THE COSTS OF VIOLENCE

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INTRODUCTION

In today's world, it is well accepted that violence exacts a high cost on global development. In about 60 countries over the last ten years, violence has significantly and directly reduced economic growth. It has hampered poverty reduction efforts and limited progress towards the Millennium Development Goals. About half of these countries experience violent conflict or are in post-conflict transition. The other half experience high levels of violent crime, street violence, domestic violence, and other kinds of common violence.[1] Common violence often increases significantly in post-conflict countries after large-scale politically motivated violence ends. Such cases include Somalia, Liberia, Guatemala, and El Salvador. Conversely, countries with high levels of common violence have shown tendencies toward sporadic large-scale instability, for example Kenya (in the form of ethnic violence) and Brazil (in the form of urban riots).

Recently the forms and distribution of violence have changed. The large-scale civil wars that prevailed until the late 1990s are no longer the main contexts of violence. Violence increasingly seems to manifest itself as common violence, particularly in urban areas. This is well documented in Latin America but also widespread in Africa and in large urban centers in Asia. Domestic violence seems to be increasing most in Africa. The scarcity of reliable monitoring mechanisms make it difficult to precisely assess the level and impact of these various forms of violence, but its predominance seems to be shifting from large-scale violent conflicts to less visible but widespread forms of common violence, and occasional collective violent outbursts. These forms of violence are very different from open wars, but can be just as damaging.

The cost of violence on development is very high, but measuring this cost has received little attention (with the exception of the case of open wars). More effective measurements of these costs will help ensure that adequate attention is paid by governments and civil society to the design and implementation of violence prevention policies and programs. The reviews presented in this publication have been commissioned by the Social Development Department (Sustainable Development Vice Presidency) of the World Bank and were jointly funded by the Fragile and Conflict-Affected Countries Group and the Social Development Department. It is hoped this collection will contribute to a better understanding of where the international community stands on the debate over how best to measure the costs of violence on economies and societies.

The authors are all academics well-versed in the study of violence and conflict. Stergios Skaperdas (University of California, Irvine) has written the section on political violence; Rodrigo R. Soares (Catholic University, Rio de Janeiro) has written the section on common and criminal violence; Alys Willman (Conflict, Crime and Violence Team, Social Development Department) has written the section on domestic violence. The concluding section, which draws these reports

[1] "Common violence" is defined in opposition to politically motivated violence. Therefore, common violence is considered that which occurs as a result of social conflict not related to political motives or events (such as war, genocide, and assassinations). It is often, though not always, related to personal and property crime.

together with the discussions of these reports within the Bank, was written by Stephen C. Miller (Conflict, Crime and Violence Team, Social Development Department), who also coordinated this work. The reviewers of this work inside the Bank were Maitreyi Das (SASDI), Norman V. Loayza (DECRG), and Gary Milante (OPCFC/DECRG).

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THE COSTS OF ORGANIZED VIOLENCE:
A REVIEW OF THE EVIDENCE*

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ABSTRACT: I critically review recent studies that estimate those costs of violence and conflict that can emerge among *organized political groupings*, from states, religious and ethnic organizations to guerillas and paramilitaries. The review includes studies that estimate direct and indirect costs due to internal conflicts (civil wars and other lower-level conflicts), terrorism, and external conflicts, including military spending. There are a number of key theoretical concerns on what counts as a cost, and, depending on the methods and evidence used, estimated costs vary widely. However, even minimum estimates are economically significant, especially for low-income countries. This is even more so when the costs of different types of organized conflict and violence are aggregated.

Keywords: Conflict, property rights, governance

JEL: D74, H56, I31, O57

* I would like to thank Alexandre Marc, Gary Milante, and Stephen C. Miller for discussions and comments, and Nathan Fiala for research assistance.

Violence can occur at virtually all levels of human interaction—from domestic violence within households, to fighting between youth gangs, to guerilla warfare, to wars between states or between alliances of states. Although all forms of conflict and violence can be expected to have economic consequences, this aspect has been neglected by economists until relatively recently.[1] However, research in this area has accelerated in the past decade as it becomes increasingly evident to academics and policymakers that wars and other conflicts have high costs that can severely impede economic development. In this paper I review recent studies that estimate the costs of violence and conflict that can emerge between *organized political groupings* such as states, religious and ethnic organizations, political parties, unions, guerillas, or paramilitaries. In particular, I examine the costs associated with:

- *Internal conflicts:* More than 70 countries have experienced civil war since World War II (Fearon and Laitin 2003). The median length of a civil war is more than seven years and the costs include the loss of life (at least 16 million in such wars); the destruction of crops, buildings, and infrastructure; the cost of arms; the wages or opportunity cost of soldiers or guerrillas; the cost of injuries and psychological incapacitation (which can be long-lasting); as well as long-term consequences on investment and economic growth.

  Civil war is not the sole form of violent conflict that can occur within countries. Lower-level insurgencies, as well as protests, strikes, boycotts, road-blocks, and similar "appropriative" activities that are undertaken by well-organized groups can lead to violence. We will touch upon these lower-level types of conflict, although there is less evidence on them than there is for civil wars.
- *Terrorism:* In some cases, violence is directed at civilians who may not even be related to the political target of the perpetrating group, resulting in what has come to be referred to as terrorism. Properly speaking, terrorism is a tactic that is usually part of a larger conflict that can be internal to a country (like in Sri Lanka or Spain's Basque region) or transnational in scope (like that of al Qaeda). We review the costs of it separately from internal and external conflicts primarily because some of the recent literature on the costs of violence and conflict has focused on terrorism.
- *External conflicts*: Although external wars between states have been fewer and caused less direct damage than internal wars since World War II, they have remained very costly for some countries (for example, Afghanistan and Vietnam) that have been involved in such warfare. Despite the relative paucity of such wars, perceived external threats induce considerable military expenditures. For 2004 world military spending was estimated to

[1] Studying the effects of conflict and violence from an economic perspective is perhaps more difficult than studying the effects of ordinary economic activities. This is because the basic theoretical framework of economics—and, as a result, much empirical research—assumes that property rights are perfectly and costlessly enforced. Conflict and violence directly contradict this assumption. Furthermore, engaging in conflict and violence against others is an *adversarial* activity, not a socially cooperative or productive one, as economic activities typically are. (For an overview of the theoretical literature on conflict that formally examines these issues, see Garfinkel and Skaperdas 2007.) Identifying what is a cost (and what is a benefit) of conflict, then, can be confusing and potentially controversial. However, regardless of method, even the minimum estimated costs of conflict and violence appear to be higher than estimated deadweight costs that are typically of major concern to economists (such as the effects of taxation, regulation, or trade protection) and therefore potentially of higher economic significance than the effects of more exhaustively studied distortions.

be over 1 trillion dollars, about 2.6 percent of world gross domestic product (GDP) (SIPRI 2005[2]), a considerable expenditure by any measure.

Excluded from this review are the costs of organized crime, a global activity in which the threat and use of violence are integral. Journalistic reports even argue that organized crime accounts for one-fifth of world GDP (Glenny 2008). However, to my knowledge there are very few systematic economic studies that estimate the costs of violence due to organized crime and this is the main reason for excluding them here.[3]

The costs of violence and conflict are not just those incurred directly when there is overt violence. Efforts to prevent overt violence from occurring, as during cold wars or in the low-level suppression of insurgencies, racks up economic costs as well. Consider that most military equipment and many soldiers have never faced or will never face war, yet still need to be purchased or paid. Moreover, the potential for conflict, even if it never materializes, can have powerful negative incentive effects on investment, trade, and economic growth. Though difficult to identify, some of the studies we review attempt to capture these negative effects of conflict potential that may never materialize

The first section of this paper briefly discusses the types of costs we review and the methods used to measure and estimate them. The second section reviews the estimates of different types of costs associated with civil war, other forms of internal conflict, terrorism, and external wars. Coverage of the expanding literature is not meant to be comprehensive: Instead, I selectively review contributions from the different categories of costs that have been examined. The final section identifies potential gaps of the costs that might not be adequately taken into account.

1. Methods of Measurement and Types of Costs

The cost to replace a house that has been destroyed during warfare, and the loss of the benefit of its services, can be calculated relatively easily. The cost of lost tourism in a volatile region, or the effects of post traumatic stress disorder (PTSD) on its residents, however, are less easy to estimate and depend in part on the method of measurement and empirical model employed by the researcher. The range of probable values of such costs can then vary widely. In this way, a continuum of possibilities exists when estimating the costs of violence, from considering only the most direct costs that have an easily calculable value to estimating different indirect costs. These further depend on what channels of causality, scenarios, and counterfactuals are assumed or which models are estimated.

[2] See page 10 for more information on this topic.

[3] A recent study (Asmundo and Lisciandra 2008) provides a lower bound estimate for the cost of protection in Sicily to be 1.4 percent of gross regional product. However, this is mostly an estimate of transfer costs (the protection payments) rather than the net economic costs of the Sicilian Mafia. Skaperdas (2001) provides an overview of the economics of organized crime.

The methods to estimate costs that have been used in the literature reviewed here, as well as the types of costs that have been estimated, are now briefly discussed.

1.1 Direct Costs: Accounting Within and Outside Budgets

The costs that can be directly attributed to a violent event (or a series of such events, as in a war) can be in principle counted using conventional accounting methods. Some of these direct costs typically include the following:

- destroyed public infrastructure
- destroyed factories and machinery
- destroyed housing, autos, and other personal property
- budgetary appropriations for cost of war and cost of lost equipment
- deaths
- physical and mental injuries
- future costs of disability
- future costs of physical and mental health care

Information on some of these costs can be easily obtained or inferred from government budgets or estimated using straightforward methods. Other direct costs, however, can be more difficult to calculate. Even some costs that are part of a government's war budget can be hidden in items that are not related to any particular defense expenditure, let alone part of a particular appropriation for a war. For example, many of the expenditures of the Iraq and Afghanistan wars are not to be found in the appropriation bills for these wars, but elsewhere in the U.S. budget (Stiglitz and Bilmes 2008).

Accounting for the costs of deaths and injuries also goes beyond the costs included in some budgets (such as the death and life insurance benefit for soldiers that might be provided by their country). Such accounting requires confronting the issue of the value of life and, even more seriously, whether the life of a citizen of a poor country should be valued differently than a citizen of a rich country. Other questions regarding some difficult-to-measure direct costs include: How do you account for the pain and suffering of the physically and mentally injured? What about the lost wages and other missed opportunities of family members who have to care for the long-term disabled? Moreover, since a substantial portion of these costs will be incurred in the future, calculating their present value requires not just estimates of their future trajectory but also assumptions about the discount rate that is employed in such calculations.

1.2 Indirect Costs

Indirect costs of violence and conflict typically include:

- population displacement
- reduced production due to violence or its threat

- reduced trade due to violence or its threat
- lower current and future physical investment
- reduction in educational opportunities
- brain drain (that is, emigration of educated work force)
- reduced tourism from abroad
- other macroeconomic effects (inflation, further unemployment, reduced economic growth)
- overall welfare costs

Simply using an accounting method does not suffice in the estimation of such costs. The use of counterfactual worlds in which conflict is absent, models of such worlds, econometric estimation, quasi-experimental methods, and combination of these methods have been used in estimating indirect costs of conflict. We briefly outline two main classes of these methods next.

Estimating indirect costs under different scenarios. A simple way of estimating some indirect costs is to create scenarios in the absence of conflict and, based on previous empirical estimates of parameters under similar scenarios, make comparisons between the "conflict" and "nonconflict" scenarios.

A simple example of how some indirect effects might be estimated is found in the long-run effects of budgetary expenditures through "multiplier" effects. The cost of war expenditures on foreign soil, for instance, may not involve just its opportunity cost in other types of expenditures but may well lead to lower multiplier effects because a significant portion of the expenditures "leak" outside the country (see Stiglitz and Bilmes 2008 on the costs of the Iraq war). In a very different context, Evia et al. (2008) estimate some indirect costs of sociopolitical conflict in Bolivia by assigning different disruption coefficients to different incidents (for example, road blockades, strikes, lockouts) in estimating such indirect costs of conflict for the economy.[4]

The advantage of such methods is that they are rather easy to perform and, if previous estimates of key parameters are reliable, the obtained estimates of costs can be plausible, at least as a first approximation. The disadvantage is that such estimates might take inadequate account of general equilibrium interactions and complex effects that cannot be detected through simple scenario calculations. However, these estimates are usually taken as rough, with wide bounds for probable range of values typically provided.

[4] A strike, for example, was assumed to induce 2.77 times the estimated direct economic losses of the event because of the potential disruption to related industries. The activity with the greatest disruption multiplier assumed (12.5 times its estimated direct economic cost) was an urban blockade. Due to the population density in cities, it was estimated that every individual participating in an urban blockade affects 100 more individuals, but not for the same amount of time of the blockade, since people have other options to move around. The study assigned one hour loss per individual suffering a blockade in the city. This is 1/8 of a labor day, so that the final effect was 100*1/8=12.5 (see Appendix A in Evia et al. 2008).

Estimating indirect costs via regressions. With appropriate data, counterfactual scenarios could be estimated and tested econometrically. For instance, in a cross-country growth regression that includes a variable for a particular type of conflict, one could compare the differential effects of that conflict on growth by calculating the effect of the conflict variable in the estimated equation.[5] As an example of that approach, Collier (1999) employed such an approach for a sample of 92 countries (19 of which had civil wars), using as the dependent variable the decade average of per capita GDP between 1960 and 1989. As one measure of the level of conflict, Collier used the number of months that each country had been in civil war during the decade. In addition to control variables, Collier also used a variable for postwar recovery and its interaction with the months-of-war variable. Blomberg et al. (2004) offer another example that employed a similar approach using many different data sources for a large number of countries, with four different types of conflict,[6] and in addition to cross-country and panel regressions used vector autoregression (VAR) methods to identify possible causal directions and the economic costs of different types of conflict. In this case, the inclusion of different types of conflict allows for the detection of possible complementarities between different types of conflict; for example, terrorism and certain types of internal ethnic conflict could be complements and the analysis might tease out which effect is more important.

Given the econometric estimates, the effects of various types of conflict could be calculated by considering a "counterfactual" country or region that has the same characteristics as the country or region in question, but without conflict. Of course, such approaches can be criticized on many grounds.[7] The most fundamental problem is typically the possible endogeneity of conflict when estimating its costs and effects on investment, growth, capital flight, tourism, and so on, and therefore there is the possibility that the causality could be reverse from that assumed. After all, low or negative growth can cause conflict (Miguel et al. 2004). Different studies attempt to overcome this problem by using Instrumental Variables, but some healthy skepticism is warranted in considering such estimates, just as in the case of the scenario-based estimates of indirect costs. The further one moves from easily measurable direct costs, the more uncertain and subject to argument are the estimates of many indirect costs.

2. Reviewing the Findings on the Costs of Conflict

In reviewing the findings I will break down the literature into four categories: Civil wars, lower-level internal conflicts, terrorism, and external wars. As civil wars have been most studied, and their effects have been the costliest and most wide-ranging for low-income countries, I will discuss civil wars in terms of the different categories of costs examined in the literature.

[5] Of course, such an exercise would be subject to critiques aimed at cross-country growth regressions in general, as well as on how the particular regression has been implemented.

[6] The four types of conflict are terrorism, internal wars, external wars away from home territory, and external wars at home.

[7] See, for example, the critique of Blomberg et al. (2004) by Garfinkel and Jeliazkov (2004).

2.1 Internal Conflicts: Civil wars

Civil wars are typically defined as those types of internal conflict that involve the government and at least one other party. They also feature a threshold of deaths—typically, 1,000 per year.[8] Collier et al. (2003)[9] provide a comprehensive discussion of the different types of costs associated with civil wars and offer an overview of different quantitative estimates. The two edited volumes by Stewart and Fitzgerald (2001) also contain a number of country studies and overall evaluation of the effects of war on economic development. Two recent overviews are Blattman and Miguel (2008), a survey of the theory, causes, and consequences of civil wars, and Collier et al. (2008), a policy-oriented piece that includes estimates of the costs of civil wars. We provide a breakdown of the different types of costs and report some of the findings from these and other recent studies.

Budgetary costs. As reported in Collier et al. (2003), the average developing country in 1995 (one with less than $3,000 per capita GDP) increased its military expenditures during civil wars from 2.8 to 5 percent of GDP.[10] That is, before accounting for other direct and indirect costs, on average the extra cost of military expenditures due to civil wars is 2.2 percent of GDP. Furthermore, other government revenues and expenditures—and, therefore, the public goods they supply—tend to decrease with the length of the war. In a sample of six countries, for example, Fitzgerald et al. (2001) report that tax revenues during war decreased or remained flat relative to GDP in five (Mozambique, Sierra Leone, Sri Lanka, Sudan, and Uganda) and increased in only one (Nicaragua). Then, reductions in the fiscal capacity of states to provide for public goods such as basic health care and other social services induces various indirect effects on the population to withstand disease, injury, malnutrition, and poverty.

Destruction of capital, investment, and capital flight. Infrastructure—roads, bridges, railroads, public buildings, hospitals—are often at the center of fighting between rebels and governments. Private capital, such as factories and housing and cattle are also often subject to significant destruction. There are no studies that systematically quantify these costs and compare them across countries, but in nations that have experienced long wars, these costs are high. For Mozambique, which experienced war continually from 1964 to the early 1990s, Bruck (2001) has made the following estimates: From 1980 to 1993 the stock of cattle had decreased 20 percent; from 1983 to 1991 almost 60 percent of primary schools were closed or destroyed; and overall, 40 percent of immobile capital was nonoperational and destroyed. For Nicaragua, Fitzgerald and

[8] However, there are considerable issues of concern in the definitions that are employed in data sources. The different thresholds for deaths and the classification of a war as internal (instead of, say, colonial) are two of the main concerns. Sambanis (2004) provides a detailed account of the issues and the empirical consequences of using different definitions of civil war.

[9] See chapter one.

[10] There is no direct reference on how these figures were calculated, but it appears they were derived by using the estimated coefficients for a cross-country type regression. Additionally, note that a higher percentage of GDP devoted to military expenditures could, in principle, result from a sufficiently precipitous drop in GDP without a change in actual defense expenditures. However, the reduction in per capita GDP due to civil war was estimated to be on the order of 2 percent by Collier (1999) and growth rates for a country in civil war are not typically negative. Therefore, the increases in military expenditures cannot be due to decreases in GDP alone.

Grigsby (2001) have estimated that, over the years of most intense conflict (1987–1989), the cumulative total economic damages were equal to about one year's GDP.

Collier et al. (2003) also reports estimates of capital flight for countries in civil war. In these, the share of private wealth held abroad goes from 9 percent before the war to 20 percent by its end. Moreover, as far as capital is concerned, war according to Collier et al. has lasting effects—by the end of first decade of postconflict peace, capital flight rises to 26.1 percent. However, as mentioned in the following section on terrorism, Blomberg et al. (2004) find neither a statistically or economically significant effect of internal conflict on investment.

Effects on growth. According to Collier's (1999) estimates, countries at war grow around 2.2 percentage points more slowly than during peace. Long-lasting wars tend to induce lower levels of growth. Stewart, Huang, and Wang (2001) calculate the difference in growth rates for 14 countries at war and compare them with those of comparable countries. They found them lagging on average about 3.4 percentage points in GDP.[11] More recently, Cerra and Saxena (2008) estimate the effect of civil wars on economic growth using the beginning of civil war as a shock in a VAR model. Using impulse response functions, the immediate effect of a civil war is estimated to induce a reduction of 6 percentage points in GDP, although almost half of that loss is recovered after about six years, and the long-run estimates are imprecise in the sense that the standard error bands allow for the possibility of a zero long-run effect. In the event of a long civil war, these negative effects on growth can be expected to compound over time and it is not clear to what extent output can be expected to partially recover in the long run, as it does in the impulse response to a theoretical one-time shock.

Country experiences in terms of growth of course vary widely. Afghanistan's GDP per capita fell by 20 percent from 1980 to 1990 and by 7.5 percent per year from 1990 to 1995 (Mardsen and Samman 2001). Sri Lanka, on the other hand, has experienced robust growth rates during war. In fact, according to O'Sullivan (2001) Sri Lanka experienced a 4.4 percent GDP growth rate during war and only 3.2 percent in the absence of war. One possible reason for such a performance was the geographical concentration of war in the Tamil areas of the island that left the rest of the country relatively unaffected. Speaking of regional differences, Miguel and Roland (2006) exploit the regional variation of the air bombing campaign of the U.S. in Vietnam in order to estimate long-run effects of conflict. They find that areas that suffered heavy bombing did not suffer a long-run negative impact on poverty rates, consumption levels, infrastructure, or literacy. It could be that this finding is due to the absence of long-run effects from bombing. Nevertheless, it is also likely that the Vietnamese government directed more resources towards the areas that were heavily bombed—they may have built more modern infrastructure that enhanced the growth potential of these areas over those that were not as heavily bombed, and thus retained their older infrastructure. In addition, Vietnam has been a rather poor country in terms of absolute levels of income since the war ended, and the war likely had an effect on its growth rate.

[11] However, the sample includes Iran and Iraq which were engaged in external war during part of the sample period, with Iraq experiencing the worst performance of all 14 countries in the sample.

The possible diversion of resources to the more heavily bombed areas likely reduced the country's overall growth rate.

Another long-term effect of civil war according to Collier et al. (2003) is that military expenditures increase permanently, on average, to 4.5 percent of GDP, instead of reverting to 2.8 percent. That implies a long-term substitution of 1.7 percentage points of GDP that become unavailable for civilian investment, other public expenditures, and consumption. This comes in addition to the possible permanent reduction in income induced by civil war.

Mortality and health. A conservative estimate of the deaths directly attributable to civil war between 1945 and 1999 is 16.2 million (Fearon and Laitin 2003). The World Health Organization (WHO) estimates that in 1999, wars directly caused 269,000 deaths (Ghobarah et al. 2003), a number that is a bit lower than in previous years. The International Rescue Committee estimates that 5.4 million people have died from war-related causes in the Democratic Republic of Congo since 1998 alone.[12]

For public policy purposes, the cost of death in rich countries is usually monetized using estimates of the value of life. For example, to estimate the cost of U.S. soldiers' deaths, Stiglitz and Bilmes (2008) use $7.2 million as the Value of Statistical Life (VSL), which is consistent with recent usage. However, Stiglitz and Bilmes did not think it was appropriate to use a different figure to estimate the cost of death for Iraqis. But making rough estimates might help to gain a sense of what the cost of death in low-income countries might be. For instance, if we were to value the life of a citizen of the Democratic Republic of Congo at 1/72 of that of an American citizen (that is, $100,000), the total cost would be $540 billion over the past 10 years (for comparison, the CIA World Factbook estimated the GDP of the country in 2007 to be a little over $19 billion at purchasing power parity). Even if the value of life in the Democratic Republic of Congo were considered at 1/720 of an American life ($10,000), still the cost would be $54 billion. What such numbers indicate is that no matter how one views the loss of life in civil wars, these losses pose an immense cost to both the deceased's loved ones and their country.

One persistent source of death and injury that lasts beyond the length of a war is landmines. The International Campaign to Ban Landmines estimated the total number of such casualties to be between 15,000 and 20,000 in 2001 (Collier et al. 2003). Such figures represent a significant improvement from previous years, when casualties from landmines were estimated to be around 26,000 per year. This reduction is attributed to the 1997 international ban on antipersonnel mines. Landmines can also have serious economic consequences. Not only may injured farmers be unable to work, but land that is suspected to be populated with mines can be underutilized or abandoned, further contributing to the affected population's poverty. Merrouche (2008) offers a case study of the effect of landmines in Mozambique, one of the most heavily mined countries in the world. The study finds that going from an average number of landmines to none is associated with an 11 point decrease in the fraction of impoverished people and a 27 percent increase in daily consumption.

[12] http://www.theirc.org/special-report/congo-forgotten-crisis.html

Beyond mortality and injury, civilian populations plagued by war become highly vulnerable to disease as a result of worse nutrition, living conditions in camps, or deteriorating health care. Malaria, diarrhea, respiratory infections, AIDS, even measles and meningitis occur more frequently during wartime and result in higher death rates than in times of peace (Collier et al. 2003). Measures exist for aggregating the impact of different diseases, such as disability-adjusted life years (DALYs).[13] For 1999 alone, 8.44 million DALYs were directly attributed to wars (Ghobarah et al. 2003). Moreover, during the same year an additional 8 million DALYs were lost as a result of wars that ended in the years 1991–1997. In principle, one could use such estimates, along with their value in terms of prevailing wages and estimates for pain and suffering, to arrive at dollar estimates of the cost of disease.

Population displacement and emigration. Another direct effect of civil war is displacement. The number of refugees around the world peaked at over 17 million in 1992, but has barely fallen below 10 million since then (United Nations High Commission for Refugees (UNHCR) 2007). However, by the end of 2006, the number of UNHCR "persons of concern" (which includes refugees, and Internally Displaced Persons (IDPs), and others) reached 32.9 million, whereas it hovered around 20 million for the preceding decade. IDPs rose most in 2006. Displaced persons and refugees are often unable to find work, and also need to be fed and housed. Thus, an accounting of the costs of population displacement should include both the cost of their care and at least a partial measure of the opportunity cost of the population.

Psychological effects and community life. Evidence from case studies suggests that the psychological effects of civil war are significant and long lasting. For example, as cited in Collier et al. (2003), "approximately 68% of the Cambodia refugees on the Thai border displayed symptoms of major depression and 37% showed symptoms associated with posttraumatic stress disorder (PTSD)." Community life under such conditions can be expected to suffer. "Social capital," according to Collier et al. (2003), is lost: "Civil war can have the effect of switching behavior from an equilibrium in which there is an expectation of honesty to one in which there is an expectation of corruption."[14].

However, the evidence on how civil war affects the psychology of war participants, victims, and community life is not completely one-sided. Bellows and Miguel (2008) have used household data on conflict experiences and postwar outcomes to examine the effects of the 1991–2002 civil war in Sierra Leone. They found those who experienced increased violence are 2.6 percent more likely to vote and 6.5 percent more likely to attend community meetings and contribute to public goods. "Civil war experiences are transformative for many, and our analysis suggests that one short-run legacy is increasing individual political participation, community

[13] According to the World Health Organization, "DALYs for a disease are the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due to disability (YLD) for incident cases of the health condition." Further details on how DALYs are calculated are found at http://www.who.int/healthinfo/boddaly/en/.
[14] Collier, Paul, V.L. Elliott, Håvard Hegre, Anke Hoeffler, Marta Reynal-Querol, and Nicholas Sambanis. 2003. *Breaking the Conflict Trap: Civil War and Development Policy*. Washington, DC: World Bank and Oxford University Press, 21.

activism, and local public good provision."[15] However, the sample is highly localized so that no general inference can be made about the whole country. Blattman (2008) also finds that forcibly conscripted soldiers in Uganda actually increased their political participation compared to a control group. These two studies raise the possibility that at least some individuals in some cultures might be psychologically resilient to being victims of violence in ways that make them, if they survive, more determined to participate socially and politically in their communities.

Although many of the costs we have already mentioned are difficult to estimate, there are still others that are so difficult to estimate it is almost impossible to monetize them, and thus they are unable to be compared with the other costs. For example, the very old, the very young, the infirm, and the poorest are more vulnerable to the direct and indirect effects of civil wars and are therefore more likely to suffer. In other words, civil wars appear to disproportionately affect the poor and most vulnerable members of society. Studies like those of Merrouche (2008) do provide estimates of specific effects on poverty (landmines, in this case). Yet quantifying this effect beyond the reduction of income for those involved is a matter of debate. Aggregate estimates of the increased risk of mortality and morbidity could pick out some of the costs of poverty and vulnerability. However, the value of less poverty in itself, or the possible higher value of an extra dollar to a poor versus a rich person are issues that have been, and will likely continue to be, debated within the economics and policy communities. Justino (2006) provides a summary of research and of the methodological issues of both the effects of war on poverty and how chronic poverty might induce war.

Collier et al. (2008) have ventured to make some overall estimates of the costs incurred by civil war. Counting only the direct costs for an average low-income country, as well as those imposed on its neighbors as a result of the war, the estimated total cost is $43 billion.[16] Adding estimates for the costs of death and DALYs yield a total minimum cost of almost $60 billion for a single civil war. Based on that estimate and the number of civil wars that have taken place since 1960, the yearly cost of civil war is estimated to be $123 billion, which is about the same order of magnitude as the total annual development aid. Collier et al. (2008), however, think that a better estimate of the total (including indirect) costs of a typical civil war is not $60 billion but closer to $250 billion. That is, according to their estimates, the minimum cost of civil wars equals all the development aid provided, but is likely to be much higher than that.

2.2 Lower-level Internal Conflicts

Civil wars, by definition, result in many deaths (typically, 1,000) that involve the government and at least one other domestic organized adversary. Conflicts with lower death tolls

[15] Bellows, John, and Edward Miguel. 2008. "War and Local Collective Action in Sierra Leone," Working Paper. Berkeley: University of California at Berkeley. http://www.econ.berkeley.edu/~emiguel/pdfs/miguel_sl.pdf

[16] The costs to neighbors ($23 billion) are actually higher than those to the country itself ($20 billion). (There is no description in the paper of the methods used to arrive at the costs for the country itself.) The estimates of the cost to neighbors use the results from Murdoch and Sandler (2002) that are based on an estimated growth model that allows for such spillover effects.

that are not formally classified as civil wars, however, can have high long-term indirect costs as well. Moreover, other lower-level conflicts between organized groups can involve violence or, even if there is no direct violence, the possibility of violence is ever present. Strikes, road blockades, or protests that might have economic, ethnic, or regional motivation, or disputes between organized prospective squatters and landowners are examples of common conflicts. As is the case with the other types of conflict we examine, these too involve direct and indirect costs. However, there is rarely destruction of property, few direct deaths or injuries, and typically related actions are dispersed geographically, even if frequent and economically disruptive. As a result, there is little standardized information (or, "data") that is systematically gathered so that even the most direct costs of such conflicts can be assessed. Their long-term indirect effects, though, could be as economically disruptive as those of civil wars.

Evia et al. (2008) use data on different incidents (strikes, road blockades, protest) from Bolivia between 1970 and 2005. The time cost alone of the participants in such incidents was on the order of 1 percent of GDP. Such incidents can also have significant spillover effects on the economy. A strike in a manufacturing plant, for example, can affect the output of other downstream and upstream production. Similarly, a road blockade can bring about wide-ranging disruption in the affected city or region. On the other hand, a sit-in or protest with few participants does not have much of an effect on economic activity. Based on assumptions of different multipliers regarding the spillover effects of different incidents, the average yearly cost of spillovers was estimated to be more than 3 percent of GDP. These costs varied widely over the years and were much higher for the mid-1980s and the 2002–2005 period, with some years approaching a loss of as much as a tenth of GDP.

Riascos and Vargas (2004) summarize results of research that includes the costs of common crime and other conflict in Colombia. They estimate these to be at least 3 percent of GDP, with some estimates going as high as 15 percent. Note that a 3 percent annual cost of conflict implies that after 24 years, a country would have 50 percent less income than it would otherwise obtain in the absence of such conflict.

2.3 Terrorism

One definition of terrorism is the use of violence against civilians by organized groups.[17] Since it is a tactic in the conduct of violence, it can and has been used in civil wars, other internal conflicts, and even in international disputes. The disproportionately large number of civilian casualties (compared to previous wars) during the Second World War and wars since could be

[17] Often it is specified that terrorist violence has a political purpose. Whereas in the large majority of cases political purpose is a feature of what is called terrorism, there are some cases in which it does not have to be so. For example, mafias and gangs can engage in terrorism in order to expand their turf and profits, and there is no scientific or policy reason for excluding in principle such activity from the definition of terrorism. Sometimes actions of organized crime groups might even take political dimensions, even though the clarity of that dimension might be murky. For example, Pablo Escobar, of the Colombian Medellin cartel, made a clear bid for political power by employing actions against civilians could be considered terrorism. Another qualification typically provided, and which is followed by all the studies reviewed here, is that the organized groups are nonstate actors, even though, again, there is no scientific or policy reason that terrorist actions undertaken by governments should be excluded from consideration.

attributed to such a tactic (and the technology that made such tactics possible). However, the data and the related empirical literature focus on the activities of organized groups that are often, but not always, militarily weak in other ways, and thus employ terrorism as a primary tactic. For example, almost all instances of systematic mutilation or raping of civilians (which can have an audience and a political motive) that have occurred in many post-World War II civil wars, especially those that have occurred in Africa, are not typically included in the data used in studies of terrorism.

A main distinction is made between terrorism committed for domestic purposes, such as the actions of the Tamil Tigers in Sri Lanka or Euskadi ta Askatasuna (ETA) in Spain, and terrorism committed for transnational purposes, like those of al Qaeda. Two recent overviews of the costs of terrorism are Enders (2007) and Sandler and Enders (2008).

With the exception of major incidents like those of 9/11 and the Madrid bombings, the direct costs of individual terrorist incidents are usually not large. Even the direct cost of 9/11 has not been large relative to GDP.[18] Therefore, the main effects that could exist, if any, would be indirect, confined to perceptions of security and their effect on investment and other economic activities.

Abadie and Gardeazabal (2003) study the indirect effects of ETA on the economy of the Basque region of Spain from the mid-1970s onward, when ETA significantly expanded its operations. They estimate what the Basque region's per capita GDP would be in the absence of terrorism. To do so, they create a "synthetic" region, a weighted composite region of the other regions of Spain (in terms of population and other key economic characteristics) which resembles the Basque region before the emergence of terrorism. This composite region is then compared to the actual Basque region. They find that the Basque region by the late 1990s was about 10 percent poorer than it would have been without terrorism. Abadie and Gardeazabal perform a number of robustness tests, including a "placebo" test in which they create a synthetic region that resembles Catalonia. This region, contrary to the composite Basque region, did not perform differently compared to the actual Catalonia region.

On another tack, Blomberg et al. (2004) take a macroeconomic perspective on the issue. In addition to terrorism, they also examine the effects of internal and external conflict on growth across 177 countries. They only consider transnational terrorist incidents, with the measures of internal conflict presumably being highly correlated with domestic terrorism. Through cross-country regressions they find the effect of terrorism to be statistically significant, but the quantitative effect is economically very small and smaller than those of internal or external conflicts. Furthermore, the estimation of a structural VAR model showed that negative shocks to GDP due to internal or external conflicts yield much larger and longer-lived effects than those obtained from a negative shock due to terrorism. Blomberg et al. (2004) also find that terrorism has a strong negative impact on investment and a positive effect on government expenditures, thus providing a possible reason for the small economic effects of terrorism: That is, governments

[18] A direct cost estimate that includes the costs of destruction, cleanup, lost hours, and the values of lives lost on September 11, 2001, totals $48.7 billion (Enders 2007).

might consciously counteract the negative effects on investment by increasing expenditures. Nevertheless, it might be more plausible that increases in government expenditures are actually due to increased security expenditures in response to terrorism. This last possibility is corroborated by the fact that internal conflict induces higher government expenditures than terrorism does. Curiously, though, internal conflict does not appear to have the expected negative effect on investment in Blomberg et al.'s study.

The issue of terrorism's impact on investment—specifically foreign direct investment (FDI)—is picked up by Abadie and Gardeazabal (2008), who use a very different measure of terrorism than others. Following the criticism of Frey et al. (2007), who argued that measures of terrorism underestimate the number of incidents and casualties, Abadie and Gardeazabal use the World Markets Research Centre's Global Terrorism Index (GTI) as their terrorism variable. The GTI combines expert ratings at the country level and covers 186 countries and territories for the period 2003–2004 (World Markets Research Center 2003). Abadie and Gardeazabal estimate a statistically significant effect of terrorism on FDI that may be economically significant. Nevertheless, as Blomberg et al. (2004) suggest, such reductions in FDI may well not lead to lower growth because reduced investment may also be correlated with higher government expenditures. Furthermore, given that the GTI is compiled by country experts (typically not from the country being evaluated), the index may reflect not so much "terrorism" risk but the types of other risks that typically lead foreign investors to reduce investment in a country. That is, GTI might not be truly exogenous as far as its effect on FDI is concerned.

The estimated costs of terrorism are either very small or, as in the case of Spain's Basque region, of the order of 10 percent of GDP. That is considerably lower than the effects of either civil war or lower-level internal conflict. Moreover, as I have stressed, terrorism is a tactic and not an altogether different type of conflict. ETA's campaign used terrorist tactics but also, I suspect, the Basque region had more strikes, protests, and other lower-level violent conflicts than other regions of Spain had. That is, the difficulty of finding strong effects of terrorism could be due to the fact that it is inherently difficult to isolate terrorism's effect from the broader context of conflict. When terrorist tactics are isolated from broader internal conflicts, as in the case of richer countries (with exceptions like those of the Basque region), the effects are negligible. When terrorism is just one part of a larger internal conflict, as it usually is in low-income countries, the effects are stronger as they are correlated with these broader conflicts.

2.4 External Conflicts

There have been considerably fewer external wars than internal wars since World War II, but the two types of war cannot be completely separated. After all, for much of this time a "Cold" war was taking place which fueled high military expenditures by the United States, the Soviet Union, and their respective allies. Moreover, from Vietnam and Cambodia to Angola and Nicaragua, some of the civil wars were at least partially or indirectly due to superpower rivalry, and the actions of proxies of the two superpowers were critical in the instigation or propagation of such wars.

The most identifiable cost of partially external conflicts is military expenditures by governments. (Of course, as mentioned earlier, for many countries that have experienced internal wars, government military expenditures have not been directed towards external adversaries but domestic ones.) Such expenditures vary widely across different countries, rarely going below 1 percent of GDP. However, a few cases go above 10 percent of GDP, such as Saudi Arabia. In fact, for 1991 (and probably because of payments associated with the first Gulf War), Saudi Arabia's military expenditures went over 22 percent of GDP. Japan's military expenditures, on the other hand, have hovered around or just below 1 percent of GDP, although these expenditures have been large, consistently exceeding $40 billion over the past decade.[19] In 2004 world military spending was estimated to be over 1 trillion dollars, about 2.6 percent of world GDP (SIPRI, 2005). Military spending data does not include some other defense expenditures on intelligence or on civilian research and development (R&D) that is in practice military R&D.[20] Some evidence indicates that military spending has decreased from earlier decades. Knight et al. (1996) report that military spending in a sample of 122 countries averaged almost 5.2 percent of GDP for the 1972–1985 period.

A comprehensive accounting of the costs of an external war is offered by Stiglitz and Bilmes (2008), who estimate the cost of the Iraq war for the United States. Stiglitz and Bilmes do not calculate the costs to Iraq itself, though they do provide a considered qualitative assessment of what it costs Iraq to be the battleground of war. In their estimates, they include items such as the following: budgetary appropriations to date for military operations, and estimates for their future values, all appropriately discounted; future disability and health care for returning veterans; future costs of restoring the military to its prewar strength, replenishing spent armaments, repairing equipment where maintenance has been deferred; estimates of some costs to the economy (for example, in some scenarios, they allow for $5 and $10 increases in the price per barrel of oil to be attributed to the war); other macroeconomic effects, like the possible crowding out of some investment expenditures. Overall, Stiglitz and Bilmes estimate that the total cost of the war ranges from $2.7 trillion in strictly budgetary costs to $5 trillion in total economic costs.

Other than this recent work, there appears to be a relative scarcity of studies that estimate the long-term costs of external wars. Blomberg et al. (2004) and Hess (2003) do so only parenthetically as they examine the effects of other types of conflict, though they both find that external wars negatively impact growth.

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[19] Note that, according to the Stockholm International Peace Research Institute (SIPRI), Japan's Constitution prohibits a military and, thus, these are formally considered "police" or "internal security" expenditures.

[20] However, some military R&D expenditures have direct civilian applications or are disguised civilian R&D. In fact, many major breakthroughs in technology—the Internet, various high-tech materials, computers, shipbuilding—have their roots in military R&D. One could possibly argue, then, that military spending is worth it just for the tremendous technological benefits it has afforded nations. However, it must be asked why one should spend money on military R&D in the hope of receiving some future uncertain technological benefits rather than directly investing in R&D for targeted civilian applications.

However, older literature regarding the effects of military expenditures on economic growth has found positive effects, presumably due to short-run demand effects or long-run technological externality effects. I will not review this literature here, but Knight et al. (1996) provide an overview and find negative effects on growth. Moreover, as Dunne et al. (2005) point out, such empirical studies are hampered by the fact that they are based on either defense-economics models or expanded endogenous growth models that emphasize the possible technological externalities of military expenditures without taking adequate account of the resource cost of these expenditures. Moreover, apparently in none of these empirical approaches is the possibility that military expenditures are determined strategically (that is, in reaction to potential adversaries).

2.5 *Overview of Costs*

I am aware of just one study that attempts a comprehensive estimate of the costs of conflict from many different sources: Hess (2003).[21] Hess adapts a model of Lucas (1987) that was meant to measure the costs of business cycles and uses it to estimate the impact of conflict regarded as a "shock" to consumption and welfare. No direct or indirect costs are calculated or estimated. Instead, Hess compares the expected welfare from each country remaining in its actual path of consumption that may include conflict to another counterfactual path of consumption where there is no state of war. Using data from 1960 to 1992, someone living in a county that experienced some conflict would permanently give up at least 8 percent of current consumption to live in a peaceful world; this figure is calculated by Hess as a lower bound of the true welfare cost of conflict. Naturally, there is wide variation across countries. All high-income countries included in the study (Australia, Canada, France, Italy, the United Kingdom, and the United States) have considerably lower costs of consumption as a percentage of consumption (with France and the United States topping the list with just over 3 percent of their consumption), but still high costs in absolute terms. Most African countries have higher costs than average, with Angola's cost being over 40 percent of annual consumption. Iraq tops the list with a cost of 65 percent of its annual consumption, while Iran's cost is 26 percent—both high levels are due to the war fought by these two countries in the 1980s.

The lower bound of the total world cost of conflict in 1985 dollars is estimated by Hess to be close to $400 billion to be paid every year, with that payment growing at the rate of population growth. Given Collier et al.'s (2008) lower-bound estimate for the yearly cost of civil wars alone—$123 billion (in, presumably, 2008 dollars), and an average estimate of close to $500 billion—Hess's lower-bound estimate for all types of conflicts appears reasonable. Therefore, without even counting the extra military expenditures of the Unites States during the twenty first century, an overall annual cost of $1 trillion for organized violence should be considered a low-end

[21] The study examines four types of external wars in terms of whether they were at home or not, and whether they were "small" or "large." Internal wars are subdivided into genocides, ethnic conflicts, abrupt and disruptive regime changes, and revolutionary wars.

estimate. Taking into account military expenditures and other direct and indirect effects of conflict and violence would result in considerably higher cost estimates.

3. Open Issues and Future Directions

Economists have only recently been interested in the costs of conflict and violence as a legitimate policy concern and as an endeavor worthy of study. With the exception of the literature that relates military expenditures to economic growth, virtually all research on the costs of conflict and violence has occurred over the past decade. Already, though, the literature has grown extensively, and, if anything, the pace of research is gaining speed, especially research on civil war. The increasing interest is obviously warranted given that the costs of conflict and violence are quantitatively very significant, arguably more significant than any other measured economic costs that might be relevant to economic development.

Some direct costs are easily measurable, such as those due to destruction or increased government spending. However, most costs, even direct ones such as those associated with death and injury, are not easy to estimate, let alone indirect costs that might result from lower investment, capital flight, or reduced tourism. Such estimates are based on either deterministic scenarios or stochastic models that are econometrically estimated, the latter of which often suffer from small samples and, sometimes, data of questionable provenance. Researchers and policymakers are unlikely to agree on the relevance or reliability of particular scenarios or models and, therefore, on the estimated costs derived from them. It is healthy, even vital, to consider a wide range of opinions and methodologies—such diversity is often key to arriving at well-rounded estimates. In some cases, general agreement might be unattainable simply because there are too many disagreements about processes or causal mechanisms. Finally, the personal views of those involved may significantly cloud the issue (as, for example, when poverty and inequality are considered to have costs beyond those that reduce a country's income).

I will now briefly discuss remaining issues and future directions for measuring and estimating costs associated with the four types of conflict reviewed. I will close with general remarks on assessing the costs of conflict.

Civil wars. As is apparent from the work reviewed here, civil wars have received the lion's share of researchers' attention. Such attention seems warranted when one considers the large number of civil wars in the post-war period, not to mention their human and economic costs. Detailed studies of country experiences along with comparative assessments, such as those discussed in Stewart and Fitzgerald (2001), are helpful complements to econometric studies that rely on more aggregated data. In particular, it is encouraging to witness recent trends in microbased studies, such as those of Bellows and Miguel (2008) or Blattman (2008), which follow samples of war-affected soldiers or individuals involved to determine both the individual and community consequences of war. Such approaches already challenge some of our preconceptions of the effects of war on individuals and their communities (or, "social capital") and additional studies are needed to clarify those effects. Are former victims of violence truly better adjusted

because of self-selection—in the sense that those who are poorly adjusted might be more likely to die or be excluded from studies—or are they so because war experiences have truly galvanized them to become civically engaged?

Collier et al. (2003) have emphasized the possible negative impact civil wars have on social capital and trust—and, in turn, on economic growth. They do not provide, however, much evidence to support that negative relationship. Therefore, operationalizing notions of social capital in various settings and examining the impact on countries' progression towards civil war, economic growth, etc. is certainly a worthy avenue for future research. The effect of civil wars on poverty and inequality, and the costs associated with them, are also of obvious continued interest.

Another quantitatively important effect emphasized by Collier et al. (2003) and Collier et al. (2008) is the spillover effect of war on neighboring countries. Following on Murdoch and Sandler (2002), who appear to be the sole researchers who have made estimates of such spillover effects, is another issue worthy of additional investigation. Finally, the expected effect of internal wars and other types of conflict on investment and capital flight does not always appear as statistically or economically significant (for example, see Blomberg et al., 2004). Since this effect is expected to be one of the key channels through which wars negatively impinge economic growth, it is important to continue investigating the relationship both in country and comparative studies.

Lower-level internal conflicts. As argued by Sambanis (2004), the particular definition of civil war adopted in any cross-country comparison can significantly change the results. This is indicative of the fact that civil wars are not completely distinct from all other types of internal (or external) conflict. Rather, there is a continuum of conflict intensities that might include, say, the Democratic Republic of Congo and Rwanda on one end of the spectrum, and the myriad of internal conflicts that involve minimal violence or the threat of violence (such as strikes or road blockades) on the other. The middle and lower ends of the spectrum have been understudied, and severely so when compared to the study of civil wars.

Examples of such violence abound. In addition to the war in Aceh province, violence has been endemic over at least the past decade to Indonesia, from the Mollucas to Borneo and Irian Jaya, to Javanese villages and towns. Furthermore, the motives of this violence have been difficult to decipher. (They can be characterized as overtly religious, ethnic, economic, or regional, but one must be careful about what appears as overt.) Similarly, conflict has been continual in Nigeria's delta since the Biafra war, and recently has flared up with consequences for oil production there. In Brazil and other Latin American countries, there are systematic disputes over land rights, pitting large landowners against organized unions of squatters. These sometimes involve deadly clashes of private security forces and union members. Some of these disputes can be considered economic, as they focus on the disposition of revenues from exportable natural resources. They have been studied as such under the rubric of the "natural resource curse".[22] Nevertheless, there has been no effort to systematically create databases that classify and measure aspects of these softer types of internal conflicts as there has been for civil wars. Yet, given the limited evidence

[22] See for example Ross (2003) and Mehlum et al. (2006).

obtained thus far, the long-term costs of such conflicts could well be of a similar order of magnitude to those of civil wars. It is highly advisable, then, to collect evidence at both the micro and macro levels, as has been done in research on civil wars.

Terrorism. Since terrorism is correlated with other types of conflict, it is difficult to isolate the effects of the tactic itself from the wider conflict to which it might be a part. Future studies would find value in pursuing the approach of Blomberg et al. (2004), who include in regressions other types of conflict to tease out substitution or complementary effects.

External conflicts. A major unresolved issue that pertains to the costs of external wars is that of the relationship between military expenditures and economic growth. As we mentioned above, the main problem is disentangling the negative effect of military spending that results from the reduction of resources that become unavailable for consumption or investment—and any distortions that might be associated with these—from the possible positive effects of military spending that results because output is below its potential level or that results from technological and organizational externalities to the rest of the economy. It appears that all of the models thus estimated do not adequately take into account the resource cost of military expenditures. They especially fail to take into account its endogeneity to those of other countries or to the choices of internal potential enemies (to the extent that some countries direct their military expenditures against such enemies).[23] It is therefore advisable to account for how strategic feedback affects security and military expenditures when studying their effect on economic growth.

Furthermore, the related literature has relied solely on cross-country evidence using aggregated data (for example, GDP, investment, military expenditures, and other aggregate variables). More detailed country case studies could break down the various components of military expenditures, investment, and other variables. Institutional knowledge of a country's economy and government should not be ignored when making assessments about the composition of these components, their relationship to each other, and to economic growth.

Adding up the costs of organized violence. I am not aware of any attempt to add up all the types of organized violence costs that are reviewed in this paper. Hess (2003) comes closest, but as discussed earlier, his approach is highly indirect and "top-down" in that he uses a cross-country econometric framework to estimate the effects of conflict on consumption as a "shock." Whereas this is a valuable approach that has produced plausible estimates (and expanding and refining Hess's approach would be most welcome), there is scope in also pursuing a "bottom-up" approach, whereby direct and indirect costs of the various types of organized violence are estimated and tabulated for individual countries and for the whole world. Collier et al. (2008) do provide overall estimates for the cost of civil wars, but there is no documentation in that paper on how these estimates were derived. Having both bottom-up and top-down estimates of the total costs of organized violence would help check the plausibility of both estimates. If the estimates do not vary too widely from one another, one can have high confidence in them.

[23] Models that do take into account this endogeneity include Hirshleifer (1995), Grossman and Kim (1996), and others reviewed in Garfinkel and Skaperdas (2007).

A final, fundamental issue of concern to economists and policymakers must be mentioned, though unfortunately not in appreciable detail.[24] An argument could be made that at least some of the costs of war and violence are necessary, as they could be considered the costs of "enforcing property rights" by states or other organized interests. Military expenditures and other security costs, even possibly the very destruction that ensues from the outbreak of wars, could be considered a necessary input into an output called "security." Therefore, from a social welfare perspective, these may not be considered avoidable (without incurring other costs at some point). A very short response to this suggestion would first point out that, contrary to other inputs in economics, the inputs to conflict and violence are combined in an adversarial fashion, not cooperatively as are inputs to ordinary production. Secondly, military increases by one party that are met with similar increases by another would increase the costs of security to both parties without necessarily changing the security of either, however that latter is measured. (On the contrary, the military build-up could make war more likely, and, as a result, decrease the security of both.) Whereas the response of states and other organized groups could indeed be considered individually rational in the short term, it does not imply that the resulting state of affairs is socially rational. The outcome is similar to that of the prisoners' dilemma: if each side could commit to their actions, they could achieve a better outcome for both. Furthermore, economists routinely calculate the costs of socially suboptimal actions (such as those of trade protection) in other settings, where the actual policies are compared to ideal policies. Likewise, then, we can think of the costs of organized violence as due to deviations of actual security policies that are suboptimal from an ideal world. What is also different from other settings, however, is the possibility that in the actual world, the costs of providing security may increase dramatically while the benefits derived from it are drastically reduced, as is the case in wars that escalate beyond the original expectations of their participants.

[24] For a detailed treatment of related issues, see Skaperdas (2008).

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WELFARE COSTS OF CRIME AND COMMON VIOLENCE: A CRITICAL REVIEW*

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ABSTRACT: This paper critically reviews a vast array of literature on the costs of crime and common violence. Using a simple economic model of crime as a theoretical benchmark, we conceptually discuss the estimates available and their potential use as inputs for public policy. We present current methodologies, explore their main results, discuss their limitations, and suggest directions for further research.

Keywords: crime, violence, welfare, costs, contingent valuation, willingness to pay

JEL codes: K42, O17, O57

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1. Introduction

Crime and violence have many potential welfare implications. They pose straightforward consequences to the quantity and quality of life, such as reductions in lifespan, widespread feelings of insecurity, and behavior changes intended to avoid crime. There is also the social waste from the value of goods lost and destroyed, the public and private money spent on prevention, and the costs of criminal justice and prison systems. In addition, and far less straightforward, crime has potentially deleterious consequences on growth, through reduced productivity and shortened planning horizons for investments in physical and human capital. This paper critically reviews a vast array of literature that tries to estimate different dimensions of the costs of crime and common violence. Using a simple economic model of crime as a theoretical benchmark, we conceptually discuss these estimates and whether they may be used as inputs for public policy. We present current methodologies, explore their main results, discuss their limitations, and suggest directions for further research.

Tables 1.1 and 1.2 present crime rates (International Crime Victimization Survey—ICVS) and mortality due to violence (World Health Organization—WHO) for various regions of the world.[1] Crime rates vary widely across regions and types of crime, from 17 percent per year for thefts in Africa and Latin America to 3.6 percent for burglaries in Asia. But the most striking differences appear in the worst byproduct of crime: violent deaths. Mortality rate due to violence varies greatly, from 21.8 per 100,000 inhabitants in Latin America and the Caribbean to 4.0 in Western Europe. Latin America and the Caribbean, together with the Former Communist block, have violence-related mortality rates far above those observed in any other region portrayed (Africa is not included due to a lack of data). For example, deaths due to violence are 200 percent more common in Latin America than in North America and the Western Pacific, and 450 percent more common than in Western Europe.

High crime, coupled with violence, burdens many dimensions of society. Measuring the magnitude of this burden in a consistent and unified way, however, is a difficult task. Material costs of crime and violence, including both direct costs and expenditures on criminal justice and crime prevention, have been estimated to comprise a significant fraction of production across different regions of the world. This number is estimated at approximately 2.1 percent of the GDP per year for the United States, and 3.6 percent for Latin America and the Caribbean.[2] Considering monetary costs related to property crime, some have suggested that the number rises to 2.6 percent for the United States and 5.1 percent for Latin America (Bourguignon 1999). In South Africa, public spending on criminal justice alone accounts for 3.1 percent of GDP (Altbeker 2005).

On top of material costs, high injury and mortality rates are among the most important direct consequences of crime. Economists have recently developed tools to estimate how much reductions in life expectancy cost society, and results indicate these can be quite significant.

[1] Mortality due to violence is defined as the number of deaths caused by homicides and injuries purposely inflicted by other persons, plus other violent deaths, according to the International Classification of Diseases (ICD). The data refer to 55 countries in the ICVS dataset and 73 countries in the WHO dataset. There are no mortality data by cause of death for Africa in the WHO dataset for the 1990s.

[2] See for example Bourguignon (1999), Londoño and Guerrero (1999), and World Bank (2003).

Recent estimates indicate that increases in mortality represent a quantitatively significant welfare loss. This loss is either the direct result of a shorter life span or the indirect effect of a shorter planning horizon on investments in physical and human capital.[3] In the case of violence, increased mortality represents a substantial welfare loss estimated to be of the same order of magnitude of direct material costs of crime (Soares 2006). Current evidence suggests that one year of life expectancy lost to violence is associated on average with a yearly social cost of 3.8 percent of GDP. This estimate still ignores costs due to injuries and reduced health, for which there are no trustworthy economic-based estimates available.

The nonmonetary dimension of the costs of crime also carries indirect economic consequences. These effects include changes in behavior from reductions in productive life length (such as decreased investments in human capital and health), reduced savings and investments in physical capital, and, therefore, reduced long-run growth. Shorter life horizons reduce an individual's incentive to take actions that generate long-term benefits and short-term costs, such as investing in education and saving for the future (Lorentzen, McMillan, and Wacziarg 2007). In countries with high HIV prevalence, for example, individuals tend to invest less in human capital (Kalemli-Ozcan 2006). This connection leads to a negative correlation between adult mortality and investments in human and physical capital, and can be a source of poverty traps.

Finally, there are various intangible costs related to labor markets, business climates, personal traumas, and changes in daily behavior. According to Londoño and Guerrero (1999), intangible costs of crime—deterioration of productivity, consumption, and labor force—constitute the major part of Latin Americans' estimated cost of violence, corresponding to 7.1 percent of the region's GDP. In Colombia, Gaviria and Vélez (2002) document that crime reduces investment and employment in poor urban communities. In Brazil, 52 percent of managers rank crime as a major business constraint (World Bank 2003a). In Jamaica, violence is estimated to result in an average loss of three work days per firm, directly affecting 19 percent of firms (World Bank 2003b). Typically, though, these dimensions are much harder to measure in a systematic and comparable way, and there is only limited evidence available.

Therefore, crime's negative effects encompass several different dimensions. As a result, there is no existing methodology capable of dealing simultaneously with all the relevant issues. As a rule, different methodologies have been developed to address different issues, and each estimate is highly dependent on its specific methodology and on the type of data available. For similar reasons, more encompassing studies inevitably lose detail and rigorousness in their analysis. In any case, some have suggested that overall costs of crime in particularly violent regions, such as Latin America, may reach as much as 10 percent of yearly GDP (Londoño and Guerrero 1999).

In this review, we concentrate our attention on economically motivated crimes and their byproducts, and on the issues that have been the main focus of recent research. Our main concern relates to crimes against personal safety and property (for example, theft, assault, robbery, homicide), and we do not explicitly address crimes derived from the prohibition of certain

[3] See for example Murphy and Topel (2003) and Lorentzen, McMillan, and Wacziarg (2007).

activities and practices (such as prostitution and drug trafficking and consumption). The very prohibition and illegality of these activities engenders much crime, corruption, and violence, which naturally raises the question of the social costs and benefits of defining certain activities as crimes (Keefer et al. 2008). We avoid this question altogether by thinking exclusively in terms of crimes associated with illegal involuntary property transfer (thefts, robberies, and burglaries) and physical violence.[4] Therefore, we also do not deal explicitly with some other relevant issues, which are nevertheless outside the main scope of the literature on costs of crime, such as corruption, white-collar crime, and domestic violence.[5]

This survey tries to rationalize in economic terms the estimates from the existing methodologies, highlight some of their limitations, and point out potential directions for future research. To do so, we start in Section 2 by establishing a very simple theoretical model that presents in clear terms the various different dimensions of costs of crime. This theoretical referential is used as a benchmark to give economic meaning to the different concepts discussed in the literature. It also guides our discussion of the various methodologies. In Section 3 we present the methodologies used to estimate particular aspects of the costs of crime and discuss some issues they fail to contemplate. Section 4 considers some difficult-to-measure dimensions of crime costs that are not included in standard methodologies. In Section 5, we present in a systematic and roughly comparable way the main empirical results currently available in the literature. Section 6 concludes with general remarks and a discussion of potentially fruitful directions for future research.

2. Theoretical Benchmark

In order to understand the various dimensions of the costs of crime estimated in the literature, we develop a very simple economic model of crime. This model follows the tradition of Becker (1968), Stigler (1970), and Ehrlich (1973), and is intended only to guide our discussion and shed light on limitations of current literature.

First, consider a rational agent that derives utility from two goods, c and y, according to the utility function

$$V_n(c,y) = a.\ln c + y, \qquad (1)$$

where a is constant. The subscript n in the utility function indicates the "no-crime" scenario. This individual maximizes (1) subject to the budget constrain $p.c + y = m$, where p is the price of good c, m is income, and the price of y is normalized to 1. In this setting, y can be interpreted as income

[4] Still, various costs of crime discussed here will be contaminated by these dimensions, either because a large part of the criminal justice system is allocated to prevent and punish crimes related to drug consumption and trade, for example, or because drug trafficking indirectly engenders organized crime and violence.

[5] Lederman et al. (2005) show that corruption seems to be driven by very different factors than common crime. Crime rates for common crimes are highly correlated with each other, but bear almost no correlation at all with perceived corruption. In relation to domestic violence, Waters et al. (2005) review some of the scant literature available. The numbers presented by the authors suggest costs of child abuse in the United States vary between $2,000 and $40,000 per child, with total costs above $14 billion. Costs of intimate partner violence vary between $1,000 and $4,000 per victim (Waters et al. 2005).

spent in all other goods apart from c, or as the utility related to the money left after c is consumed. Given the quasi-linear specification proposed, there is no income effect in the demand for c, so any loss of income or expenditure is immediately reflected on reduced demand for y.

The optimal choice of this consumer implies consumption of the two goods corresponding to a "no-crime" scenario $c_n = a/p$ and $y_n = m - a$. This is the "no-crime scenario" against which one may compare a situation with positive incidence of crime. As we shall see, this is precisely what some of the strategies employed in the literature try to do. To understand what the methodologies actually measure, let us now consider, in turn, the problems of a potential victim and a criminal.

Victims

Assume that good c may be stolen, while y cannot. Suppose that c is a good targeted by criminals, so the probability of being victim of a crime, $\pi(c)$, is an increasing function of c. In case the individual is victimized, he loses an amount x of good c, and, in addition, experiences a subjective loss of welfare corresponding to σ in monetary units. Assume that the individual takes the amount x stolen as given. In this "crime-scenario," the expected utility of a potential victim is given by:

$$V_c(c,y) = \pi(c)[a.\ln(c - x) + y - \sigma] + (1- \pi(c))[a.\ln c + y]. \qquad (2)$$

First-order conditions for the individual's problem in this case give the optimum level of consumption in the "crime-scenario," c_c, implicitly from the expression:

$$\frac{\alpha}{c_c} - p + \pi(c_c)\frac{\alpha x}{c_c(c_c - x)} + \pi'(c_c)\left[\alpha \ln\left(\frac{c_c - x}{c_c}\right) - \sigma\right] = 0. \qquad (3)$$

The first two terms in this expression characterize the solution in the absence of crime. Note that the third term is positive, while the fourth is negative, since $c_c > x$ and $\pi(c)$ increase with c. The third term compensates for the expected reduction in the consumption of c from the probability of c being stolen. The fourth term accounts for the fact that, with a higher c, the probability of being victimized is higher.

These last two dimensions represent the direct welfare consequences for a potential victim. Their relative importance depends on the relevance of the various dimensions for the particular type of crime under consideration. So, for example, the last term disappears for a crime whose probability of victimization is not affected by the consumption of c (inconspicuous consumption, linked to random probability of victimization). In this case, $c_c > c_n$, since the individual insures against the probability of loosing x units of c by buying more c than before. Our quasi-linear utility function is particularly convenient because it isolates substitution effects in c, so that income effects are always reflected on y only. This means that $\pi(c_c).a.x/c_c(c_c - x)$ represents exactly the increased demand for c in anticipation of the possibility of having an amount x stolen. For example, in the case where $\pi(c_c) = 1$, $c_c = (a/p) + x$, so that the amount actually consumed of c remains the same, and the loss from victimization is reflected in reduced

consumption of y (by an amount $p.x$). Generally, this term represents a utility loss that can be measured directly in terms of reduced consumption of y. Other expenditures on public or private security and the justice system would appear here in the budget constraint as additional expenses or taxes, also reducing the amount of y consumed.

But the most commonly considered effect of crime at the individual level is probably that captured by the fourth term in expression (3). It represents the increased probability of victimization from increased consumption of c, which may be understood as related to wearing expensive jewelry, driving a fancy car, or walking in certain areas of a city at night. The increased probability of victimization is associated with higher likelihood of occurrence of the state where consumption is $(c_c - x)$ instead of c_c, and also higher likelihood of experiencing the utility loss represented by σ. The term σ here captures all dimensions of victimization not related to the material loss directly associated with the good stolen. In general, it is associated with the possibility of other negative consequences, apart from the transfer of goods, arising from the interaction between victim and perpetrator. So it is most obviously related to the fear and trauma associated with the episode, and to the possibility of injury or death. If $\pi(c)$ is strongly increasing in c, or if the utility loss from victimization σ is sufficiently high, the term $\pi'(c_c)\{a.ln[(c_c - x)/c_c] - \sigma\}$ tends to be larger in absolute value than $\pi(c_c).a.x/c_c(c_c - x)$, and c_c tends to be lower than c_n. This is probably the most appealing case, where crime represents a utility loss much more relevant than the direct welfare loss from reduced consumption, so that individuals distort their decision in order to avoid activities or types of consumption that are associated with higher probability of victimization. In this case, crime works as a tax on the consumption of certain goods, implying welfare losses similar to those observed in the presence of distorting taxes. We maintain this hypothesis through most of what follows.

Criminals

Suppose that criminals decide on the amount x to be stolen, but that x has to be produced with crime effort e, which generates negative utility. The negative effect of crime effort may be related to actual work or to some social norm attaching negative value to criminal activities. Suppose that criminal gain x is produced according to $x = \ln e$, and that criminals have an instantaneous utility function given by $\beta.x - e$.

Criminals may be caught with a probability $\theta(e,s)$, which is increasing on the level of criminal effort and on expenditures s on some public safety technology. In case they are caught, they lose the gains from crime and experience a punishment equivalent to a utility loss δ. In principle, δ is also produced with some other public safety technology (and some expenditure j), and corresponds to different dimensions of punishment once a criminal is convicted. In this setting, the perpetrators' expected utility is given by:

$$P(x,e) = \theta(e,s)(- e - \delta) + (1 - \theta(e,s))(\beta.x - e). \qquad (4)$$

Suppose that criminals take s, j, and the individuals' choices of c as given.[6] First order conditions for the problem give the optimal choice of e implicitly from:

$$(1-\vartheta(e^*,s))\frac{\beta}{e^*}-1-\frac{\partial\vartheta(e^*,s)}{\partial e}(\delta+\beta.\ln e^*)=0\,. \qquad (5)$$

Costs of violence commonly discussed in the literature include the expenditures on police, criminal, and justice system (s and j), the loss related to punishment of criminals (incarceration, wages lost, and so forth, represented by δ), and sometimes the value of goods stolen or lost (x).

Welfare Costs of Crime

For given expenditures on public security s and j, an equilibrium in this economy is a combination of (c_c, y_c, e^*), such that: (c_c, y_c) maximize the utility function (2), given e^*, subject to $p.c + y + s + j = m$; and e^* maximizes the utility function (4), given c_c and $x^* = \ln e^*$.

Typically, discussions of the optimal design of criminal justice policies do not attach positive value to the utility of criminals. In this situation, the optimal social choice of s and j would be that which leads to maximum utility from the perspective of victims, taking into account the reaction of criminals (which here would be equivalent to the solution if s and j were private goods and potential victims were aware of the decisions of criminals).

Notice that any level of crime is socially inefficient in the sense that it can never lead to a first-best allocation. If governments could freely transfer resources across individuals, first-best allocations would always imply a zero level of crime, even if governments attached positive weight to criminals' utility function. In this case, governments would simply transfer a certain amount x of the good c to criminals, but the levels of effort e, and expenditures on prevention and punishment s and j, would always be set to zero. Any amount of e allocated to extraction of x from potential victims is a social waste since it reduces the utility of both criminals and victims, and may imply other expenditures on public safety that further reduce well-being. This is roughly the perspective implicit in most of the discussion on the welfare costs of violence.

The concepts analyzed here map some of the most commonly discussed dimensions of welfare costs of violence. When measured in monetary units, the difference in expected welfare of potential victims between the "no-crime" and "crime" scenarios, or the social loss associated with crime, is:

[6] We abstract from a series of complicating details here. First, we do not allow adjustments on the extensive margin, so that the number of criminals and potential victims is fixed (with the former smaller than the latter). Second, there is the matching between victims and criminals. We assume that criminals choose the amount x to be stolen from a given victim, but that they do not choose specific victims. In order to make this compatible with the assumption that the probability of victimization π is increasing on c, one may assume that there is a unit interval of potential victims who are randomly drawn by criminals with probability proportional to c. Finally, we assume that expenditures s affect the probability that the criminal gets caught, but that s does not affect the probability of victimization. This comes immediately from the fact that we do not allow adjustments on the extensive margin. So, literally, s affects the amount stolen in any given crime, but not the number of crimes committed. This is certainly the most limiting of the hypotheses discussed in this footnote. Nevertheless, the framework proposed is able to highlight in the simplest way possible the main issues relevant to the discussion of the welfare cost of violence.

$$L_V = s + j + \pi(c_c).(\sigma + p.x) + p.(c_n - c_c). \quad (6)$$

The variables s and j indicate the expenditures on crime prevention and punishment respectively, which are reflected in reduced consumption of other goods (y). Direct utility losses from victimization, which encompass psychological traumas and fear, injury or even death, are represented by σ, which is measured in the same unit of y. Together with the goods lost or destroyed (value of $p.x$),[7] these are the direct costs of victimization, which happen with probability $\pi(c_c)$. In addition, fear of the risk of victimization changes individuals behavior in such a way that consumption of c is reduced from c_n to c_c, representing a loss of welfare of value $p.(c_n - c_c)$. These different dimensions of cost can be briefly categorized as public and private security expenditures (s and j); loss from goods stolen (x); subjective utility loss (σ); and loss from change in behavior to avoid crime ($c_n - c_c$). As will be seen later, the vast majority of estimates available refer to the first three terms in this expression.

In relation to criminals, the typical discussion in the literature does not follow so closely what theory would suggest. Strictly, social costs of crime from the perspective of criminals include those associated with punishment δ and also the effort allocated to crime e. Estimates from the literature try to get at some values related to δ by accounting for such things as lost wages and productivity of those incarcerated, incapacitated, and killed as a consequence of criminal behavior. On top of that, δ should also account for the direct utility loss from incarceration and other types of punishment. In relation to e, estimates should ideally try to account for the goods that could have been produced had criminals worked in the legal sector, generating value added. The social loss related to criminals, therefore, should be:

$$L_C = e + \theta(s,e)\delta. \quad (7)$$

As we shall see, most of the estimates of the costs of crime map some concept discussed above, and try to compare a given crime environment with the situation in the absence of crime. This is an intuitive comparison, which gives a measure of the magnitude of overall social losses implied by the existence of crime and, therefore, the importance of the issue in society. Nevertheless, it is unclear whether these numbers are useful from the perspective of public policy decisions.

In this context, the typical problem facing a government is how to allocate spending on crime prevention and punishment in a way that will maximize social welfare. The optimal allocation of resources would equate marginal benefits from further expenditures to marginal costs. So a government would contemplate increasing s and j, and weighing these costs against the marginal benefits. In terms of the expressions above, a government would choose s and j in order to minimize the total social loss, represented by $L_V + L_C$. In order to assess the benefits from increased expenditures, one would have to know how changes in s and j would affect crime

[7] Whether x should be considered as a true social loss or just a transfer of resources within society depends on the relative value attributed to it by victims and criminals. Generally, at least part of the value of x represents a net social loss, since consumers who purchase the good in the market tend to value it more than criminals (Glaeser 1999). Here, we follow the most common approach in the literature and do not count the utility criminals derive from the stolen property as being socially valuable. So we consider the total value of the good stolen as a social loss.

effort *e* and, in consequence, the costs and probability of victimization, the behavior of potential victims, and the cost of punishment to criminals. These involve knowledge of a series of causal relationships that are not immediately observable by policy makers, such as the response of criminals to increased punishment or probability of apprehension, the behavioral response of potential victims to reductions in crime, and the relationship between increased punishment and increased utility loss of incarcerated criminals. These are not trivial objects to estimate, and certainly much more elusive than the overall costs of crime typically calculated in the literature. Still, there are some methodologies that seem to be closer to what one would need to analyze the optimal allocation of resources to public safety.

Having outlined a theoretical structure to guide our discussion, we now turn to the different methodologies used in the estimation of the costs of crime and violence.

3. Methodologies

As mentioned earlier, there is no unified framework that addresses all dimensions of the welfare costs of crime and violence. Various methodologies have been developed to deal with some aspects of the problem. Alternatively, other studies have analyzed specific consequences of crime that highlight less tangible aspects of this cost, but these do not yield explicit results that are easily expressible in monetary units. In this section, we discuss the main methodologies applied in the literature to estimate the welfare cost of violence: these include accounting of expenditures and other costs, contingent valuation surveys, and other marginal willingness-to-pay approaches.

Accounting

Simple accounting is probably the most widely applied method used to estimate the welfare costs of crime. This is a straightforward use of the basic logic outlined in the last section: Societies experience several costs and losses that would not exist in the absence of crime; these costs correspond to a loss of resources that could potentially be used with other goals, and therefore, a welfare loss associated with the existence of crime. Studies using this strategy typically incorporate a combination of the following dimensions: Value of property lost or destroyed; public and private security expenditures; medical expenses for injuries and psychological damages that result from crime; wages lost by people incarcerated, incapacitated, or killed; and subjective costs associated with pain, suffering, and lost quality of life.

The specific dimensions considered in each study depend on the data available for each location and time period. Actual calculations make use mostly of secondary data. They may include public budgets and household surveys of private consumption (expenditures), official medical records and data (medical expenses), demographic information on criminals and victims and their respective sentences or incapacitation (wages and productivity lost), and data from jury awards, insurance, or other studies using some of the methodologies discussed below (pain, suffering, and quality of life).

In our simple model, we only considered out-of-pocket expenditures on crime prevention and punishment. Generally, there may be also expenditures that allow researchers to partly asses the direct utility loss (σ). Medical expenses, for example, reveal a lower bound of the costs with injury, since the suffering associated with the condition should at least be equal to the money that was spent on treatment. As mentioned before, some of the estimates from this literature go as far as to include costs related to pain, suffering, and lost quality of life. But it is not clear, for example, whether incorporating both medical expenditures on injuries and direct utility loss from suffering, based on other types of estimates, would not constitute, in some dimension, double counting. Medical costs are undertaken to overcome or minimize the costs of suffering, and at least a portion of jury awards are designed precisely to compensate for these.

This point reveals the lack of a theoretical referential in the accounting literature. Studies typically add up all the dimensions that can possibly be estimated from available data, without clearly understanding or framing the conceptual differences between the various types of costs—as in, costs that are undertaken to keep crime under control and costs that result from criminal activity. Therefore, as in the case discussed above, it is possible for double counting to occur. In addition, some of the numbers do not correspond to the relevant theoretical concepts. For example, in relation to the incarceration of criminals, the relevant social cost should be the utility loss experienced by incarcerated criminals. This includes wages lost during productive lifetime, as calculated by studies in this literature, but should also include other dimensions associated with incarceration (loss of liberty and contact with family, violence experienced in jail, and so forth).

Studies that use the accounting methodology include Miller et al. (1993) for the United States; Londoño and Guerrero (1999) for some Latin American countries and cities (Caracas, urban Colombia, El Salvador, Lima, Mexico City, and Rio de Janeiro); Brand and Price (2000) for England and Wales; Mayhew (2003) for Australia; ISER (1998) and Rondon and Andrade (2003) for Brazilian cities (Rio de Janeiro and Belo Horizonte, respectively); World Bank (2003b) for Jamaica; Altbeker (2005) for South Africa; and Bundhamcharoen et al. (2008) for Thailand. Mayhew (2003), for example, offers estimates of costs related to homicides, assaults, sexual assaults, robberies, burglaries, thefts, criminal damages (vandalism), arsons, frauds, drug offences, the criminal justice system, production lost by prisoners and victims, victim assistance, the security industry, and insurance administration. On top of budget numbers and industry data, his calculations incorporate medical costs of fatalities from hospitalized and nonhospitalized cases, estimated loss of production from people unable to work, estimates of intangible costs from available willingness-to-pay estimates (to be discussed later on), compensation awards to victims, and desired victims' compensation.

The main advantage of the accounting methodology is that, in principle, it addresses several relevant dimensions of the costs of crime. However, it also has a few drawbacks. First, despite adequately mapping some concepts related to the overall costs of crime, it does little to provide estimates of the marginal costs and benefits relevant for policy making. Second, its lack of theoretical foundation sometimes leads to double counting, as different estimates related to

similar underlying concepts are added up together. Finally, some of the sources used to back out certain numbers do not necessarily provide unbiased estimates of the relevant concepts. So, for example, jury awards offer estimates of the welfare loss associated with certain types of injuries. But it is not clear whether juries are able or supposed to provide unbiased estimates of the relevant number, which would be the subjective welfare loss attributed to the event by individuals.

Contingent Valuation

The contingent valuation methodology was originally designed and extensively applied by the environmental economics literature.[8] It relies on surveys to elicit the subjective value that individuals place on public goods, such as cleaning a polluted river, protecting endangered species, and so forth. This technique has become increasingly popular in recent criminology research, after the initial contributions of Cook and Ludwig (2000) and Cohen et al. (2004).

The logic of the contingent valuation method is simple and sensible. In order to attribute value to a good that is not transacted in the market, the best strategy is simply to ask how much people would be willing to pay for it. To this end, contingent valuation studies conduct surveys. Some of these ask individuals to choose between different policy alternatives; some offer price schedules and ask respondents to indicate the maximum they would be willing to pay for a certain outcome. In Cohen et al. (2004), for example, "respondents were asked if they would be willing to vote for a proposal requiring each household in their community to pay a certain amount to be used to prevent one in ten crimes in their community."[9] In Atkinson et al. (2005), respondents were told the characteristics of a type of crime and the current risks of victimization, and then asked to express their willingness to pay to reduce the "chance of being a victim of this offence by 50 percent over the next 12 months. The payment vehicle for this change was a one-off increase in local charges for law enforcement … with amounts varying from £0 to £5,000, where respondents were asked to place a tick against that amount which corresponded to the maximum they would be prepared to pay for reducing the risk by half".[10]

The hypothetical exercises performed in these studies focus on offering a given outcome to individuals and asking what they would be willing to pay for it. Under perfect conditions, this type of exercise would reveal exactly the value of certain changes in outcomes from the perspective of individuals. This is a powerful concept, close in essence to the numbers that are needed for public policy making. In what refers to the individual costs incurred by potential victims, the contingent valuation method is particularly interesting because it does not require decomposition of different types of costs. By answering what they are willing to pay for a certain outcome, individuals are taking into account whatever costs may be relevant, from their subjective perspective, as they evaluate how much a certain policy is worth to them. From the

[8] For a review, see Mitchell and Carson (1989).

[9] Cohen, Mark A., Roland T. Rust, Sara Steen, and Simon T. Tidd. 2004. "Willingness to Pay for Crime Control Programs." *Criminology* 42 (1): 93.

[10] Atkinson, Giles, Andrew Healey, and Susana Mourato. 2005. "Valuing the Costs of Violent Crime: A Stated Preference Approach." *Oxford Economic Papers* 57: 568.

perspective of victims, this number would summarize everything there is to know. The optimal investment in public safety would compare these marginal gains to the marginal costs of implementing a certain outcome, given the technologies available and social costs associated with them (law enforcement, punishment of criminals, and so forth).

Contingent valuation studies typically focus on one crime, and therefore answers to survey questions can be used to refer to the marginal benefits associated with reductions in that particular type of crime. So, for example, Ludwig and Cook (2001) focus on injury from gun violence in the United States, Cohen et al. (2004) analyze burglary, serious assault, armed robbery, rape, sexual assault, and murder, also in the United States, and Atkinson et al. (2005) look at common assault, wounding, and serious wounding in England and Wales.

The simplicity of the contingent valuation approach makes it very appealing. Even though the methodology has not yet been applied to many different contexts, in principle it could be used as a powerful tool in the comparative analysis of marginal benefits of crime reduction. For example, the same questionnaire, implying the same set of changes in outcomes, could be applied in different areas, regions, or countries. Responses to survey questions would indicate the overall benefits of certain policies to potential victims, irrespective of the specific cultural or institutional setting. This would not require specific knowledge of that particular setting (such as the cultural stigma associated with different types of crime) since responses to the survey would supposedly summarize all relevant benefits and costs from the perspective of victims.

Still, the contingent valuation methodology also has its drawbacks. First, it only explores one side of the cost-benefit equation—the marginal gain of reducing crime by some predetermined amount. This dimension reveals the potential benefits from a certain change in outcome, but one would need the other side of the equation to take into account the marginal cost for society to attain this change. Optimality would be the choice of a certain reduction in crime rates for which the marginal benefit to potential victims equated the marginal cost of the reduction in crime. While contingent valuation elicits the benefits from crime reduction, other methodology would be needed to estimate the policy costs involved in different crime scenarios. Notice that the latter remains extremely difficult to estimate, for it involves the technological costs related to policing, constructing and maintaining penitentiaries and the justice system, costs of punishment to criminals, and so forth. Apart from subjective costs of punishment to criminals, these are not and cannot be contemplated within the contingent valuation methodology, since they are quasi-technological parameters that cannot be revealed from preferences.[11]

But the most serious limitation of the contingent valuation strategy comes from what also constitutes its main strength: Its simplicity. Economists have long been skeptical of information extracted from stated preferences, rather than revealed ones. Questions that ask individuals how they would react in a certain situation, or the value they would attribute to a hypothetical good, are not real decision-making situations. Individuals do not incur the actual costs and benefits of

[11] By quasi-technological parameters, we mean relationships such as the amount of additional police needed to reduce crime in a certain area by a given fraction, the corresponding expansion in the prison system to accommodate increased punishment, and so forth.

the decision, and therefore may not put adequate thought into gathering and processing information. Or they may be subject to systematic bias related to what they think the "expected" answer should be. For these reasons, most economists prefer estimates of willingness to pay based on actual behavior, or revealed preferences, rather than stated preferences.[12] Similar criticisms have been made regarding the booming literature on experimental economics (Levitt and List 2007).

Another potential problem with contingent valuation surveys is that they are framed according to a specific context. So when individuals are asked how much tax they would be willing to pay to reduce the incidence of crime, they may implicitly bring into their answer their perception of the quality of law enforcement agencies and other local institutions. So their answer may not exactly address the policy outcome proposed (a 50 percent reduction in crime rates, for example), but rather the specific context in which it is framed.

Other Willingness-to-Pay Methods

There are other methods besides contingent valuation that try to estimate the marginal willingness to pay for reductions in crime and violence. These methods typically make use of estimates obtained from hedonic price models and deal with narrower dimensions of crime.

Hedonic models regress the price of a certain good on its attributes, and back out of estimated coefficients the intrinsic valued attached to each attribute.[13] So a house may derive its value from the quality of its living space, number of bedrooms, garage, amenities, and also from its location. The level of crime and violence in the surrounding area may be an additional attribute of a house, and individuals may be willing to pay more to live in an area with lower crime. An estimate of how much the attribute "low-crime" is worth in the pricing of a house immediately provides an estimate of the cost of crime. If, everything else constant, individuals are willing to pay more to live in an area with lower crime, it means that their willingness to pay for the corresponding reduction in violence is at least equal to that amount. This back-of-the-envelope calculation based on estimates from a hedonic regression provides a simple way of assessing the costs of location-specific crime and violence for a certain population. This was the logic of the seminal contribution of Thaler (1978), who estimated the impact of property crimes on real estate values in Rochester, New York. Other papers, such as Lynch and Rasmussen (2001) for the case of Jacksonville, Florida, apply different versions of this methodology to estimate costs of specific types of crimes.

The numbers generated from hedonic models can, in principle, be interpreted similarly to those obtained from contingent valuation surveys: They show the willingness of individuals to pay for certain reductions in crime rates.[14] Hedonic models have an advantage in that they rely on preferences revealed by market behavior, by analyzing the actual amount that people pay to avoid living in high-crime areas. Their limitations are the same as contingent valuation surveys in

[12] For more on this topic, see Carson et al. (2001).
[13] For more on this topic, see discussion in Rosen (1974).
[14] There is the issue of nonlinearity of the willingness to pay, often neglected in the hedonic model methodology, but considered more carefully in most contingent valuation studies.

that they address only the potential victim's side of the cost-benefit analysis. Therefore, any results obtained from hedonic models should be contrasted with the costs of implementing different policies. Another limitation is that hedonic models of this type can only help evaluate the willingness to pay for crimes that can be immediately mapped into some good transacted in the market. Typically, estimates make use of real estate prices or rental rates, so the types of crimes addressed must be geographically delimited and linked to one's residential area. In this sense, contingent valuation methods are more flexible, since the hypothetical questions raised can, in principle, contemplate any type of policy change.

Other developments from the field of health economics (a field which is also based on hedonic models) have recently been used to analyze the welfare costs of crime. The so-called value-of-life methodology offers a framework in which changes in mortality rates can be valued through a marginal willingness-to-pay method. Studies in this literature make use of hedonic estimates of compensating differentials for mortality risks as benchmarks for the willingness to pay for marginal changes in mortality.[15] These values are then plugged into theoretical models of various degrees of complexity in order to recover, through calibration, underlying preference parameters.[16] Once these preference parameters are recovered and given a certain wage and income profile, the theoretical models can immediately provide marginal willingness-to-pay numbers for any given shift in age-specific mortality rates. So, one can simulate the social willingness to pay for any given reduction in homicide rates by recovering the actual mortality profile due to homicide from data. This was the strategy applied by Soares (2006), who used cause- and age-specific mortality data from 73 countries to estimate the total cost of mortality due to violence across countries.

The greatest advantage of the value-of-life methodology is that it offers a rigorous theoretical framework that, once calibrated, can be used to simulate the welfare gains from any given policy change. In this sense, it also potentially offers estimates of the marginal welfare gain to potential victims, as do the contingent valuation and the hedonic real estate pricing methodologies. But the particular advantage of the value-of-life approach is that once the relevant parameters of the theoretical model are calibrated, new policy simulations can be performed without further survey data or analysis. This is precisely the advantage of having a theoretical model that is capable of simulating individuals' behavior under different scenarios.

But the advantages of the theory also come at a price. The theory's simplifying assumptions are inevitably reflected in biases of the estimates, and it is difficult to guess the extent of these biases under different circumstances. Also, the value-of-life approach is designed to deal only with changes in mortality. While it could in principle be extended to incorporate losses in welfare due to injuries and incapacitation, it will never be able to account for all relevant dimensions of welfare losses associated with crime. The simple fear of becoming a victim (and

[15] High-risk occupations pay, on average, higher wages to compensate for the increased probability of death. As in the case of crime and real estate prices, this relationship can be used in a hedonic model setting to estimate the implicit value individuals attach to changes in survival probabilities. For a review of the hedonic strategy in the context of compensating differentials, see Viscusi and Aldy (2003).

[16] For examples, see Murphy and Topel (2003) or Soares (2006).

the associated trauma) cannot be summarized entirely by the welfare loss from the probability of death or injury, had these outcomes been generated under other circumstances.

Still, as with contingent valuation, the willingness-to-pay methods discussed here are also applicable to various contexts, irrespective of specific institutions or culture. Since they aim to uncover individuals' preferences through some sort of market behavior, estimates obtained should summarize all the relevant aspects considered by individuals in the decision-making process.

4. Difficult-to-Measure Costs of Crime

Several potential consequences of crime escape the scope of any of the methodologies discussed above. These go above and beyond the immediate costs related to victimization, expenditures on prevention, and punishment, and include costs associated with the effects of a violent environment on decisions affecting investment, entrepreneurship, human capital accumulation, urban development, and, ultimately, economic growth. Most of these are related in some way to changes in behavior induced by crime, but are more or less indirect or long-term effects of the crime itself. There is some evidence that crime affects all of these dimensions, but these cannot be easily incorporated into the methodologies discussed before.

The theoretical connection between crime and different types of investment is clear. By reducing expected lifespan, and, more generally, increasing uncertainty about the future, crime reduces the incentives to engage in activities that result in current costs and future benefits. The negative effect mortality has on investments in human capital has been analyzed generally by Lorentzen, McMillan, and Wacziarg (2007), and specifically by Kalemli-Ozcan (2006) in the particular case of AIDS. Though this connection has not yet been empirically established for the case of crime, it is likely that a similar mechanism operates, especially in high violence areas such as Latin America (table 1.2). But the health effects of crime are not restricted to mortality. Though more difficult to quantify in monetary terms through willingness-to-pay frameworks, welfare losses of crime due to injuries and incapacitation are also likely to be very high. For the Caribbean, for example, the United Nations Office on Drugs and Crime and the Latin American and Caribbean Region of the World Bank (2007) estimate disability-adjusted life years (DALYs) lost to violence (per 100,000 inhabitants) between 238 (Dominica) and 716 (Guyana). By increasing mortality and morbidity rates, particularly during the most productive years of life, crime should reduce investments in general and, in particular, investments in education.

In reality, some evidence suggests that not only does crime reduce the amount invested in education, but it also reduces the productivity of investments actually undertaken. Severnini (2007) shows that in Brazil, the performance of public school students in a standardized exam seems to be negatively affected by the incidence of violence in the area where the students' school is located. Therefore, students in high-crime areas perform significantly worse than similar students in low-crime areas. The effect is particularly strong for students during adolescence and in the low end of the ability distribution, and stronger in schools with a high number of students

per classroom and a high fraction of male students. A possible direct link between violence and proficiency is teacher turnover, which seems to be higher in high-violence areas.

The impact of crime on business is also potentially serious. Gaviria and Vélez (2002) argue that crime reduces investment and employment in poor urban Colombian communities. In Brazil, 52 percent of managers rank crime as a major business constraint according to the World Bank's Investment Climate Survey (World Bank 2003a). Krkoska and Robeck (2008) present more systematic evidence on the negative effects of crime on entrepreneurship. They use survey data from 9,500 firms in 26 European transition countries, plus data on additional 4,000 firms from 8 nontransition countries in the European Union and Southeast Asia. In a within-country analysis, they show that firms perceiving a higher risk of victimization display systematically lower rates of job creation (or employment growth). Interestingly, the effect is driven by the perception of incidence of street crime, not organized crime.

These results are also generally consistent with those obtained for the case of Jamaica. Using a survey of firms, World Bank (2003b) shows that 36 percent of firms in Jamaica close before dark to avoid crime, and claim they would be willing to remain open an additional 3.6 hours on average if crime was not a concern. In these same firms, private security spending amounts to 2 percent of annual revenue, while there is an average loss of three work days per year due to violence (19 percent of firms claim to be directly affected by crime).

Hamermesh (1999) and Cullen et al. (1999) analyze different aspects of crime's impact on organization of urban life and urban growth. Like the Jamaican case, Hamermesh shows that high crime tends to shift working hours away from nighttime and toward daytime, and that this shift tends to be more significant among women. His evidence indicates that the crime of homicide has the strongest effect on the distribution of working hours. Cullen et al. (1999) analyze the impact of crime on population change across urban areas, where the change tends to be driven mostly by in-and-out migration. They show that increases in crime rates are consistently associated with declines in city population, and that this decline is more intense among the educated. In this way, crime can clearly affect the way a city functions and even its long-run dynamism.

All dimensions discussed above work toward reducing investments and productivity, and the overall efficiency of the economy. Therefore, one might expect crime also to have long-term consequences for growth rates. Though it is a considerable challenge to establish this causality empirically, there are some estimates available based on cross-country data using dynamic panel techniques. World Bank (2006), for example, uses the Arellano-Bond technique in a panel of 43 countries to estimate the impact of crime, as measured by the homicide rate, on the growth rate of income per capita. The authors find that higher crime rates at one point in time are consistently related to lower growth rates in the following five years. This effect is also consistent with the results obtained by Krkoska and Robeck (2008), who, in a cross-country context, show that countries where perception of crime was high in 2002 experienced systematically lower inflows of foreign direct investment (FDI) in the following three years. In this case, both overall crime and costs associated with organized crime seem to be related to lower levels of FDI.

Another often neglected dimension of crime is the distribution of its costs across the population. Though this issue has received increased attention in recent years, it is still understudied in both the determinants of crime and costs of crime literature. Some of the contingent valuation and other willingness-to-pay methods allow for heterogeneity, but most of the studies on costs of crime do not have as a main concern the distributive implications of the incidence of crime.

Evidence suggests that the distribution of crime in society may vary depending on the country and the type of crime, reflecting most likely the distribution of public security and the availability and effectiveness of private security against different types of crime. Levitt (1999) finds that, in the United States, the poor are more likely to be victims of violent crimes than the rich, with more mixed results for property crime. Still, when the 1990s are compared to the 1970s, property crime victimization has also become more concentrated among the poor over time. Similarly, Di Tella et al. (2006) find that most of the increase in burglary rates in Argentina during the 1990s was shouldered by the poor, since the rich were able to adopt effective protective strategies (private security, alarm systems, and so forth). In contrast, for street robberies, for which no effective protective technology was available, increases in victimization were roughly similar across rich and poor.

On the other hand, Gaviria and Pagés (2002) show that for 17 Latin American countries, the typical victim of property crime comes from rich and middle-class households. In the particular case of Colombia, Gaviria and Vélez (2002) document that individuals in the top quintile of the socioeconomic scale have a higher probability of property crime victimization, while victimization by violent crime is roughly constant across the income distribution (though the rich are most often victims of kidnappings and the poor are most often victims of homicides). The authors also find that as a result, households in the top quintile are more likely to adopt some sort of costly protective behavior, such as installing anti-theft devices at home, participating in neighborhood watch programs, hiring private security personnel, avoiding road trips, or even migrating. Like most other studies, Soares (2006) presents evidence that homicide victimization is also more common in lower socioeconomic strata in the case of Brazil.

Overall, the costs of crime have many other possible dimensions and byproducts that can be qualitatively assessed by strategies different from those discussed in the previous section. Among these, inequality in the distribution of crime is the one that deserves perhaps the most attention. In most cases, though, these dimensions cannot easily be incorporated in methodologies that try to estimate the total costs of crime and violence, sometimes because they are difficult to quantify in monetary units and sometimes because their assessment is greatly dependent on the availability of very specific data. Still, these alternative approaches offer important insights into less acknowledged dimensions of the social costs of crime and contain very relevant qualitative information.

5. Results from the Literature

In this section, we present evidence from the studies discussed earlier in a systematic and comparable way. This is no trivial task, since the studies use different types of data, focus on different units of analysis, and offer estimates on different types of costs of crime. This section is not intended to be an exhaustive review of all studies available on costs of crime, but rather an illustration of the types of numbers that can be obtained from methodologies such as the ones discussed in Section 3. There are certainly many omissions in this review, but we hope it captures the essence of the different strategies currently available.

In this spirit, table 1.3 summarizes the main results of some studies discussed in this paper. The table is organized by methodology, specific study in question, geographic region or area of analysis, year, types of crime or expenditures included, and main results. Since the studies are diverse in nature, main results may refer to estimates of costs of crime, potential welfare gain from crime reduction, or other consequences of crime. Also, some results are presented in monetary units, others as shares of GDP of the relevant geographic area, and some in nonmonetary terms. All monetary values were converted to U.S. dollars using the respective exchange rate and deflated to 2007 prices.

As the table makes clear, studies using the accounting methodology span various types of crimes, and in each case, incorporate different dimensions of costs. Still, when seen as a fraction of local production, the order of magnitude of the estimates is often quite similar. For the Brazilian cities of Belo Horizonte and Rio de Janeiro, costs of crime are estimated to add up to, respectively, 5 percent and 4 percent of yearly production. In the average for Latin America, once various other dimensions are incorporated, Londoño and Guerrero (1999) extrapolate country estimates and suggest that the number may be as high 14 percent of GDP (including rough estimates for some "intangible costs"). The estimated costs for Australia, England and Wales, and the United States—presented in the table as dollar values—also correspond to roughly comparable fractions of production. In the case of Australia, Mayhew (2003) estimates a cost that corresponds to 10 percent of GDP, while Brand and Price (2000) estimate numbers for England and Wales of the order of 7 percent. The U.S. number from Miller et al. (1993)—which refers to rape, robbery, assault, arson, and murder only— is a little lower than that, at around 3 percent of GDP, but again within the same order of magnitude. In the case of Jamaica (World Bank 2003b), dimensions related to medical costs, lost productivity, and public expenditures on security add up to 3.7 percent of yearly production, with 3.1 percent coming from public expenditures on security alone. Similarly, in South Africa (Altbeker, 2005), public expenditures on criminal justice alone correspond to a yearly cost of 3.7 percent of GDP. Finally, costs of crime related to direct medical costs and loss of productivity in a relatively low crime society, such as Thailand, represent only 0.23 percent of yearly production (though these do not include expenditures on the criminal justice system).

On the whole, an overview of the accounting literature suggests that overall expenditures and costs associated with crime correspond to a significant fraction of yearly production, possibly

up to 10 percent of GDP, depending on the case in question and the dimensions incorporated into the analysis.[17]

As mentioned before, contingent valuation studies do not generate such encompassing estimates of the overall costs of crime, but do provide numbers that are probably more useful in terms of public policy analysis. This literature shows that the subjective cost of victimization may vary significantly from crime to crime. Cohen et al. (2004), for example, find that the willingness to pay to avoid one burglary and one assault are, respectively, $30,102 and $84,286. The number for armed robbery and sexual incident is around $300,000, and for murder around $11 million. Ludwig and Cook (2001), through estimates of the willingness to pay to reduce gunshot injuries (both fatal and nonfatal), arrive at a number of roughly similar magnitude, implying a willingness to pay per injury of $1.5 million, and a value of a statistical life between $7 million and $8.5 million. Atkinson et al. (2005) present numbers on willingness to pay per incident for England and Wales that are somewhat smaller than those obtained for the United States, but again within the same order of magnitude. Overall, however, the use of the contingent valuation approach to estimate the costs of crime is still limited when compared to the accounting methodology, and particularly so for developing countries.

Willingness-to-pay methods based on hedonic regressions give as basic output the impact of crime rates on real estate prices across areas with different incidences of crime and violence. Based on this type of variation, Thaler (1978) estimated the average cost of property crime in Rochester, New York, to be around $2,560, while Lynch and Rasmussen (2001) estimated that high crime areas in Jacksonville, Florida, had real estate prices discounted up to 40 percent (or $50,000), according to the incidence of crime. Finally, Soares (2006) used hedonic estimates of compensating differentials for mortality risks as inputs in the calibration of a theoretical model. The calibrated model suggests that, across 73 countries, the loss of life expectancy implied by deaths due to violence corresponds to roughly 1 percent of yearly GDP. Each additional year of life expectancy lost to violence is estimated to increase the social cost of crime by 3.8 percent of yearly GDP.

The remaining rows of table 1.3 present effects of crime estimated in particular studies that do not fit in any of the methodologies described earlier. We include them here to illustrate the various potential effects of crime and how they may be assessed. For example, Cullen et al. (1999) show that crime may reduce urban growth and development. They estimate that areas that experience increases in crime rates suffer losses in population (urban flight) on an almost one-to-one basis—each additional reported crime is associated with a one-person decline in city residents. Hamermesh (1999) shows that high crime in urban areas also affects other economic decisions, such as when people choose to work. He shows that people tend to work less during

[17] Dalal and Jansson (2007) estimate costs of crime (medical costs, productivity lost, and other costs) for five events experienced by specific families in the Indian regions of West Bengal and Andhra Pradesh. The events are related to physical violence, varying from a severely beaten 32-year-old man to a 50-year-old man killed by gunfire. The total cost of the events varies between 100 percent of monthly family income ($87) in one case, to 5,811 percent of monthly family income ($46) in another. These are interesting examples of how violence may disrupt a family's life, but since they are closer to case studies than systematic evidence, we do not include them in table 1.3.

nighttime in high crime areas. Using differences in wages throughout the day, he backs out from his estimates a willingness to pay per worker (for a 75 percent reduction in crime rates) between $397 and $2,640. Finally, using dynamic panel techniques and a cross-country dataset, World Bank (2006) suggests that crime may reduce the long-run growth rate of the economy. According to the estimates, a 10-point reduction in homicide rates would on average imply a welfare improvement between $2.2 and $10 billion.

6. Concluding Remarks

Current estimates of the welfare costs of common crime and violence offer a broad picture of the social losses related to crime. Yet, different methodologies deliver different types of estimates, each with a particular conceptual significance. The most serious limitation of this literature at the present stage is probably its lack of theoretical foundations, and therefore lack of a simple unified framework under which the different numbers provided by the empirical studies can be appreciated and compared.

A long methodological tradition in the area has attempted to estimate the overall consequences of crime in terms of welfare loss to society. Though interesting and illustrating in and of themselves, we argue here that numbers like these are not particularly useful from the perspective of public policy formulation. Estimates closer to what a policy maker would need in order to design an optimal public safety strategy are provided by studies that try to get at marginal willingness-to-pay values. Particularly promising in this direction is the recent use of the contingent valuation methodology to unveil individuals' willingness to pay for alternative sets of potential policies. Though there are methodological concerns in relation to stated-preference strategies, in principle this idea comes close to a direct assessment of the benefit side of a cost-benefit evaluation of public safety policies.

Still, the literature is as of yet entirely silent on the cost side of this same equation. A major empirical challenge is to develop a methodology that allows the estimation of some sort of public safety production function, mapping expenditures along various dimensions on relevant outcome variables. Together with willingness-to-pay numbers for alternative policy scenarios, these would constitute ideal tools for public policy decision making.

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Table 1.1: Crime Rates (%) from Victimization Surveys (ICVS), World Regions, Average for the 1990s

Region	Burglary	Thefts	Contact Crimes	Any Crime
Latin America	11.8	16.9	15.0	43.6
Africa	12.9	16.6	11.4	39.6
Asia	3.6	11.1	4.3	18.9
Former Communist Block	6.8	12.9	7.0	31.7
North America	8.0	10.1	8.7	34.0
Oceania	8.4	9.4	8.3	33.4
Western Europe	4.2	9.5	5.8	28.1

Notes: Regional numbers are unweighted country averages. Source is ICVS (1989, 1992 and 1996/97). Burglaries include attempted burglaries. Thefts are bicycle or motorcycle and other personal thefts, including pickpocketing. Contact crimes are robberies, sexual incidents and/or threats/assaults. Any crime includes all previous categories plus theft of car/joyriding, theft from car, and car vandalism. Numbers based on major cities from each respective country.

Table 1.2: Mortality Due to Violence, World Regions, Average for the 1990s

Region	Mortality Due to Violence (per 100,000)
Latin America & Caribbean	21.8
North America	6.5
Western Europe	4.0
Former Communist Block	17.2
Western Pacific	7.8

Notes: Regional numbers are unweighted country averages. The only African country included in the WHO cause specific mortality data is Mauritius, and the only Eastern Mediterranean country is Kuwait. These regions are not included in the table. Mortality due to violence is homicide and injury purposely inflicted by other persons plus other violent deaths, from the International Classification of Diseases (ICD).

Table 1.3: Summary of Selected Studies on Welfare Costs of Common Crime and Violence

Method	Study	Unit of Analysis	Year	Type of Crime or Expenditure	Main Result (Costs of crime, potential welfare gain from crime reduction, or other consequences of crime) (in 2007 US $ or % of production, unless otherwise noted)					
Accounting	Miller, Cohen, and Rossman (1993)	U.S.	1987	Rape, robbery, assault, arson, murder	Rape	Robbery	Assault	Arson	Murder	Total
					16.72 billion	38.46 billion	160.56 billion	1.42 billion	80.28 billion	297.47 billion
	ISER (1998)	Rio de Janeiro (Brazil)	1995	Medical assistance, years to death or incapacity, material losses, expenditures with safety, justice system, insurance	Medical	Injuries and Premature Deaths	Material Loss and Security Expenditures	Total		
					43 million	1 billion	1.7 billion	2.8 billion (5% of GDP)		
	Londoño and Guerrero (1999)	Latin America	1990s	Medical costs, loss output, intangible costs	Human Capital	Capital	Transfers between Victims and Criminals	Total Cost		
					1.9%	4.8%	2.1%	14.2%		
	Brand and Price (2000)	England and Wales	1999–2000	Medical costs, loss output, intangible costs	Crime against individuals: average cost = $3.100; total cost (billion) = $50.4.	Commercial and public sector cost: total cost (billion) = $14.2	Fraud and forgery: total cost (billion) = $21.6	Traffic and motoring/other nonnotifiable offences: total cost (billion) = $7.5	Total cost of crime (billion) = $93.7	

Table 1.3: Summary of Selected Studies on Welfare Costs of Common Crime and Violence

Method	Study	Unit of Analysis	Year	Type of Crime or Expenditure	Main Result (Costs of crime, potential welfare gain from crime reduction, or other consequences of crime) (in 2007 US $ or % of production, unless otherwise noted)				
	Mayhew (2003)	Australia	2001–2002	Medical costs, loss output, intangible costs	Direct Costs from Crime	Criminal Justice System	Costs of Provision for Victims	Private Security	Total Cost
					24 billion	8 billion	1 billion	4 billion	37 billion
	Rondon and Andrade (2003)	Belo Horizonte (Brazil)	1999	Public and private security expenditures, value of goods stolen, potential income lost by fatal victims, medical expenses	Expenditures on Crime Prevention	Costs from Existing Crime	Total		
					2.26%	1.6%	3.9%		
	World Bank (2003b)	Jamaica	2001	Medical costs, loss of output, public expenditure on security	Medical Costs	Lost Production (in 2001 only)	Public Expenditure on Security	Total	
					0.40%	0.20%	3.10%	3.70%	
	Altbeker (2005)	South Africa	2004	Public expenditure on criminal justice	3.10%				

Table 1.3: Summary of Selected Studies on Welfare Costs of Common Crime and Violence

Method	Study	Unit of Analysis	Year	Type of Crime or Expenditure	Main Result (Costs of crime, potential welfare gain from crime reduction, or other consequences of crime) (in 2007 US $ or % of production, unless otherwise noted)					
	Bundhamcharoen, Odton, Mugen, Phulkerd, Dhisayathikom, and Tangcharoensatien (2008)	Thailand	2005	Direct medical costs, loss of productivity	Direct Medical Costs	Loss of Productivity	Total			
					35 million	379 million	415 million (0.23% of GDP)			
Contingent-valuation	Ludwig and Cook (2001)	U.S.	1998	Gun violence, fatal and nonfatal	Exercise: 30% reduction in crime	WTP Total (billion)	Per Injury (million)	Value of Statistical Life (million)		
						31.2	1.52	6.9 to 8.6		
	Cohen, Rust, Steen, and Tidd (2004)	U.S.	2000	Burglary, serious assault, armed robbery, rape and sexual assault, and murder	Exercise: 10% reduction in crime	WTP per Crime—Burglary	WTP per Crime—Serious Assault	WTP per Crime—Armed Robbery	WTP per Crime—Rape, Sexual Assault	WTP per Crime—Murder (million)
						30,102	84,286	279,347	285,367	11.68
						WTP Total—Burglary* (billion)	WTP Total—Serious Assault* (billion)	WTP Total—Armed Robbery* (billion)	WTP Total—Rape, sexual assault* (billion)	WTP Total—Murder* (billion)
						12.9	14.9	13.6	15.7	18.18

Table 1.3: Summary of Selected Studies on Welfare Costs of Common Crime and Violence

Method	Study	Unit of Analysis	Year	Type of Crime or Expenditure	Main Result (Costs of crime, potential welfare gain from crime reduction, or other consequences of crime) (in 2007 US $ or % of production, unless otherwise noted)			
	Atkinson, Healey, and Mourato (2005)	England and Wales	2001	Common assault, other wounding and serious wounding	Exercise: 50% reduction in crime	Common Assault—WTP per Crime	Wounding—WTP per Crime	Serious Wounding—WTP per Crime
						8,903	52,099	60,419
WTP	Thaler (1978)	Rochester (NY)	1971	Property crime	Hedonic model: cost of an "average" property crime roughly $2,560			
	Lynch and Rasmussen (2001)	Jacksonville (FL)	1994–1995	Rape, robbery, assault, motor-vehicle theft, burglary, larceny	Reduction of 39% of price of a home in the two deciles with the highest cost of crime (from $129,670 to $78,630)			
	Soares (2006)	cross-country	1990s	Homicide rates	Calibration. Exercise: 100% reduction in mortality due to violence	WTP Total—Present Value	WTP—Annual Flow	
						29%	1%	
Other	Cullen and Levitt (1999)	U.S. and Chicago	1970–1980, 1990	Per capita city crime	One-person decline in city residents per reported crime			

Table 1.3: Summary of Selected Studies on Welfare Costs of Common Crime and Violence

Method	Study	Unit of Analysis	Year	Type of Crime or Expenditure	Main Result (Costs of crime, potential welfare gain from crime reduction, or other consequences of crime) (in 2007 US $ or % of production, unless otherwise noted)			
	Hammermesh (1999)	U.S.	1996	Homicide	Exercise: 75% reduction in homicide rate	Increase in Evening and Night Work 0.2 hours per person	Welfare Cost of Homicide Rate on Work Timing $5.3 to $13.2 bi	WTP per Worker—Present Value $397 to $2,640
	World Bank (2006)	cross-country	1990s	Homicide rates	Exercise: 10 point reduction in homicide rates	2.2 to 9.4 bi		

Note: Values deflated to 2007 US $ using the CPI.

VALUING THE IMPACTS OF DOMESTIC VIOLENCE:
A REVIEW BY SECTOR*

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ABSTRACT: This paper critically reviews the literature estimating the costs of domestic violence, defined as violence occurring between household members or intimate partners. The review attempts to value the full range of economic and social impacts of domestic violence by bringing together research from various disciplines, including public health, criminology, demography, development, sociology, psychology, and economics. The discussion is organized by sector to illuminate the costs to public health, justice systems, housing, education and economic productivity. Finally, the review separates the costs at the individual, community, macro and intergenerational levels to highlight how impacts are distributed in society. This organization is intended to aid policy discussions to determine appropriate entry points for interventions to reduce and prevent domestic violence.

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I. Introduction

Domestic violence—abuse experienced within families or between intimate partners—is one of the most pervasive expressions of violence.[1] Worldwide, an estimated one in three women will be physically or sexually abused in her lifetime, most commonly by a family member or partner (Heise et al. 1999; WHO 2005)[2]. In many of these cases, violence against women is accompanied by child abuse (Hilberman and Munson 1977; Roy 1988).

The effects of such violence are staggering and extend far beyond the victim and her household. Unlike victims of other forms of violence, the vast majority of domestic violence victims experience repeated attacks, such that the impacts of violence may multiply over time. The World Bank (1993) estimates that globally, 9 million disability-adjusted life years (DALYs) are lost each year as a result of rape and domestic violence. This figure is greater than the DALYs lost due to all forms of cancer, and twice those lost by women as a result of automobile accidents. The costs to individuals can be debilitating, and include immediate medical expenses, legal costs, property damage, and time and productivity lost at work as a result of injuries or longer-term trauma and suffering. Furthermore, families and communities bear the burden of housing and caring for victims. On the macro level, the costs of responding to domestic violence drains budgets for the health, justice, housing and other sectors, and drags down overall growth and productivity. The most far-reaching impacts are those felt by the children of victims, who face a greater risk of continuing the cycle of violence themselves.

There is by now a growing body of literature which attempts to estimate the costs of these impacts in monetary terms (ICRW 2004; WHO 2004). These studies have been important in framing the issue for policymakers, helping to position it within the broader agenda of development and social welfare and within government budgeting priorities (Morrison and Orlando 2004). These efforts have employed various approaches but have commonly focused on the cost-of-services provision as the primary indicators.

Yet in focusing primarily on the cost of intervention, purely costing exercises necessarily draw attention from the much greater costs incurred from ignoring the problem of domestic violence. These are manifested in the extensive social and psychological impacts of continued abuse, which are often transmitted across generations. The literature valuing these has tended to focus exclusively on one sector. The majority of the research has examined the negative impacts of such violence on victims' physical, mental, and reproductive health, and to a lesser extent, the impacts on their children's mental and physical health, without assigning a monetary value to

[1] The term "domestic violence" refers generally to violence between members of the same household and thus can include children and adults, both male and female. However, most work on domestic violence focuses on violence perpetrated against adult women, as they are the most vulnerable to this type of abuse. The abuse of children, men and elderly adults is generally separated in the literature. In addition, much of the literature on domestic violence focuses on violence by an intimate or domestic partner. For the purposes here, I use the term to refer to intra-family violence. When citing the literature, I have kept the term used in the respective studies. A detailed discussion of definitional issues is given in Section II.

[2] A review of 50 population-based surveys in 36 countries found that the percentage of women who have at some time in their lives been physically harmed by an intimate partner ranged from 10 to 50 percent (Heise et al. 1999). More recently, a World Health Organization (WHO) multicountry study of domestic violence in 10 countries reported lifetime prevalence rates of physical violence by an intimate partner to be between 13 and 61 percent, with most countries showing a range of 23–49 percent (WHO 2005).

these. A separate body of work has focused on the impacts of abuse on victims' employment status, productivity and income.

This paper attempts to value the full range of impacts of domestic violence by bringing together research from various sectors, including public health, criminology, demography, development, sociology, psychology, and economics. It discusses these impacts at the individual, community, and macro levels. Where appropriate, different costing methodologies are also discussed, and a more detailed description of their strengths and weaknesses is given in Annex 2. Section II discusses challenges in defining and measuring domestic violence, as these affect valuation of its impacts. Section III reviews what is known about the costs of domestic violence to various sectors—physical and mental health, justice, housing, education, and economic productivity. This section is organized by sector to aid policy discussions. Within each, I differentiate the impacts at the individual, community, macro, and intergenerational levels. The final section summarizes the challenges going forward.

II. Issues in Definition and Measurement

Defining Domestic Violence

How domestic violence is defined is a central issue in estimating its impacts, since the definition determines the size of the population under consideration. Definitions differ in their specification of the type of relationship between perpetrator and victim, the kinds of violence included, and the frequency of violent incidents. For example, government agencies, including law enforcement institutions, tend to restrict the use of the term to physical violence between legally recognized spouses, and only consider as crimes those incidents that result in physical evidence.

In contrast, advocacy groups often support a broader definition that includes psychological, financial, and verbal abuse in addition to physical abuse, and one which extends the range of possible perpetrators to boyfriends, friends, former partners, and other family members.

The terms domestic violence and Intimate Partner Violence (IPV) are often used interchangeably in the literature, although operationally there are important differences. These differences rest chiefly on the type of relationship between abuser and victim. Domestic violence refers broadly to activities involving members of the same household, which can include spouses, partners, and other family members such as parents, children, or siblings. The term also commonly includes violence between individuals who previously shared a household, such as former boyfriends or spouses. IPV is narrower in scope. It consists of violence between individuals who are engaged (or were formerly engaged) in an intimate, usually sexual, relationship. They may or may not share a household. While in practice most studies focus on female victims, both concepts include violence suffered by men. In this paper I have used the

broader term domestic violence, and when referring to specific studies, I have kept the term used by the respective authors.

Definitions also differ in the types of abuse included. One of the more comprehensive definitions is that given by the United Nations Secretary General, which defines IPV as "a range of sexually, psychologically and physically coercive acts used against adult and adolescent women by a current or former intimate partner, without her consent."[3] The literature on violence contains a clearer consensus on the behaviors for some categories than for others. For example, physical abuse is generally considered to include the use of a weapon or physical force, such as slapping, kicking, hitting, beating, choking, pushing, burning, or holding one against their will.

There is less consensus on which behaviors, and with what frequency, constitute psychological violence. The term generally refers to acts meant to control or isolate the victim by threatening, degrading, insulting, stalking, or humiliating her. While these behaviors are generally accepted as part of domestic violence patterns, they are rarely included in estimates of the cost of such violence. One exception is the U.S. Centers for Disease Control and Prevention (CDC) inclusion of stalking behaviors, defined as "repeated visual or physical proximity, nonconsensual communication, and/or verbal, written, or implied threats directed at a specific individual that would arouse fear in a reasonable person."[4] The existence of at least two incidences of stalking behaviors is also a requirement for this classification. The associated costs are estimated in terms of services provided to address the negative impacts of stalking, including mental health care, and productivity lost from paid and unpaid work.

Other definitions in the literature include financial and economic violence within the category of domestic violence (ICRW 2004). Economic or financial violence involves denying a victim access to or control over material goods, basic resources, and assets. The latter is a relatively recent addition to the concept of domestic violence, and no studies to date have included it in costing estimates.

The public health and psychology literature generally defines sexual violence as harmful or violent sexual contact, or sexual acts perpetrated against the victim's will. This includes acts that are imposed under pressure or influence of drugs or alcohol.

Another defining feature of domestic violence is that victims experience the violence repeatedly. However, the frequency criteria for defining a case as domestic violence are often disputed in the literature. As the International Center for Research on Women (2004:14) notes, "A measurement issue is whether to include women who experienced only one form [of violence] one time, or if there has to be a minimum criterion of x forms and/or y times."[5] Defining domestic violence as particular behaviors, as opposed to a pattern of controlling behaviors, has important implications for measuring its impacts.

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[3] United Nations Secretary General. 2006. *Ending Violence Against Women: From Words to Action*. New York: United Nations, 43.

[4] Centers for Disease Control and Prevention. 2003. *Costs of Intimate Partner Violence Against Women in the United States.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 9.

[5] International Center for Research on Women. 2004. *Costs of Intimate Partner Violence at the Household and Community Levels.* Washington, DC: ICRW.

Measuring Prevalence and Victimization.

The extent of domestic violence in a given context is generally measured by the *prevalence rate* (number of victims) and the *victimization rate* (number of incidents). In performing costing estimates, the prevalence rate defines the number of people to be included in the estimates—that is, the total number of victims. The victimization rate, or number of total incidents, offers a clearer assessment of the impact of domestic violence on services because it captures the fact that victims may suffer violence repeatedly, and therefore access services more than once (ICRW 2004).

Estimating prevalence is a challenge given that domestic violence—more than other forms of violence—is highly susceptible to underreporting. The literature on violence against women repeatedly emphasizes that the vast majority of victims do not seek help, and those that do look for support tend to turn to informal networks of friends, neighbors, religious institutions, or community groups (Heise et al. 1999; ICRW 2002). Their actions thus escape many data collection efforts. Furthermore, cultural and social norms that condone violence may make victims reluctant to identify themselves. This can be reinforced by lack of sensitivity by police or other first responders to domestic violence. In turn, service providers may not record information on whether clients are using their services as a result of domestic violence. Finally, the degree of reporting may vary across countries due to institutional and cultural factors, making comparisons difficult. Crime reporting rates generally tend to be higher in countries with higher levels of public confidence in the criminal justice system (UNODC and World Bank 2007).

Ideally, prevalence and victimization rates are taken from large surveys that ask respondents to report whether they have been victims of domestic violence, and if so, how often (Day 1995; Greaves et al. 1995; Miller et al. 1996; CDC 2003). Annex A summarizes the principal data sources for prevalence and victimization rates. Other studies conduct original surveys and estimate prevalence and victimization for the general population (Rao 1998; Morrison and Orlando 1999; Ribero and Sánchez 2004).

When broader surveys do not have access to the actual prevalence rate, researchers rely on data from service providers to estimate institutional prevalence—the use of services by domestic violence victims. For example, Snively (1994) estimated prevalence by the number of police call-outs for domestic disputes. However, it can be problematic to rely on service provision as an indicator of prevalence for several reasons. First, many victims never access services, or do not disclose their status when they do. Service providers may not record when a victim accesses services repeatedly, and thus may double-count victims. Data drawn from service providers may also skew estimates of prevalence or victimization if institutions classify domestic violence differently. Often, service agencies do not collect information on the relationship between the victim and her abuser—as a result, incidents of stranger violence are indistinguishable from domestic or intimate partner violence in the data.

III. Impacts by Sector

The impacts of domestic violence are felt far beyond the victim, extending broadly to households, communities, and greater society. Most of the literature on costing domestic violence tends to divide costs into two categories: direct and indirect. Direct costs represent expenses directly associated with preventing and responding to domestic violence. These include direct health and mental health care costs, medicines and emergency room visits, judicial services, law enforcement costs (such as detention and prosecution of perpetrators, and protection of victims), civil justice, property damages, and social services such as temporary or transitional housing, job or skills training, counseling for victims, or treatment for perpetrators. Indirect costs include all costs associated with, but not directly related to, a violent intimate or domestic relationship. These include lost earnings or employment, decreases in quality of life, pain and suffering, and impacts on other family members, such as children. Others have disputed the direct/indirect dichotomy as too narrow to capture the diverse impacts of domestic violence (ICRW 2004; Gancheva et al. 2006) and have proposed extended frameworks that include social and economic multiplier effects (Buvinic et al. 1999).

This paper organizes the discussion of impacts by sector rather than according to direct and indirect categories. It is hoped that this organization can better inform policy discussions regarding the appropriate areas of intervention. This section reviews the existing knowledge of how domestic violence impacts the health, education, legal, housing and economic sectors at various levels. A matrix summary is provided in table 1.1.

Physical and Reproductive Health

Domestic violence is associated with a wide spectrum of negative health outcomes, from direct injuries resulting from attacks to long-term trauma. The most extreme health impact is murder. An estimated 62 percent of female homicides in the United States and 40 percent in the United Kingdom are perpetrated by an intimate partner (Parliamentary Assembly of the Council of Europe 2002; Violence Policy Center 2005). In Bangladesh, Colombia, India, Nigeria, and Pakistan, many thousands of women are killed in dowry-related disputes or maimed by rejected suitors (Parliamentary Assembly of the Council of Europe 2002). Direct and immediate nonfatal impacts include injuries to the head, neck, thorax, breasts, and abdomen, which have been documented to be more common than women injured in other ways (Grisso et al. 1999). Other health-related impacts include chronic pain syndrome and gastrointestinal disorders (Heise et al 1999; Campbell 2002), as well as lower caloric intake compared to women who are not abused (Rao 1998).

Domestic violence is also linked to many negative reproductive health outcomes for women. These include increased risk of HIV and other sexually transmitted infections (STIs), as well as undesired pregnancies and complications during pregnancy (Heise et al. 1999; Campbell 2002; Kishor and Johnson 2004, 2006). For example, a study of women in Cambodia, Haiti, and the Dominican Republic showed that women who reported abuse were significantly more likely to have an STI than women who did not report abuse (Kishor and Johnson 2006). Similarly, a

Table 1.1: Key Impacts of Domestic Violence by Sector and Level of Intervention						
	Physical and Reproductive Health	**Mental Health**	**Legal/Judicial**	**Housing/Shelter**	**Education**	**Employment and Productivity**
Individual	Homicide; suicide provoked by abuse; maiming; nonfatal injuries (commonly to head, thorax, abdomen, breasts); chronic pain syndrome; gastrointestinal disorders; increased risk of HIV and STI infection; miscarriage; undesired pregnancy.	Suicide; depression; post-traumatic stress disorder anxiety; insomnia.	Costs associated with restraining orders, protection orders, divorce.	Costs of securing temporary housing/shelter.	Victims' decreased participation in educational programs; abusive partners may interfere in education attendance; violence may impact education performance.	Lost productivity and earnings due to time off work for injuries; court appearances; reduced income due to increased medical or other related costs; decreased earnings from dropping out of school or losing job due to violence; reduced performance from harrassment from abusers at work.
Community	Increased burden on health services in the community; cost of medical expenses may be borne by victim or abusers' extended family.	Emotional support to family and friend victims of domestic violence.		Increased burden on family and community members to provide shelter for victims.		Economic support to friends or familiy victims drains income.
Macro (State/Society)	Increased HIV/STI infection associated with domestic violence drains health budget.	Costs of staffing crisis centers; hotlines; counseling and other social programs for victims and perpetrators.	Police patrolling and call-outs; costs of prosecution; probation; reform programs for perpetrators; incarceration; compensation to victims.	Staffing and maintenance of shelters; security costs to protect victims at shelters.	If victims decrease investment in education: Costs of victims' leaving school in reduced tax base (due to reduced earnings of dropouts); cost of second-chance programs for dropouts.	Costs of reduced productivity due to poor attendence or weakened performance; increased insurance costs for employers; costs to employers of needed security at work; costs of high turnover of domestic violence victims.

Intergenerational	Children of victims tend to have lower vaccination rates, higher under-five mortality rates; lower nutrition levels.	Children of victims may suffer emotional and behavioral problems; abuse of alcohol and drugs; early sexual activity; tendency of children to enter abusive relationships as adults, or perpetrate violence.			Children of victims may exhibit lower school attendance rates, worsened academic performance (some evidence of the opposite as well). Emotional or behavioral problems associated with abuse may impact school performance.	Behavioral and emotional problems associated with living in abusive environments may affect work and productivity as an adult.

study of Tanzanian women found that HIV-positive women were more than twice as likely to report abuse by a partner than HIV-negative women, and this difference increased to more than 10 times among young women 18–29 years of age (Maman et al. 2002). The relationship between increased risk of infection and abuse has several potential explanations. Women in abusive relationships might be less able to negotiate condom use. In addition, there is evidence that men who abuse their partners are more likely to engage in other high-risk behaviors associated with STIs, such as having multiple sexual partners, unprotected sex, and using illicit drugs; (Johnson and Das 2008).

The experience of violence during pregnancy appears common across many contexts. In a cross-national study of nine developing countries, the number of women who reported being beaten while pregnant ranged from 1 percent in Cambodia, to 5 percent in Haiti and the Dominican Republic, to a high of 11 percent in Colombia and Nicaragua (Kishor and Johnson 2004). Research has shown that women beaten while pregnant are twice as likely to miscarry (Stark et al. 1981; Bullock and McFarlane 1989; Jejeebhoy 1998). The stress from victimization is also associated with delays in seeking prenatal care, which risks the viability of the fetus (Newberger et al. 1992; Taggart and Mattson 1995).

The cost of these impacts on individuals, communities, and the health sector are substantial. Immediate physical injuries imply direct costs in emergency medical care for both individuals and service providers. On the household level, even one severe incident of violence, especially if it requires hospitalization, can push a family into debt or economic stress, especially if loans are required to pay the expenses or compensate for loss of income due to the injury. In Colombia, Ribero and Sánchez (2004) estimate the health costs of violence against women borne by households to be 0.06 percent of GDP, and the costs of child abuse to be 0.09 percent of GDP. In some contexts, the costs of health care following violence are borne by the extended family, usually the natal family of the victim, which further drains family resources (ICRW 2000).

A growing number of studies, most of which have focused on developed countries, have estimated the total direct costs to the health sector in monetary terms using a direct accounting methodology. This approach multiplies the unit cost of a service by the number of times the service was used, and sums these across services to obtain a total estimate. This method was developed by the U.S. Centers for Disease Control and Prevention (CDC 2003). The total number of incidents of domestic violence is obtained from the U.S. National Violence Against Women Survey (NVAWS), and is used to estimate the number of times different services are accessed. Next, the average costs of services per victim are calculated (usually from targeted surveys of health providers). These are multiplied by the number of reported incidents for each corresponding service to determine the cost of each service. Finally, the costs are summed across sectors for the total estimate. Using this method, the CDC (2003) estimated that domestic violence costs $4.1 billion annually in direct medical services.

In most studies, the unit costs of services must be estimated from other data. Some studies rely on prior research (Greaves et al. 1995), while others conduct original surveys or consultation of service providers (; Blumel et al. 1993; Snively 1994; Greaves et al. 1995; Day 1995;

Stanko et al. 1998), or interviews with victims (Institute for Women of Andalusia 2003). In Canada, studies have derived estimates ranging from Can$408 million in direct medical costs (Greaves et al. 1995). In Spain, such methods have estimated a cost of €384 million in direct medical and mental health costs (Institute for Women of Andalusia 2003).

If data on unit costs are unavailable, direct cost accounting can be done using a proportional methodology.[1] The cost of responding to domestic violence is estimated by determining the proportion of the total budget of different service providers that is spent on these services and aggregating for all providers. Using this approach, Day (1995) estimated that domestic violence cost Canadians $7.6 million in direct medical plus $1.3 million in direct dental costs.

Even though the costs of longer-term, negative reproductive health outcomes have not been separated out in the costing studies to date, these can be assumed to be quite large. The cost of terminated pregnancies due to abuse or stress-induced miscarriage, for example, cannot be accurately determined. Similarly, the costs of increased STI, (and especially HIV infection) to individuals, communities, and the health sector as a result of domestic violence are presumably substantial, but no studies have yet attempted to quantify them.

Mental Health

The most common mental health outcomes associated with domestic violence are depression and post-traumatic stress disorder (PTSD). In one meta-analysis of studies from the United States, the risk of developing both of these in women abused by partners was even higher than the risk associated with childhood sexual assault (Golding 1999). Other associated mental health problems include insomnia, anxiety and social dysfunction (Campbell 2002). One study of women in Nicaragua linked 70 percent of general emotional distress cases to violence by an intimate partner (Ellsberg et al. 1999).

While the trauma, pain, and suffering associated with domestic violence are widely recognized in the literature, only a few studies have attempted to assign them monetary values. In the absence of solid data, some researchers have substituted proxies for relevant costs, and then used a direct accounting approach to sum the totals. Miller et al. (1996) estimate the cost of pain and suffering by imputing values for different experiences of violence. The values are obtained through an extensive review of the economic literature on crime and violence. They calculate from the literature the mean value for lost earnings resulting from death and for reduced quality of life, and multiply these by the number of incidents of rape and domestic violence. Based on this method, they estimate annual costs to be $127 billion for rape, $93 billion for assault, $61 billion for murder (excluding arson and drunk driving) and $56 billion for child abuse.

Miller et al.'s (1996) breakdown of associated expenses exemplifies the magnitude of long-term mental health impacts. For example, the total lifetime cost per victim of a rape is

[1] Day (1995) is one example. See also ICRW (2002) for a more detailed description.

estimated to be $110,000 because many rape victims experience repeated assault, especially in cases of domestic abuse.[2] The estimate is broken down into the following categories: $500 in immediate medical care; $2,400 in mental health services; $2,200 in lost productivity (due to time off work); and $104,900 in pain and suffering. The latter figure is based on research into the prevalence of rape trauma syndrome, emotional breakdowns among rape victims, and other lifelong physical manifestations of sexual trauma. The cost of domestic violence per victim is $11,000 per victim.

A small but growing body of work has applied contingent valuation methodologies to estimate intangibles associated with domestic violence. The most common among these are willingness-to-pay (WTP) methodologies. These are based on the assumptions of basic cost-benefit analysis, which posit that the cost to society of an undesirable outcome will equal the amount people would be willing to pay to avoid that outcome. Walby (2004) adapts data from a survey of willingness to pay to avoid certain injuries from traffic accidents and uses it to estimate different costs associated with domestic violence. Using proxies from similar traffic accident-related injuries, she estimates the costs of pain and suffering resulting from domestic violence not counted in the costs of services to be a staggering £17 billion per year. This estimate represents more than three times the estimate for annual direct costs resulting from domestic violence (£5.7 billion).

Legal/Judicial

The costs the legal and judicial system incur responding to domestic violence will vary depending on the legal framework. Broadly speaking, costs may include police response to call-outs, enforcing protection orders, assisting victims in legal processes, divorce, criminal prosecution, incarceration, and victim compensation, among others. A few studies have attempted to estimate these using direct accounting. In Canada in 1995, Greaves et al. (1995) estimated the costs to the criminal justice system at Can$872 . In Colombia, Ribero and Sánchez (2004) estimate that cases involving domestic violence cost Col$1.6 billion, representing about 6 percent of the yearly budget for the public prosecutor's office.

In the United Kingdom, costs to the criminal justice system are estimated at £1 billion a year. Within this estimate, the largest proportion corresponds to the police, followed by prosecution, courts, probation, prison, and legal assistance. An additional £0.3 billion is estimated annually for civil-legal costs, including specialist legal actions (such as injunctions to restrain or evict an abuser), divorce, and child custody. These civil-legal costs are estimated to be split evenly between the victim and the state (Walby 2004).

Both the victim and the state incur legal costs in varying proportions. In Canada, legal costs comprise 20 percent of the state's total cost of responding to domestic violence (Greaves et al. 1995); in Colombia they account for 22 percent (Ribero and Sánchez 2004). Walby (2004)

[2] The cost per rape was estimated at $87,000 (Miller et al. 1996).

calculates that domestic violence-related costs to the legal sector account for 25 percent of the total budget for violent crime.

Housing, Temporary Shelter and Property Damage

Housing remains a critical issue in addressing domestic violence. In developed countries, the experience of domestic violence has been linked to homelessness by research and advocacy campaigns. In the United States, domestic violence is listed as a primary risk factor for homelessness in 9 out of 25 cities (U.S. Conference of Mayors 2003). In some regions, an estimated one-third of homeless women are homeless because of domestic violence (Wilder Research Center 2004).

On the individual level, the cost of obtaining temporary shelter can be prohibitive for low-income women. Greaves et al. (1995) estimated that victims in Canada pay Can$386,000 hotel costs annually, based on a unit cost of Can$40 per night for a hotel room and an average of two nights spent in hotels per violent incident.

Costs to the housing sector may include staffing, maintaining, and securing shelters, and paying for housing programs for victims or allocating portions of budgets to house victims of violence. The cost of domestic violence to the housing sector in the United Kingdom is estimated at £1.2 billion annually. This figure includes how much it costs local housing authorities and associations to house the homeless due to domestic violence, housing benefits for this emergency housing, and staffing and maintaining shelters (Walby 2004).

In developing countries where housing is generally scarce, shelters for domestic violence victims are rare or nonexistent. Instead, the burden of sheltering victims and their children falls mostly on friends or family (ICRW 2000, 2004). Because this is often done informally, these costs have rarely been measured in studies. One exception is a recent study of Macedonia (Gancheva et al. 2006) in which 92 percent of the sample had to leave their home as a result of violence—62 percent of these had to leave during the night. In 74 percent of these cases, victims and their children found shelter with family or friends, while the rest went to shelters, hotels, or temporarily rented apartments. Overall, the costs of temporary shelter to individuals accounted for 4.6 percent of costs associated with domestic violence in the study. A much larger proportion—60 percent of the total in this study—resulted from damage to property during the violent incident, including housing, furniture, and children's toys. As a result of violence, 70 percent of victims were forced to change residence, although these substantial costs were not measured by the study.

Education

The relationship between domestic violence and educational attendance and performance is a complicated one. Research on welfare initiatives in the United States shows that violent partners may interfere in victims' accessing of college, educational programs, employment training, and literacy programs (Gittel and Moore 1989; Raphael 1995).

A decreased investment in education may also be a behavioral response to abusive situations. Recent economics work suggests that individuals exposed to violent environments may change their behavior or preferences to adopt shorter life-planning horizons (Lorentzen et al. 2005). They may decrease or abandon personal savings or education because exposure to

violence has led them to underestimate the long-term benefits. In contexts of high HIV/AIDS prevalence, for example, a negative correlation between human capital investments and adult mortality rates has been observed (Kalemli-Ozcan 2006). To date, these behavioral responses have not been explored in the literature on domestic violence, and as a result their impacts are not well understood. These relationships need to be explored in more detail, controlling for a wider range of potentially interfering variables.

However, the relationship between exposure to domestic violence and educational performance has been examined for children of victims, and has produced inconsistent findings. One study using data from Peru, Haiti, and Zambia found that children of women who suffered abuse had higher attendance rates and were less likely to lag behind in age/grade progression than children of nonvictims (Morrison and Orlando 2004). The results suggest that victims might be attempting to protect their children by keeping them in school and out of the home for as much of the day as possible. Evidence also exists to the contrary: One study of Nicaragua and Chile reported that 63 percent of victims' children had to repeat a school year and received on average four years less formal schooling than children of nonvictims (Morrison and Orlando 1999). Potential explanations include the debilitating impact of abuse (such that victims are unable to keep their children in school due to reduced income), injuries that interfere with parenting and childcare responsibilities, changing of houses, or other factors.

Employment and Productivity

Studies that explore the impact of domestic violence on employment and productivity have produced mixed findings about these complex relationships. In Colombia, Ribero and Sánchez (2004) found that abused women were much more likely to be unemployed, with 8 percent higher unemployment rates than nonabused women. Women whose children were abused had 4–8 percent higher unemployment rates. In contrast, a study of Peru, Haiti, and Zambia found that abused women were more likely to be employed than nonvictims (Morrison and Orlando 2004). A third study of rural India found no significant relationship (Agarwal and Panda 2007).

Other empirical work suggests that while violence may not interfere with a victim's ability to obtain employment, it does impact socioeconomic and occupational status over time by hindering one's ability to maintain steady employment. In a study of a low-income neighborhood in Chicago, Lloyd (1997) found that while women experiencing violence were just as likely to have a job as other women, they more frequently lost jobs and had lower incomes overall. Other studies of women in domestic violence shelters reported similar observations. A study by Friedman and Couper (1987) observed that 56 percent of interviewees had lost at least one job, and 54 percent had missed at least three days of work per month due to violence inflicted by an intimate partner. Similarly, in a survey by Shepard and Pence (1988), 58 percent of respondents reported worsened work performance due to absenteeism and tardiness as a result of abuse, and 24 percent said abuse was a factor in losing a job. Nor are victims safe from violence when at work: One study of the United States reported that half of victims experienced harassment from

their abusers while at work (United States Bureau of National Affairs 1990). Over time, the emotional and psychological impacts of abuse can trigger depression, which may also impact work attendance and performance.

Empirical evidence from developing countries is scarce but suggests a similar pattern. In a study of Nagpur, India, 62 percent of women reported experiencing violence in the past year, and of these, 9 percent had injuries serious enough to prevent them from being able to work either at a job or in the household, or both, for an average of seven days per incident. The study also reported that in 42 percent of cases, the abusive partners also missed work for an average of 7.5 days per violent incident. Thus, for each incident, the average household loses the equivalent of two weeks' pay (ICRW 2000).

Studies that assign a monetary value to these impacts suggest that lost earnings represent some of the highest costs associated with domestic violence. Two of these studies have used econometric techniques to compare outcomes for victims and nonvictims. Using a reduced-form earnings equation, Morrison and Orlando (1999) estimated that victims of domestic violence faced reduced earnings totaling $1.56 billion in Chile and $29.5 million in Nicaragua. These losses represent an estimated 2 percent of GDP in Chile and 1.6 percent of GDP in Nicaragua (see Annex A for a more detailed discussion of methodology).

More recently, researchers have employed matching methods in order to more rigorously establish control groups to compare outcomes. Ribero and Sánchez (2004) use Propensity Score Matching to assign cases to control (never experienced domestic violence) and experimental (victims of violence) groups. They found that women who experience severe violence earn 70 percent less in monthly income than do nonabused women. On the macro level, lost earnings and temporary unemployment due to violence against adult women costs the equivalent of 2.43 percent of GDP annually. The cost of child abuse, in terms of unemployment and lost earnings for the mother, is estimated at 1.5 percent of GDP.

Greaves et al. (1995) used direct accounting methods to estimate lost earnings due to female homicide, absenteeism by victims, and absenteeism of incarcerated perpetrators in Canada. The total cost in lost employment and productivity is estimated at Can$576 million annually. Of this, the bulk (81 percent) falls on the individual victim, in the form of lost lifetime earnings due to death, victim absenteeism, and lost income of perpetrators due to court appearances or incarceration. The remaining Can$106 million represents costs to the state in terms of lost tax from death and absenteeism.

Intergenerational Impacts

A growing body of literature links the experience of domestic violence to a wide range of adverse outcomes for children, whether they experience abuse directly or witness it. Various studies report that mortality rates of children under five years old are higher (Binka et al. 1995; Jejeebhoy 1998; Ganatra et al. 1998; Åsling-Monemi et al. 2003; Kishor and Johnson 2004) and vaccination rates are lower for children of women who experience domestic violence (Kishor and Johnson 2004). One study that analyzed data from Leon, Nicaragua, controlled for other factors

related to infant and child mortality and estimated that children of victims were six times more likely to die before the age of five. Furthermore, a third of all deaths of children were related to domestic violence against the mother (Åsling-Monemi et al. 2003). Domestic abuse has also been associated with low birth weight (Campbell 2002), and lower levels of nutrition (Rao 1998; Jejeebhoy 1998; Ganatra et al. 1998), although the strength of the relationship tends to vary with the indicator of malnutrition used (Kishor and Johnson 2004). As discussed previously, the relationship between child exposure to domestic violence and educational performance is still not well understood. Some studies have found higher attendance rates and progress indicators among children of domestic violence victims (Morrison and Orlando 2004), while others find the opposite (Morrision and Orlando 1999).

Children who live in homes where abuse occurs are at greater risk of being abused themselves than children in nonabusive homes. Studies from the United States have indicated that older children are frequently abused and injured when they intervene to protect their mothers from abuse (Hilberman and Munson 1977; Roy 1988). Domestic child abuse has been shown to be associated with youth-risk behaviors such as alcohol and drug use, early and risky sexual experience, and violence (Campbell 2002;; Heise et al. 1999). In a study of youth in the Caribbean (World Bank 2003), it was reported that 16 percent of adolescent school-going boys who were not abused by parents used drugs, compared to 28 percent who were abused. Drug use for girls increases from 13 percent to 18 percent if they are abused by parents. Among school-going girls, girls who have been abused at home begin sexual activity twice as early as those who are not abused.

Of the studies reviewed in this paper, only one attempted to quantify the health-related costs of child abuse in monetary terms. Ribero and Sánchez (2004) estimate the annual, direct, health care costs of child abuse to households is equivalent to 0.092 percent of GDP, more than the health care costs of violence against adult women (0.062 percent of GDP). This suggests the impacts of child abuse can be even more damaging, and longer term, than domestic violence against women.

Children who are not physically abused but who witness abuse often exhibit the same emotional and behavioral impacts as children who are directly abused (Hilberman and Munson 1977; Roy 1988; Jaffe and Sudermann 1995). Long-term psychological effects such as depression and suicidal tendencies can manifest from the "guilty bystander" experience of witnessing abuse without being able to stop it, regardless of the age of child when the abuse occurs.

Children who witness abuse are also prone to continuing the cycle of violence as teenagers and adults. Indeed, a Presidential Task Force on Violence and the Family in the United States identified a child's exposure to violence between adults in the home as the strongest risk factor for transmitting the cycle of violence from one generation to the next (American Psychological Association 1996). In many cases, children adopt the roles they witness in their homes, as either victimizer or victim. Female children who witness or experience violence at home may be more likely to enter abusive relationships as adults (Kalmuss 1984; Seltzer and Kalmuss 1988). In a study of nine countries by ORC Macro, women were twice as likely to report

suffering abuse if their own mothers had been abused (Kishor and Johnson 2004). Along the same lines, male children who witness abuse may present an increased tendency to perpetuate violence as adolescents and adults, whether in their own homes or in delinquent or gang activities (American Psychological Association 1996; Dahlberg 1998; World Bank 2008).

IV. Conclusions

This analysis highlights the extensive impacts of domestic violence on key economic and social sectors. The intent has been to emphasize not only the costs of responding to domestic violence, but also the immense costs of ignoring abuse. The latter accrue to individuals, communities, and society more broadly over time.

In purely monetary terms, the greatest costs are lost productivity and earnings incurred by both victims and perpetrators over time, which can devastate individuals and households. At the macro level, these productivity losses amount to a substantial portion of GDP.

Yet lost productivity and earnings due to violence are themselves outcomes of other negative impacts on the health and educational performance of victims. The extent to which domestic violence exacts a toll on the physical, mental, and reproductive health of victims is only beginning to be understood. The trauma and stress over the long term affect all aspects of a victim's life, from her educational and professional development, to her ability to parent children and participate in her community. These complex interrelationships constitute some of the biggest challenges to designing domestic violence prevention strategies.

There has been substantial research into the physical and reproductive health impacts of domestic violence. These include not only immediate physical injury but also chronic pain, increased risk of STI infection, and threatened or terminated pregnancies. The psychological effects of abuse have also been well researched, suggesting important relationships between abuse and long-term mental health problems such as post-traumatic stress disorder, anxiety, and depression.

What is less understood are the behavioral responses to abuse. Future research might examine how abuse affects victims' investment in human capital, both for themselves and their children. Similarly, the employment experiences of victims should be more rigorously explored. Such research can inform interventions that address the educational and employment challenges faced by victims and their children and may also provide useful entry points for prevention initiatives.

At the macro level, the costs associated with responding to victims put serious strain on health, housing, and legal budgets. Costing exercises are useful in quantifying some of this burden. Yet these can only tell us the costs of interventions themselves—demand for services is likely to be much higher. In developing countries where resources and services are often scarce, actual demand may be substantially larger than service provision. More rigorous data collection from consumers and potential consumers of these services is needed to adequately address this issue. As outlined in Annex A, a number of standardized, international data sources do exist, but

these face serious funding constraints to their broader implementation. Supporting data collection is therefore a key priority in violence prevention.

Finally, while the impacts on victims are immense, the costs to children are even more far-reaching and damaging. Children of victims have a higher probability of premature death, worse health and nutritional indicators, and may suffer a host of emotional and behavioral problems born from their experience as a victim or witness of violence. Perhaps the most destructive impact is the increased propensity of children to continue the cycle of violence, either as victims or perpetrators. The cost of allowing this cycle to repeat itself is arguably the most important consideration moving forward.

ANNEX A: Data Sources on Domestic Violence Prevalence and Incidence

Over the past 15 years, there has been greater effort to collect data on violence victimization and to work toward comparable data collection across countries. Many of the studies in industrial countries now have the advantage of national surveys focusing specifically on violence against women. These collect information from representative samples on prevalence, victimization, lost earnings, and productivity due to violence, and, in some cases, service use by victims. These surveys are generally considered to collect better data on victimization and prevalence than broader national demographic surveys and censuses that may only include one or two questions on violence. Surveys focused on violence against women are also more likely to include safety and confidentiality provisions in their implementation, such as anonymous reporting (Walby 2004). They are also more likely to train interviewers to keep the interview private and deal with emotional sensitivity of respondents (Ellsberg et al. 2001).

Focused surveys are also generally regarded as being more effective at overcoming cultural perceptions about what activities constitute violence. For example, broader surveys, such as national censuses, may only ask a couple questions to assess victimization. In some cases, these questions come at the end of the survey and represent a significant departure from other topics covered. Giving respondents just one or two opportunities to disclose their violent experiences often results in underreporting, especially of moderate or light abuse (Ellsberg et al. 2001). To correct this, most studies on domestic violence now use the Conflict Tactic Scale (CTS), first developed by Straus in 1973 and used in hundreds of surveys since (Straus 1990; Straus and Gelles 1986). The CTS consists of a set of questions about the respondent's experience with specific violent acts. These range from mild verbal abuse to life-threatening actions, and are designed to avoid the self-censoring that victims often adopt when asked directly about their experiences with violence. In addition, focusing on specific behaviors reduces the reporting inconsistencies that result from differing cultural perceptions of violence. Ideally these can be attached to general population surveys as a separate module to ensure representative sampling.

Few studies on costing domestic violence have been done in developing countries, due principally to a lack of reliable data. Those that exist have either used police crime statistics (Lozano 1999) or conducted original, targeted surveys and interviews (Rao 1998; Morrison and Orlando 1999; Ribero and Sánchez 2004).

International surveys do exist, but have yet to be standardized and widely implemented. The longest-standing and most widely implemented survey on domestic violence is the Measure Demographic and Health Surveys Domestic Violence Module. This project began collecting data on prevalence of domestic violence within households in the early 1990s, and by the end of the decade had developed a standard module that has now been implemented in 17 developing countries, some multiple times.[3] The DHS domestic violence module has been popular in many countries because it can be attached to national population surveys, which helps increase its coverage and decrease implementation costs. (Kishor and Johnson 2004).

[3] For a full list of countries see http://www.measuredhs.com/topics/gender/archives/dv_publications.cfm.

A second international data source is the World Health Organization (WHO) Multicountry Study on Domestic Violence and Women's Health. This survey has been implemented in 11 developing countries and collects data on prevalence and health outcomes of domestic violence, although not on related services and their costs (WHO 2005).

The International Crime Victim Survey (ICVS) series collects data on sexual assault and assault by intimate partners. Although the questions are not extensive, they offer a basis for computing prevalence rates and defining relevant services to include in costing exercises for a representative sample.[4] To date, the ICVS has been implemented in 70 countries, but only a small number of these are developing countries, and in these, the survey has only been implemented in capital cities.

The United Nations began a project to design an International Violence Against Women Survey (IVAWS) in 1997, using much of the same methodology and infrastructure as the ICVS. The IVAWS project began data collection in 2003. It takes a crime victimization perspective and contains detailed questions on experiences with violence, including information on relationship with the abuser, specific acts of violence, injuries associated with abuse, and number of incidents of each type of abuse, as well as information on the types of services used and experiences with those. The methodology relies on specially trained interviewers who are sensitive to the topic, respect and interpret cultural context, ensure privacy and confidentiality for respondents, and possess other related skills. Countries participate on a self-funded basis. As of 2007, the survey had been implemented in just 11 countries, most of them developed.[5]

[4] The ICVS contains questions on sexual offenses (grabbing, touching, assaulting "for sexual reasons in a really offensive way") and on assault (whether the victim has "been personally attacked or threatened by someone in a way that really frightened you"). Both questions refer to events that occur at home or elsewhere. If the respondent answers yes to either, he or she is asked for more detailed information on the relationship with the offender, how serious the attack was, how many times it occurred and where, and what (if any) type of services were sought, including reporting the incident to the police. In developing countries, the ICVS is implemented face-to-face. See Van Dijk et al. 2007, Appendix 8 for questionnaire.

[5] Countries and economies that have implemented the IVAWS are Australia, Costa Rica, the Czech Republic, Denmark, Mozambique, Switzerland, Greece, Hong Kong (China), Italy, the Philippines, and Poland (UN 2007).

ANNEX B: Costing Methodologies

To date, the literature on costing domestic violence has produced widely different estimates on its impact, even when analyzing it in the same context. These differences result from different objectives, methodologies, and categories of costs included in the estimations. These are explained in more detail in this annex and summarized in table 1.3.

Table 1.3: Comparison of Costing Methodologies

Objective	Methodology	Advantages	Challenges
Estimating Direct Costs	Direct accounting.	1. May be less data intensive than other approaches. 2. Straightforward method.	1. Definition of categories is arbitrary, and important costs can be omitted. 2. Estimate of actual cost may not reflect willingness to pay, or ideal provision. 3. Time frames of data included from various sources may be inconsisent 4. Long-term costs are not captured. 5. Potential to double-count
Estimation of indirect/intangible costs (pain and suffering, lost productivity)	Direct accounting, using imputed values (Miller et al. 1996).	Addresses problems of gaps in data availability.	Estimates are only as robust as the choice of proxies
	Willingness to pay proxies (Walby 2004).	1. Useful policy tool because it quantifies public preferences about DV.	1. Because targeted survey data is not available, tends to rely on assumptions about comparability of different risks which may not be accurate. 2. May not be realistic in contexts where DV is socially accepted.
	Disability-adjusted life years Lost (DALYs) (World Bank 1993).	1. Allows for quantification of loss in quality of life. 2. Can be easily compared across contexts and to other categories of violence and disease.	1. Data intensive. 2. Complex methodology. 3. Comparisons of the impact of other diseases/violence only make sense if done in DALY terms.
	Comparison of outcomes using econometrics (Rao 1998).	Allows for determination of statistical relationships between victimization and different outcomes.	1. Data intensive. 2. Determination of control group defines robustness of results: it is difficult to match cases based on observable variables, so this method cannot determine differences caused by unobservable factors.
	Comparison of outcomes using Propensity Score Matching (Morrison and Orlando 2004).	1. Allows for more rigorous definition of control groups. 2. Allows for assessment of relationship of DV on selected outcomes.	1. Relies on large sample sizes 2. Simultaneity issues. 3. Does not allow for estimation of total costs of DV, only its impact on different outcomes.

Estimating Direct Cost Using Accounting Methods

The most common approach to costing domestic violence is a simple accounting methodology that multiplies the unit cost of a service by the number of times the service was used, and sums these across services to obtain a total estimate. In this approach, the researcher first determines the prevalence rate and/or victimization rate (number of incidents), either from specialized surveys, general population surveys, or by estimating the institutional prevalence. Next, a list of relevant services is compiled and their unit costs estimated.

Like prevalence rate estimates, estimation of unit costs of services is subject to data availability. In some cases, researchers can draw on specialized surveys like the U.S. Medical Expenditure Panel Survey, Medicare 5% Sample Beneficiary Standard Analytic Files to determine the unit costs of different services. Then, the costs of specific services are multiplied by the number of times each service was used (number of incidents). An example is the method used by the CDC (2003) and summarized in Morrison and Orlando (2004). Data on incidence of domestic violence are taken from the U.S. National Violence Against Women Survey (NVAWS) and used to derive an estimate of how many times different services are used. Next, the average costs of services per victim are calculated (usually from targeted surveys of health providers) and multiplied by the number of reported incidents for that service. These costs are summed across different sectors for a total estimate.

In the majority of studies, the unit costs of services must be estimated from other data. Some studies rely on prior research (Greaves et al. 1995), while others conduct original surveys or consult with service providers (Roberts 1988; Blumel et al. 1993; Snively 1994; Greaves et al. 1995; Day 1995; Stanko et al. 1998). Still others conduct interviews with victims (Institute for Women of Andalusia 2003). For some categories, it may be impossible to know how much of the cost should be apportioned to domestic violence (and therefore included in the estimate). For example, Yodanis and Godenzi (1999) wanted to calculate the costs related to criminal justice services, but no data were available on which cases involved domestic violence. To address this, they used data from a national survey on the number of women who contacted lawyers, sought divorces, or obtained protection orders as a result of domestic violence, and adjusted these to account for the proportion of women who drop charges before prosecution. The estimated typical cost of a court case was then applied to all these cases for the total estimate. However this typical cost does not reflect the portion of the service attributed to domestic violence. Thus, studies that use average costs as a proxy for the marginal cost of the service (the proportion due to domestic violence) will overestimate the total costs.

If data on unit costs are unavailable, direct cost accounting can be done using a proportional methodology (Day 1995). This method only requires data on institutional prevalence—that is, the quantity of services provided. The cost of responding to domestic violence is estimated by determining the proportion of the total budget of different service providers that is spent on these services, and aggregating for all providers. This method can be used where data on prevalence and/or unit costs are unavailable.

The accounting method has the key advantage of being relatively straightforward. It can be used to estimate virtually any category of costs, so long as the corresponding data are available. The latter, however, represents one of the chief drawbacks of the accounting method—the categories to be included, and thus the quality of the estimate, depend directly on the data available. In addition, because data are often drawn from various institutions and sources, there is the potential for double-counting victims, incidents, or costs. For example, if individuals pay a user fee to access services, the amount of this fee should be discounted from the average cost of the service to the provider.

An important caveat with using direct accounting, especially in developing countries, is that service provision may be a poor indicator of whether the optimal amount of the service is being provided (Morrison and Orlando 2004). The quantity of services provided to victims may not represent the actual demand for services, for several reasons. Many victims may not be counted because they either do not access services, or turn to informal networks that escape data collection. In addition, service providers rarely collect information on victims they turn away or refer elsewhere. As one example, a 24-hour survey of domestic violence service centers in the U.S. found that 10 percent of victims seeking services (5,183 victims) in a single day were not served due to lack of resources (Iyengar et al. 2008). This discrepancy between the demand for services and their actual provision can result in real costs being seriously underestimated. This can be especially problematic in developing countries where resources are limited, and service provision therefore may represent only a fraction of actual need. Standing alone, this method has the potential to undervalue the cost of domestic violence.

Estimating Intangibles by Assessing Willingness to Pay

According to the logic of standard cost-benefit analysis, the cost to society of an undesirable outcome, such as injury from violence, is assumed to equal the amount individuals would be willing to pay to avoid such an event. Some researchers have used this principle to attach a monetary value to certain outcomes based on the public's willingness to pay to avoid them.

Walby (2004) employed this approach, following the method used by the U.K. Department of Transportation to model the costs of pain and suffering resulting from car accidents. The Department of Transportation administers a survey asking respondents to report the amount they would be willing to pay in order to reduce their risk of suffering injuries and fatalities from automobile accidents.[1] This methodology was adapted by Brand and Price (2000) to estimate willingness to pay to avoid certain types of violent crime. For example, a homicide was assigned the same value as that reported for a fatality from a traffic accident; common assault was assumed to have a human cost equal to that of light injuries from a road accident, and so on.

[1] Given that asking respondents for direct estimates can appear unrealistic, researchers instead ask them to compare risk assessments for different events and then link these assessments to monetary costs.

Walby (2004) then matched different types of injuries from domestic violence to the estimates for comparable injuries from common crime from Brand and Price (2000). For example, the pain and suffering associated with stalking was estimated to be equal to that of common assault (£240). For some crimes, such as rape, the accompanying trauma is such that there are no common crime or traffic injury equivalents. The willingness to pay could be assumed to be substantial, given that in the British Crime Survey (BCS) it was reported that women fear rape more than any other crime. Based on this, Walby estimated willingness to pay to avoid rape as equal to that of a serious injury, defined as forceful enough to break a bone (£104,300). The cost of willingness to pay to avoid each type of injury was multiplied by the number of incidents for each, and summed across all injuries to obtain the total estimated cost.

Because it produces an estimate of what the public would presumably pay to avoid certain outcomes, the willingness-to-pay approach can be an effective advocacy tool. Willingness to pay helps policymakers weigh costs of different policy interventions against benefits so they can make clearer decisions about violence prevention and response. The weakness of this method, at least at present, is that it relies on imputing values from other surveys (because targeted surveys on domestic violence are scarce). The emotional and psychological costs of domestic violence are not comparable to those from other forms of violence or accidents, even if the direct medical costs (for example, emergency care for a broken limb) may be. Targeted data collection is needed to accurately discern public willingness to pay for policies that reduce these risks. These estimates would then have the benefit of comparability with other willingness-to-pay estimates for other policies, facilitating cost-benefit analysis.

However, this approach might not always be realistic. Its effective use relies on a minimal understanding of violence as negative behavior and a general preference to reduce its impact (ICRW 2004). Therefore, it might be less effective in contexts where violence is accepted as a norm. In addition, it might be difficult to translate the concept of assigning a monetary value to the avoidance of risk in contexts where market-based insurance mechanisms are rare.

Estimating Social and Economic Multiplier Effects Using Proxies

In a study of youth in Latin America, Cunningham et al. (2008) developed a methodology to estimate opportunity costs associated with risky behavior that could potentially be adapted to assess the costs of domestic violence. First, they use macro-level survey data to estimate different direct costs and opportunity costs of risky behavior. They then input these values to a general accounting equation and multiply by the prevalence for the negative behavior. For example, to calculate how much it financially costs individuals to drop out of school, they subtract the direct financial benefit of studying (in terms of cash transfer incentives, for example) from the cost of school (in fees, books, foregone earnings from studying rather than working, and others). To estimate the opportunity cost of dropping out of school, they sum the foregone earnings due to dropping out (defined as the difference between average earnings for high school graduates and those for dropouts) plus the foregone earnings due to not attending college (the average earnings differential between a college graduate and a high school graduate, weighted by the probability

that a high school graduate will attend college). The method uses a 5 percent discount rate and sets the working life to 45 years, and assumes the wage differentials are constant over an individual's lifetime.

Estimated financial costs to society include the costs of different programs, such as vocational training, that would be provided to a dropout (and would, it is assumed, not be necessary had he or she stayed in school) multiplied by the dropout rate. Finally, social opportunity costs are calculated as the tax value of earnings foregone by individuals who drop out of school, to avoid double counting lost earnings.

One advantage of this method is that it draws on data from broad-based population surveys, which are more easily accessible than, for example, data on unit costs of services. These imputed values are also more representative, given that they originate in general demographic surveys. These elements would facilitate the method's adaptation to estimate some of the social and individual costs of domestic violence, such as the cost to individuals and society in lost earnings due to a violence event. The costs of some intergenerational effects could potentially be quantified as well if combined with data on adverse outcomes, such as the number of victims' children who drop out of school.

Comparison of Outcomes Using Econometrics

The plentiful literature on domestic violence documents the negative impacts on victims' physical and mental well-being, educational performance, employment, and productivity in both unpaid and paid labor. Some studies have worked to quantify these effects by comparing socioeconomic outcomes of women who have experienced domestic violence to those who have not. For example, Rao (1998) regresses domestic violence and caloric intake of female victims and their children against whether the woman has ever been abused by her husband. Cases were placed into the abused and control groups according to their answers to a survey in which they were asked to report whether they had ever been beaten by their husbands during the course of their marriage. Comparing outcomes in this way is useful to establish relationships, but does not solve problems of simultaneity—that is, it does not indicate a causal relationship or its direction, and it does not quantify the impact.

Morrison and Orlando (1999) use econometric techniques to estimate the effect of domestic violence on employment and earnings. They estimate an earnings equation that includes standard explanatory variables such as age, education, marital status, and number of children. A separate equation for victims is estimated using these and variables associated with domestic violence. Comparison of the results revealed an average loss in earnings of between 34 and 46 percent for women suffering physical, emotional or sexual abuse. However, these methods do not allow Morrison and Orlando to address problems of simultaneity—in other words, they cannot determine whether violence lowers earnings or whether women with lower earnings are more susceptible to violence. Morrison and Orlando attempt to correct this by using instrumental variables to instrument for violence. However, with small sample sizes, it is difficult to find instrumental variables for violence that are not also correlated with the outcome variables.

Other researchers have employed econometric matching methods to address the limitations of comparison approaches. Ribero and Sánchez (2004) use Propensity Score Matching to assign cases to control (never experienced domestic violence) and experimental (victims of violence) groups. This method, also employed by Morrison and Orlando (2004), improves on standard parametric techniques (such as regression analysis) by allowing for the definition of control groups not on the basis of observable variables (for example, age or education) but instead on the indicator under study, in this case the estimated probability of experiencing domestic violence. Cases from each group are paired with the case that most closely matches it on all variables measured. Earnings and employment are compared for each pair; the differences are assumed to be attributable to the experience of domestic violence (Ribero and Sánchez 2004).

These techniques are useful in estimating the impact of violence on particular, measurable outcomes such as earnings and labor force participation. They are not intended to estimate total costs to individuals or institutions, and thus are a complementary element of bigger costing exercises.

Measuring Loss in Quality of Life Using Disability-Adjusted Life Years

The disability-adjusted life year (DALY) method is used to estimate the burden of different diseases, accidents, and forms of violence. It is calculated as the present value of the future years of disability-free life that are lost as a result of illness, injury, or premature death. Whereas many other methods estimate the burden of violence or disease in terms of lives lost only, the DALY method quantifies loss in quality of life. The DALYs lost to fatalities from domestic violence are calculated by taking all cases of death from domestic violence and grouping each by age, sex, and demographic region. The DALYs lost to death are then calculated by subtracting the age at premature death from the life expectancy for that age and demographic group in a low-mortality population. Estimates of lost quality of life due to injury or disability are calculated by taking the average period of duration of a condition (to recovery or death) and multiplying this by a weight assigned according to the severity of the injury in comparison to death. Death and disability losses are combined, with an allowance added to discount the value of years lost as one ages (so that future years of life are valued progressively less) and for age weights (so that life lost at different ages is assigned different values). The value of life years is assumed to rise steeply from zero at birth, to peak at age 25, and decline progressively with each additional year. This has the effect of increasing the importance of diseases and violence toward children and youth.

Globally, it is estimated that 9.5 million DALYs are lost to rape and domestic violence (World Bank 1993; Heise 1994). A study of Mexico City reported that rape and intimate partner violence were the third most important cause of DALYs lost, after diabetes and child-birth related conditions, and more than those lost to road accidents.

The advantage of the DALY method is that it allows for quantification of loss in quality of life. However it is more data-intensive and methodologically complex than other methods. It has not been used to estimate costs in monetary terms.

ANNEX C: Summary of Selected Studies on the Cost of Domestic Violence

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Friedman and Couper (1987)	New York City	N/A	Impact on employment, work performance.	Long interviews with 50 women in domestic violence shelters.	Long interviews (N=50)	56% had lost at least one job; 54% missed at least three days of work/month due to violence.
Shepard and Pence (1988)	Duluth, MN		Impact on employment, work performance	Long interviews with 71 women in shelters	Long interviews (N=71)	58% said work performance affected by violence; 55% had missed work; 62% had been late to work; 24% had lost a job due in part to experience of violence.
Roberts (1988)	Queensland, Australia	Domestic Violence = physical, emotional or sexual abuse of people over 16 by partner/spouse or family member.	Police, legal, social benefits, emotional costs, health, support, loss of productivity	Retrospective case studies with 20 women recruited through service agencies and shelters. Costs from interviews with service providers. Incidence from surveys.	Interviews with victims and service agencies.	$A 108.65 million
New South Wales, Women's Unit (1991)	New South Wales	Domestic violence of women at various ages.	Individual, government, employer and third party—health care, legal, criminal justice, social welfare, employment, child care, and housing.	Accounting estimates. Ex: Deaths = value of estimated lost earnings. Cost of services = incidents x typical cost of service.	N/A	$A 1.5 billion

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Blumel et al. (1993)	Australia	Physical and psychological abuse, rape and sexual assault.	Legal (including divorce); housing; court; emergency medical; police; income support; direct health; counseling and referral; lost earnings; perpetrator programs.	Retrospective case studies with 10 domestic violence, 20 sexual assault and 20 rape victims recruited through service agencies to determine which services accessed and how often. Estimates of costs from interviews with service agencies. Lost earnings from reported weekly wage and estimated time off work.	Interviews with victims, service agencies.	$A 620 million
Snively (1994)	New Zealand	Family violence against women and children.	Direct: medical care, medicine, relocation/housing, legal costs, dental care, police, courts, shelter and crisis agency services, income support, social welfare, lost earnings.	Typical pattern of services created. Prevalence calculated as equal to police call-outs. Five-times base scenario: mulitiply base case times five. Lost income = sum estimates of lost earnings per incident.	Survey of service providers. Data on prevalence from police (police call-outs = prevalance), government documents and prior research.	$NZ 1.2—1.4 billion
Day (1995)	Canada	Physical and sexual abuse of women.	Immediate medical and dental costs, lost earnings from paid and unpaid work, psychiatric services, alcohol and drug abuse, shelters, crisis lines, volunteer time, government support services.	Accounting method using data from various surveys. Estimated cost of service provision as proportion of provider budgets spent on assisting DV victims.	National Survey on Violence Against Women, national surveys, government budgets, provincial health survey, national crime victimization survey.	Can$1.5 billion overall, including $7.6 million in initial medical assistance, $1.3 milion in dental costs. Cost of one day of lost work = $36.3 million.

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Greaves et al. (1995)	Canada	Sexual assault/rape and child incest/ sexual assault (as defined in Criminal Code of Canada), violence against women by intimate partners (VAW survey, using modified CTS).	Lost earnings, housing services, death, lost tax revenue, court costs and legal services, victim compensation, medical, couseling, prevention/education campaigns, research, volunteer hours. Costs are divided into those to the state (incarceration, social services), personal (medical, lost income) and third-party (sheltering a friend who is a victim, costs to insurance companies).	Accounting estimates. Ex: Deaths = value of estimated lost earnings. Cost of services = incidents x typical cost of service.	National Violence Against Women survey (N=12,300); Government General Social Survey (telephone); prior research (Day 1995); consultation with service providers.	Total cost: Can$4.2 billion comprised of 2.4 bn in social services, $872 million in criminal justice services, $577 million in lost earnings, and $408 million in direct medical costs. Costs accrue to the state (87.5 percent), individual (11.5) and third parties (0.9).
Miller et al. (1996)	United States	All crime. Relevant categories: rape and domestic violence defined in criminal law terms.	Cost to victims only, in property damage and loss, medical care, mental health care, policing, insurance costs, lost earnings in paid and household work, pain and suffering, death.	Direct accounting (# incidents * estimated cost of services). Lost productivity calculated using NCVS survey data on time lost and average earnings reported. Intangibles: lost earnings from deaths and reduced quality of life imputed from prior research.	National crime victimization survey, FBI Uniform Crime Reports.	US$105 billion tangible, $450 billion intangible *for all crime*. Rape = $110,000/victim. DV = $11,000/victim.
Korf et al. (1997)	Netherlands	Physical and sexual domestic violence against women.	Police and criminal justice, medical, psychosocial care, lost earnings, social security.	N/A	N/A	US$142.2 million

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Lloyd (1997)	Humboldt Park neighborhood of Chicago, IL, USA	"Verbal and physical abuse and coercion by men directed at adult women in intimate relationships."	Effects of domestic violence on labor force participation.	Standardized interviews (N=824), 24-hour-long interviews with survey respondents, community profile based on interviews with neighborhood leaders, analyisis of census data, review of administrative data.	Original survey of women 18 and older using CTS; U.S. Census data.	Women experiencing abuse were more likely to have been unemployed, had held more jobs, reported more health problems, had lower incomes, and were more likely to receive public assistance than other women.
Stanko et al. (1998)	London Borough of Hackney	DV = "Abusive and assaultive behavior between intimates, among members of a household, and/or between former partners." Includes rape and sexual assault.	Public services only: police, court services (divorce, prosecution), housing/refuge, social workers, medical care including emergency care.	26 composite case studies. Prevalence estimated from review of agency files to estimate percentage of case loads resulting from DV.	Original surveys of service providers (N=107) and women in a doctor's office waiting room (129), records searches.	£5—7.5 million
Godenzi and Yodanis (1998)	Switzerland	Physical, sexual and psychological abuse of women and girls.	State costs—medical treatment, police and justice, victim-related support, support and counseling, research.	Accounting using national study data. Ex: Court-related costs = (# women who contact lawyers/seek divorce after violence * typical cost)	Various surveys.	US$290 million (Sw F 409 million)
Rao (1998)	Karnataka, India	Spousal abuse.	Relationship between various determinants on whether a woman is beaten. Relationship between being beaten and the victim and her childrens' caloric intake.	"Participatory econometrics" involving researcher in all stages of data collection and analysis. Ethnographic data to generate hypotheses: regression to test these.	Household observations, focus groups, in-depth interviews with 70 women and 30 men, surveys among 177 women and 130 of their husbands, and a census of the 149 potter families (170 women).	Women who suffer abuse and their children have lower caloric intake than women who do not. Abused women have less control over family resources than other women.

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Morrision and Orlando (1999)	Chile and Nicaragua	Domestic violence against women.	Employment, health services, children's educational acheivement.	Estimate reduced form earnings equation to estimate impact on LFP: Estimate earnings equations with standard explanatory variables, and variables to measure the presence of DV to establish reduced earnings associated with DV.	Original surveys of 310 (Santiago) and 378 (Managua) women. Stratified random sampling.	Chile: Reduced earnings of US$1.56 billion. Nicaragua: Reduced earnings of US$29.5 million. In Chile, 63.1% of children of victims had to repeat a school year, and studied an average of four years less than children of nonvictims.
Lozano (1999)	Mexico City	Rape and intimate partner violence.	DALYs lost due to homicide, suicide and injuries related to IPV.	Estimate DALY for homicides, suicides and injuries. Combine for total estimate.	Police crime statistics, national data on life expectancy, data on injuries from hospital emergency rooms.	27,200 DALYs (1995)
CDC (2003)	United States	Rape, physical assault, and stalking of women aged 18 or older by a spouse, ex-spouse, or current or former boyfriend or girlfriend, date, or cohabitating partner.	Medical costs from injuries, mental health costs, lost productivity, lost lifetime earnings due to homicide.	Cost of services by direct accounting. Cost of lost productivity = est days of unpaid and paid work lost * mean earnings from Census data. Cost of homicide = # IPV homicides * mean present value of anticipated lifetime earnings by age group (from Census data). Value of household labor imputed estimates from census data.	National VAW survey (8,000 men, 8,000 women), U.S. Census, Bureau of Labor Stats. Homicide rates from FBI Uniform Crime Reports. Health costs from Medical Expenditure Panel survey and Medicare data.	US$5.8 billion. Includes $4.1 in direct medical and mental health services, $0.9 billion in lost productivity, and $0.9 billion in lifetime earnings due to IPV homicide.

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Institute for Women of Andalusia (2003)	Andalusia, Spain	Domestic violence against women by a current or former intimate partner.	Social services, judicial costs, police, health costs, human and emotional costs, employment and productivity.	Estimate of total population from national survey on VAW. Mapping of "critical path" of service acquisition through interviews with victims.	National survey on VAW, interviews with 300 women in state-provided shelters to determine service demands.	€2.4 billion (for Andalusia) of which 30% in reduced employment/productivity; 27% in social services; 25% for services for children of victims; 16% health and mental health services; and 3% legal costs.
Ribero and Sánchez (2004)	Bogotá, Baranquilla and Barancabermeja, Colombia	Domestic violence = physical and emotional abuse of women and children in the home.	Lost earnings, medical costs, policing, legal, social services.	Propensity Score Matching to define pairs of comparable homes with and without DV. Comparison of earnings, time off work, health costs. Cost of services through direct accounting.	Original survey conducted in 2003 of 2,293 women based on Revised Conflict Tactics Scales.	Col$8.8 trillion (2003 pesos), equal to 3.93% of the national GDP. This includes .062% of GDP in health costs and 2.431% of GDP in lost earnings and unemployoment from violence against women, and .092% in lost earnings and unemployment, and 1.5% of GDP in health impacts from child abuse.
Walby (2004)	England and Wales, 2001 data	Domestic violence = physical and sexual abuse by intimate partner. Excludes violence by household member who is not an intimate.	Government services (criminal justice, health care, social, housing, civil and legal); loss of economic output; human and emotional costs borne by the victim	Health and service provision costs by accounting method; loss of economic output = time off work due to injury + non-wage payments by employer, insurance etc. Estimate of human costs based on public's "willingness to pay" to avoid violence (values imputed from surveys of WTP to avoid traffic injuries, fatalities).	2001 Home Office British Crime Survey self-completion module on inter-personal violence; national criminal statistics; reports from service providers	£23 billion. This includes £1 bn to the criminal justice system; £1.2 bn to health sector; £0.25 bn to social services; £0.16bn in housing services; £0.3 in civil legal costs (1/2 borne by victim, 1/2 by state); £2.7bn in lost economic output (time of due to injuries); and £17bn in pain and suffering of victims.

Study	Location	Operational Definition of DV/IPV	Type of Costs Considered	Methods Used	Data Source	Estimates (annually)
Gancheva et al. (2006)	FYR Macedonia	Physical, psychological, and sexual violence perpetrated by men against women in a present or former family or intimate relationship.	Costs to social work centers and NGOs (shelter, counseling, legal advice, help lines, awareness campaigns); criminal justice (policiing, prosecution, court costs).	Data from interviews and surveys used to map help-seeking patterns. Costs estimated (costs/case x registered # cases = total cost). Also estimate the cost per ideal case for ideal, full state response in 3 scenarios (light, moderate, complex).	National statistical and budget data, questionaires to service providers, interviews with service providers and 50 victims.	Mden 26.3—34.4 (€425—553.7)

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CONCLUSION: METHODOLOGIES AND LOOKING FORWARD[*]

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Practitioners in the field of development are increasingly recognizing that high levels of violence have significant negative impacts on economic growth and poverty reduction. Across many disciplines, a growing research base is coming to the same conclusions. Unfortunately, this research base is divided into distinct areas of study. This impedes both a holistic understanding of violence and a comprehensive measurement of costs.

The papers presented in this collection have brought together three areas of study that are typically addressed independently: political violence, common and criminal violence, and domestic violence. As a first step in a much longer process, the goal of this report has been to critically analyze the current leading methodologies for measuring the costs of violence and to suggest promising areas for future research. It is hoped that future studies will build on this one by conceiving and applying methodologies and practices that will bring these areas of study closer together. Such efforts will help create a more comprehensive evidence base for designing and implementing effective violence prevention programs and policies.

Methodologies

While the three papers in this report draw on different fields of research, there is an encouraging concordance in the methodologies applied to measuring the costs of violence in each paper's respective area of study.

Accounting methodology

In costs of violence studies, the accounting methodology is the most widely applied methodology. It involves a straightforward process of aggregating the monetary (or monetized) costs that result from acts of violence. Typically, these costs include the value of destroyed property, medical expenses, security expenses, wages lost due to violent death, injury, or imprisonment, and a subjective monetizing of pain and suffering. The great advantage of this methodology is its straightforwardness and simplicity. However, it is frequently compromised by incomplete and incorrect data and the potential for both under- and over-counting.

Willingness-to-pay methodologies

The papers in this study describe three willingness-to-pay methodologies: *contingent valuation*, *hedonic*, and *value of life*. All of these seek, in various ways, to determine how much people are willing to pay for a particular good, a particular service, or a stipulated change in an outcome. These methods are often helpful in informing policy decisions.

Willingness-to-pay: contingent valuation

Using this methodology, survey respondents are given hypothetical options and asked to choose either their preference or how much they would be willing to pay for a desired outcome.

For example, one might be asked, "What is the maximum you would be willing to pay to reduce crime by 10 percent in your community?" Or, "If your city could either reduce crime by 10 percent or use the same funds to renovate the city's hospitals, which would you prefer?" A benefit of this method is that the respondent is assumed to consider all relevant factors and to further weight those factors to the degree that he or she finds appropriate. Therefore, the data-intensiveness of the accounting method is obviated. While this method offers some helpful insights for policy intervention and budget allocations, it does not suggest which policies will actually succeed in achieving the proposed outcomes. Nor does it suggest the cost-effectiveness of any particular policy. Another problem with this method is that people's actions are often observed to differ from their stated preferences.

Willingness-to-pay: hedonic model

Unlike contingent valuation, the hedonic model is based on data derived from actual behavior. This data-intensive model isolates individual attributes of goods or services to determine what value consumers place on those specific attributes. For example, a study in Jacksonville, Florida, used this model to compare house prices in high-crime areas with house prices in low-crime areas. By comparing data on number of bedrooms, number of bathrooms, square footage, and other features, the researchers concluded that residents of low-crime areas in Jacksonville were willing to pay a $50,000 premium (40 percent of the average home price) to live in a low-crime area. Two disadvantages of this model are that it requires a great deal of data and it is effective only in the context of a well functioning market.

Willingness-to-pay: value of life model

Related to the hedonic model, this methodology addresses marginal mortality and measures the monetary value that people ascribe to changes in their survival probabilities. For example, survey respondents may be asked, "What is the maximum you would pay to extend your life by one year?" This methodology is also used to compare hazardous jobs with safer jobs and to derive the financial compensation that people demand in exchange for accepting a certain (average) decline in life expectancy. This potentially data-heavy or data-light model only deals with changes in mortality, but its theoretical simplicity enables its application in many settings and scenarios.

Econometric regressions

This methodology brings data—often large amounts of data—together to search for patterns in phenomena. For example, an econometric model was used to analyze socioeconomic data collected from women in the United States and found that women who indicated they had previously suffered from physical, sexual, or emotional abuse earned an average of 34 percent less than the other women in the study. Regression models can be very useful in showing these kinds of patterns, but they require good data and are incapable of demonstrating causation. In the above-mentioned study, for example, the regression model does not indicate if past

experiences of abuse somehow cause a woman to earn less, or if a woman who earns less tends to be more susceptible to abuse, or if there is an alternative cause—or several of them—and abuse just happens to coincide with lower earnings for another reason.

Calculating multiplier effects

Indirect and long-term costs of violence are important and often significant, but measuring them is a considerable challenge. When relevant data is available, calculating multiplier effects can be a useful means of combining the probabilities of certain indirect or future impacts with predicted (average) costs of those impacts. This methodology might be used, for example, to combine the marginal probability that an abused child (compared to a non-abused child) will not graduate high school with the average differential in lifetime earnings between high school graduates and non-high school graduates. This information could then be used to determine an initial calculation of the long-term lost income that results from the abuse of a child. This calculation can be modified by factoring in additional probabilities and data, such as the additional wages earned during high school years and the money saved by not paying school fees. A study on socio-economic conflict in Bolivia used multiplier effects in a different way. The study calculated the average indirect economic costs of certain types of conflict-related events and then assigned coefficients to determine the indirect costs from the direct costs. The indirect economic cost of an urban blockade and a strike were determined to be 12.5 and 2.77 times the direct costs of those events, respectively.

Disability-adjusted life years (DALYs)

Designed by the World Health Organization (WHO), this methodology creates a single measurement that includes both violence-induced mortality and violence-induced morbidity. The mortality component is calculated by subtracting the age (at death) of a victim of mortal violence from that victim's life expectancy. Then, all of these years lost by all of these victims are added together. The morbidity component is calculated by weighting violence-induced disabilities according to severity of incapacitation and then aggregating all these weighted years of all the people who experience these disabilities. Combining the mortality and morbidity components results in the DALYs. A 1993 study concluded that, globally, 9.5 million DALYs are lost each year to rape and domestic violence. While the scope of DALYs is limited to just mortality and morbidity, its straightforward and well-delineated theoretical framework makes this methodology a potentially effective complement to some of the other methodologies.

Looking Forward

Measuring the cost of violence is a relatively new area of study. Most of the research in this field has been conducted in the past decade. This nascence is reflected in the limited number of studies, limited data, and the limited engagement among scholars and practitioners in related fields. However, many areas for fruitful advancement emerged from this study.

Standardization of data collection and methodologies

Compounding the dilemma of limited data is the multiplicity of distinct terminologies, survey instruments, and scopes for conceptualizing and measuring violence and its costs. While this study has stressed the value of learning from diverse fields and practices, it is important to acknowledge the limitations of utilizing disparate and often isolated studies to inform a holistic understanding. Much research in this field remains incomparable or nearly incomparable. It is hoped that future studies will build on this one by continuing to bring researchers and their areas of study together to determine more consistent practices that can improve comparability and analysis across space and over time.

A lack of context

While studies on the costs of violence gather valuable data, this data often lacks context. An integration of quantitative and qualitative research will bring better insights into the social and economic drivers of violence, as well as its social and economic impacts. Context is also needed to effectively apply this research to policymaking.

Violence prevention policymaking

Studies on the costs of violence may convince policymakers that violence prevention is worthwhile. But more research is needed on both the impacts and cost-effectiveness of various violence-prevention policies and programs.

Micro-level analysis of long-term impacts of violence on behavior

The behavioral impacts of violence over time are poorly understood. Fruitful insights may be gained from studies that find behavioral differences between soldiers and non- soldiers in the decades following a war. Studies could also assess how coping strategies and the normalization of violence may influence marginal costs of violence over long periods of time. The fields of anthropology and sociology may offer good insights and helpful direction.

Poverty, violence, and poverty traps

The vast majority of violence-related research is conducted in high-income countries. More research on violence in low-income countries—and especially in fragile and post-conflict countries—may uncover important connections between violence and poverty. These insights may lead to effective policy options that are specific to areas of high poverty and fragility.

The role of fear

Fear of violence influences business investment, migration, investment in education and health, and more. Fear also reduces trust and social cohesion, which seem to correspond with increasing violence. Prevalence of violence and prevalence of fear of violence do not always coincide. Research that explores the relationship between fear and violence could lead to policy

options that effectively address both of these factors. Research that illuminates strategies for reducing fear—without encouraging risky behavior—would be very useful.

Distribution of the costs (and benefits) of violence

Costs of violence are not shared equally within a population. Victims and perpetrators usually endure the highest costs through direct losses and criminal justice retribution, respectively. In most cases, poor people seem disproportionally impacted. Distribution of costs can differ over time if, for example, the financing of military activities is deferred to the future. The majority of costs associated with murder are typically borne by the family of the victim, while the costs of imprisoning the perpetrator are shared more broadly. There are also many who benefit from violence, such as thieves who are not caught, suppliers of goods and services to militaries, and militia leaders who acquire not only spoils of warfare but often the respect and admiration of their followers. Measurement methodologies that differentiate between those who pay the various costs and those who reap the various benefits of violence could lead to improved targeting of assistance to the former and reduced incentives for the latter.

Impact of criminalization

The criminalization of an activity has the potential to increase violence. For example, the choice to criminalize certain drugs has created an underground industry that infuses guns into communities, corrupts police forces, and has other harmful effects. More research on the impacts of criminalization on violence and the relationship between the two will help guide policy that maximizes social welfare more comprehensively.

A Call to Action

Subjectivity is both a confounding and necessary component of measuring the costs of violence. To measure the cost of a war, one must consider the value of life. To measure the cost of a terrorist incident, one must consider the value of feeling safe. These and other subjective costs are vital to any comprehensive cost of violence, but the quantifying of subjective costs is inherently—and appropriately—open to challenge and debate. While this report seeks to help improve methodologies for measuring the cost of violence, it is important to recognize that an accurate and precise cost will never be achieved. This final point is offered not as a call to despondency, but rather a call to action. The costs of violence are difficult to measure; they are also real and are impacting people every day. Subjectivity as well as imperfect methods and insufficient data will always constrain these measurements, but they should not constrain efforts to prevent violence and reduce its negative impacts. Measuring the costs of violence is a valuable endeavor, but only so far as it informs action. As we seek to improve methods and as we seek to acquire better data, we must also *act*.

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