



**CEDE**

## **DETERMINANTS, EFFECTS AND COSTS OF DOMESTIC VIOLENCE**

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### **Abstract**

This paper analyzes the determinants, effects and costs of domestic violence (DV) against women and children in Colombia. The most relevant factors that explain the occurrence of DV in a household are suffering from DV as a child and living with someone that frequently and excessively consumes alcohol. DV against women increases their probability of unemployment by 6.4 percentage points, lowers their earnings by approximately 40% and worsens their health. DV against children negatively affects their health, school attendance and academic attainment. It is estimated that at least 4.2% of Colombian GDP is lost due to indirect costs of DV.

**Keywords:** Domestic Violence, Probit Model, Matching Estimator

**JEL Classification:** J1

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# **DETERMINANTES, EFECTOS Y COSTOS DE LA VIOLENCIA INTRAFAMILIAR**

## **Resumen**

En este artículo se analizan los determinantes de la violencia intrafamiliar (VIF) en Colombia y se mide su impacto sobre diversas variables de la mujer tales como el ingreso, el desempleo, y la salud y sobre variables del hogar en particular el nivel de salud y educación de los niños. Los determinantes más relevantes de la violencia intrafamiliar son haber sido víctima o testigo de violencia en el hogar materno y estar casada o unida a un hombre que consume alcohol de manera frecuente y elevada. A través de la técnica del “matching estimator” se estiman los efectos de la VIF. Se encuentra que si en un hogar existe maltrato a menores o agresiones físicas contra la mujer, los ingresos laborales mensuales de la mujer son cerca de 40% inferiores de lo que serían si no hubiera VIF. Así mismo la VIF determina una mayor probabilidad de desempleo para la mujer y peor salud para la mujer y los niños frente a quienes no sufren VIF. Los costos de oportunidad de la VIF alcanzan por lo menos 4.2% del PIB.

**Palabras clave:** Violencia intrafamiliar, Modelo Probit, Estimador de Emparejamiento

**Clasificación JEL:** J1

## **1. Introduction**

The objective of this paper is to determine the variables or factors associated with domestic violence [DV] in Colombia, to measure the impact of DV on the welfare of the households and to estimate the indirect costs that society has to bear due to DV. The data come from a random survey applied to 2300 women in three Colombian cities in 2003.

The current research on DV has found a positive relationship between economical dependence of the woman and DV. However, the direction of the relationship is still a matter of debate. In most of the economic literature it has been assumed that being more economically dependent on the husband implies that women face more violence from their partners (Basu and Famoye 2004, Farmer and Tiefenthaler 1996, 1997, etc). However, according to Koenig et al (2003), DV impedes women's economic and social development and their capacity for self determination. We assume that when women are victims of DV it necessarily implies that they have lower earnings, through the effects that DV or the fear of violence has on the woman's self esteem, capacity to work, look for a job, or find a better job.

The paper is divided in eight sections including this introduction. The second section contains a review of the literature. The third section describes a behavioral model where DV arises from the husband's utility maximization and the woman's labor earnings depend on the level of DV that she is subject to. The data for the study and the variables used to measure DV are described in section four. The fifth section examines the determinants of DV. The sixth section contains an estimation

of the effects that DV has on a series of household outcomes (labor market indicators, health, nutrition and education of household members). The methodology used to measure these effects is the matching estimator. In the seventh section we estimate the monetary costs associated to DV, based on the effects calculated in section seven. The last section concludes.

## **2. Literature review**

The analysis of DV from an economic perspective is quite recent. According to Blau (1998), the theory to model the causes of DV is basically non-existent due to the lack of a theoretical framework and to the critical problems with the data.

Among the most recent theoretical approaches from the economic perspective we find Tauchen et al (1991), Farmer and Tiefenthaler (1996, 1997), Tauchen and Witte (1995) and Pollack (2002). Tauchen et al (1991) set up a non-cooperative model for the family where violence is a way for the husband to elicit a desired behavior from the woman and a source of utility for him. Their econometric models show that the levels of violence depend on the income of the partners, with poorest families reacting to an increase in the partner's income by reducing the level of violence.

The reaction of women to husband's aggression has been analyzed by Farmer and Tiefenthaler (1996, 1997). They find that after an episode of DV most women look for help through the family or the State, but return to their husband in a relatively short period of time. Aside from the psychological theories that may exist to explain this behavior, the economic explanation is that a battered woman uses the temporal refuge after the violent episode as a threat to the aggressor, which gives

the signal that she is capable of abandoning him. The objective of this threat is to reduce the future levels of DV. Tauchen and Witte (1995) estimate a stochastic dynamic model for DV that leads them to conclude that even if arrest of the aggressor deters DV in the short term, in the long term its effects fade out.

Pollack (2002) models the intergenerational transmission of violent behavior, by assuming that those men who grew up in a violent home are more likely to be aggressive as adults, and, at the same time, those women who grew up in a violent home are more likely to be victims of DV. Such men and women are also more likely to match later on in the marriage market. The author does not estimate his model empirically, but concludes that short term policies such as the police reaction to DV complaints or the court arrangements after DV episodes can be effective in reducing the level of DV that some households suffer. This sort of policies, through the intergenerational link just described, would also have an effect for the future generations.

The data problems concerning the subject of DV arise from several areas. As Basu and Famoye (2004) point out, many of the studies on DV are not based on random samples, but on selected samples. When studies are restricted to women who complain to the authorities about the incidents of DV, they ignore the population of DV victims that do not register a complaint. Studies with surveys using random samples have problems of non response bias, different definitions of violence, fear of disclosure and concerns for safety of both respondents and interviewers (Ellsberg et al. 2001). In addition to this, there is no consensus on the way questions regarding DV should be asked, on the reference period that is appropriate for a good

recollection of the events, and on the detail with which the matter should be dealt with in order to obtain good measurements<sup>2</sup>.

A large part of the empirical literature on DV has sought to determine the factors that generate the phenomenon. Some of these factors are transmitted across generations, some have economic causes, and others have cultural roots. The factors of intergenerational transmission of DV have been widely researched in the empirical literature. It has been found that having been a victim of DV as a child highly increases the likelihood of suffering or perpetrating DV as an adult. Female children are more likely suffer DV from their husbands, and male children are more likely to become aggressors (Straus et al. 1980, Huesmann et al. 1984, Widom 1989). In Colombia, Klevens at al (2000) compared the DV histories of a group of men accused of being DV perpetrators and a control group. Among the treatment group, it is more likely to find men that suffered from severe forms of DV in their childhood than among the controls. Similarly, women who are partners of the men in the treatment group are more likely to have experienced physical or sexual abuse as girls.

In addition to the intergenerational factors, there is a set of contextual variables that are associated with a higher prevalence of DV towards women and children. Among them the most important is the husband's excessive consumption of alcohol. According to Klevens (1998) the aggressive husbands not only were

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<sup>2</sup> The difficulties with the data on DV are evident in the DV modules of the Demographic and Health Surveys [DHS] of 1990, 1995, and 2000 in Colombia (Profamilia 1990, 1995, 2000). Each survey measures differently the intensity of the aggressions, their frequency and they do not have a period of reference for the questions.

victims or witnesses of DV as children and face economic difficulties, but they also tend to consume alcohol in an excessive and frequent manner. The link between alcohol abuse and DV aimed at children was the subject of the analysis by Markowitz and Grossman (1998). Using data from the 1976 Physical Violence in American Families Survey and a number of state alcohol control variables, they show that increasing the tax on beer by 10% can effectively reduce the probability of severe violence by 2.3% and the overall violence by 2.1%.

Two economic variables frequently associated with DV are the lack of education and difficult economic circumstances in the household, due to poverty or to an external shock that generates an additional stress on the family (such as job loss (Klevens et al. 2000). Using data from the DHS 2000, Gaviria and Vélez (2001) find that the poorest households and households with the lowest educational levels for husbands and wives are those that exhibit the highest incidence of DV. In fact, they report that among the poorest 40%, about 8% of women and children were victims of some sort of abuse inside the household. However, the decrease of DV with wealth is not as sharp, since they also report that among the wealthiest 20%, about 5% of women and children were victims of DV. In the case of sexual abuse of women, they did not find any difference between the populations with more or less wealth.<sup>3</sup> With respect to the educational levels, they find that in about 50% of the couples with physical abuse towards women or children, the woman and her husband had barely completed primary school. Additional risk factors that have been associated with DV in some case studies in Colombia are specific

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<sup>3</sup> They measured wealth with an asset index.

characteristics of the Latino culture, such as the patriarchal family institutions or the “machismo” that permeates the society (Palacio and Castaño 1994, Uribe and Uribe 1990, Klevens et al. 2000).

The literature on the costs of violence is less developed than the literature on the determinants. The work by Londoño and Guerrero (1999) attempts to measure in economic terms the costs of violence in six countries of Latin America. They are not focusing on DV alone, but all sorts of violence and calculating the direct and indirect costs that each society has to bear due to violence in general. Their calculations for Colombia indicate that the direct costs of violence are 11.4% of GDP, which corresponds to the losses in health and material costs. They also calculate that the indirect costs of violence are 8.9% of GDP, associated with the loss in productivity and investment.

The importance of measuring the economic costs of DV lies in the need to attract the attention of policy makers with respect to the need to formulate actions to protect victims of DV and prevent its occurrence (Morrison and Biehl 1999; Morrison et al. 2004). Morrison and Orlando (1999) used household surveys in Nicaragua and Chile to measure the costs of DV in these countries. They calculate the effects of DV on the decision of the woman to work, her earnings and their child’s school performance. They find that even if DV has no effect the woman’s decision to work, it has a clear effect on diminishing the woman’s labor earnings. According to their estimates, in Santiago women who are victims of DV earn on average 34% less per month than the women who do not suffer from DV (in Managua the estimated figure is 46%). By adding up these effects over the entire population, their calculations imply that approximately 2% of the Chilean GDP and 1.6% of the Nicaraguan GDP



were lost due to DV. Morrison and Orlando (1999) estimated their models using simultaneous equations techniques, which presume finding instruments to explain DV that are not correlated with income<sup>4</sup>.

This study attempts to fill some of the existing gaps in the measurement and estimation of the effects and costs of DV. We advance in the measurement problem by working with various types of DV using scales of severity and frequency, and we include not only women but also children.

### **3. The model**

While many of the existing models of DV against women predict that women's incomes will decrease the level of violence by increasing her bargaining power inside the household (for example Farmer and Tiefenthaler, 1997), in our model we want to look at the effect that an aggressive husband or partner has on a number of outcomes from the household. These outcomes include the woman's potential to work and her earnings, her health, the health of the children and other members of the household, and their human capital accumulation.

Independent of household wealth, it is easily understood that when a woman is battered this has an impact on her self-esteem, her capacity to find and maintain a job, her ability to negotiate for better pay and her overall earnings. It also affects her

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<sup>4</sup> The instruments used by Morrison and Orlando (1999) were the number of times that the husband consumes alcohol in excess, if the woman was a victim of domestic violence as a girl, if the father of the woman was aggressive with the mother, and whether the conflicts in the household are solved by negotiation.

health status, makes her less able to help her children with school, nourish and treat them properly, affecting many of the family outcomes, current and future, as a whole.

The model presented has two parts. In the first we model how the husband decides on the amount of violence that he inflicts upon his wife. In the second part we model the incidence of DV on female earnings. We assume that this level of violence is independent of the current earnings of the woman, but not on a long list of unobservable variables that could be related to her potential earnings. In order to model the incidence and intensity of DV, we assume that the husband values positively a vector of services that the wife provides for him. For simplicity we will assume that this is a net service from woman to man, that could be negative when the man is providing services to the woman. The woman, on the other hand, receives a disutility from providing such services for the husband, as proposed by Tauchen et al (1991).

We assume that the woman's utility has to be binding at a level that keeps her into the marriage. Therefore if she stays married is because the disutility she gets from the marriage is at most of value  $u^*(.)$ . The man, knowing that the woman's disutility is binding at  $u^*(.)$ , decides how much violence to inflict on his wife. The violence can be zero or positive and will result from his utility maximizing behaviour and on the services he receives from the wife. Each couple has a specific utility function for the man and the woman and a specific level of utility  $u^*(.)$  (i.e. different women may need different levels of utility to stay married). This determines a variety of levels of violence that the husbands inflict and a variety of services that women give to their husbands. Both the utility of the man and the disutility of the woman depend on the amount of services the woman provides to the husband ( $Sh$ ), and on

the level of violence the man inflicts on the woman ( $DV$ ). This level of violence is net from the husband to the wife (it would be negative when the woman abuses the husband).

Let  $U_w = U_w(Sh, DV)$  be the utility function of the wife. Given the model's assumptions, the derivatives of  $U_w$  with respect to both arguments are negative. For example assume that:

$$U_w(Sh, DV) = -(Sh \cdot DV).$$

Let  $U_h = U_h(Sh, DV)$  be the husband's utility function. Given the assumptions, the derivatives of  $U_h$  with respect to both arguments are positive. For example assume that:

$$U_h(Sh, DV) = Sh^{1/2} + DV^{1/2}.$$

The husband maximizes his utility subject to a minimum level of utility for the woman  $u^*(.)$ . The problem of the man is:

$$\text{Max } U_h(Sh, DV)$$

$$\text{subject to } U_w(Sh, DV) = u^*(.).$$

With the example utility functions it reduces to:

$$\text{Max } Sh^{1/2} + DV^{1/2}$$

$$\text{subject to } Sh = -u^*(.) / DV$$

The solution of this problem is a pair  $(Sh, DV)$  that determines in each household how many net services the wife provides for the husband and how much violence he inflicts upon her, depending on the level of utility  $u^*(.)$  that guarantees that the woman stays in the relationship. Following the example, the solution leads to:

$$DV = Sh = (-u^*(.))^{1/2}.$$

Given the specifications used in this model, the level  $u^*(.)$  has to be a negative number. The external factors that determine  $u^*(.)$ , i.e. the boundary level of utility that keeps the woman in the relationship, could be her education, her experiences of DV as a girl, and factors that may affect her decision of remaining in the relationship, such as the number of children, whether she is married or cohabiting and her age. In this way, the level  $u^*(.)$  is exogenous to the problem, but it depends on the woman's personal characteristics.

The model does not exclude the possibility that the husband provides services to the wife and that the wife mistreats the husband. This is allowed with different parameters of the utility functions. Among the husband's characteristics that could affect his marginal utility of DV are having been a victim/witness of DV as a child, or consuming alcohol in excess.

The second part of the model recognizes that DV has a direct effect on female earnings. In order to do this, we assume that female earnings are determined by:

$$w_i = \beta K(X_i, DV_i)\varepsilon_i.$$

where  $w_i$  are earnings of woman  $i$ ,  $\beta$  is a productivity extra-environmental factor that reflects the characteristics of the local labour market,  $X_i$  are the woman's characteristics (human capital endowments, age and other characteristics) and  $DV_i$  is the level of DV she experiences at home. The function  $K$  determines how the woman transforms her inputs (human capital, other characteristics and DV) into labour earnings. The factor  $\varepsilon_i$  is an error term that takes into account the unobservable factors.

#### **4. The data**

The data on violence aimed at children and women, individual characteristics of the perpetrator and the household come from the 2003 Domestic Violence Survey [DVS]. This survey was carried out by the Centro de Estudios para el Desarrollo Económico [CEDE] in the cities of Bogotá, Barranquilla and Barrancabermeja<sup>5</sup>. The survey asked about violence in the home and it contains detailed information on the family demographics, human capital, labour market participation and earnings of the household head and partner, and health levels of all family members. The data consists of a sample of 2,293 households, representative for the three Colombian cities. Of these households 1,686 women make up the sample of victims or potential victims of spousal abuse (were married or in cohabitation) and 2,186 women have children, victims or potential victims of parental or adult abuse. Details on the sample design of the survey are included in the Appendix (Subsection 1).

##### **4.1 Domestic Violence Variables**

Following the approach of the Colombian DHS, the module regarding DV was placed in the questionnaire after sections on housing characteristics, employment, reproductive history and family planning, child health and nutrition. An adaptation of the Revised Conflict Tactics Scale [CTS2] was used in order to obtain the measures of domestic violence in the DVS. The CTS2 is one of the best available techniques for collecting information on DV and has been used in a large number of studies to date (Straus et al (1996)). The module was designed to identify the existence of two

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<sup>5</sup> The selection of these cities was a requirement from the funding source. They are among the largest cities in Colombia.

types of DV: violence toward women and violence toward children. The questions aimed at measuring the violence toward women were asked as follows:

“Disregarding how well you and your partner get along, there are times when you disagree, get upset with each other, each one wants something different, or you may have fights. This may happen when you are tired, upset or for other reasons. Each couple tries to solve these differences in a variety of ways. This is a list of the things that may happen between you and your partner when you have these disagreements. Please let us know, in the past year, how often any of the following took place in your home.”

The list of options included the following: (a) he accused you of being unfaithful; (b) he did not let you meet your friends; (c) he tried to limit your contact with your family; (d) he insisted in knowing where you were all the time; (e) he watched how you spent your money; (f) he took you to social events; (g) he consulted with you important family decisions; (h) he ignored you; (i) he insulted or swore at you; (j) he has threatened to leave you; (k) he has threatened to date another woman; (l) he has threatened to hit or throw something at you; (m) he has threatened to separate you from your children; (n) he has threatened to leave you without his economic support; (o) he accused you of being a lousy lover; (p) he did something to spite you; (q) he shouted or yelled at you; (r) he destroyed something belonging to you; (s) he pushed, grabbed or shoved you; (t) he slapped you; (u) he kicked, bit or hit you with a fist; (v) he threw something at you; (w) he threatened you with a knife or gun; (x) he twisted you an arm or pulled your hair; (y) he burned or scalded you on purpose; (z) he choked you; (a1) he insisted on sex when you did not want; (a2) he used threats to make you have sex; (a3) he used force to make

you have sex. The answers were: 1) always, 2) frequently, 3) sometimes, 4) very few times and 5) never.

Each option can be coded for severity (depending on the type of aggression) and frequency and all questions refer to the 12 month period prior to the survey.

When the partner sometimes or few times does (a) – (e), (h) – (r) or (a1)-(a2), or when very few times does (f) or (g), we defined that the woman was a victim of **seldom psychological domestic violence**. When the partner sometimes or few times does (s) – (z) or (a3), we defined that the woman was a victim of **seldom physical domestic violence**. When the partner always or frequently does (a) – (e), (h) – (r) or (a1)-(a2), or when he never does (f) or (g), we defined the woman as a victim of **continuous psychological domestic violence**. When the partner always or frequently does (s) – (z) or (a3), we defined that the woman was a victim of **continuous physical domestic violence**.

The second objective of the DVS was to measure domestic violence toward children. The questions aimed at measuring this type of violence were asked to the woman as follows: “When your children younger than 12 are at home, who is the person that takes care of them more often? In the house, who are the people that discipline your children younger than 12? In the last year, in order to discipline or correct your children, how often each of these persons (that apply), did the following?”

The list of options included: (a) explained to them why their behaviour was not o.k.; (b) ignored or did not speak to them; (c) insulted or swore at them; (d) threatened to expulse them from the house; (e) left them out of the house; (f) threatened to abandon them; (g) threatened them with scary imaginary characters;

(h) shouted or yelled at them; (i) took something belonging to them away; (j) forbid them from doing something that they like; (k) took away privileges; (l) deprived them from food; (m) forced them to do household chores or work; (n) threw cold water at them; (o) took away or hid the clothes; (p) gave them spankings, slaps or pinched them; (q) pushed, grabbed, shoved them or hit them with the fists; (r) shook them; (s) forced them to be in an uncomfortable position or locked them up; (t) pulled their ears or hair; (u) kicked them or hit them with a hard object like a belt, broom, cane or other; (v) burned or scalded them on purpose; (w) choked them; (x) tried to suffocate them by hand or with a pillow; (y) threatened them with a gun or knife; (z) used a gun or knife against them. The answers were: 1) frequently, 2) sometimes and 3) never.

When options (b) – (m) happened sometimes we said that the child was affected by **seldom psychological violence**. When these options happened frequently it is said that the child is victim of **continuous psychological violence**. When options (n) – (t) happened sometimes we said that the child was victim of **seldom physical violence**. When these options happened frequently it is said that the child is victim of **continuous physical violence**. When options (u) – (z) happened sometimes we said that the child suffered **seldom severe physical violence**. When these options happened frequently it is said that the child is victim of **continuous severe physical violence**.

In addition to this, a list of variables was included in order to capture negligence toward older children or adolescents (11-18 years old). These questions were phrased as follows: “Do you (or your partner) ... (n1) ... know where your children go after school?, (n2) ... know with whom your children stay after school?, (n3) ... get phone calls from your children when they are out of home? , (n4) ... know



where they are when they are out of home in the afternoons or evenings? , (n5) ... know what plans your children organize with their friends? , (n6) ... ask them where they are going?" The answers were: 1) frequently, 2) sometimes and 3) never.

When options (n1) to (n6) happened only sometimes, it is said that the child was victim of **seldom negligence**. If these options never happened, it is said that the child was affected by **continuous negligence**.

#### **4. 2 Incidence of Domestic Violence**

Based on the previous definitions, the incidence of DV against women and children, for the whole sample and by cities is described in Table 1.

The figures of seldom psychological and continuous psychological domestic violence toward women are considerably larger than those of physical violence. The differences between the means of Barranquilla and the other two cities in both forms of psychological violence toward women and children are significant. Also in Barranquilla the means for physical violence and negligence toward children seldom and continuous are higher, but for the severe forms of violence toward children, the higher levels of Barranquilla disappear. Instead, for the seldom severe form of aggression toward children, Barrancabermeja has a significantly higher average than the other two cities.<sup>6, 7</sup>

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<sup>6</sup> These figures are not strictly comparable to the ones derived from the DHS because the DHS does not have a period of reference for the offenses and the questions are not based on the CTS2. According to the DHS, in 1995 53% of the households have children that are severely mistreated (48% in 2000), 33% of women are psychologically offended (44% in 2000), 20% of women are beaten

The survey also inquired about episodes of sexual abuse to children. In only 12 households of the survey the mother reported to know that someone had performed incorrect sexual behaviors with one of her children, implying that the incidence of sexual abuse detected by the survey is too low (less than 1%) to take it into account. However, this does not imply that sexual abuse does not occur, only that it most likely occurs without parental knowledge or that it is more difficult for parents to admit it. The instruments used in this survey did not account well for this type of violence.

In order to observe the patterns in the incidence of DV, the statistics of these variables were calculated by household wealth<sup>8</sup>, mother's education level, mother's marital status and mother's age (tables are included in the Appendix – Subsection 2). As can be seen Table A.2.1, all forms of violence toward women decrease

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by their husbands (34% in 2000) and 5% of women have been coerced to perform sexual acts against their will by means of threats or physical force (8% in 2000). (DNP - BID- Uniandes (2005))

<sup>7</sup> The figures of physical violence towards women are lower than the ones reported by Ellsberg et al (2001) in two cities of Nicaragua (in León 27% and in Managua 33% of women reported experiencing violence within the last year), but they basically stay in the range of domestic violence incidence reported by Krug et al (2003) for 45 countries (between 10% and 69%). According to the CTS2, in the US 47% of the men reported at least one instance in which they had physically assaulted their partners in the 12 month period preceding the survey (Straus et al (1996)).

<sup>8</sup> The wealth index for each household was built using factor analysis. The components of this index were: household has refrigerator, TV, other physical assets, access to water, sewage, electricity and phone, type of fuel used for cooking, floor material and "socioeconomic strata", a code used by the public services companies to charge differential rates depending on the location of the residence.

markedly between the extreme quintiles of wealth, although they do not change much within the mid-quintiles. For children, the decrease in DV indicators with wealth is more gradual: basically all variables show a slight decrease between one quintile and the next, confirming the findings of Gaviria and Vélez (2001).

A similar trend is observed when the data are organized by education level of the woman/mother (Table A.2.2). Even though there is a decrease of all forms of DV toward women with schooling, the incidence of DV for women with more than complete high school is still very high: 44% of women with more than 11 years of education are occasionally mistreated psychologically by their partners or husbands, and 30% are continuously psychologically mistreated by their partners or husbands. This pattern is also observed for DV toward children. Severe physical violence and negligence (seldom or continuous) decrease with mother's schooling: women without schooling exhibit the highest incidence of continuous psychological domestic violence toward children (almost 50%) and of seldom negligence (32.5%) and women with more than high school exhibit the lowest (20% and 8% respectively). However, seldom psychological and seldom physical violence toward children exhibit an unexpected increase with mothers' schooling.

Table A.2.3 shows that all forms of DV toward women occur more frequently when the woman is in cohabitation than when she is legally married. This result is also observed for the DV toward children. In this case, the levels of DV observed toward children are higher when the woman is married or in cohabitation than when she does not have a partner (single, separated / divorced or widow).

Finally, Table A.2.4 shows how the incidence of DV varies with mother's age. While psychological and seldom physical domestic violence diminish with age,

continuous physical domestic violence toward women does not. DV toward children is lower for younger mothers (who most likely have younger children), and negligence increases for older mothers, particularly for mothers in their 30's (who most likely have teenage children). Nevertheless, the highest incidence of continuous physical violence is attained for mothers in their 20's.

## 5. Determinants of Domestic Violence

In order to examine the determinants of DV, we aggregate the definitions of DV in the following way:

A. **DV toward women [DVW]:** when there is seldom or continuous psychological violence, or seldom or continuous physical violence. In the sample 57.7% of women suffer from this type of domestic violence<sup>9</sup>.

B. **DV toward children [DVC]:** when there is continuous psychological violence, or continuous physical violence, or continuous negligence, or seldom severe physical violence or continuous severe physical violence.<sup>10</sup> In the sample 50.5% of households suffer from this type of DV.<sup>11</sup>

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<sup>9</sup> The distribution across cities of this type of DV is: 54% in Bogotá, 72% in Barranquilla and 48% in Barrancabemeja.

<sup>10</sup> The reason for leaving out the seldom psychological, seldom physical and seldom negligence is that these concepts involve punishments that could be commonly but occasionally applied to children in order to discipline them. We did not want to necessarily to classify them as abusive.

<sup>11</sup> The distribution across cities of this type of DV is: 45% in Bogotá, 63% in Barranquilla and 56% in Barrancabemeja.

Based on the theoretical model of section 3, the observed levels of DV in a given household depend on a series of demographic characteristics of the couple, such as their education levels or age, their past experiences as children, and other factors that may alter their reservation utility levels or the shape of their utility functions— like characteristics of the family structure of their present household, such as the number of children. Descriptive statistics of the variables taken into account in order to explain the observed incidence of DV are included in the Appendix, Subsection 3.

The average woman in the sample is 34 years old, has 9 years of schooling and is married in 37% of the cases. The husband/partner is five years older, has 10 years of schooling, and is working in 67% of the cases. The average household has 4.7 persons, with a ratio of children younger than five on average of 0.14, and a ratio of women 15-49 of 33%. The alcohol consumption among the males is relatively high, given that on average a husband/partner gets drunk almost once per month.

Each woman was questioned on how her parents disciplined her in her parental household. The questions were exactly the same as the ones applied to inquire about the behavior toward children in her present household, except that the period of reference was not the last year, but her childhood. Therefore it is possible to build the same variables of DV toward children, but applied for the woman when she was a girl. In addition to this, the woman was questioned on whether her father used to mistreat her mother in her parental household, and whether her husband/partner was a victim of DV as a child in his parental household. From the survey it is possible to conclude that most women were victims of DV in their

household, and that a rather large number of women (30%) witnessed her father mistreating her mother in the parental home.

### **5.1 Unconditional Differences between Households with and without DV**

Given the general descriptive statistics of our sample, we are now interested in knowing whether or not households with DV are different from households without DV. Tables 2 and 3 present the differences in means of the DV determinants for the sample of households with and without DV.

These statistics show that the households that suffer from DV are considerably different than households without DV. In households without DV women have more education, fewer children and exhibit higher marriage rates. The husbands/partners also have more education, work more often, drink less alcohol, use drugs less often and are less prone to get involved in fights or being in jail. Households with DV are poorer (as measured by the assets index), have a lower ratio of women 15-49, are larger and have more persons per dormitory. Finally, men and women who live in households with DV were more often victims or witnesses of DV as children.

We have established that there are several variables that differ unconditionally between households with and without DV. In the next subsection we will proceed to determine the effect of such variables on the probability that a household experiences DV.

## 5.2 Probit Models

We estimate a Probit model that attempts to explain the probability of DV as a function of the characteristics of the woman, her husband/partner, their household and characteristics of their parental homes. The estimated model is:

$$\Pr(\text{Domestic Violence}_i = 1 | X_i) = \pi_i = F(\gamma' X_i) \quad (1),$$

where F is the Normal distribution cumulative function, X is the vector of characteristics, and  $\gamma$  are the parameters to be estimated. The results of the estimation are included in Table 4. The marginal effects of the changes in the variables are estimated at the mean values of the variables. When one of the independent variables is a dummy, the marginal effect is reported for a change between 0 and 1. The estimation of the DV Probit models allows us to determine the factors related to DV and the degree of such association.

Table 4 has two parts, the first is the model of DVW and the second is the model of DV toward children. The first part shows that the probability of DVW increases if the husband or partner consumed alcohol until getting drunk in the month prior to the survey, if he takes part in fights or has been in jail (demonstrating a violent behavior outside the household), if there are more children 0-5 and more persons per dormitory in the household. This probability is also increased when the woman or her husband/partner were affected by DV as children: whether the woman was victim of psychological or physical violence in her maternal household, whether the father and the mother had physical fights and whether the husband/partner was a victim of DV are all significant, and their marginal effects are of considerable size (close to 9% each). This finding is an additional evidence of the intergenerational transmission of DV.

The factors that deter the incidence of this type of DV are the woman's education, if the husband/partner is employed at the time of the survey, and when the woman is married (as opposed to cohabitation). Although age and age squared were not significant, in other specifications of the model including only age the coefficient was positive and significant at 2% with a marginal value of 0.52% per year, indicating that the probability of being mistreated increases with age and that a woman 10 years older than another is 5.2% more likely to suffer DV in her household.

The highest marginal effects are obtained when the husband/partner consumes alcohol and when he takes part in fights or has been in jail. They increase the probability of DV toward the woman by 11% and 14% respectively. The size and positive sign of the "ratio of children younger than 5" (more younger children, larger number) could indicate that the presence of older children acts to protect the woman from DV, or, that more young children adds stress to the relationship and increases the likelihood of DV. Finally, the dummy variable of Barranquilla was highly significant and positive: due to unknown reasons, the measured incidence of DVW in Barranquilla is 24% higher than in Barrancabermeja.<sup>12</sup> It is not possible to know whether this result implies that men in Barranquilla are more aggressive toward women, that women in Barranquilla respond more openly to a survey like the DVS, or both. The result reveals that the three cities, even though in the same country, have marked differences in terms of culture, traditions and difficult to measure cultural aspects such as "machismo".

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<sup>12</sup> Barrancabermeja is the city of reference.



The second model estimated in Table 4 explains the probability of DV toward children. The results show that this probability increases with the number of children ever born to the woman, alcohol consumption of the husband/partner, if the woman was victim of DV in her household and witnessed her parents having fights, and if the husband/partner was also victim of DV in his maternal household. The mother's age is significant in both linear and quadratic forms, and the coefficients indicate that DVC increases until the mother is close to 35 years old, and from then on it starts to decrease. On the other hand, if the mother is more educated, if there are more women between 15 and 49 years old and more children aged 0-5, and if the household is located in Bogotá, then the probability of DVC diminishes.

The marginal effect of psychological DV toward the woman when she was a girl is rather large: it increases the probability of DVC by 13 percentage points. A similar result is obtained when the father was abused as a child. This increases by 8.5 percentage points the probability of DV toward children.

The large negative effect of the number of women 15-49 in the household as a proportion of the household inhabitants suggests that women help as a shield to protect the children from adult abuse.

## **6. Effects of domestic violence in Colombia**

We seek to determine the effect of DV on different household welfare measures such as labor market variables (unemployment, income), health status of household members and scholastic achievement for children. To do this, we compare similar households with and without DV. If differences exist between the two types of households, it will be possible to conclude that DV has an effect (negative) on

household welfare. Once the effects of DV have been calculated, we will proceed in the next section to quantify them in monetary terms and in this way measure the costs of DV.

### **6.1 Household welfare variables**

DV can negatively affect labor income, reduce labor force participation, limit opportunities to find employment, and increase spells of unemployment. The manner in which DV impacts the aforementioned indicators ranges from decreased self-confidence to physical impairment preventing an active job search or job performance. In this study the variables we use to describe the woman's employment conditions are: female labor income<sup>13</sup> and unemployment.

We also analyze the impact of DV on health status of the woman, by looking at two variables that indicate whether the woman has suffered from abortion or miscarriage and whether the woman had suffered from health complications at the time of giving birth, such as excessive vaginal bleeding, loss of conscience or convulsions, high fever, or others.<sup>14</sup>

To determine the effect of DV on the health of the household members we calculated three indicators using the survey data. The first is a household health status index, which is the average over all the household members of a self-reported health status that ranges from 1 (very good) to 4 (bad). The second indicator is the household health problems index, which is the average of household members that reported a health problem. It was constructed using information about health

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<sup>13</sup> It corresponds to the monthly labor income from the previous month, only for positive incomes.

<sup>14</sup> These variables are dummies equal to one if yes, and zero otherwise.

problems (illness, accident, dental problems and others) reported for each household member during the previous month. This index takes a value of zero when there were no ill household members and is equal to one if all household members were afflicted by some illness during the previous month. The third indicator is an index of hospitalizations that indicates how many household members were hospitalized in the previous year (except for pregnancy reasons). The hospitalization index is zero if no household member was hospitalized and one if all household members were hospitalized at least once during the previous year.

We also considered as indicators of child health status the incidence of high respiratory infection (cough and fever) and acute intestinal illness (AIL) in the two weeks prior to the survey for the last child born alive between 0-5 years old. Other variables related to household welfare are primary and secondary<sup>15</sup> school attendance of school aged children and the average over-age of school aged children<sup>16</sup>. The descriptive statistics for the variables that measure household welfare are shown in the Appendix, subsection 3.

## **6.2 Effects of domestic violence on household welfare**

The *effect* of DV is the difference in magnitude of a particular variable between households or individuals that are victims of violence and those that are not.

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<sup>15</sup> These indicators were defined as equal to 1 if all household members between 7 and 11 years of age for primary (12 -17 for secondary) attend school and it approaches zero as more members in this age group do not attend.

<sup>16</sup> For each child it was defined as “over-age= age - grade attended – 6.” This was averaged across all children between 7 and 17 years old in the household.

However, given that differences between households with and without violence may be caused by reasons other than DV, problems of endogeneity arise when traditional methods are applied – such as instrumental variables (IV) – to determine the effects of DV. The problem faced by Morrison and Orlando (1999) stems from the difficulty in finding valid instruments for DV, such that they are correlated with DV but not correlated with the dependent variable (for instance, earnings).

Instead of using IV, we implement the matching estimator. It is more precise and less sensitive to changes in functional form than traditional parametric methods (Heckman et al (1999)). To find the effect of DV on a variable  $y$  the question of interest becomes “what would have been the value of this variable  $y$  for an individual who is a victim of DV had that person not suffered DV?” The difference between these two values is exactly the *effect* of DV on  $y$ . The problem with this type of analysis lies in the impossibility of observing the same individual in two different situations at the same time (in a household that suffers from DV and in one that does not).

If  $y_1$  and  $y_0$  are the values of  $y$  for individuals from violent and non-violent households, respectively, then we need the value of  $y$  for individuals in violent households ( $y_1 | X, DV_i = 1$ ), had they been in households without violence ( $y_1 | X, DV_i = 0$ ). The difference between these two values is the *effect* of DV,

$$effect = (y_1 | X, DV_i = 1) - (y_1 | X, DV_i = 0) \quad (3)$$

However, since ( $y_1 | X, DV_i = 0$ ) is unobservable, we should compare the value of  $y$  for individuals that suffer DV to those individuals not affected by DV, but that have characteristics similar to their counterparts in terms of the probability of experiencing violence. In other words, we match (with the objective of comparing)

each individual from a violent household with a similar individual from a non-violent household.

The matching estimator compares each individual in households with DV to those that have the closest probability of suffering violence, but that do not (neighbors). The estimation of standard errors and confidence intervals is carried out through bootstrapping. The effect measured is pure in the sense that it is not contaminated by effects from wealth, education or geographical location. In this study, we used different matching criteria, but for clarity we present only the results of the five nearest neighbors.

Table 5 shows the effects of DVW on the list of welfare variables. Table 6 does the same but regarding DV toward children. Each table includes the mean value of the observed variable for the treated (with DV), the controls (without DV) and the mean difference. The last two columns contain the bootstrapped difference and its standard error, which is used to calculate the significance of the difference.

The results in confirm that DV against women has adverse effects on several of the household welfare measures. In particular, the calculations allow us to conclude that a woman victim of DV earns on average 244,836 pesos less per month than a woman similar to her (approximately 44% of the average earnings of women without DV), but that is not affected by DV. The results with the log(monthly income) indicate that a woman without DV earns 38% more than a woman with DV on average. The probability of unemployment for a woman that is victim of DV is 6.4 points higher than for a woman without DV. The woman affected by DV has a higher probability of suffering from pregnancy related health problems, such as having an abortion, miscarriage or other health problems after giving birth. Also, it is more

likely that family members of a woman victim of DV report bad health status or health problems. Similarly, children aged 0-5 in households where a woman is affected by DV suffer more from cough, fever or acute intestinal illnesses<sup>17</sup>.

Regarding the effects on child education in the household, we found that both the school attendance of children 7-11 and the over-age of children 7-17 are worse in households where the woman/mother suffers from DV. The size of the effects indicate that comparing two households with one child, one where the woman suffers from DV and the other not, the child in the household without DV has a probability of attending school that is close to 6 percentage points higher than the child in the household with DV. The child in the household with DV has an over-age of 0.32 higher than the over-age of the child in the household without DV.

Similar results are observed when we analyze the effects of DV against children on household welfare variables (Table 6). In this case fewer effects were significant, but the signs of the significant variables are as expected.

It is interesting that DVC also has an effect on the female labor outcomes. A woman whose children are victims of DV earns on average 234,745 pesos less per month than a similar woman whose children are not affected by DV. The probability of unemployment for a woman whose children suffer DV is 2.6 points higher than for a woman without this type of DV in her household.

It is more likely that the members of a family with DVC report bad health status or health problems, although the size of these effects is smaller than when the DV is toward the woman. Child health outcomes apparently are not affected by DV

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<sup>17</sup> These results are with respect to the last child born alive. Similar results were obtained when the analysis was carried out with all children aged 0-5 in the households.

against them. This may be due to the fact that we are measuring health status of very young children (0-5) who may not be as severely affected by DV as older children.

Regarding educational outcomes, we see that DV towards children has an effect on school attendance of children aged 12-17. A teenage victim of DV has a probability of attending school that is 6 percentage points lower than a similar non-DV teenager.

## **7. Economic costs of domestic violence**

To estimate the economic costs of DV in terms of the monetary value, we take into account the value of the effect and multiply it by its incidence. Once we have calculated the effects of DV on the welfare variables it is possible to calculate the costs associated with each effect for the economy as a whole. The methodology to calculate the costs is as follows:

$$Cost = Effect \times Price \times Incidence \times Population$$

where effect is the one found in the previous section, price is the price of the effect (in market prices of 2003), incidence is the portion of the population that suffers from the specific type of DV under study, and population is the group likely to be directly affected by each type of DV. We estimate annual costs in 2003 pesos. Also, it is important to clarify that the costs estimated in this section constitute a lower bound of the actual costs of DV in the country. We only calculate present costs and not

future or intertemporal costs<sup>18</sup> and we do not account for individuals who leave the labor force as a result of DV.

The calculations of economic costs are shown in detail in Table 7. We provide only an estimation of the economic costs of DV on the variables related to labor outcomes of the woman, whose effects were significant at least at the 5% or 1%<sup>19</sup>. The costs of violence towards women associated with female labor income are corrected taking into account the average earnings for women in the entire country, as given by the Continuous Household Survey [ECH] of 2003. This correction has to be made because the country-level earnings are lower than the earnings in the three cities covered by the DVS.

According to the analysis in the previous section, both violence toward women and children have negative and sizable effects on potential female earnings. The population likely to suffer a decrease in earnings is the women who have positive earnings (i.e. who are occupied and remunerated). In 2003 this sub-population was approximately 7 million women. Therefore, from this population we calculate the costs of DV towards women for all women who are occupied and are married or have a partner, and separately we calculate the costs of DV towards children for all

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<sup>18</sup> For instance, the fact that a child suffers from or witnesses DV today will most likely have an effect on his/her earnings tomorrow. These long term effects are not calculated in this paper.

<sup>19</sup> We exclude from this analysis those costs associated with health or educational outcomes because i) some of them are very hard to measure accurately, given that the variables we use are mainly qualitative; ii) the effects of DV on health and schooling of children and family members are likely to have repercussions in the future, making them difficult to measure, and, iii) in a previous measures of these costs (Ribero and Sánchez, 2004) showed that costs associated with female labor outcomes were much larger.



women who are occupied and have children younger than 17. In this way we avoid double-counting the costs for households that have both types of DV.

The costs of DV towards married or cohabiting working women add up to 6.36 billion pesos. The potential earnings of those women who would have been working if they had not been victims of DV would have been 0.781 billion pesos of 2003, equivalent to 0.35% of the Colombian GDP<sup>20</sup>. These two figures add up to 7.14 billion pesos, and represent the labor earnings that women who were victims of DV in 2003 failed to receive. They are equivalent to 3.2% of the Colombian GDP of 2003.

For all women that are employed and have children younger than 17 (excluding those who are also victims of DV towards women), the calculated cost of DV towards children adds up to 2.27 billion pesos. This value represents lost female labor earnings for women whose children suffered DV in 2003, and it is equivalent to 1% of the Colombian GDP of 2003.

Summing the subtotals of Table 7 we find that the costs of DV total 9.415 billion pesos of 2003 (US\$3,314 million)<sup>21</sup>, approximately 4.22% of Colombian GDP.

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<sup>20</sup> This was calculated with the effect of DV on unemployment. In this case the relevant population is the all female labor force participants, which in 2003 was approximately 8.7 million. According to the estimations, DV towards women increased the number of unemployed women by 215,420 in the year 2003. These figures result from multiplying the population by the effect by the incidence. Under the assumption that, if working, these women would have been earning the average labor income (\$360,828), figure that comes from the ECH 2003, their labor earnings would have been equal to 781,076 million pesos of 2003.

<sup>21</sup> The average exchange rate for September 2003 was 2840 pesos per dollar. Banco de la República.

Our estimates are approximately twice as large as those found by Morrison and Orlando (1999) who calculated the loss due to DV was more than 2% of GDP in Chile and 1.6% of GDP in Nicaragua<sup>22</sup>.

As seen in the previous section, DV also has a negative effect over children's and mother's health and on the overall health status of household members. These effects, however, are difficult to monetize without making strong assumptions<sup>23</sup>. The same holds for the effects of DV on child school attendance and educational performance.

## **8. Conclusions**

This paper identifies the variables associated with DV and measures the impact of DV on household welfare in Colombia. Assuming that DV has a direct impact on women's economic and social development, self-esteem and capacity for self determination, we estimate the costs that society bears due to DV via the effects of DV on female earnings and employment.

The research was based on the *Revised Conflict Tactics Scale* – a methodology not previously applied in Colombia – that has proven very helpful at collecting information on the degree of severity and frequency of DV. This study focuses on household level DV inflicted on women by men and inflicted on children by adults.

The DV summary statistics show that the most common type of DVW is psychological. In a given year, about 46% of married or cohabiting women in

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<sup>22</sup> Morrison and Orlando did not take into account the costs of unemployment.

<sup>23</sup> See Ribero and Sánchez (2004) for this estimation.

Colombia are continuously psychologically mistreated by their partners and 16% are physically abused by their partners. These percentages are lower than previously reported statistics for the region that did not include a specific time frame (Profamilia 1995, 2000).

We also find that violence toward children is very common: in almost one out of every two households with minors, the children are repeatedly psychologically abused and in nearly two out of five household children are battered or neglected. These figures show that DV is a phenomenon that requires attention and analysis in order to understand better its causes and consequences.

Based on the survey data, we carried out a set of statistical and econometric exercises with the objective of explaining the causes of DV. We find that DV, whether against minors or women, is strongly associated with episodes of intrafamily violence that the woman and/or her spouse/partner experienced in their maternal homes. For example, minors whose mothers experienced psychological abuse as children had a 13% higher probability of suffering violence. If the father of the household suffered violence in his maternal household, the probability that he will use violence against his children or partner increases nearly 9%. Furthermore, if the man participates in street fights or has been in jail (i.e. shows patterns of violence outside the home) or gets drunk regularly, severe violence against the spouse or partner increases nearly 8%. Factors such as age, education or household wealth influence only marginally the presence of DV. For this reason it is incorrect to claim that household violence is caused primarily by unemployment, poverty or difficult economic circumstances. The intergenerational transmission of DV and the alcohol abuse play a much more important role.

After identifying the causes of DV, we consider its effects and costs. The effects of DV were found using the matching estimator, enabling us to compare households with and without DV. The variables chosen for comparison were income, female employment, household health, and scholastic attainment for children and youth. We find that households suffering violence against minors or women lose approximately \$250,000 pesos in female monthly labor income (approximately 44% lower) and unemployment is 6.4% higher. In the same way, health status for individuals that live in households with DV is worse than their non-violent counterparts. With respect to scholastic attainment, children and youth in violent households suffer a lag of nearly a third of an academic year.

Lastly, we estimate the costs of DV for Colombia, costs that fall directly on households that suffer violence and affect indirectly the entire society. We find that lost female income as a result of DV against women or children represents approximately 3.8% of GDP, and income lost due to higher unemployment is nearly 0.35% of GDP. This means that the total annual costs associated with all aspects of DV sum to at least 4.2% of GDP. The costs are somewhat higher than those calculated for other countries (using different methodologies) that place the figure at around 2% of GDP. We emphasize that these other studies only compute the lost labor income associated with the violence against women, leaving out the costs associated with violence against minors and the costs of DV associated with unemployment.

The costs computed in this paper are opportunity costs in the economic sense of the term, meaning they represent a flow of money that potentially could have been generated in the economy in the hypothetical situation that there was no DV. We

are not calculating the direct costs of DV incurred when battered women or children use police, medical or psychological assistance. Therefore, the estimated costs of DV constitute only a lower bound of the actual costs of this phenomenon.

## Tables

**Table 1. Domestic Violence toward Women and Children**

Domestic Violence toward Women	Total	Bogotá	B/quilla	B/meja
1. Seldom psychological	60%	57%	75%	48%
2. Continuous psychological	46%	43%	56%	39%
3. Seldom physical	16%	15%	18%	15%
4. Continuous physical	4%	4%	4%	4%
Domestic Violence toward Children	Total	Bogotá	B/quilla	B/meja
1. Seldom psychological	58%	53%	74%	55%
2. Continuous psychological	15%	12%	26%	10%
3. Seldom physical	41%	39%	53%	39%
4. Continuous physical	7%	5%	13%	3%
5. Seldom severe physical	32%	31%	27%	42%
6. Continuous severe physical	5%	5%	5%	5%
7. Seldom negligence	15%	14%	22%	10%
8. Continuous negligence	10%	8%	19%	5%

Source: DVS

**Table 2. Differences in household characteristics with and without DV toward women**

	Domestic Violence toward women = 0		Domestic Violence toward women = 1		Mean Difference	
	Mean	Std. Dev.	Mean	Std. Dev.		
<b>Woman Characteristics</b>						
Age	34.34	8.32	34.19	8.54	0.154	
Education	10.02	4.20	8.50	4.09	1.519	***
Number of children ever born	2.23	1.35	2.63	1.50	-0.401	***
Married	0.57	0.49	0.42	0.49	0.157	***
<b>Husband/partner Characteristics</b>						
Age	38.85	9.50	38.46	10.12	0.392	
Education	10.50	4.37	9.14	4.48	1.358	***
Works	0.93	0.26	0.89	0.31	0.038	***
Times gets drunk in a month	0.45	1.06	1.41	3.33	-0.958	***
Times uses drugs in a month	0.00	0.00	0.18	2.07	-0.178	**
Part takes in street fights or been in jail	0.04	0.20	0.10	0.30	-0.060	***
<b>Household Characteristics</b>						
Wealth index	0.14	0.65	-0.10	0.70	0.247	***
Per capita income other household members/1000	206	357	172	860	34	
Length of marriage	11.70	8.10	12.42	8.10	-0.713	*
Ratio children less than 5	0.13	0.16	0.15	0.17	-0.021	**
Ratio women 15-49	0.32	0.14	0.30	0.13	0.025	***
Household size	4.43	1.52	4.91	1.80	-0.479	***
Persons per dormitory	2.10	1.07	2.61	1.37	-0.514	***

	Domestic Violence toward women = 0		Domestic Violence toward women = 1		
<b>Parental Households' Characteristics</b>					
Psychological domestic violence s/c woman	0.81	0.40	0.87	0.34	-0.062 ***
Physical domestic violence s/c woman	0.52	0.50	0.66	0.47	-0.141 ***
Physical severe domestic violence s/c woman	0.56	0.50	0.67	0.47	-0.109 ***
Negligence s/c woman	0.07	0.25	0.15	0.35	-0.081 ***
Father and mother of woman had fights	0.25	0.43	0.34	0.47	-0.089 ***
Man was victim of domestic violence	0.35	0.48	0.40	0.49	-0.053 **
<i>Number of observations</i>	713		973		

Differences are significant at: \*\*\* 1%; \*\* 5%; \* 10%

Source: DVS

**Table 3. Differences in characteristics of households with and without DV toward children**

	Domestic Violence toward children =0		Domestic Violence toward children =1		
<b>Woman Characteristics</b>	Mean	Std. Dev.	Mean	Std. Dev.	Mean Difference
Age	34.49	9.57	34.85	7.31	-0.356
Education	9.74	4.04	8.26	4.10	1.485 ***
Number of children ever born	2.16	1.22	2.81	1.44	-0.650 ***
Married	0.37	0.48	0.34	0.47	0.026
<b>Husband/partner Characteristics</b>					
Age	39.06	10.68	38.99	8.88	0.064
Education	10.28	4.40	8.99	4.44	1.294 ***
Works	0.89	0.30	0.92	0.28	-0.018
Times gets drunk in a month	0.81	2.09	1.22	3.15	-0.409 ***
Times uses drugs in a month	0.08	1.31	0.13	1.84	-0.043
Part takes in street fights or been in jail	0.06	0.24	0.09	0.28	-0.022 *
<b>Household Characteristics</b>					
Wealth index	0.13	0.65	-0.15	0.69	0.277 ***
Per capita income other household members/1000	163	316	116	249	47 ***
Length of marriage	13.24	9.19	12.91	6.90	0.333
Ratio children less than 5	0.15	0.17	0.14	0.16	0.014 **
Ratio women 15-49	0.36	0.16	0.30	0.14	0.053 ***
Household size	4.55	1.80	4.93	1.68	-0.378 ***
Persons per dormitory	2.15	1.10	2.57	1.33	-0.427 ***
<b>Parental Households' Characteristics</b>					
Psychological domestic violence s/c woman	0.82	0.39	0.88	0.32	-0.062 ***
Physical domestic violence s/c woman	0.56	0.50	0.67	0.47	-0.102 ***
Physical severe domestic violence s/c woman	0.60	0.49	0.69	0.46	-0.095 ***
Negligence s/c woman	0.09	0.29	0.14	0.35	-0.049 ***
Father and mother of woman had fights	0.27	0.44	0.34	0.47	-0.071 ***
Man was victim of domestic violence	0.32	0.47	0.38	0.49	-0.068 ***
<i>Number of observations</i>	1083		1103		

Differences are significant at: \*\*\* 1%; \*\* 5%; \* 10%

Source: DVS

**Table 4. Probit Models of Domestic Violence**

	Domestic Violence toward Women (1)			Domestic Violence toward Children (2)		
	Coef.	S.E.	dF/dx	Coef.	S.E.	dF/dx
<b>Woman Characteristics</b>						
Age	-0.038	0.032	-0.015	0.284	0.029	0.113 ***
Age squared	0.001	0.000	0.000	-0.004	0.000	-0.002 ***
Education	-0.019	0.009	-0.007 **	-0.028	0.008	-0.011 ***
Number of children ever born	0.007	0.031	0.003	0.156	0.027	0.062 ***
Married	-0.234	0.073	-0.091 ***	-0.050	0.070	-0.020
<b>Husband/partner Characteristics</b>						
Works	-0.291	0.117	-0.109 **	0.027	0.070	0.011
Got drunk last month	0.280	0.073	0.107 ***	0.049	0.064	0.020
Part takes in street fights or been in jail	0.390	0.135	0.143 ***	0.076	0.101	0.030
<b>Household Characteristics</b>						
Ratio children less than 5	0.477	0.236	0.186 **	-0.644	0.208	-0.257 ***
Ratio women 15-49	-0.338	0.266	-0.132	-0.851	0.211	-0.339 ***
Persons per dormitory	0.117	0.032	0.045 ***	0.048	0.028	0.019 *
<b>Parental Households' Characteristics</b>						
Psychological domestic violence s/c woman	0.225	0.078	0.088 ***	0.335	0.073	0.133 ***
Physical domestic violence s/c woman	0.200	0.069	0.078 ***	0.126	0.064	0.050 **
Negligence s/c woman	0.085	0.075	0.033	0.048	0.066	0.019
Father and mother of woman had fights	0.195	0.073	0.075 ***	0.147	0.065	0.059 **
Man was victim of domestic violence	0.241	0.071	0.093 ***	0.213	0.064	0.085 ***
<b>City Dummies</b>						
Bogotá	0.155	0.099	0.061	-0.334	0.087	-0.132 ***
Barranquilla	0.688	0.119	0.248 ***	0.136	0.104	0.054
<b>Intercept</b>	0.056	0.573	-	-4.600	0.523	-
<i>Number of observations</i>	1683			2184		
<i>P-Value Chi2(18)</i>	0			0		
<i>Pseudo r squared</i>	0.1076			0.1442		
<i>Log. Likelihood</i>	-1022.9			-1295.5		
<i>Observed probability</i>	0.57754			0.5041		
<i>Predicted probability at the means</i>	0.5893			0.5048		
<i>% Correct Classification</i>	0.6655			0.685		

\* : significant at 10%, \*\* : significant at 5% and \*\*\* : significant at 1%

Data Source: DVS



**Table 5. Effects of domestic violence toward women on household welfare**

	<i>Average Treatment on the Treated</i>			<i>Bootstrap</i>		
	Treated	Controls	Difference	Observed	Std. Error	
<b>Female Labor Outcomes</b>						
Monthly income	300,243	549,635	-249,392	-244,836	59,086	***
Log(monthly income)	11.718	12.026	-0.308	-0.320	0.158	**
Unemployment	0.160	0.096	0.064	0.064	0.021	***
<b>Female Health Outcomes</b>						
Abortion or miscarriage	0.278	0.201	0.078	0.076	0.026	***
Had health problems with birth	0.141	0.083	0.058	0.058	0.017	***
<b>Household Health Outcomes</b>						
Household health problems index	0.250	0.147	0.103	0.102	0.012	***
Household health status index	2.122	1.942	0.179	0.178	0.018	***
Hospitalizations in hh last year	0.050	0.043	0.008	0.008	0.006	
<b>Children Health Outcomes</b>						
Cough last 2 weeks, last born	0.277	0.174	0.103	0.103	0.023	***
Fever last 2 weeks, last born	0.153	0.071	0.082	0.082	0.016	***
Acute intestinal illness, last born	0.085	0.049	0.035	0.035	0.013	***
<b>Children Education Outcomes</b>						
School attendance hh children 7-11	0.955	0.979	-0.024	-0.024	0.011	**
School attendance hh children 12-17	0.846	0.860	-0.014	-0.015	0.030	
Overage children 7-17 in household	1.647	1.320	0.327	0.318	0.146	**

Notes: \* difference is significant at 10%; \*\* at 5%; \*\*\* at 1%. Source: DVS  
 Method used: nearest five neighbors.  
 hh means household.

**Table 6. Effects of domestic violence toward children on household welfare**

	<i>Average Treatment on the Treated</i>			<i>Bootstrap</i>		
	Treated	Controls	Difference	Observed	Std. Error	
<b>Female Labor Outcomes</b>						
Monthly income	304,615	539,334	-234,719	-234,745	60,120	***
Log(monthly income)	11.823	12.105	-0.282	-0.288	0.131	**
Unemployment	0.138	0.111	0.027	0.026	0.014	*
<b>Female Health Outcomes</b>						
Abortion or miscarriage	0.256	0.226	0.030	0.029	0.018	
Had health problems with birth	0.097	0.107	-0.010	-0.010	0.014	
<b>Household Health Outcomes</b>						
Household health problems index	0.207	0.184	0.023	0.023	0.011	**
Household health status index	2.074	2.015	0.059	0.059	0.018	***
Hospitalizations in hh last year	0.045	0.049	-0.004	-0.004	0.004	
<b>Children Health Outcomes</b>						
Cough last 2 weeks, last born	0.209	0.204	0.005	0.006	0.017	
Fever last 2 weeks, last born	0.103	0.105	-0.002	-0.002	0.012	
Acute intestinal illness, last born	0.069	0.064	0.005	0.005	0.013	
<b>Children Education Outcomes</b>						
School attendance hh children 7-11	0.963	0.976	-0.013	-0.013	0.010	
School attendance hh children 12-17	0.834	0.893	-0.059	-0.059	0.025	**
Overage children 7-17 in household	1.602	1.544	0.059	0.059	0.123	

Notes: \* difference is significant at 10% ; \*\* at 5% ; \*\*\* at 1%. Source: DVS  
 Method used: nearest five neighbors.  
 hh means household.

**Table 7 - Costs of Domestic Violence in Colombia**

<b>Costs of Domestic Violence Toward Women on Female Labor Outcomes</b>											
	<b>Effect</b>	<b>Incidence</b>		<b>Norm(1)</b>	<b>Population</b>	<b>Fraction of relevant population</b>		<b>Price</b>		<b>Annual estimated costs</b>	<b>%GDP</b>
Yearly labor income	-244,836	0.570	(3)	0.837	7,078,627	64.086%	(2)	1		-6,364,172,091,365	-2.851%
Unemployment	0.064	0.594	(5)	0.837	8,688,169	65.415%	(4)	360,828	(6)	-781,075,742,332	-0.350%
Sub-Total										-7,145,247,833,697	-3.201%
<b>Costs of Domestic Violence Toward Children on Female Labor Outcomes</b>											
	<b>Effect</b>	<b>Incidence</b>		<b>Norm(1)</b>	<b>Population</b>	<b>Fraction of relevant population</b>		<b>Price</b>		<b>Annual estimated costs</b>	<b>%GDP</b>
Yearly labor income	-234,745	0.285	(7)	0.837	3,376,999	1	(8)	1		-2,270,606,385,012	-1.017%
Sub-Total										-2,270,606,385,012	-1.017%
<b>Total annual estimated costs</b>										<b>-9,415,854,218,709</b>	<b>-4.22%</b>

Source: DVS

Notes for Table 7:

- (1) Incomes are normalized by multiplying the effect by the ratio of income in the National Household Survey (360,828) divided by the average sample income in the CEDE sample (430,899).
- (2) In this column the total population of the country is normalized in order to consider the fraction of the population that could be affected by this type of DV: violence against women only occurs among women with a spouse or partner. For this reason, in the total working population we consider the percent of women that work and have a spouse or partner with the proportion 712/1111 given by the DVS.
- (3) The incidence of 0.57 results from dividing  $(406/712)$  = women with husbands or partners, victims of violence and positive income (406) divided by the total number of women with a husband or spouse and positive income (712).
- (4) The percent of the relevant population 0.654 comes from  $(923/1411)$  where 923 is the number of women that are working or searching for work and have a husband or partner divided by the total number of women in the sample that are working or looking for work, 1411.
- (5) The incidence of 0.594 comes from  $(548/923)$  where 548 is the number of women with violence that are working divided by the total number of women in the sample that are working or searching for work and have a husband or partner.
- (6) Average income of women in Colombia was \$360,828 pesos in 2003 according to the National Household Survey. We assume this is the income that an unemployed woman would earn.
- (7) Given that violence against minors only occurs in households with minors, the effect on income is measured using the proportion of women that have positive income and children, 1063 women. This is divided into two groups, those that have a husband or partner (680) and those that do not (383). Of those that do not have a husband or partner, 186 present violence against minors. The figure is 347 for those with a husband or partner, and 230 of the 347 were included previously because they also suffer from violence against women. For this reason, from the group with a husband or partner, only 117  $(347-230)$  do not have the costs of household violence already calculated. That means that the group of interest is  $(117+186=303)$  women of the total women that work and have children (1063). This gives the figure  $0.285=303/1063$ .
- (8) In this case the entire population is relevant given that it pertains to the population of employed women with children younger than 17 years old.

All figures are in Colombian pesos of 2003. The estimated value of the GDP in 2003 was 2.23192E+14, according to DNP.

**Table 7.1 - Data for populations**

Occupied women	7,078,627
Female labor force	8,688,169
Occupied women with children younger than 17	3,376,999

**Sources: ECH-DANE, 2003**

## Appendix

### Subsection 1. Survey carried out by CEDE for the domestic violence study

The population considered for the study was made up of households in the cities of Bogotá, Barranquilla, and Barrancabermeja. The sample framework used for the sample selection in Bogotá and Barranquilla was the list of city blocks produced by DANE. In Barrancabermeja the sample was taken from a random selection of city blocks from DANE maps. The sample selection process for households and women was based on a random selection of city blocks. In each block selected the houses and households in the city block were listed and then selected, starting from the corner and moving clockwise. If in a selected household there was more than one eligible woman (between 15 and 49 years old), one of them was selected, using as a preference if they were married, with children, or separated with children, single with children and lastly single without children, in that order. The samples are similar to the sample framework used by DANE and they are representative of the populations in the study.

**Table A1.1 Sample size by “estrato” and city**

		City						Total	
		Bogotá		Barranquilla		Barrancabermeja			
		Count	%	Count	%	Count	%	Count	%
Estrato	Low	639	42.8%	207	41.5%	164	54.7%	1010	44.0%
	Med	722	48.3%	113	22.6%	121	40.3%	956	41.7%
	High	133	8.9%	179	35.9%	15	5.0%	327	14.3%
Total		1494	100.0%	499	100%	300	100.0%	2293	100%

Source: CEDE

**Subsection 2 - Table A2.1. Domestic Violence Variables and Household Assets**

<b>Domestic Violence toward Women</b>					
	<b>Quintile 1</b>	<b>Quint. 2</b>	<b>Quint. 3</b>	<b>Quint. 4</b>	<b>Quintile 5</b>
1. Seldom psychological	0.754	0.664	0.646	0.628	0.497
2. Continuous psychological	0.612	0.513	0.510	0.478	0.359
3. Seldom physical	0.241	0.183	0.218	0.160	0.111
4. Continuous physical	0.068	0.046	0.040	0.050	0.019
<i>Number of observations</i>	183	345	192	320	646
<b>Domestic Violence toward Children</b>					
	<b>Quintile 1</b>	<b>Quint. 2</b>	<b>Quint. 3</b>	<b>Quint. 4</b>	<b>Quintile 5</b>
1. Seldom psychological	0.711	0.649	0.608	0.593	0.492
2. Continuous psychological	0.280	0.241	0.275	0.239	0.180
3. Seldom physical	0.561	0.462	0.430	0.373	0.372
4. Continuous physical	0.141	0.077	0.069	0.080	0.035
5. Seldom severe physical	0.080	0.066	0.040	0.050	0.022
6. Continuous severe physical	0.423	0.437	0.325	0.317	0.221
7. Seldom negligence	0.205	0.210	0.162	0.154	0.119
8. Continuous negligence	0.181	0.141	0.145	0.097	0.045
<i>Number of observations</i>	239	439	265	410	833

**Table A2.2. Domestic Violence Variables and Mother's Years of Education**

<b>Domestic Violence toward Women</b>						
	<b>0</b>	<b>1-4</b>	<b>5</b>	<b>6-10</b>	<b>11</b>	<b>&gt;11</b>
1. Seldom psychological	0.759	0.734	0.657	0.641	0.583	0.442
2. Continuous psychological	0.621	0.591	0.504	0.525	0.421	0.302
3. Seldom physical	0.175	0.230	0.197	0.217	0.129	0.071
4. Continuous physical	0.100	0.070	0.042	0.057	0.025	0.008
<i>Number of observations</i>	29	154	274	415	513	301
<b>Domestic Violence toward Children</b>						
	<b>0</b>	<b>1-4</b>	<b>5</b>	<b>6-10</b>	<b>11</b>	<b>&gt;11</b>
1. Seldom psychological	0.496	0.666	0.581	0.606	0.563	0.519
2. Continuous psychological	0.483	0.280	0.233	0.201	0.227	0.207
3. Seldom physical	0.250	0.424	0.387	0.445	0.425	0.409
4. Continuous physical	0.125	0.155	0.089	0.052	0.059	0.031
5. Seldom severe physical	0.450	0.424	0.390	0.348	0.290	0.170
6. Continuous severe physical	0.100	0.099	0.073	0.041	0.034	0.008
7. Seldom negligence	0.325	0.238	0.205	0.165	0.131	0.088
8. Continuous negligence	0.275	0.235	0.140	0.101	0.072	0.025
<i>Number of observations</i>	40	210	351	546	687	352

**Table A2.3. Domestic Violence Variables and Mother's Marital Status**

<b>Domestic Violence toward Women</b>	<b>Married</b>	<b>Cohabiting</b>	<b>Other</b>
1. Seldom psychological	0.531	0.666	--
2. Continuous psychological	0.386	0.525	--
3. Seldom physical	0.154	0.281	--
4. Continuous physical	0.037	0.065	--
<i>Number of observations</i>	814	872	
<b>Domestic Violence toward Children</b>	<b>Married</b>	<b>Cohabiting</b>	<b>Other</b>
1. Seldom psychological	0.545	0.613	0.542
2. Continuous psychological	0.221	0.240	0.197
3. Seldom physical	0.387	0.466	0.367
4. Continuous physical	0.055	0.092	0.057
5. Seldom severe physical	0.313	0.369	0.237
6. Continuous severe physical	0.036	0.063	0.032
7. Seldom negligence	0.180	0.130	0.156
8. Continuous negligence	0.085	0.123	0.101
<i>Number of observations</i>	777	826	583

**Table A2.4. Domestic Violence and Mother's Age**

<b>Domestic Violence toward Women</b>	<b>15-20</b>	<b>21-30</b>	<b>31-40</b>	<b>41-49</b>
1. Seldom psychological	0.682	0.595	0.596	0.599
2. Continuous psychological	0.511	0.453	0.448	0.468
3. Seldom physical	0.212	0.168	0.161	0.143
4. Continuous physical	0.030	0.033	0.043	0.038
<i>Number of observations</i>	88	501	648	449
<b>Domestic Violence toward Children</b>				
1. Seldom psychological	0.464	0.597	0.661	0.476
2. Continuous psychological	0.107	0.203	0.277	0.200
3. Seldom physical	0.464	0.544	0.434	0.265
4. Continuous physical	0.068	0.073	0.070	0.057
5. Seldom severe physical	0.089	0.326	0.419	0.214
6. Continuous severe physical	0.030	0.036	0.048	0.052
7. Seldom negligence	0	0.024	0.216	0.242
8. Continuous negligence	0	0.019	0.161	0.124
<i>Number of observations</i>	112	619	828	627

Source of all tables in this Appendix: DVS

**Subsection 3 - Table A.3.1. Descriptive Statistics Socioeconomic Variables**

	Total		Bogotá		Barranquilla		B/bermeja	
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
<b>Woman Characteristics</b>								
Age	34.35	8.61	34.85	8.65	32.95	8.75	34.14	8.23
Education	9.14	4.17	9.19	4.12	9.18	4.11	8.8	4.37
Number of children ever born	2.37	1.44	2.31	1.38	2.5	1.52	2.43	1.54
Married	0.35	0.48	0.37	0.48	0.34	0.47	0.32	0.47
<b>Husband/partner Characteristics</b>								
Age	38.74	9.80	39.1	9.76	37.43	10.14	39.24	9.63
Education	10.56	5.14	9.72	4.53	9.37	4.12	9.11	4.05
Works	0.667	0.471	0.67	0.47	0.67	0.48	0.63	0.47
Times gets drunk in a month	0.998	2.656	1.045	2.983	0.890	1.770	0.943	2.132
Times uses drugs in a month	0.102	1.570	0.139	1.910	0.053	0.695	0	0
Part takes in street fights or been in jail	0.077	0.266	0.079	0.270	0.074	0.262	0.666	0.248
<b>Household Characteristics</b>								
Wealth index	0.001	0.68	0.04	0.61	-0.05	0.64	-0.12	0.88
Per capita income other household members/1000	159	604	179	735	120	159	122	188
Length of marriage	12.65	8.20	12.93	8.3	11.78	8.55	12.82	7.64
Ratio children less than 5	0.14	0.16	0.13	0.17	0.15	0.17	0.15	0.15
Ratio women 15-49	0.34	0.16	0.34	0.16	0.3	0.16	0.35	0.14
Household size	4.67	1.78	4.41	1.6	5.63	1.68	4.42	2.01
Persons per dormitory	2.33	1.23	2.23	1.13	2.7	1.17	2.21	1.46
<b>Parental Households' Characteristics</b>								
Psychological domestic violence s/c woman	0.74		0.72		0.83		0.72	
Physical domestic violence s/c woman	0.61		0.6		0.66		0.58	
Physical severe domestic violence s/c woman	0.63		0.68		0.41		0.77	
Negligence s/c woman	0.12		0.15		0.03		0.07	
Father and mother of woman had fights	0.30		0.35		0.15		0.3	
Man was victim of domestic violence	0.35		0.42		0.1		0.38	
<i>Number of observations</i>	2295		1495		500		300	

Source: DVS



**Table A.3.2. Descriptive Statistics Welfare variables**

	Total		Bogotá		Barranquilla		Barrancabermeja	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
<b>Female labor outcomes</b>								
Monthly income (positive)	430,899	732,170	482,822	833,717	307,792	332,483	289,367	342,561
Log(monthly income)	11.998	1.990	12.167	1.799	11.699	2.202	11.390	2.560
Unemployment	0.131	0.337	0.127	0.333	0.16	0.367	0.100	0.300
<b>Female health outcomes</b>								
Abortions or miscarriage	0.23	0.42	0.22	0.42	0.28	0.45	0.18	0.38
Had problems with birth	0.10	0.30	0.1	0.3	0.09	0.28	0.09	0.28
<b>Household health outcomes</b>								
Index of household health problems	0.20	0.25	0.2	0.26	0.21	0.21	0.18	0.25
Household health	2.04	0.44	2.05	0.46	2.1	0.33	1.95	0.47
Hospitalizations (household)	0.05	0.10	0.046	0.1	0.043	0.9	0.059	0.11
<b>Children health outcomes</b>								
Cough last 2 weeks, last born	0.20	0.40	0.16	0.37	0.29	0.46	0.24	0.43
Fever 2 weeks, last born	0.11	0.31	0.08	0.27	0.19	0.4	0.1	0.3
AIL, last born	0.07	0.25	0.06	0.24	0.09	0.29	0.05	0.22
<b>Children educational outcomes</b>								
School attendance, ages 7-11	0.97	0.15	0.979	0.125	0.946	0.209	0.978	0.146
School attendance, ages 12-17	0.86	0.32	0.872	0.317	0.862	0.295	0.834	0.358
Overage children 7-17	1.541	2.040	1.443	1.957	1.774	2.146	1.606	2.215
<i>Number of observations</i>	<i>2295</i>		<i>1495</i>		<i>500</i>		<i>300</i>	

Source: DVS

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