Tamil Tigers' independence war has on tourism. It finds that conflict accounts for 21 percent of decline in international tourist arrivals.

Sonmez, Sevil F., Yiorgos Apostolopoulos, and Peter Tarlow. 1999. "Tourism in Crisis: Managing the Effects of Terrorism." Journal of Travel Research 38: 13-18.

Abstract: Tourism industry is highly vulnerable to terrorist attacks. Tourism crisis management requires planning.

Annotation: Terrorism has a more profound effect on tourism than natural disasters. For tourist destination, a period of tourism crisis ensues after a terrorist attack until full recovery and pre-conflict conditions resume.

Comment: Discusses strategic and ideological targeting of tourists by terrorists. Strategically, terrorist attacks disrupt tourism and create publicity. Ideologically, tourists can be targeted for socioeconomic grievances by locals as well as ideological values, such as conspicuous consumption.

Stiglitz, Joseph E. and Linda J. Bilmes. 2008. "The Three Trillion Dollar War: The True Cost of the Iraq Conflict." New York: W.W. Norton.

Abstract: The book spotlights expenses hidden from the US taxpayer, including big-ticket items like replacing military equipment (being used up at six times the peacetime rate) and the cost of caring for wounded veterans. The authors also investigate the cost in lives and economic damage within Iraq and the region. Finally, the authors measure what the US taxpayers' money would have produced if instead it had been invested in the further growth of the US economy.

Summers, R. and A. Heston, 1995. "Standard of Living: SLPOP An Alternative Measure of Nations' Current Material Well-Being." Working paper. University of Pennsylvania.

Abstract: An alternative to per capita Gross Domestic Product, GDPPOP, has been developed for measuring countries' current material well-being: Total consumption less military expenditures, per capita. Estimates of SLPOP are presented along with GDPPOP for many countries and five different years during 1970-1989. The economic gap between richer and poorer countries as measured by SLPOP is smaller than the gap in overall economic capacity as measured by GDPPOP.

Annotation: GDP includes investment, i.e., production of goods to help production of goods in the future. Investment is excluded from the SLPOP in addition to military expenditures. The article provides SL numbers for 112.

Comment: This measure is close to being a Peace GDP, but defines violence narrowly as military spending.

Theisen, Ole Magnus. 2008. "Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited." Journal of Peace Research 45(6): 801-818.

Abstract: This article starts with an attempt at replicating earlier findings on the link between population density, soil degradation, deforestation, water scarcity and civil war, but several results are not replicable. The final results lend little support to a purported link between resource scarcity and civil conflict, whereas it replicates earlier findings on the importance of poverty, instability and dependence of fuel exports.The author concludes that poverty and dysfunctional institutions are strongly related to conflict, while scarcity of natural resources has limited explanatory power in terms of civil violence.

Comment: The article contains a few tables/models which may be useful in terms of linking conflict/civil war with different types of environmental, social or political problems.

World Tourism Organization. 2002. "The Impact of the September 11 Attacks on Tourism: The Light at the End of the Tunnel." Tourism Recovery Committee, Second Meeting. World Tourism Organization. http://pub.unwto.org:81/WebRoot/Store/Shops/Infoshop/Products/1262/1262-1.pdf. [accessed February 14, 2009].

Abstract: The study looks at the effects of the 9/11 terrorist attacks on the tourism industry and which segments of the industry were affected the most. It underlines important lessons that would be useful in future conflict situations.

Comment: There are many studies of the economic impact of 9/11. This has the most detail on the tourism sector.

World Tourism Organization. 2008. "Tourism Highlights." http://www.unwto.org/pdf/highlights_e.pdf [accessed February 14, 2009].

Abstract: Overview of facts and figures on tourist industry globally in 2008, such as number of tourist arrivals per country, value of spending in $US millions, and as a percentage of GDP.

Comment: Tourism is a sensitive indicator of the impact of war, conflict and terrorism.

World Tourism Organization. 2008. World Tourism Barometer 6(3).

Abstract: Tourism experts predict sharp decline in confidence, rapid slowdown in tourism growth, and initial forecast for 2009 predicts growth between 0 and 2 percent.

Versi, Anver. 2003. "Kenya Bears Brunt of Mombasa Terror." African Business: 11.

Abstract: This article looks at the economic consequences of Mombasa's Paradise Hotel terror attacks, which left 16 dead in 2003. The direct effects include the tourism industry, which is 12 percent of Kenya's GDP and employs 500,000 people. Moreover, Mombasa is an important port for neighboring countries of Uganda, Rwanda, Burundi, Democratic Republic of Congo and Tanzania, If ships choose to avoid it due to terrorism fears, it will have negative economic effects on those countries as well.

Zussman, Asaf, Noam Zussman, and Morten Orregaard Nielsen. 2006. "Asset Market Perspectives on the Israeli-Palestinian Conflict." Bank of Israel Discussion Paper No. 2006.02: 1-49.

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Abstract: Finds that major escalations in violence, such as the outbreak of the Intifada in 2000, lead to significant declines in asset prices in both Israel and the Palestinian Authority. Conversely, major peace initiatives, such as the Oslo accords in 1993 and the Road Map plan in 2003, lead to substantial increases in asset prices on both sides of the conflict.

Annotation: The outbreak of the Intifada yielded a drop of 22 percent in market value of the TASE (Tel Aviv Stock Exchange), while the Road Map peace negotiations led to an increase of 25 percent in the market value, which is quite significant considering the market capitalization of the TASE was about 60 billion USD during that period.