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# Methodological Approaches for Estimating the Economic Costs of Violence against Women and Girls

## 1. INTRODUCTION

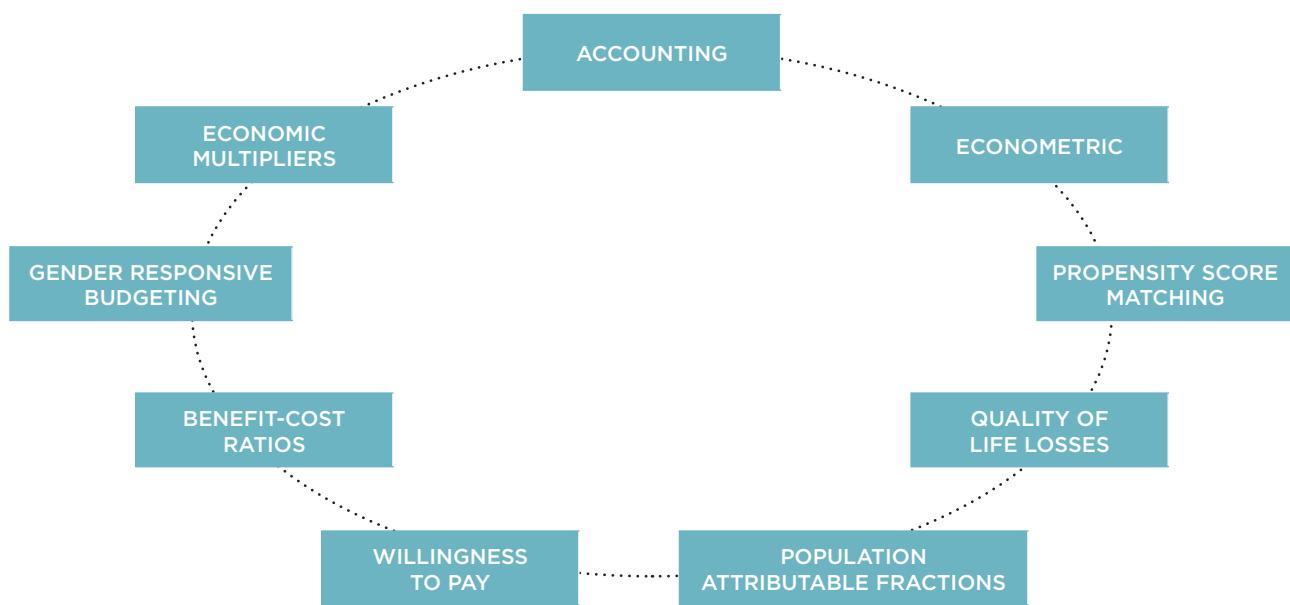
According to the WHO (2013), 35 percent of women globally experience either intimate partner violence or non-partner sexual violence within their lifetime. Regardless of the level of development, violence against women and girls has significant economic and social costs. These costs can occur at the individual and household level, at the business and community level, and at the government and state level.

Methodologically, many alternative approaches currently exist within the literature to quantify these various costs, from accounting approaches that estimate the direct tangible costs of service provision owing to violence, to econometric techniques that establish the many impacts of violence on women and their children's education and health, to the estimation of disability-adjusted life years that establish violence against women and girls as a public health cost. However, as noted by Duvvury et al. (2013), the implications of violence against women and girls on economic growth has not been systematically reviewed or empirically tested. This is particularly relevant within developing country contexts where economic growth is so important for advancing economic development.

In this review of the methodological approaches for establishing the economic costs of violence against women, we provide a brief overview of each respective methodology used in the literature, an assessment of current evidence, and its associated limitations. In doing so, we evaluate some of the methodological gaps that currently exist and provide an alternative methodological approach for estimating the full macroeconomic cost of violence against women.

## 2. METHODOLOGICAL OVERVIEW

As illustrated in Figure 1, there are currently nine alternative approaches within the literature to quantify the various impacts of VAWG. This includes the accounting approach, econometric analysis, propensity score matching, quality of life losses, benefit cost ratios, population attributable fractions, the willingness to pay approach, gender responsive budgeting, and estimating economic multipliers. As with any methodology, each is subject to its own merits and drawbacks and in the following sub-sections, we provide an overview of each approach.



**FIGURE 1: METHODOLOGIES TO QUANTIFY THE IMPACTS OF VAWG**

### 2.1 Accounting approach

The accounting approach is a core methodology used in most studies to establish the direct costs of service provision (see Greaves et al., 1995; Heiskanen and Piispa 2001, 2002; Morrison and Orlando, 1999; Access Economics, 2004). It is the most commonly used methodology for estimating the associated costs of violence against women and girls. Within this approach, the economic costs of violence are typically separated into two components: direct costs and indirect costs. Direct costs refer to the out-of-pocket expenditure relating to violence by individual women as well as the cost of provision of services to survivors of violence. These costs can include, for example, visits to health care facilities, the use of social services, and judicial related expenditure incurred by women as well as the expenditure by state on health, social services, law enforcement and judicial sectors. Indirect costs represent the value of goods and services lost as a result of domestic violence and include: income loss through job loss or increased absenteeism, decreased productivity in the workplace, and decreased labour force participation, costs of increased mortality and morbidity, pain, suffering, and loss in quality of life, costs of increased drug and alcohol use, inter-generational transmission of violence, behavioural problems of children, and reduced educational performance of children (Duvvury et al., 2013).

The accounting approach multiplies the unit cost of a service by the number of times the service was used and sums these across sectors to derive a total cost estimate. This approach requires the calculation of the prevalence rate and / or the incident rate, which can come from several alternative sources, including specialized surveys, population surveys or by estimating the institutional prevalence (Willman, 2009). The relevant services required are compiled and their unit costs estimated. Average costs of services per victim are calculated and multiplied by the number of reported incidents for that service. Costs are then aggregated across different sectors to derive the total cost.

## 2.1.1 Evidence using the accounting approach

Table 1 below illustrates some example findings using the accounting approach. These studies have taken place across both developing and developed country contexts. A 2009 study by the ICRW used an accounting methodology approach to estimate the direct and indirect costs of intimate partner violence at the household and community level in Bangladesh, Morocco, and Uganda. They find the average out-of-pocket cost of one-time service use to be \$5 in Uganda, and \$157 in Morocco, and approximately 1.6 percent and 6.5 percent of GDP respectively. A study by Zhang et al. (2012) provides an estimate of the economic impact of spousal violence in Canada in 2009. Three categories of cost are included: justice system costs, victim costs, and third-party costs. Of the total estimated costs of CAD\$7.4 billion, CAD\$6 billion was incurred by victims as a direct result of spousal violence for items such as medical attention, hospitalizations, lost wages, missed school days, and stolen/damaged property. The next highest was the total economic impact borne by third parties and others. This was estimated to be CAD\$889.9 million and included funeral expenses, loss of affection to family members, costs to others hurt or threatened in the incidents, social services operating costs, employer loss, negative impact on children and other government expenditures. Finally, justice system costs were estimated to be CAD\$545.2 million. This includes the cost of policing services, corrections, courts, prosecutions, legal aid, child protections, separation and divorces and civil protection orders.

**TABLE 1: EVIDENCE USING THE ACCOUNTING APPROACH**

AUTHOR	COUNTRY	COST	COST CATEGORIES
ICRW (2009)	Uganda Morocco Bangladesh	USD\$5 in Uganda <sup>a</sup> USD\$157 in Morocco <sup>b</sup> USD\$5 in Bangladesh <sup>c</sup>	Health; Police; Justice; Local informal authority; Social services
NCRVAW&C (2009)	Australia	AUD\$13.6 billion in 2009 AUD\$15.6 billion (estimated for 2021-22)	Seven cost categories: Pain and suffering; Health; Production; Consumption; Administrative and other; Second generation; Transfers
Zhang et al. (2012)	Canada	CAD\$7.4 billion	Medical attention; Hospitalisation; Lost wages; Missed school days; Stolen/Damaged property; Lost productivity
Duvvury et al. (2012)	Viet Nam	USD\$1.41 billion (out-of-pocket expenditure and missed work) USD\$2.26 billion (productivity loss)	Medical; Police; Court; Shelter; Legal aid; Foregone earnings; Productivity loss
UNFPA. (2015)	Egypt	2.17 billion LE in the past year Total cost could reach 6.15 billion LE	Annual direct and indirect costs, and annual indirect intangible costs

<sup>a,b</sup> Relates to the average total cost of one-time service use in Uganda and Morocco;

<sup>c</sup> In Bangladesh, it relates to the value of lost work per violence incident to households

The 2009 Australian study by the National Council to Reduce Violence Against Women and their Children updates the 2002-2003 cost estimates of domestic violence and projects these costs to 2021-22. Overall, this study estimates that the cost of violence against women and girls in 2009 is AUD\$13.6 billion. They estimate that by 2021-22, violence will cost the Australian economy AUD\$15.6 billion. There are seven cost categories allocated across eight groups within society. The seven cost categories include pain, suffering and premature mortality, health, production related costs (lost production (wages and profit) from absenteeism, search and hiring costs, lost productivity, lost unpaid work, retraining costs, loss of labour capacity), consumption related costs (property replacement and settlement of bad debts), administrative and other costs, second generation costs, and transfer costs. A study by Duvvury et al. (2012) in Viet Nam found that out-of-pocket expenditure and missed work due to domestic violence results in costs of USD\$1.41 billion. This included the out-of-pocket expenditures incurred by women following an incident of intimate partner violence for health care costs, property replacement costs, police and justice costs, accommodation costs, and formal complaint costs. In terms of lost earnings, three main categories are considered: days taken off work by women, days taken off housework by women, and days taken off work by men. When productivity loss is included, the total cost is estimated to be USD\$2.26 billion, or 1.41% of GDP for Viet Nam in 2010. Finally, a study of 20,000 women aged 18-64 was conducted by UNFPA in Egypt (2015). This study estimated the annual economic cost of DV against women perpetrated by her husband or fiancé, individuals in close surroundings and strangers in public spaces. The total cost of violence (including both direct and indirect costs) for women and their families is 2.17 billion LE in the past year. This is based on only one severe incident in the last 12 months prior to the survey. It is estimated that the total cost could reach 6.15 billion LE.

Using the accounting methodology, indirect costs can also be estimated. For example, women in the U.S lost 10.1, 8.1 and 7.2 days of paid work, respectively, from stalking, rape and physical assault per victimisation. The number of days of household chores lost from these three types of IPV was even greater, at 12.7, 13.5 and 8.4 days respectively. The estimated total value of days lost from both employment and household chores is estimated to be USD\$858 million. Of this, the value of lost productivity from paid employment is approximately \$728 million, and \$130 million relates to lost productivity from household chores. In total, more than 13.5 million total days are lost from paid and household productivity (CDC, 2003).

### 2.1.2 Limitations

As outlined by Morrison and Orlando (2004), the accounting approach, while straightforward to carry out, may seriously underestimate the true social costs of violence against women and may be problematic in developing country contexts. Variations in the types of costs provided by these studies may result from several fundamental influencing factors prevalent in developing country contexts. Firstly, the level of service provision across countries is likely to produce significant differences in cost estimates. For example, in the Global South, minimal service provision currently exists to address violence against women. Given that there are fewer services available to women, accurately establishing this cost is difficult. Secondly, utilisation of services by women is often limited. As noted by Duvvury et al. (2004), this lack of service utilisation by women is partly driven by the norms of acceptability of violence and also by the lack of available services due to inadequate policy attention. Thirdly, inadequate information systems exist meaning only fragmented data is available. The lack of systematic information on service utilisation, or help-seeking by women experiencing violence, implies that the true cost of violence against women cannot be deciphered or coherently estimated. As a result, the type of costs varies by the degree to which there is a developed response to violence against women.

More generally, there are also several limitations with respect to measuring the level of loss in the economy. In particular, Morrison and Orlando (2004) find two problems when using direct costs. Firstly, the use of actual expenditures may not be a good indicator of whether the optimal amount of the public good is being provided. Secondly, direct cost estimates cannot be interpreted without some reference base, such as GDP or cost estimates for other social issues. Duvvury et al. (2013) note additional drawbacks of the accounting approach that include the potential for double counting, that costs are not identifiable by who pays, and that time frames of data within sectors are inconsistent, making aggregation across sectors difficult.

## 2.2 Econometric Techniques

There have been a considerable number of studies using econometric techniques to examine the relationship between violence against women and many of its associated outcomes. This includes examining the impact on employment, on physical health, on mental health, on education, on children and on intra-household bargaining. Typically, these studies employ either a logistic regression (multiple and/or binomial) or a probit regression to examine these relationships and often an instrumental variable for violence within their econometric analysis will be required. Instrumental variables are used to address any potential simultaneity issues which may arise when examining the relationship between violence and many of its associated outcomes (in particular, the impact on earnings and labour force participation). These instrumental variables are those variables that are related to violence but have no correlation with the variable under examination. To identify an appropriate instrumental variable, a logistic regression is often estimated. This allows one to identify those variables that are closely linked to violence and usually include: age, educational attainment by the woman and her partner, socio-economic status, excessive alcohol use by the husband, experiencing or witnessing violence as a child, and conflict negotiation within the household. Significant variables for violence are then tested against the outcome variable under consideration (for example, earnings) to assess its robustness as a variable for violence.

### 2.2.1 Evidence using the econometric approach

There have been several studies using econometric techniques, both in developed and developing country contexts, which have examined the link between violence against women and women's employment (including their labour force participation and earnings), with mixed results within the literature. Table 2 below provides a brief summary of some existing studies. Lloyd (1997), using a multivariate logistic regression, examined whether women who have experienced intimate partner violence (IPV) have lower rates of labour force participation than women who have not. This analysis was carried out on a sample of

1 The factors used by Morrison and Orlando (1999) include age, education, marital status, and number of children in the household.

824 women aged over 18 in Chicago. The authors found no evidence of a significant relationship between the two. Similarly, Morrison and Orlando (1999), using household survey data from Chile and Nicaragua, find that there is no impact on women's participation in the labour force after controlling for several factors. However, as noted by Morrison and Orlando (2004), these results may be due to other countervailing factors that influence the results and cause simultaneity issues between violence and participation. With respect to labour force participation, violence may be used instrumentally by male aggressors to control women which may bias the results. Farmer and Tiefenthaler (2004), on the other hand, find that labour force participation is higher among women in the US who have suffered violence.

Heath (2014) examines the relationship between female labour force participation and the incidence of domestic violence in Dhaka using a probit model. The results show a positive correlation between work and domestic violence. However, the study finds both education and age of first marriage to be important determinants of domestic violence as a result of entering the workforce. Women with less education, or who were younger at first marriage face an increased risk of domestic violence than their more educated, older counterparts. In terms of the impact on earnings, Duvvury et al. (2012) find that Vietnamese women experiencing violence earn 35% less than those not abused. This is similar to the findings of Morrison and Orlando (2004) where earnings loss was estimated to be 34% in Chile and 46% in Nicaragua. This earnings loss results in an overall productivity loss of 2% in Chile, 1.6% in Nicaragua, and 1.78% in Viet Nam. Sanchez et al. (2004) find that Colombian women who suffered physical violence have 14% lower earnings than women who did not suffer violence, while in Brazil, productivity loss due to violence-related injuries accounted for approximately 12% of the total health budget or 1.2% of GDP (WHO CDC, 2007).

**TABLE 2: EVIDENCE USING THE ECONOMETRIC APPROACH**

AUTHOR	COUNTRY	ECONOMETRIC TECHNIQUE	RELATIONSHIP	CENTRAL FINDING
Hindin et al. (2008)	10 countries	Multivariable logistic regression	Physical health	Alcohol consumption by the husband/partner and exposure to inter-parental violence are found to be risk factors.
Heath (2014)	Bangladesh (Dhaka)	Probit regression model	Female labour force participation	Positive correlation between female labour force participation and experience of domestic violence is found.
Duvvury et al. (2012)	Viet Nam	Two-step regression	Earnings	Vietnamese women experiencing violence earn 35% less than those not abused.
Meekers et al. (2013)	Bolivia	Probit regression model	Mental health	Exposure to physical and sexual violence increases likelihood of experiencing many forms of mental health disorders.

The impacts on physical health have also been well documented in the literature by those employing econometric techniques. Using data from the DHS of 10 countries, Hindin et al. (2008) examine the health outcomes potentially related to women's experience of IPV. A multivariable logistic regression was used to assess the adjusted relationship between women's characteristics, household characteristics, partner characteristics, couple difference, and community level factors and women's experience of physical or sexual violence in their current relationships. Overall, the authors found little consistency across countries in the factors affecting women's risk of IPV. Of all the individual, husband/partner, couple, household, and community characterises studied, the only ones that emerge as consistent risk factors of IPV are alcohol consumption by the husband/partner and exposure to inter-parental violence. Other factors that are significant in 5-6 of the 10 countries studies are women's occupation, women's age at first marriage, and women's attitudes towards wife beating.

A study by Parish et al. (2004) examined the general, sexual, and reproductive health outcomes associated with IPV in China among a sample of 3,806 women and men aged 20-64. Using binomial and multinomial logistic regression analysis, they find that significant risk factors for partner violence include sexual jealousy, patriarchal beliefs, low female contribution to household income, low male socioeconomic status, alcohol consumption and residence in regions other than the South or Southeast. Similarly, in Colombia, Pallitto and O'Campo (2004) examine the relationship between IPV and unintended pregnancy among a sample of 3,431 ever-married women aged 15-64 who had given birth in the last five years or were currently pregnant. Using a multivariate logistic regression, the authors found that 55% of respondents had at least one unintended pregnancy, and 38% had been physically or sexually abused by their current or most recent partner. Women's adjusted odds of having had an unintended pregnancy were significantly elevated if they had been physically or sexually abused.

2 The countries include Bangladesh (2004), Bolivia (2003/4), Dominican Republic (2002), Haiti (2005), Kenya (2003), Malawi (2004), Moldova (2005), Rwanda (2005), Zambia (2001/2), Zimbabwe (2005/6).

More recently, there have been studies from developing country contexts that have examined the relationship between violence against women and mental health. Overall, the findings show that a significant link exists between the two. Meekers et al. (2013), using a probit regression model in Bolivia, find that women exposed to physical violence in the past year are more likely to experience symptoms of depression, anxiety, psychogenic non-epileptic seizures, and psychotic disorders. Those experiencing sexual violence are more likely to suffer from all mental health issues while psychological violence is associated with an increased risk of depression, anxiety, and psychogenic disorders. In Paraguay, Ishida et al. (2010) using a multivariate logistic regression, find that IPV is independently associated with an increased risk for common mental disorders and suicidal ideation as measured by the SRQ-20. Emotional abuse is associated with the greatest increase in the risk of common mental disorders, while recent physical abuse is associated with the greatest increase risk of suicidal ideation. Avanci et al. (2013), using a binary logistic regression model, find that women victims of severe physical violence by their partner were more likely to suffer from mental health problems than those never exposed to this type of violence. This was based on a sample of 389 mothers with schoolchildren in Rio de Janeiro, Brazil.

### **2.2.2 Limitations**

Within the econometric framework for establishing the costs associated with domestic violence is the problem of potential simultaneity between earnings and violence. Several authors use an instrumental variables approach to instrument for violence, however, this econometric approach has several weaknesses. As noted by Morrison and Orlando (2004), the instruments for violence may include physical abuse in the women's childhood and the number of times per month the husband arrives home drunk. Both of these factors, however, may also have a direct impact on earnings by affecting self-esteem and thus effort and ability. In addition, the use of instrumental variable techniques in relatively small samples may be problematic.

## **2.3 Propensity Score Matching**

Propensity score matching (PSM) has been suggested as an alternative approach to overcome the limitations of econometric regression analysis, in particular, many of the complications associated with instrumental variables (Morrison and Orlando, 2004). This method 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. PSM is a non-parametric technique used to estimate causal treatment effects and is useful for managing selection bias in observational studies. Selection bias typically arises when a comparison group is not available. In experimental settings, individuals can be randomised into two groups: those receiving the intervention (often called the treatment group) and those who do not (often called the control group) which ensures a counterfactual exists. Normally, the outcomes between the two groups would be observed to obtain a purely unbiased effect-estimate. However, within observational studies, no true comparison group representing the counterfactual exists and as a result, selection bias may exist (Vyas and Heise, 2014). To overcome this selection bias issue, matching methods may be used to imitate an experimental design (Caliendo and Kopeinig, 2005). As explained by Vyas and Heise (2014), from a set of identified pre-intervention factors X, select a non-exposed comparison group so that the distribution of X in this group is similar to the distribution of X in the exposed group. By theoretically conditioning on X, one ensures that the outcome is independent of exposure and the only remaining relevant differences between the two groups is their exposure to the intervention.

An important step in using PSM is selecting the covariates (i.e. the pre-intervention factors X) within the analysis. Typically, probability models such as logit or probit models are estimated for a range of risk factors of violence such as age of women and men, relationship status, educational attainment of women and men, household wealth, attitudes to physical violence, number of children in the household, household socioeconomic status, alcohol and drug consumption, exposure to violence as a child, and labour force participation of women and men (Morrison and Orlando, 2004). The probability model derives a single variable (called the propensity score) that captures the probability that a respondent will be exposed to the intervention (in this case, the probability of experiencing violence) (Vyas and Heise, 2014).

Next, matching of exposed and non-exposed individuals takes place based on the similarity of their propensity scores. If the propensity scores of exposed and non-exposed individuals overlap in the area called the region of common support, then they are matched. Otherwise, they are discarded from the analysis. There are several matching techniques available to conduct PSM including (1) nearest neighbour, (2) kernel, and (3) radius. Each technique has its own individual merits and drawbacks and should be chosen on the basis of the analysis. Finally, once successful matching has taken place, the means of the variables under examination (for example, employment) of the exposed and non-exposed groups are compared.

3 This is referred to as the conditional independence assumption (CIA) and is a critical assumption within propensity score matching.

4 The region of common support allows women to be matched when their distributions overlap.

### 2.3.1 Evidence using propensity score matching

Although the literature using PSM to examine the various impacts of violence against women is quite sparse, it has examined the impacts on employment (Sanchez et al., 2004; Morrison and Orlando, 2004; Vyas and Heise, 2014), on differences in their earnings (Sanchez et al., 2004; Vyas, 2013), on their health (Sanchez et al., 2004; Morrison and Orlando, 2004), and on their children's education and health (Sanchez et al., 2004; Morrison and Orlando, 2004). Table 3 below summarises some of the evidence using propensity score matching.

**TABLE 3: EVIDENCE USING PROPENSITY SCORE MATCHING**

AUTHOR	COUNTRY	IMPACT VARIABLE	KEY FINDING
Sanchez et al. (2004)	Colombia	Women's employment	Unemployment rates that were 8% higher
Vyas (2013)	Tanzania	Women's earnings	Abused women earn less than non-abused women.
Morrison and Orlando (2004)	Peru, Haiti, and Zambia	Women's health	More likely to experience many reproductive health issues
Morrison and Orlando (2004)	Peru, Haiti, and Zambia	Children (their health and education)	More likely to suffer diarrhoea, anaemia, and be shorter in height in Peru. Children of women victims in Peru were found to be more likely to attend school and less likely to be behind in school.

Morrison and Orlando (2004) use PSM to examine the effect of gender based violence on women's employment (amongst others) in Peru, Haiti, and Zambia. They find that women affected by lifetime physical violence are 6.2% more likely to be in paid employment in Peru, 2.2% more likely to Haiti, and 6% more likely in Zambia. There is no measurable impact found for women experiencing current physical violence. Similarly, Sánchez et al. (2004) found that in Columbia, women experiencing violence had unemployment rates that were 8% higher than non-abused women. Finally, Vyas and Heise (2014) use PSM to estimate an unbiased effect size of women's employment on their risk of experiencing partner violence in urban and rural Tanzania using data from the 2010 Tanzania Demographic and Health Survey (DHS). They find that Tanzanian women who work outside of the home are significantly different from those who do not, suggesting substantial self-selection into employment. In both urban and rural areas, women's risk of partner violence appears higher among women who worked in the past year. In rural areas, being paid in cash was found to reverse this effect, while the stability of employment reduced this risk in urban hubs.

The relationship between intimate partner violence and women's weekly earnings was also examined in Tanzania by Vyas (2013). This study examined the difference in women's weekly earnings from formal waged work and non-agricultural self-employment using data from the 2008-2009 Tanzania National Panel Survey. The results show that abused women earn less than non-abused women, with the greatest loss experienced by women in formal waged work and by women in urban areas. This equates to an estimated productivity loss of 1.2% of Tanzania's GDP. In Colombia, Sanchez et al. (2004) found that women who experienced moderate violence would have earned approximately USD\$60 more per month if they had not been abused. Women who experienced sexual violence would have earned USD\$100 more per month. This compared to a mean monthly earnings for the entire sample of USD\$142, therefore representing a significant reduction in their earnings owing to violence.

In terms of the impact on women's health, Morrison and Orlando (2004) find that women suffering physical violence were far worse off than their matched counterparts in Peru, Haiti, and Zambia. They found that these women were more likely to have (1) complications during delivery – in Peru, this was 7% higher for women that experienced physical violence, (2) termination of pregnancy prior to term, (3) contract sexually transmitted diseases – this was 4% higher for women victims of physical violence in Peru and 1.9% higher in Zambia, (4) suffer from genital sores or ulcers – in Haiti, it was 4.3% higher while in Zambia it was 2.8% higher, (5) anaemia. Sanchez et al. (2004) found similar results in Colombia where women victims of IPV had a higher probability of suffering a miscarriage or problems in childbirth. Regarding the impacts on children (including their health and education), Morrison and Orlando (2004) found that children were more likely to suffer diarrhoea (6.7% more likely in Peru), anaemia (1.2% in Haiti), and shorter in height in Peru. Children of women victims in Peru were found to be more likely to attend school and less likely to be behind in school. Sanchez et al. (2004) found also found that there was little or no impact on children's educational outcomes in Colombia. However, children were found to suffer from recurrent coughing, severe respiratory infections, diarrhoea, and high fever.

### **2.3.2 Limitations**

While propensity score matching has many advantages over standard regression analysis, it still has several limitations. As outlined by Duvvury et al. (2013), this methodology requires large sample sizes and the quality of the estimates depends on the satisfaction of the conditional independence assumption (such that the error term is uncorrelated with any outcome of interest). Also, this approach does not provide total costs of domestic violence for households or communities. According to Morrison et al. (2007) PSM is sensitive to omitted variable bias, and does not explicitly deal with issues of simultaneity, particularly the bias between earnings and violence. In addition to this simultaneity bias, Heckman et al. (1998) has shown that bias may also exist as a result of matching errors, whereby failure to compare the treatment and control groups within the region of common support could result in significant bias within the results.

## **2.4 Quality of Life Losses**

Quality of life losses encompass two types of estimation: Disability-Adjusted Life Years (DALY) and Years of Life Lost (YLL). 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. To calculate the DALYs lost to death for example, the age at premature death is subtracted from the life expectancy for that age and demographic group in a low-mortality population. DALY's are measured on a scale of 0 to 1 with 0 representing a year of perfect health and 1 representing death (Access Economics, 2004). An increase in this scale coincides with an increase in the loss of health. For example, a broken ankle corresponding to a DALY of 0.20 implies that 20% of one year of healthy life is lost (Zhang, 2012). To obtain a monetary value, a dollar figure is assigned to value a statistical life year (NCRVAW&C, 2009). DALY estimates are useful for dimensioning the importance of domestic violence relative to other public health problems.

### **2.4.1 Evidence using Quality of Life Losses**

The first estimates of the DALY cost of gender-based violence were produced by Heise et al. (1994), who estimated that more than nine million disability-adjusted years of life are lost each year worldwide as a result of rape and family violence, more than that from all types of cancer and more than twice that lost by women in motor vehicle accidents. In Mexico City, Lozano (1999) estimated that rape and intimate partner violence against women were the third most important cause of DALY's lost, ahead of auto accidents and additional health related problems. Brown (2008) used data from the World Health Organization and the World Bank, estimate the economic value of DALYs lost due to violence. The report estimates that 48.4 million DALYs were lost as a result of 1.6 million deaths due to violence in 2002, for a total estimated economic value of US\$151 billion (in constant US\$ for the year 2000). The DALY's 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 (Wilmann, 2009). A study by the NCRVAW&C (2009) in Australia estimate that the cost of pain, suffering, and premature mortality costs was AUD\$3.5 billion 2002-2003. It is expected that by 2021-22, this will rise to AUD\$3.9 billion. The authors note that as a result of the Plan of Action intervention, AUD\$10,073 for every woman can be avoided. This is equivalent to AUD\$288 million (or 10%) in reduced costs by 2021-22. More recently, Stern et al. (2013) estimate that in total, 20,000 years of life are lost in Switzerland due to IPV. By assigning a value of CHF100,000 to one year of life lost, the total costs are estimated to be CHF2 billion.

### **2.4.2 Limitations**

While the estimation of DALYs has helped in recognising violence against women as a public health issue, measures have not been useful in either formulating policy response to violence or having an impact beyond the health sector. The weakness of this approach is that outcomes that do not result in mortality or morbidity, such as lost productivity, increased future criminality or more street children are not captured in the DALY estimates. Moreover, DALY calculations are methodologically complex and can be data-intensive (Morrison and Orlando, 2004).

## 2.5 Population Attributable Fraction

Other methods available to quantify the costs of domestic violence include calculating the population attributable fraction for health related costs as a result of intimate partner violence. As outlined by ANROWS (2016), population attributable fractions (PAFs) determine the proportion of a particular disease that could have potentially been avoided if the population had never been exposed to a risk factor. This is estimated by using separate PAFs for each disease. The share of disease that is attributable to domestic violence is computed. The domestic violence attributable cost for each disease of interest is then estimated by multiplying each PAF by the corresponding medical cost. Total attributable costs to IPV are then calculated as the sum of the domestic violence-attributable costs across all diseases (Brown et al., 2008). With the econometric approach, the domestic violence attributable costs are the product of the number of victims and the resulting increase in annual medical costs attributable to violence. The increase in annual medical costs is then estimated using standard regression techniques.

### 2.5.1 Evidence using Population Attributable Fractions

Using regression models that account for attributable health care costs, Kruse et al. (2011) find that women who are victims of violence incur significantly higher health care costs than a reference population of women who have not been exposed to violence. Using data for Denmark, the attributable costs of violence were estimated to be approximately D1,800 per year. Adjustment for age and deliveries only rendered higher attributable costs, while adjustment for multiple episodes during 2002-2005, socioeconomic status and, in particular, a history of psychiatric contact rendered lower attributable costs. The study by Kruse et al. (2011) estimates attributable health care costs of violence against women “by using a register-based econometric analysis, based on identification of all known victims of violence and their actual health care costs”. Attributable health care costs are calculated by estimating the average health care cost among victims of domestic violence that is additional to a normal level of health care costs by non-victims of domestic violence. The findings by Kruse et al. (2011) are in line with other research in this area. For example, attributable health care costs in the US were estimated to be US\$1,727 (Jones et al., 2006) and between US\$1,348 to US\$3,611 in a study by Brown et al., 2008.

### 2.5.2 Limitations

According to Access Economics (2004), PAFs may be subject to causality issues. The burden of suffering and premature death, and their associated direct health costs, are derived from research to determine estimate the proportions of various health impacts (deaths, mental illness, substance abuse, etc.) that are said to be caused by domestic violence. However, the possibility that correlation between domestic violence and another factor (for example, depression) may both be due to a third (unidentified) factor—such as a previous life circumstance, or that the causality may be two-way. These various impacts need to be disentangled in order to generate more robust fractions that would be generally accepted among the broader health community. Additionally, as discussed by Kruse et al. (2011), some selection bias may exist in the estimation of attributable fractions.

## 2.6 Willingness to Pay

A growing body of work exists in the area of contingent valuation methodology. A popular approach within this methodology is to estimate the willingness of individuals to pay for lives free of domestic violence, Morrison and Orlando (2004). The willingness to pay approach is based on the assumptions of basic cost-benefit analysis, which says that the cost to society of an undesirable outcome will equal the amount people would be willing to pay to avoid that outcome, Willmann (2009). There are three willingness to pay methodologies; contingent valuation, hedonic, and value of life. All of these seek to determine how much people are willing to pay for a particular good, a particular service, or a stipulated change in an outcome. Economists have developed estimates of the value of a statistical life (VSL) using evidence on market choices that involve implicit trade-offs between risk and money. Viscusi and Aldy (2003) summarise the vast literature in this area, most of which uses econometric analysis to determine the dollar amount that would be accepted by an individual to induce them to increase the possibility of death by x percent. For example, if an individual is willing to pay \$100 to eliminate a 0.01% risk of death, the VSL for that person is  $\$100/0.01\% = \$1$  million. According to the Bureau of Transport Economics (2000), international research on willingness to pay places the value of life between AUD\$1.8 and AUD\$4.3 million (Access Economics, 2004).

### 2.6.1 Evidence using Willingness to Pay

Walby (2004) utilizes this willingness to pay approach by 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 approximately £17 billion per year. Miller et al. (1996) used jury awards to determine the willingness to accept compensation for pain suffering and loss of quality of life due to fatal and non-fatal outcomes. Additionally, Sorenson (2003) used a willingness to pay approach in California to establish the willingness of the general public to pay for domestic violence prevention programs. Her approach utilized frequencies and chi-squared tests to describe key findings along with logistic regressions to predict willingness to pay. Overall, Sorenson found that 81 percent of respondents would be willing to pay USD\$5 and 75 percent would be willing to pay USD\$25 to support the prevention of domestic violence. More recently, Walby & Olive (2014) use the willingness to pay methodology to examine the physical and emotional impact of violence on victims in the UK using the Home Office methodology. This approach is based on the Burden of Disease methodology which estimates the cost of gender based violence and IPV by examining the average loss of healthy life years through injury per crime type multiplied by the value in monetary terms of a healthy life-year. Using this approach, the cost of the physical and emotional impact of gender based violence is estimated to be EUR 18,910,974,129, of which 89 percent was for gender based violence against women. The cost of physical and emotional impact of IPV was estimated at EUR 7,255,626,748, of which 91 percent was for IPV against women.

### 2.6.2 Limitations

The willingness-to-pay approach however is subject to several limitations. First, they require significant data and make assumptions regarding the similarity of duration and intensity of trauma from IPV and other violent crimes. Given the lack of willingness-to-pay or accept surveys focused on IPV, studies using methodologies make assumptions about comparability of risk. Additionally, the application of the methodology is limited in many developing countries given the normalization of violence as a socially accepted phenomenon and where market-based valuation of life, i.e. life and other types of health insurance are undeveloped, is not the norm, Duvvury et al. (2013). Its effective use also relies on a minimal understanding of violence as negative behaviour and a general preference to reduce its impact (Duvvury et al., 2004). Therefore, it might be less effective in contexts where violence is accepted as a norm. Estimating the willingness to pay for a fundamental right, while demonstrating the importance society attaches to an issue, may in itself, be controversial. Willingness to pay estimates are sensitive to income levels and income distribution, which can also make them unattractive methodologies to use (Morrison and Orlando, 2004). Given the limitations associated with the willingness to pay approach, alternative research has been established in the area of quality of life estimations. A life satisfaction equation is estimated using income and domestic violence variables. Using this approach, individual costs of domestic violence are derived as the estimated marginal rate of substitution with respect to household income. That is, how much income would households be willing to give up in order to be free of domestic violence? Santos (2013) finds that domestic violence "is a major inhibitor of individual and social welfare". Estimates using the quality of life estimations are in line with those produced using stated preference models, as in Atkinson et al., 2005. However, the quality of life estimation approach suffers from several issues. Sen (1990) argues that self-assessments of life in gender include adaptation and levels of resignation, which invalidate the use of this variable. Other criticisms include the dependency on the respondent's own mood and memory to provide a retrospective judgment.

## 2.7 Benefit-Cost Ratio

The Post-2015 Copenhagen Consensus on gender equality uses a benefit-cost ratio (BCR) for their gender related research. Benefit-cost ratios are indicators used formally in cost benefit analysis to summarize the overall value-for-money of a project or proposal. Clots-Figueras (2014) evaluates the goals set out by the UN HLP in the report “A New Global Partnership”. In order to achieve gender equality, three issues are outlined as pre-conditions. 1) increase the number of years of education attained by women 2) ensure equal rights of women to own and inherit property, sign a contract, register a business and open a bank account, 3) improve access to sexual and reproductive health for all women. Additionally, there should be emphasis on the reduction of violence against women and girls (VAWG) and reduce child marriage. Within this report, a BCR rating is given to each of the goals set out by the UN HLP report. For example, a BCR rating of 8 is given to dealing with issue 1) above – that is; increasing the number of years of education attained by women.

Braunstein (2014) in her assessment of the Clot-Figueras (2014) paper argues that benefit cost evaluations of policies for gender equality must be gender-aware in the sense of incorporating how gender structures, many of which exist outside the market sphere, shape choice and opportunity in economically significant ways. Accordingly, the benefits and costs of a variety of programs aimed at increasing gender equality must account for the opportunity cost of time spent away from unpaid care work. For example, Budlender (2008) estimates the value of unpaid care work in developing countries to range between 7 and 63 percent of GDP. As such, unpaid care work clearly has a value, and must be incorporated within quantitative analysis to ensure the benefit cost analysis is gender aware. Additionally, Braunstein (2014) argues that restricting evidence to micro experimental studies misses a large macroeconomic literature on gender. The inclusion of a macroeconomic perspective in the benefit cost analysis should engage the instrumental case for gender equality: that gender equality is good for economic growth. The economic logic is simple; excluding women from education, employment and other economic opportunities limits the pool of potential workers and robs economies of a key productive asset. Several econometric techniques are available, including fixed effects models and the use of instrumental variables within regression analysis.



## 2.8 Gender Responsive Budgeting

Gender-responsive budgeting (GRB) is a method that analyses government budgets and the planning, execution and reporting (budget cycle) to delineate the gendered impacts of budgetary decisions. In the absence of service provider data, it has been used to gather a broad overview of government/international donor investments in violence against women service provision and prevention efforts. It has been widely applied to establish the obligations of governments to address violence against women, the level of resources allocated, and the financial gaps in resource allocations. Application of this method requires full knowledge of what violence against women services are planned and available, as reflected in current legislation or national action plan and comprehensive knowledge of the national budgeting process within the specific country. The approach focuses on the entire budget, rather than at specific unit costs of services, prevention interventions and/or application of legal remedies.

A GRB approach to costing can identify gaps in violence against women related services or policies, weaknesses or absence of referral systems and/or protocols needed for better management of specialized and general public and private services that survivors might access. As illustrated in Figure 2, the GRB methodology involves a) institutional, policy and legal scan (environmental scan), b) review previous research on violence in the country, review of available administrative and (if it exists) survey data, c) mapping of survivor's journey for seeking and accessing services and d) budgetary analysis.



**FIGURE 2: STEPS IN GENDER RESPONSIVE BUDGETING**

Conducting a budgetary analysis typically relies on a 3P (Prevention, Provision of Services, and Prosecution) approach. Prevention typically revolves around analysing the resources available to institutionalise and effectively implement a legal and policy framework. Analysis of the provision of services usually involves examining the government budget for the provision of specialised health and legal services (such as crisis centres, shelters, etc.). Finally, a budgetary analysis of the prosecution of perpetrators is undertaken. As a result of implementing this methodology, the expected outcomes will establish i) gaps in legislation and policy, in particular services, ii) the level of resources allocated to existing services, iii) the sources of funding for these services, iv) system wide referrals and protocols in practice, and v) adequacy of current allocations and resources. A detailed discussion of the process and tools that can be used in each step of the process are described in detail in the Manual for Costing a Multidisciplinary Package of Response Services for Women and Girls Subjected to Violence, based on the experience of implementing a GRB approach in Cambodia and Indonesia.

## 2.9 Economic Multipliers

Violence against women prevents an economy from attaining its full economic potential. Estimating economic multiplier effects can give us some indication of the loss to economic growth as a result of domestic violence by taking into account the structural inter-linkages of the macroeconomy. As outlined by Raghavendra et al. (2017), the loss of income at an individual level has both direct and indirect effects due to the structural inter-linkages of the economy, which translates losses at a microeconomic level to losses at a macroeconomic level. Considering the structure of production in the estimation of loss due to violence can help to quantify the impact of loss in one sector on the other sectors of the economy through the multiplier effect.

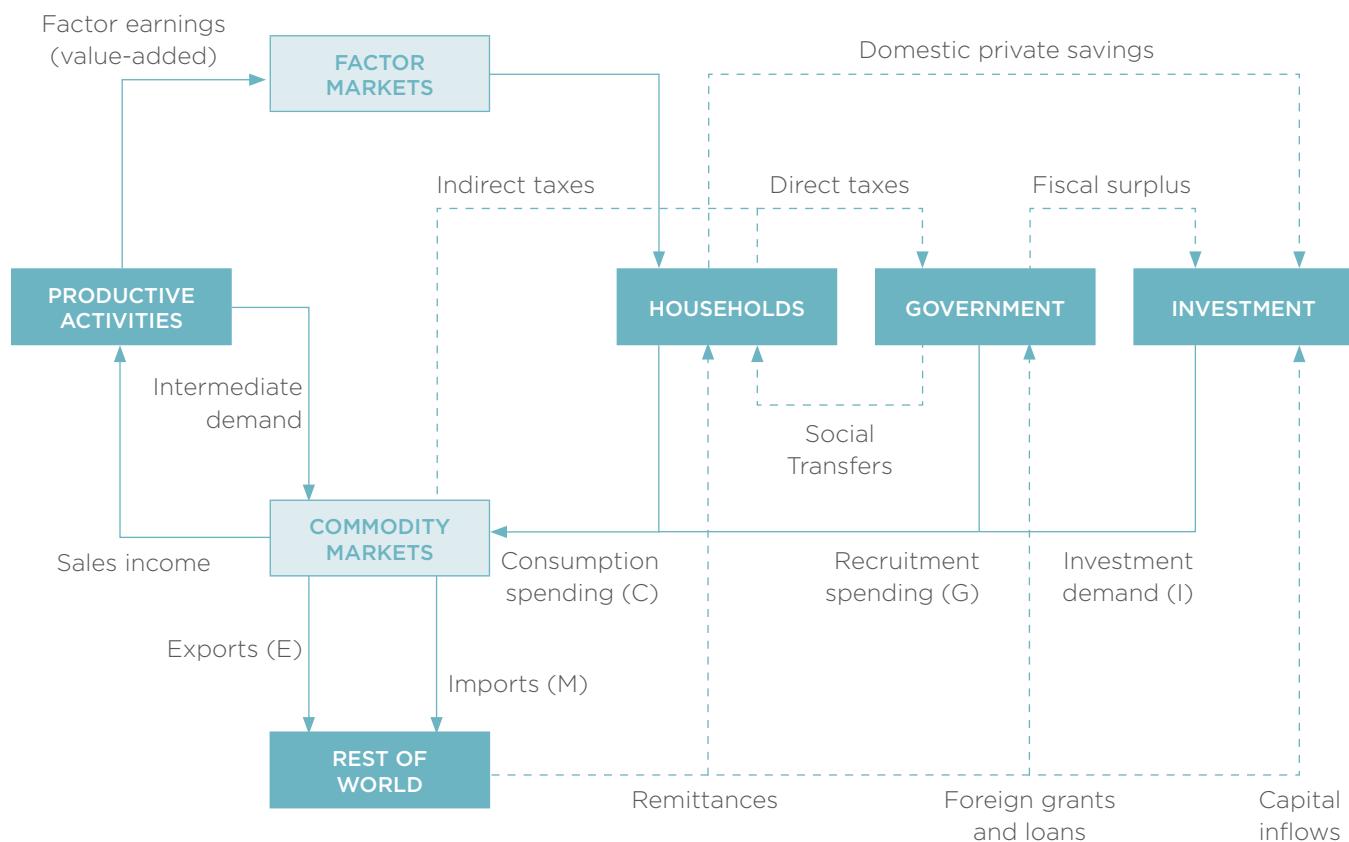
Aggregate demand is skewed towards goods and services related to the effects of violence thereby diverting resources from their optimal use. This results in lower economic growth and a reduced standard of living. This has an impact on aggregate supply that is also reduced through lower productivity, reduced output and exports, and reduced savings and investments. Additionally, this reduction in output is even larger because of the economic multiplier whereby a dollar lost represents more than just a dollar. Rather, it represents the lost tax revenue and the benefits thereof, as well as the lost savings and spending that is passed on to others to save and spend many times over (Day et al., 2005).

### 2.9.1 Evidence using economic multipliers

While the idea of economic multipliers is not new within the domestic violence literature, there has been little research into estimating these economic multiplier effects. Cunningham et al. (2008) developed a methodology to estimate opportunity costs associated with risky behaviour that could be adapted to assess the costs of domestic violence in Latin America. Elsewhere, research on multiplier effects for war expenditure (Stiglitz and Bilmes, 2008) and socioeconomic conflict in Bolivia (Evia et al. 2008) has been conducted and could possibly be adapted to domestic violence data. However, to our knowledge, no one has explicitly provided comprehensive estimates that takes into account both the categories of loss, sectoral and inter-sectoral, due to violence (Raghavendra et al., 2017).

## 3. AN ALTERNATIVE APPROACH: SOCIAL ACCOUNTING MATRIX

The above methods will give an indication of the individual costs and the aggregate loss for the economy as a result of violence against women. However, as outlined by Raghavendra et al. (2017), this type of estimation does not account for structural inter-linkages within the real economy. For example, the loss of income for an individual woman as a result of violence impacts the economy in two ways: firstly through losses in output for a particular enterprise and sector, and secondly through losses in her consumption of goods and services. This loss in consumption demand leads to further losses in output in the real economy.



**FIGURE 3: THE CIRCULAR FLOW OF THE ECONOMY**

Source: International Food Policy Research (2015)

The circular flow of the economy (as given in Figure 3) captures all the interactions between sectors and institutions. Essentially, each institutions' expenditure becomes another institutions' income. A Social Accounting Matrix (SAM) is also a representation of the economy. It is an accounting framework that assigns numbers to the incomes and expenditures in the circular flow diagram. The framework of a SAM provides a firmer theoretical basis to estimate the economic costs of VAWG. SAM accounts for the structural interlinkages that exist within real economies, regardless of whether they are developed or developing economies. SAM is a particular representation of a macroeconomic system that incorporates a considerable level of information about the transfers, transactions, and relationships between macro and meso level economic categories or accounts (Pyatt and Round, 1985). The SAM framework is flexible in terms of accounting for all the economic activities, such as consumption, production, and distribution, at various levels of disaggregation with the economy. As such, calibrating a large class of models for economic policy analysis pertaining to distribution, poverty, and other macroeconomic issues would be possible using this framework. Using SAM we can estimate the loss of income due to violence against women within the framework of the circular flow of income between activities, factors, and household accounts. In addition to the level of income loss due to violence, which is the direct cost incurred by women and men in individual sectors of production, we can derive the indirect impact of that loss for the other sectors in terms of both production and consumption demand using the SAM-based multiplier analysis. The multiplier analysis can be modified to incorporate both these effects to study how violence against women impacts on macroeconomic output and income.

## 4. IMPACTS OF DATA RESTRICTIONS

As discussed, there are many alternative approaches available within the literature to estimate the many costs and impacts of violence against women and girls. While there are many advantages and disadvantages to each approach, in reality, the choice of methodology, will be limited by several prevailing factors.

Establishing robust estimates on the costs of violence against women and girls may be subject to significant data limitations and gaps particularly in developing country contexts where only incomplete and fragmented data is available (Duvvury et al., 2013). This can have important impacts on the methodological approach being undertaken. For example, propensity score matching can be used to establish the many impacts of violence on women and girls. However, for accurate results to be obtained, large sample sizes are required to provide a meaningfully matched comparison group (Morrison and Orlando, 2004).

Similarly, establishing productivity impacts of violence requires robust data on prevalence rates, firm level data (such as absenteeism, presenteeism, etc.), and labour force statistics (such as wage rates, labour force participation, etc.) is required, which may be difficult to obtain in contexts where reliable national survey data is not available.

## 5. CONCLUSIONS

In this review of the methodological approaches for establishing the economic costs of violence against women, we provided a brief overview of each respective methodology used within the literature, an assessment of current evidence, and an examination of some of the limitations of using each methodology.

Currently, there are nine alternative approaches available in the literature to estimate the costs of violence with each methodology having its own advantages and drawbacks. Overall, the accounting approach is the most commonly used method to estimate the direct and indirect tangible costs associated with violence against women. This approach is easy to implement, and can provide a quick rough estimate of costs (Duvvury et al., 2013). However, this approach on its own is likely to severely underestimate the true cost of violence to the economy. Econometric techniques (including propensity score matching) have been useful in examining the multiple impacts of violence (such as the impact on education, labour force participations, earnings, and physical, mental and reproductive health) on women and their children. While econometric methods can be sensitive to selection bias and issues relating to the selection of instrumental variables, propensity score matching is a viable alternative for overcoming some of these issues and offers a more methodologically rigorous approach for examining the impacts of violence. Similarly, while the estimation of quality of life losses (such as DALYs), population attributable fractions, and the willingness to pay approach, help to establish the health related costs of violence, they have not yet been useful in formulating policy responses or having any impact outside the health sphere (Morrison and Orlando, 2004). Finally, there have been several techniques (benefit-cost ratio and economic multipliers) that have yet to be subject to rigorous empirically testing, therefore making it difficult to assess their ability to provide meaningful estimates on the costs of violence against women and girls.

Within developing country contexts, data restrictions will limit the type of analysis which can be undertaken. Overall, however, it is clear that in order to provide a full assessment of the many impacts and costs of violence against women and girls on individuals and households, communities and businesses, and government and state, several, methodologies should be employed. In order to establish the economic direct and indirect tangible costs, the accounting approach can be employed. This methodology will provide estimates of the out-of-pocket expenses associated with violence against women and also the number of days lost per incidence of violence. This approach can also be used to establish the tangible economic impacts for businesses. The econometric methodology, with the inclusion of propensity score matching, will underpin how violence against women impacts the economy, from labour force participation, to earnings, to health costs. Using the social accounting matrix, we can estimate the full macroeconomic loss owing to violence while taking into account the complex interlinkages of the macro economy. Finally, using gender responsive budgeting, we can examine budgetary planning and allocations by government to address violence against women and girls.

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