Courant Research Centre

'Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis'

Georg-August-Universität Göttingen
(founded in 1737)

Discussion Papers

No. 136

Violent Behaviour
The effect of civil conflict on domestic violence in Colombia

Dominik Noe, Johannes Rieckmann

March 2013, revised: September 2013

Wilhelm-Weber-Str. 2 · 37073 Goettingen · Germany
Phone: +49-(0)551-3914066 · Fax: +49-(0)551-3914059

Email: crc-peg@uni-goettingen.de Web: http://www.uni-goettingen.de/crc-peg

Violent Behaviour

The effect of civil conflict on domestic violence in Colombia

Dominik Noe[1] & Johannes Rieckmann[2]

February 2013

Revision: September 2013

Abstract

In this paper we analyse the impact of civil conflict on domestic violence in Colombia and find that higher conflict intensity increases the likelihood of women to become a victim of domestic violence. The idea behind our approach is that the experience of conflict changes behaviour, attitude and culture. We consider domestic violence to be an observable outcome of this change in behaviour. Taking advantage of the uneven spatial distribution of the conflict we assess its impact, using micro data from Colombia.

Keywords: Domestic violence; conflict; Colombia; crime; spatial identification

Acknowledgements

We would like to thank Chris Müris for his help and support as well as Walter Zucchini. Furthermore we would like to thank Stephan Klasen, Axel Dreher and the participants of seminars in Bonn, Göttingen and Heidelberg as well as the 2011 Arnoldshain conference for helpful comments and discussion contributions. Financial support by the German Research Foundation (DFG) through the CRC-PEG is gratefully acknowledged.

[1] Courant Research Centre "Poverty, Equity and Growth", Georg-August-University Göttingen, dnoe@uni-goettingen.de

[2] Development Research Group, Georg-August-University Göttingen, jrieckmann@uni-goettingen.de

1. Introduction

It is often claimed that violence begets violence. This can mean that the one being stricken strikes back. It can however also mean that witnesses of violent acts are influenced in their own behaviour and therefore might exercise violence themselves.

The idea of this paper is that the experience of fighting and bloodshed caused by a civil conflict, will change the behaviour and attitude of the population witnessing it, so that they will be more willing to also use violence. If this was the case, conflict could create a self-reinforcing culture of violence which would hinder its termination, slow down the recovery afterwards or increase the likelihood of new fighting. Culture and attitude are hard to observe and therefore we use differences in observable behaviour to check this hypothesis. Many forms of observable violence could be a direct consequence of the conflict and not necessarily an expression of a behavioural change in the general public. Domestic violence is an observable form of violent behaviour that is not likely to be a direct consequence of a military conflict, but there are plausible mechanisms how the behavioural change caused by such a conflict could lead to the use of violence within the family. The main channels through which we expect conflict to increase domestic violence are increased acceptance of violence if exposure of people to different forms of violence is augmented; and the function of domestic violence as a stress release in an insecure environment.

This research aims at improving the understanding of the consequences of conflict. Blattman and Miguel (2010) state that there is a lack of theory and evidence "in assessing the impact of civil war on the fundamental drivers of long-run economic performance – institutions, technology and culture – even though these may govern whether a society recovers, stagnates or plunges back into war".[3] While domestic violence is a crime and its investigation and prevention in itself an important issue, we also use it as an indication of behavioural change. It is a threat for the security and cohesion of society as it increases the violent potential for the future. This does not only refer to those people whose behaviour has been changed by the conflict but also to later generations who suffer from this domestic violence and are thereby negatively affected from childhood on.

[3] A prominent example for literature on the impact of violence on cultural norms is a paper written by Miguel, Saiegh and Satyanath (2011). The authors find a strong link between a professional football player's violent conduct – measured by red and yellow cards attributed – with the civil conflict history in his country of origin.

In order to analyze the impact of civil conflict on behaviour, attitude and culture we use micro-data from Colombia, considering domestic violence to be an observable outcome of changes in behaviour. Using the uneven spatial distribution of conflict intensity between districts we find that a higher incidence of combat within a district significantly increases the likelihood of women in this district to become a victim of domestic violence.

Colombia was chosen for various reasons. Domestic violence is a very common phenomenon in the country. In our sample up to 20 percent of the interviewed women who are currently in a partnership report physical abuse by their partners.[4] This is very high compared to other countries.[5] In our data only women were interviewed and therefore we cannot consider domestic violence from women against men.

Today's conflict in Colombia has its roots in the 1950's and still continues. It involves different guerrilla organizations, of which the most important today, are the FARC and ELN (Ejército de Liberación Nacional). Originating as peasant organizations especially the FARC became a highly organized and effective guerrilla army with thousands of soldiers. As a defence against the guerrilla, private actors - mainly land owners - founded paramilitary organizations which later on joined to become the AUC (Autodefensas Unidas de Colombia). All non-state actors rely heavily on illegal means of financing. The most important sources are drug production and trafficking, kidnapping and extortion. Although the illegal economy was not the source for the conflict it is probably a main cause for its duration and its intensification especially in the 1990s.[6]

[4] The recall period comprises the past twelve months. 12.4% of the women report to have been subject to have experienced violence by a person other than their partner before that period (see also Table 1). Note that the lifetime prevalence cannot be found straightforwardly by summing up the two measures, as there will probably be an intersecting set. Also the non-captured prevalence of physical violence inflicted by the current partner longer than twelve months ago could be confounding, although in the other direction (thus underestimating lifetime prevalence).

[5] The World Health Organization (García-Moreno et al., 2005) reports in Table 4.1 exposure to at least one act of physical act of violence within the past twelve months ranging from 3.1% (urban Japan) to 29% (provincial Ethiopia); with a non-weighted mean of 14.8% (own calculation). Ten countries from Africa, Asia, Europe, Oceania and South America are part of the considered sample. Reported lifetime prevalence of domestic violence ranges between 13% (urban Japan) and 61% (provincial Peru). In Africa on average the situation seems to be particularly dire. Durevall and Lindskog (2013) report in Table 2 prevalence rates of physical intimate partner violence in eight sub-Saharan countries. DHS data stem from 2005 to 2011, with a recall period of twelve months. Violence rates range between 10.7% (Burkina Faso) and 56% (Rwanda), with a non-weighted mean of 31% (own calculation).

[6] For a short summary of the rather complicated conflict history and involved parties in Colombia since the mid-20th century see, e.g., Steele (2007) and Garces (2005). Gutierrez Sanin (2008) provides useful insight on the characteristics of the non-state "armies" entangled in these conflicts.

Despite the long duration of the conflict the state is still functioning, although not in complete control over all of its territory. Because of the existence of such a functional state, high quality data about the conflict is available. Very few countries display both - the incidence and severity of conflict as well as the "rich micro-level data" (Steele, 2007) - as is the case in Colombia.

Our analysis is based on individual-level data from the year 2005. In order to identify the effects of conflict we use the uneven spatial distribution of conflict intensity within the Colombian territory. We find that a woman in a district with high conflict intensity has an up to ten percent higher chance of being a victim of domestic violence than a woman in a district with average or lower conflict intensity.

2. Theory and Literature Review

This paper is based upon the idea that experiencing or witnessing violent manifestations of conflict will increase the incidence of domestic violence in spatial proximity of these manifestations. This means we expect a behavioural change in people due to conflict. The observation of behavioural change is, in most cases, very difficult and therefore there is not much empirical research in this field. Two of the few exceptions are Voors et al. (2012) who find that people who experience violence from conflict become more risk-seeking and have a higher discount rate; and Blattman (2009) who finds victims of violence to show higher political activity.

We assume that the repeated and sustained witnessing of violent acts in the context of armed combat affects the mind-set. It can lead to "widespread tacit tolerance and acceptance of the use of physical violence to solve private and social problems" and ultimately to an omnipresent *culture of violence* (Waldmann, 2007, specifically on the case of Colombia). Acclimatization and role models influence the way conflicts are resolved. This applies also within the framework of small social groups like the family, and all the way down to intimate relationships (see, e.g., Adelman, 2003, on the effect of militarization). An environment of violent crime in the community is "associated with elevated risks of both physical and sexual violence in the family" (Koenig et al. 2006). Also, "community-level

norms concerning wife beating“ (ibid.) have a significant effect on occurrence rates, as well as on the consequences the affected wives draw from the experience in terms of, e.g., divorce rates (Pollak 2004). Wood (2008) argues that “social processes may be reshaped by conflict processes”. Another factor might be the “emotional blunting” of victims, witnesses or perpetrators as a consequence of their experiences. This can lower the psychological threshold restraining the use of force at home. Post-traumatic stress disorders can result from exposure to violence, and lead to changes of behaviour. It was found in the United States that veterans with posttraumatic stress disorder (PTSD) are more often perpetrators of domestic violence than the general population (Sherman et al. 2006). We expect a similar effect to apply for witnesses of violence who were not directly involved in combat. We believe number and intensity of violent outbreaks to increase due to this effect.

Domestic violence is usually divided into two categories, one of which is referred to as expressive, the other one as instrumental. In the expressive form perpetrators gain utility from inflicting physical harm on their partners or children by being able to express their feelings in a drastic way, and release their emotional pressure (Winkel 2007). Living in a conflict zone brings about a general and unassigned feeling of threat, loss of control, helplessness and an elevated level of emotional stress because the usual societal rules that bring a certain protection from physical and other harm do not necessarily apply anymore when the actions of present armed combatants are incalculable. Passing this pressure on onto others within the closest social environment in a “cyclist manner” – ducking and kicking – may serve as a psychological relief valve for these people. When persons feel the aforementioned loss of control they might use violence to prove to have predominance at least over their direct social environment, i.e., at least over some part of their life.

Tauchen et al. (1991) describe not only this expressive aspect of utility creation for the perpetrator, but also include an instrumental function of spouse-beating. Domestic violence in its instrumental function is shaped and intended to modify the victim’s behaviour. It aims to “educate” the victim in line with the interests of the perpetrator. The aforementioned emotional blunting will decrease empathy for others and thereby the threshold to resort to violent coercion instead of verbal dispute.

A very important point about domestic violence is its acceptance or non-acceptance by the victims. This is largely determined by cultural norms and the victim’s alternatives or exit

options. If a victim is economically dependent on the perpetrator it is very difficult to leave an abusive relationship; while, e.g., a good education and an independent economic situation could facilitate the exit. Cultural and personal norms determine whether the victim will even recognize domestic violence as an injustice and try to end the relationship; or just accept it as something normal. Whether it is accepted or legally possible to end an abusive marriage also depends on the societal background.

Both sexes are represented among perpetrators and victims of domestic violence (see, for example, Straus 1993, Karnofsky 2005). The majority of perpetrators are male domestic partners, while most victims are female (e.g., Aizer, 2010). This also is the case that we have to focus on in our analysis due to data limitations. In an unsafe external environment both woman and men feel an increased need for protection. We believe that one important source of protection is the closest social environment, which is the family. If physical violence is commonplace in the geographical vicinity of their homes, we suppose that people show an increased reluctance to leave this protection. Compared to a situation without violent conflict, we therefore assume women to accept and endure more domestic violence than they would in a peaceful external environment. Probably this is even more the case for mothers who have to look after children. The fear of losing access to their children could hinder the former to turn their back on the children's father. Fear for the children's physical well-being also makes it difficult for mothers to leave them with their partner if he is a potential threat to the children. In the presence of violent exterior threats it becomes more crucial for the family to persist in order to serve as a protective environment. This function gains in importance as in the "climate of uncertainty, distrust, and polarization" which comes along with violent conflict, "traditional social networks of mutual aid might likewise weaken" (Wood 2008). The traditional role of the man as provider is widely accepted in Colombia. It can come along with a higher threshold of accepted domestic violence compared to other societies, as women may feel dependent (Karnofsky 2005, see also Farmer and Tiefenthaler 1997 on a resource-centred non-cooperative model of domestic violence).

The spatial proximity of violent incidents to households is of relevance because closer events are perceived to be much more threatening than distant ones. Events one learns about by word of mouth or by direct witnessing are more terrifying than those which are taken notice of only from the newspapers or television broadcasting. Studies have shown that an incident

of extreme violence can have distinct adverse psychological effects on people even if it happened thousands of kilometres away from them. For example, the terror attack against the World Trade Center in Manhattan on September 11th in 2001 has had a traumatizing effect on people all over the United States of America (Cohen Silver et al. 2002). It seems more than comprehensible that combat taking place only a few kilometres away from their homes will feel even more threatening for the Colombian population.

If experiencing or witnessing brutal physical violence - as present in a conflict - causes a behavioural change towards more violent patterns, the consequences which society has to cope with are diverse and serious. We believe that the potential for future violence is increased. High crime rates can be observed in societies afflicted by violent conflict (for the case of Colombia see, for example, Richani 1997). We think that the sparking of new conflicts becomes more likely and the reconciliation of ongoing ones more difficult. We also expect post-conflict recovery of societies to get hampered. The consequences of the specific behaviour known under the term domestic violence are not only dire for the directly affected victim. Detrimental effects arise for society as a whole from at least two elements. If domestic violence is a widespread phenomenon in a society we believe it to cultivate future conflict due to the lack of peaceful conflict resolution role models. Children whose ability to build affectionate relationships is destroyed are prone to resort to physical violence to resort conflicts in their adult life (Karnofsky 2005). Furthermore, children who become victimized - or witness family members becoming victimized - often get stunted in their development of a free and confident personality. Fonagy (1999) proposes an attachment theory perspective on violence by men against women, with intimate partner violence being regarded as an “exaggerated response of a disorganized attachment system” in consequence of absence of a male parental role model and a history of abuse. Pollak (2004) introduces an intergenerational model of domestic violence in order to capture the influence of violent parents onto their children’s future behaviour and the resulting vicious cycle, or “cycle of violence”. In the long run we presume the detrimental effects for children to lead to negative macroeconomic consequences (see also Calderón, Gáfaro and Ibáñez, 2010, on inter-generational consequences of violence).

Research results about the effect of conflict on domestic violence can also be found in Gallegos and Gutierrez (2011) investigating the case of Peru. While the subject is the same

their empirical approach is somewhat different. We use contemporaneous conflict and they relate conflict data aggregated over the years 1980-2000 to data on domestic violence in the years 2003-2008. Gallegos and Gutierrez find that exposure to conflict during late childhood and early teenage years raises the probability to suffer from domestic violence later in life. Because of the long time period between the conflict and the observed domestic violence the identification in space and time becomes more problematic and it is impossible to determine whether or not the perpetrator of domestic violence has been exposed to conflict. The study however suggests that some of the effects we observe as a direct response to the conflict experience might persist in the long term as well.

We empirically test our theory, using Colombian data because of the long and ongoing conflict and the data availability. In addition Colombia as a whole could probably be justifiably called a violent society not only considering the conflict but also when it comes to crime and violence in everyday life. Waldmann (2007) conducts a qualitative meta-analysis of publications[7] in economics, political sciences and sociology to trace the "culture of violence" and structural conditions fostering it. He finds that the violence in Colombia is deeply rooted in the society and culture of the country and also analyses its interaction with the conflict. The violence in Colombia extends into the family where domestic violence is very common, not only occurring as the abuse of partners but also as widespread abuse of children.

3. Data and Estimation Strategy

For our analysis we use individual level data about domestic violence and aggregate data about the conflict and combine both on the basis of spatial location.

The data on domestic violence comes from a Demographic and Health Survey (DHS) conducted between the end of the year 2004 and the beginning of 2005. In total, 41,344 women between the ages of 13 and 49 years living in 37,211 households were interviewed. Besides questions about socio economic characteristics, health and reproductive behaviour, this survey contains a specific domestic violence module that asks detailed questions about the experience of domestic violence during the last twelve months and in the time before. In

[7] Waldmann reviews scientific publications from the English, French, German, and Spanish language area.

the survey between 17 and 20 percent of the women living in a relationship reported physical abuse by their partner during the past twelve months. The households can be located on the district level and the interviews took place in 230 of the more than 1100 Colombian districts.[8] The spatial distribution of these districts is shown in Figure 1. Since we can identify both the location and time of the experience of domestic violence we are able to relate its occurrence to the conflict intensity in the region during the time before.

The data on conflict intensity comes from the Colombian "Presidential Program for Human Rights and International Humanitarian Law" ("Programa Presidencial de Derechos Humanos y Derecho Internacional Humanitario"). This project tracks the inner conflict in Colombia as well as directly connected and some other forms of violence like homicides, assassinations of syndicate members, journalists or politicians. The indicator we use to measure conflict intensity, is the number of armed confrontations between government and irregular forces per district and year. This indicator is available for all Colombian districts. It does not include other forms of violence like one-sided attacks and massacres and therefore mainly consists of confrontations between guerrilla and government forces (as paramilitaries usually try not to fight government troops). A future extension of this work could be to also use the above mentioned excluded types of violence, either additionally or alternatively. We do believe that the indicator is sufficient for our purpose, as we expect open armed confrontations mainly to happen where the conflict is most intense. Figure 2 shows the magnitude of the indicator for all districts of Colombia. As can be seen there the conflict is concentrated in some regions while others are not very much affected. This spatial variation enables us to identify the effect of conflict.

The empirical model is a Probit regression by which we determine the probability for each individual woman in the sample to have become a victim of domestic violence in the previous year.

The model takes the form:

$$\Pr(Y_{im} = 1 | C_m, X_{im}) = \Phi(\beta_0 + \beta_1 C_m + \beta X_{im})$$

[8] There were interviews in 231 districts but we exclude one district because there was only one woman interviewed who had a partner. The terms municipality and district are used interchangeably in the text.

Where Y_{im}, the dependent variable, is a dummy variable indicating whether or not woman i living in municipality/district m has experienced domestic violence during the last twelve months. C_m is our conflict intensity measure for municipality m. This is our main explanatory variable and it is defined as the number of armed confrontations in the district in the years 2003 and 2004 which are the two years prior to the interview.[9] Because of this we only include women who have been living for at least two years at the place where they were interviewed. X is a vector of other individual or household specific control variables we assume to influence the probability of having been the victim of domestic violence. The standard errors are clustered at the municipality level.[10]

Our identification in time has shortcomings since the conflict data is only available on a yearly basis. Therefore for the early interviews we might count confrontations that had not yet happened (our indicator is for the whole year of 2004 and some interviews started already in October) and for late interviews there might be confrontations we did not count (the interviews continued until the middle of 2005). There are also weaknesses in the spatial identification. Since we only count what happens in the district, the fighting in large districts could have taken place very far from the interviewed household, which would matter if the effect of violence decreases with distance. On the other hand we underestimate the conflict intensity people are exposed to in small districts, where confrontations happening in neighbouring municipalities are still very close but not counted (often they would be only a few kilometres away). We use different approaches to try to account for this. Our findings are however robust to all those different specifications (not all are reported in the paper). There are also arguments for possible endogeneity issues like reverse causality and unobserved variable bias. Since we do not think that this is a major problem and the discussion is somewhat lengthy, it is not presented in the main results but separately in section 4.4.

[9] Note that these years fall into the time period of "Plan Colombia", a multi-billion dollar program of military (and other) cooperation of the United States of America and Colombia. It was implemented between the years 2001 and 2005 and aimed at waging war against organized drug-related crime. Probably the conflict data therefore stem from a rather intense phase of the clashes. For a short introduction and some figures on "Plan Colombia" see Pineda (2005) and Mejia and Restrepo (2008).

[10] The actual data clusters reported in the data are located at a much lower level. Using those instead of the district level reduces the standard errors of our results (not reported).

Since our interest is in domestic violence perpetrated by the spouse or partner, not all women interviewed are part of our analysis.[11] In our different specifications we use basically two samples. The first sample are all women that currently have a partner (married or not) and are living together with this partner. This classification is based on the information given by the women. This group allows us to use all our household specific control variables and comprises 17,319 women. The second group consists of the first group and additionally, all women who state that they are in a relationship, but do not live with their partner. In this case, we are slightly changing the analysis as some control variables are no longer applicable or require a change in their interpretation. The number of observed women in this case increases to 21,636.

The incidence of domestic violence is even higher among women who do not live with their partner (close to 33 percent). Including this group in our analysis strongly increases the measured effect of the conflict variable and also increases its significance. Our expectation is that this group contains many women who have actually left their partners because of abuse. Although in this case we can capture less information with some of the control variables, we think that the results using the extended group of women tells us more about the real magnitude of the effect of conflict on violent behaviour.

As we want to see the effect of war on non-combatants only, we exclude all women whose partner is in the military. Regular fighters in the FARC hardly have any contact to their family (as described, e.g., in Gutierrez Sanin, 2008). Therefore the only case where the partner of an interviewed woman can be an active combatant is if he is a member of a paramilitary group. Estimates for the relevant time period range between seven to twelve thousand paramilitary fighters (ibid.), so the contamination of our dataset is probably small, since Colombia has a population size of about 40 million.

Our main dependent variable is constructed from questions about physical violence perpetrated by the partner during the twelve months before the interview. It contains the following categories: Being pushed or shaken; hit with the hand; hit with an object; bitten; kicked or dragged; attacked with a knife, gun or other weapon, being physically forced for an

[11] Extending the analysis to include violence exercised by persons other than the partner is not possible, because the questions about domestic violence in the last 12 months only refer to the partners' behaviour. Therefore only women with a partner can be used for the analysis.

unwanted sex act and whether the partner tried to strangle or burn the woman. We also included it if the woman was threatened by her partner with a knife, gun or other weapon. Although this is not a physical attack we think that in its quality it comes close enough to be included. Our dependent variable is coded one if any one of the mentioned attacks happened and zero otherwise. We later also include other non-physical aspects.

Descriptive statistics of our variables are presented in Table 1 and Table 2. Table 1 presents the descriptives for the whole sample of women who are living together with their partners. In this table we do not include women who do not live with their partner as the household characteristics are not the characteristics of the household of the perpetrator. If they are included, the values are very similar, except that the percentage of victims of violence is increased by about three percentage points from 17.7 to 20.7 percent.

In Table 2 the statistics are presented separately for conflict intensive districts and others. Here we define districts as conflict-intensive if there had been more than two armed confrontations during the time considered. The percentage of women who reported physical abuse by their partners is about three percentage points higher in the conflict zones. Also, more women in conflict zones report to have experienced violence in the past (not by their current partner). Surprisingly most other indicators that turn out to increase the incidence of domestic violence in our analysis are looking more positive in those regions which are more conflict-intensive. On average, people in these areas are wealthier and more educated than those in more quiet districts. Including women who do not live with their partners in these statistics (not reported) does not change these trends. So just looking at the descriptive statistics already gives a hint that conflict might increase violent domestic behaviour. More information about the variables is given in the next section.

4. Analysis and Results

This section presents the results of our main specifications and those of various robustness checks, consisting of changes in variables or the analysed samples. The basic, as well as the alternatives specifications, confirm our central theory that the experience of conflict changes

behaviour towards more violent patterns, which can be observed by a higher incidence of domestic violence.

4.1 General models

Our basic models can be found in Table 4 in the first two columns. The dependent variable is whether the woman has experienced physical domestic violence within the last twelve months. The two different columns present the results for the two different samples of women. Including the women who are in a relationship but do not live with their partner does not affect the sign of the coefficients but their magnitude. There are also no important changes in the significance levels.

Our main variable of interest - the number of armed confrontations - is positive and highly significant. This shows that living in an area of higher conflict intensity increases the risk of being the victim of domestic violence. The average marginal effects of our conflict variable are 0.0013 and 0.0022 for the two samples respectively. Taking the difference between the most peaceful and the most conflict-intensive region, this would present a risk-increase between four to seven percentage points.

Theory suggests that the occurrence of domestic violence depends on the characteristics of the perpetrator and furthermore on the characteristics of the victim. An important point here is also whether and to which extent the victim accepts the violence before it decides to leave the relationship. This is influenced by incentives for remaining in the abusive relationship and the options to leave. In order to try to capture these possible determinants of domestic violence we introduce an array of control variables into our analysis.

The first control variables are wealth dummies. Since DHS surveys do not ask for income this is calculated from household assets and contained in the survey data. The reference category is the group of the poorest households. It can be seen that the risk of being victimized is significantly reduced in the two highest wealth categories. Wealth can be seen as stress reducing and wealthy people might rather be able to protect themselves, reducing the incidence of domestic violence. When including women that are not living with their partners, these variables can be interpreted as the alternative option because they refer to the wealth of the household where women can go if they do not live with their partner. Living in a rural location also seems to reduce the risk of victimization. A larger number of

children is however associated with more domestic violence. The reason for this could be more stress in the family because of its size. It could also be an indication for more "traditional" family values, which promote having children and attach less intrinsic value to women. Children also represent an incentive for women to stay in the household as described in the theory part. We expect that in households with more female adults they might be better able to protect each other. Controlling for this we find that higher numbers of female adults in the household indeed reduce victimization. The number of children and the number of female adults are not included when using the larger sample, as they do not always refer to a common household of the potential victims and perpetrators.

When it comes to the personal characteristics we find that older women are less likely to be abused. There can be various reasons why age should matter. One could guess that age increases experience and can give higher social status. Younger, less experienced women might be more easily convinced by their partner to stay using false promises and be less respected. Older partners are also less likely to be perpetrators of domestic violence because on the one hand the relationship probably already proved to be stable and maybe people just become calmer with age.

Looking at education one should expect it to reduce violence, since more educated women have much better options to leave a relationship and do not need economic support from a male partner. Higher education will probably also be connected with more modern values, coming along with a reduced acceptance of violence against women. When it comes to the partner's education, the more educated men will most likely also have less "traditional" values and a higher capability of resolving disputes without violence. Since partners are often similar in both age and education, we expect these factors to have a strong effect and use dummy variables for the different education levels as control variables. We find no significant effect for primary and secondary education (the reference category being no formal education, variables with a confidence level lower than 90% are considered insignificant in this paper). Only women with a higher education have a significantly lower risk of becoming victims of domestic violence. Equally for the partner's education, only the higher education dummy is negative and significant (at more than the 99% level). Colombia is a highly unequal country and this picture could be a result of the strong separation between classes not only in financial aspects, but also in attitudes.

An unexpected result is that women who are currently working become victims more often, while one would expect that for them it would be easier to leave and thus become victimized less often. Our best explanation is that although the women say that they are working, the job or income are unobserved and therefore we know little about the actual character of the employment situation and level of independence it can render. Second we suspect that the higher incidence of violence in this case could be a result of jealous partners, because women who are working are more likely to leave the house and have contact with other men.

We try to control for the economic importance of the women's income for the household. Women are asked in how far their income is used for coverage of current expenses of the household; or if it is mainly saved. Our dummy variable, which assumes the value of one if the income of the women is at least partially used for current expenses, is not significant.

As a control we also use a dummy variable that assumes the value of one if the woman has, at the time of the interview, been pregnant for at least six months. We expect men to show more restraint when it comes to pregnant women in order to not harm the child. The variable captures whether the woman has been pregnant for at least half of the time the questions about domestic violence refer to. The result is as expected, the coefficient is negative and significant at the one percent level.

In the survey women are questioned whether they had been the victim of violence in the past. It is a known phenomenon that people who were the victims of violence in the past have a higher tendency of becoming a victim again. To check for this we use a dummy assuming the value of one if the woman was in any way physically abused in the past by someone other than her current partner. The variable turns out positive and highly significant in all specifications.

In conclusion, it can be said that nearly all of our variables are significant at more than the 90% level and their signs in accordance with the theoretical considerations.

4.2 Different spatial identification and simulation of effect's magnitude

As mentioned before, problems might arise with the spatial identification when it comes to very large districts. In some Colombian districts the distance from one border point to another exceeds 400 kilometres. In this case our identification is more problematic because the fighting could have taken place very far from the interviewed households. In order to control for this we exclude all districts with an area of more than 2500 square kilometres. The results are reported in columns three and four of Table 4 for the two different samples respectively. In these cases the coefficients of the confrontations variable increase strongly, as do the t-statistics. In column four, the average marginal effect for the conflict variable now reaches 0.0033. To give an idea of the dimensions of the effect we make use of a simulation. For the model including all women in a relationship, in districts smaller than 2500 square kilometres, without observed conflict, the average probability of having been the victim of domestic violence in the last twelve months is about 19.8 percent. Keeping all other characteristics for these women constant, but changing the conflict indicator to the highest observed level in the sample (33 confrontations in the two years considered), the probability of victimization is predicted again and the average increases to 32.1 percent, which corresponds to an increase of 12.3 percentage points.

As another way to incorporate the differences in spatial identification, we adjust the conflict variable by the district size.[12] Again our variable of interest (conflict incidence) is highly significant. It now has a larger marginal effect (but the range of the variable is of course much smaller than before).

The opposite issue - likewise briefly mentioned above - is that people are most likely affected by the conflict in proximal districts especially if districts are rather small (some districts cover an area of less than 40 square kilometres). We do not suspect this to be a problem, because the conflict usually does not sharply stop at a district border, which is why conflict intensity measures for neighbouring districts are anyway correlated. We also use model specifications where we include the armed confrontations of nearby districts into the

[12] The number of attacks is divided by the square root of the district area. The square root is used since we are more interested in distances than area sizes. Even though this is by far not perfect, it is a simple measure that comes closer to what we actually want to observe than using the area. Also the range of values is much smaller than for area sizes.

measure (not reported). These approaches show similar coefficients and significance values, thereby confirming our results, but not offering any further insights.

4.3 Different measures of domestic violence

Domestic violence does not only have physical aspects. There are many other possibilities of mistreatment in a relationship. Control over another person can for example also be achieved by means of threats (which can include threats of violence). To include non-physical aspects we use models with different definitions of domestic violence and check for the influence of external conflict. The indicators contained in the variables are listed in Table 3.

The first alternative measure includes threats as an indicator. It is coded one if the woman reports that her partner used at least one of the following threats against her in the last twelve months: threat to abandon her; to take away the children; to withdraw economic support; or if she was threatened with a weapon (as in our first indicator). We use these as they are all assertive and serious threats. The survey contains other questions about non-physical aspects that we did not include. These are whether the partner did use expressions like ”you are good for nothing”; did not allow the woman to see friends; limited contact with the family; or wanted to know where she was “all the time”. We do not include these questions because we think that they could be mainly driven by jealousy (which we consider not to be conflict related) and at least some of them also depend on the personal perception of the woman.

The results of the model using threats as the dependent variable can be found in Table 5 in the first and second column for both samples of women. As can be seen, the coefficient of our conflict variable hardly changed. For the other variables there are changes in the coefficients; and even some variables that were statistically insignificant before now turn significant. The main interesting finding is that threats are already reduced at lower income and education levels.

When using the combined indicator including physical violence and threats, we also see nothing contradicting our prior findings. The results are reported in Table 5 in columns three and four.

4.4 Possible endogeneity issues

Different arguments could be raised that suggest an endogeneity problem in the analysis. The first idea is that of reverse causality. Domestic violence could lead to women leaving their partner and because of a lack of alternatives they might subsequently join the guerrilla and participate in combat. Female soldiers in the Colombian guerrilla troops are common and this could theoretically increase the number of fighters and thereby also conflict intensity. The same argument could be made about children who experience or witness domestic violence at home and therefore leave, subsequently joining the irregular forces. Child soldiers are also common in the Colombian conflict and most studies agree that many of the child soldiers join voluntarily to escape domestic violence or sexual abuse (e.g., Brett, 2003, p.10). The argument about the conflict intensity is the same as for the women.

While we consider domestic violence to be a possible source for violent potential in the society and thereby future conflict, we do not think that this mechanism is very problematic for our spatial identification. The bias would only exist if domestic violence increased conflict intensity in exactly the district where the domestic abuse takes place. We consider this to be unlikely. The guerrilla troops are highly organized and disciplined military-like organizations. The locations of fighting are subject to strategic military choice. This means the guerrilla troops will not fight where they have the best recruiting opportunities, but instead will redeploy the recruits to the places where the fighting takes place. If therefore conflict intensity is determined by military strategy there will be no bias because of reverse causality. A comprehensive overview over the organizational structures and composition of the irregular forces is given in Gutiérrez Sanín (2008).

We think that roughly the same argument holds for unobserved factors. We consider it unlikely that there are factors that would influence military strategy at the group or state level and at the same time domestic violence. Even though both are forms of violence they are exercised in completely different settings. Using violence against a partner is an

individual decision. Armed confrontations are a mixture of planning, strategic interest and chance. Despite not considering it likely we try to control for an unobserved variable bias, caused by some unknown factor, underlying higher numbers of armed confrontations and higher incidence of domestic violence in the districts. We do this by using a two-stage instrumental variable approach. As instruments we employ geographical characteristics that influence the conflict by offering military advantages or economic incentives for the irregular forces.[13] The elevation-range is a measure for how mountainous the terrain is. It was calculated using high resolution satellite elevation data from the International Center for Tropical Agriculture – CIAT (90m SRTM Data). High ranges indicate a more rugged terrain offering cover and concealment for the guerrilla forces. If the district is characterized by oil production or exploration (referred to as oil region), it is more interesting for irregular forces, since an important source of money for all insurgents is the extortion of the oil industry, mainly through sabotage (destruction of pipelines). Therefore oil regions show more armed confrontations. The data on oil regions was obtained through SIG-OT (Sistema de información geográfica para la planeación y el ordenamiento territorial).

We expect these instruments to influence the conflict but not to have any effect on domestic violence. Domestic violence as discussed in the theory section has an instrumental and expressive function and will also depend on traditions or values. We cannot see any way how our geographical indicators could influence the perceived need of spouses to discipline their partner or create additional stress except through conflict. Looking at traditions and values, if a more mountainous terrain was associated with more secluded regions, it could be argued that a larger distance to civilization could mean less contact and more traditional values favouring violence against the partner. To check for this we looked at the correlation between the instruments and some general indicators of seclusion or isolation. On average the municipalities with mountainous terrain are somewhat closer to larger cities (most Colombian towns are located on the three mountain chains) and show slightly higher levels of development (measured by the percentage of households with unsatisfied basic needs, a multidimensional poverty measure published by the Colombian national statistics

[13] More information on how the geographical data was obtained and how the indicators were calculated, can be found in the technical notes in the appendix.

department DANE) so the exclusion argument is not valid.[14] The correlations between the oil region indicator and city distance or development measures are around -0.05 and 0.05 respectively. So there seems to be no important correlation. For both instruments the correlation with telephone coverage as a proxy for social isolation is between 0.03 and 0.05. Since we find no support for systematic differences between more or less mountainous or oil rich districts, we expect our instrument to have no other impact on domestic violence than through the channel of conflict.

The most common technique used for instrumental variable estimation is probably the two-stage least squares estimation.[15] We present the results for this approach in column 3 of Table 7. The coefficient of the conflict variable is positive and highly significant. The F-statistic in the first stage does not imply a weak instrument problem and the Sargan-score for the overidentification test cannot reject the null hypothesis that our instruments are valid at a conventional level. In this setting the effect of conflict is positive and highly significant.

We do however consider this approach with the standard procedure to be problematic for various reasons. In the first stage we are dealing with count data (the number of confrontations) and in the second stage with binary data. In both cases a linear model is not the best approximation. More importantly the conflict as well as the instrumental variables are observed at the district level, while everything else is observed at the individual level. This means that each individual observation in the same district carries the same information about the conflict and instruments. Thereby in the first stage the influence of each district on the prediction of conflict depends on the number of individuals observed in the district (the first stage would have to be weighted). We have about 20.000 observed cases (because of the number of women) but the data originally only observes conflict information for the 230 districts where women were interviewed. The test statistics however are calculated as if there actually were 20.000 conflict observations. All second stage explanatory variables are also incorporated into the first stage. First we do not think that in the Colombian case the characteristics of households and individuals are good predictors of

[14] To check for seclusion and similar arguments, municipality level variables were added to the original model (distance to cities, forest density, coca production, etc.). While some of them had some explanatory power, the conflict indicator still remained significant (results not reported)

[15] We use the Stata command 'ivregression' with the 2sls option to estimate this model.

conflict and more importantly, this procedure produces a different prediction of conflict for each individual in the second stage, while actually the prediction should be the same for all individuals in the same district.

Because of this we use an alternative approach as well. For the prediction of the number of armed confrontations in the first stage we use a negative binomial regression, since we are working with count data and we do not include any second stage regressors. The results of the first stage regression are shown in Table 6, column 1. Here we can see that our instrumental variables are highly significant but the pseudo R^2 is relatively low which indicates that the instruments are rather weak.

The second stage regression is as in our original analysis a Probit regression. Standard errors in our two-stage process are calculated using bootstrapping of both stages. The results are reported in Table 7, column 2. All models are calculated using the sample for all women. The dependent variable is – only physical – domestic violence. Again the conflict variable increases domestic violence and is highly significant. The weak instrument problem does however cast some doubt on the validity of the results.

There are other potential instruments we did not use because we were not sure about the exclusion restriction. Using them together with the elevation and oil variables increases the explanatory power of the model used for the prediction of conflict (see columns 2 and 3 of Table 6), but the R^2 is never very high. They are however also reported since an exploration of factors determining the conflict intensity might be interesting. Unlike in the first stage model, we include all Colombian districts not only the ones where interviews were conducted in these models. If no other source is mentioned the information on the municipality indicators was obtained through SIG-OT (Sistema de información geográfica para la planeación y el ordenamiento territorial). The conflict is more intense in regions with higher coca production (measured as the percentage of land in the district dedicated to growing coca plants, data from the Colombian Drug Observatory ("ODC - Observatorio de Drogas de Colombia"). This is an example for economic incentives since the insurgent forces rely heavily on income from trafficking drugs and intermediate products. If large proportions of the district surface are covered by forest this offers cover and concealment, rest and hiding places for guerrilla troops (Forest cover data source: FAO, Global Forest Resources Assessment 2000). The indicator has a positive and significant effect on conflict intensity.

National highways are interesting for all sides as lines of communication, supply and transport of personnel (or interdiction of such). The coefficient of a dummy indicating the presence of a national highway within at least three kilometres of the district is positive and significant. The presence of an oil refinery is insignificant (there are only five in Colombia).

Additional variables are the population density, the presence of an oil pipeline within a distance of less than three kilometres, the distance to the next larger town and to the next army base,[16] indicating that conflict is actually happening closer to towns but further away from army bases.

In general we do not see indications that the analysis suffers from an endogeneity problem, but due to the lack of better instruments, we cannot give a definite proof for this.

5. Conclusions

We find evidence that the presence of intense conflict seems to increase the risk of women to be the victim of domestic violence. We suspect the effect of conflict to work through behavioural change in the form of higher acceptance of violence and emotional blunting, through more expressive violence as a release for heightened stress and through higher acceptance of domestic violence by the victims who are less willing to give up the protection of their family in an insecure environment. Our highest estimates show an increase of more than twelve percentage points in the incidence of domestic violence when comparing a peaceful and a conflict intensive environment which is a very large effect.

We are convinced that the effects of this change in behaviour and the long-term effect that domestic violence has on future generations will have serious consequences for the society as a whole. Violence from a conflict causes more violent behaviour and domestic violence affects future generations in similar ways. This cycle of violence will then be a major hindrance for the resolution of any conflict. The violence could also spread from the military conflict into the civil life, e.g., in the form of different kinds of violent crime.

[16] The raw data to create those indicators was extracted as GIS data in the form of ESRI shape files, from SIG-OT except for the locations of army bases which was determined based on information available from the web pages of the Colombian National Army.

Colombia has a long history of violence which cannot only be seen in the conflict but also in its enormous crime rates and the intra-family violence. It is probably a sad example of how different forms of violence can reinforce each other. We suspect that the effect of conflict on domestic violence is not necessarily as large in other countries as it is in Colombia. Domestic violence is always very much influenced by the cultural and general environment and this could be more favourable in Colombia than in other conflict regions.

We think that conflict changes attitudes and behaviour even though as shown by Blattman (2009) not always with only negative consequences. Understanding the impacts however is very important for conflict and post-conflict developments. More research on the individual and behavioural effects of conflict, especially on peoples' attitude towards violence and its comparison across regions should therefore prove to be very interesting areas of future research.

References

Adelman, M. (2003). The Military, Militarism, and the Militarization of Domestic Violence. *Violence against Women*, 9, pp. 1118 - 1152.

Aizer, A. (2010). The Gender Wage Gap and Domestic Violence. *American Economic Review*, 100 (4), pp. 1847–1859.

Bjørkhaug, I. (2010). Child Soldiers in Colombia: The Recruitment of Children into Non-state Violent Armed Groups. *MICROCON Research Working Paper*, 27, pp. 1 – 25.

Blattman, C. (2009). From Violence to Voting: War and political participation in Uganda. *American Political Science Review*, 103 (2), pp. 231-247.

Blattman, C. and E. Miguel (2010). Civil War. *Journal of Economic Literature,* 48 (1), pp. 3 - 57.

Brett, S. (2003). You'll Learn Not to Cry: Child Combatants in Colombia. Human Rights Watch.

Calderón, V., M. Gáfaro and A. M. Ibáñez (2010). Forced Migration, Female Labor Force Participation, and Intra-household Bargaining: Does Conflict Empower Women? *Households in Conflict Network Seminar paper*, pp. 1 – 46.

Durevall, D., & Lindskog, A. (2013). Intimate Partner Violence and HIV in Sub-Saharan Africa. Department of Economics, University of Gothenburg, *Working Papers in Economics*, 563, p.29.

Farmer, A. and J. Tiefenthaler (1997). An Economic analysis of Domestic Violence. *Review of Social Economy*, 55 (3), pp. 337 – 358.

Fonagy, P. (1999). Male perpetrators of violence against women: An attachment theory perspective. *Journal of Applied Psychoanalytic Studies*, 1(1), 7-27.

Gallegos, J. V. and I. A. Gutierrez (2011). The Effect of Civil Conflict on Domestic Violence: the Case of Peru. *SSRN Working Paper Series*, pp. 1-29.

García-Moreno et al. (2005). WHO multi-country study on women's health and domestic violence against women: initial results on prevalence, health outcomes and women's responses. World Health Organization, p. 28.

Gutiérrez Sanín, F. (2008). Telling the Difference: Guerrillas and Paramilitaries in the Colombian War. *Politics Society* 36 (1), pp. 3-34.

Justino, P. (2009). Poverty and Violent Conflict: A Micro-Level Perspective on the Causes and Duration of Warfare. *Journal of Peace Research*, 46, pp. 315-333.

Karnofsky, E. (2005). Familiäre Gewalt und Kindesmißbrauch in Kolumbien. *Brennpunkt Lateinamerika*, 4, pp. 37 – 44.

Koenig, M. A. *et al*. (2006). Individual and Contextual Determinants of Domestic Violence in North India. *American Journal of Public Health*, 96 (1), pp. 132 - 138.

Mejia, D. and P. Restrepo (2008), The War on Illegal Drug Production and Trafficking: An Economic Evaluation of Plan Colombia. *Households in Conflict Network Working Papers*, 53, pp. 1 – 57.

Miguel, E., Saiegh, S. M., & Satyanath, S. (2011). Civil War Exposure and Violence. *Economics & Politics*, 23(1), 59 - 73.

Pineda, C. (2005). Plan Colombia - A Political, Economic, and Cultural Analysis of Coca and Poppy Eradication Projects in Putumayo, Colombia. *Totem: The University of Western Ontario Journal of Anthropology*, 13 (1), pp. 72 – 80.

Pollak, R. A. (2004). An intergenerational model of domestic violence. *Journal of Population Economics*, 17 (3), pp. 311 – 329.

Richani, N. (1997). The Political Economy of Violence: The War-System in Colombia. *Journal of Interamerican Studies and World Affairs*, 39 (2), pp. 37-81.

Sherman, M. D. et al. (2006). Domestic Violence in Veterans with posttraumatic stress disorder who seek couples therapy. *Journal of Marital and Family Therapy*, 32 (4), pp. 479 - 490.

Silver, R. C. et al. (2002). Nationwide Longitudinal Study of Psychological Responses to September 11. *The Journal of the American Medical Association*, 288 (10), pp. 1235 - 1244.

Steele, A. (2007). Massive Civilian Displacement in Civil War: Assessing Variation in Colombia. *Households in Conflict Network Working Paper,* 29, pp. 1 - 36.

Straus, M. A. (1993). Physical Assaults by Wives: A Major Social Problem. In *Current Controversies on Family Violence*, chapter 4, pp. 67 - 87.

Tauchen, H. V., A. D. Witte and S. K. Long (1991). Domestic Violence: A non-random Affair. *National Bureau of Economic Research Working Paper Series*, 1665, pp. 1 - 37.

Voors, Maarten J., Eleonora E. M. Nillesen, Philip Verwimp, Erwin H. Bulte, Robert Lensink and Daan P. Van Soest (2012) 'Violent Conflict and Behavior: A Field Experiment in Burundi', *American Economic Review*, 102 (2), pp. 941-964.

Waldmann, P. (2007). Is there a Culture of Violence in Colombia? *International Journal of Conflict and Violence*, 1 (1), pp. 61 - 75.

Winkel, F. W. (2007). Post traumatic anger: Missing link in the wheel of misfortune. *Intervict, Tilburg University*, pp. 1 - 58.

Wood, E. J. (2008). The Social Processes of Civil War: The Wartime Transformation of Social Networks. *Annual Review of Political Science*, 11, pp. 539 - 561.

Appendix

Figure 1

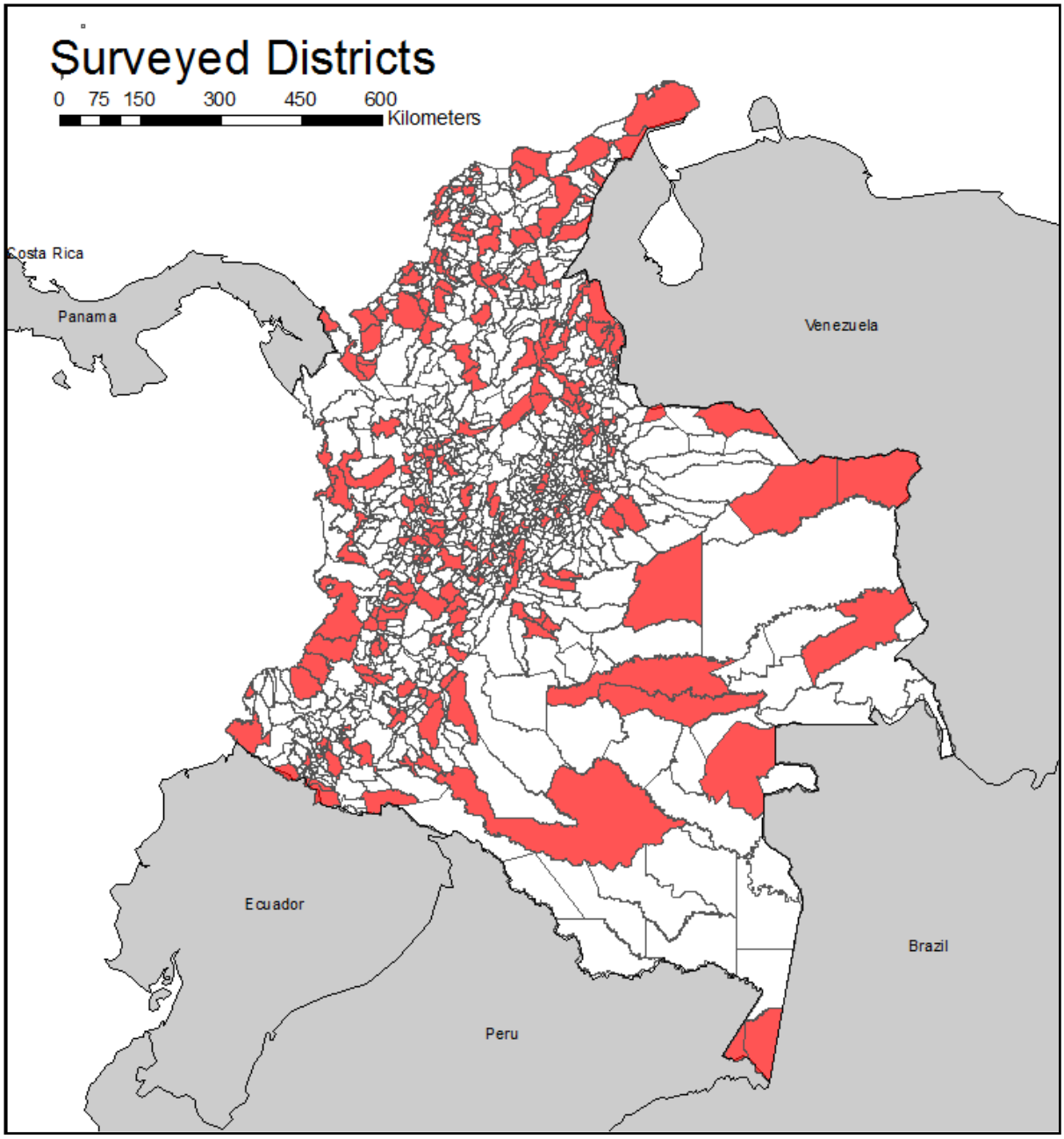

Figure 2

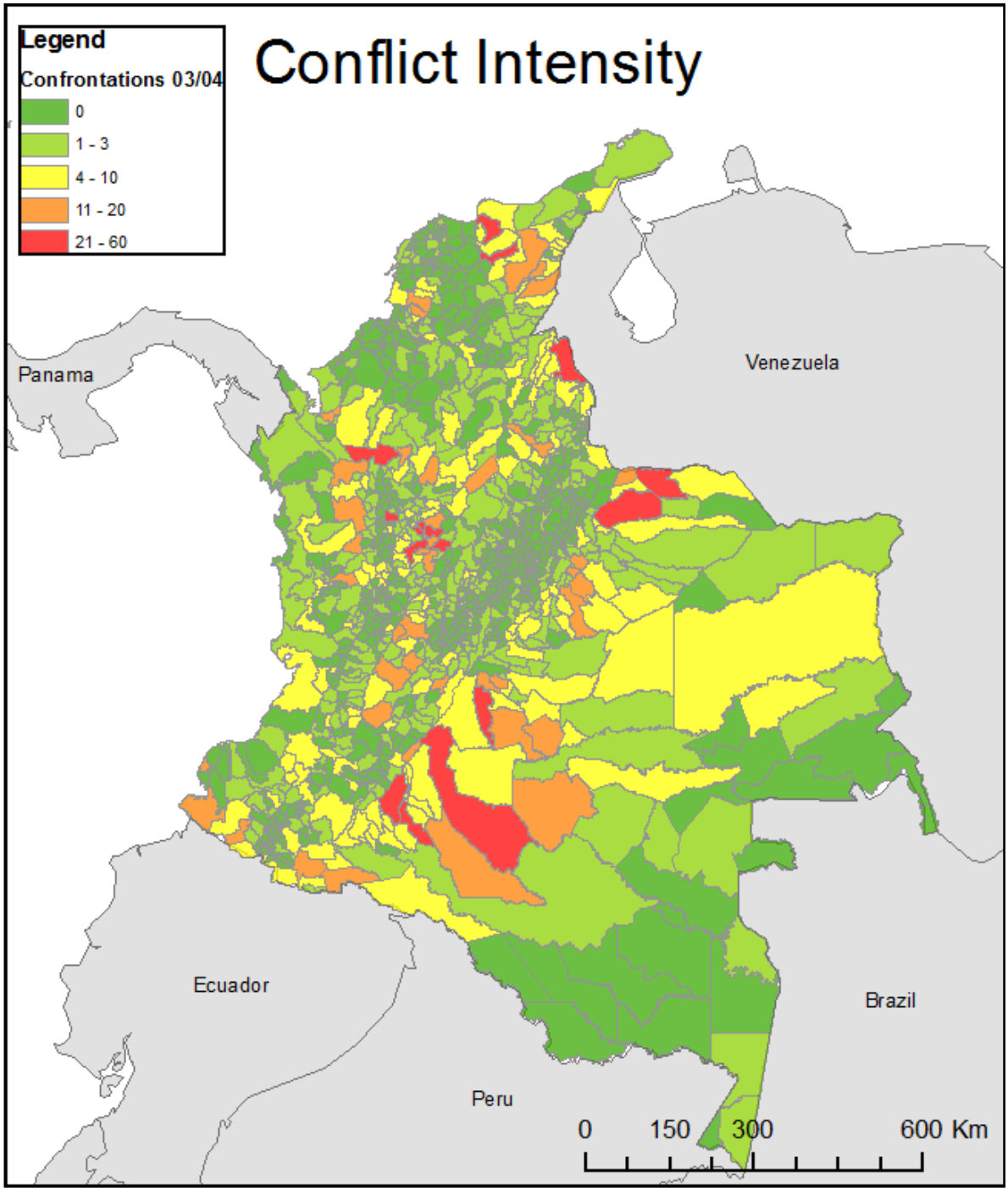
Legend
Confrontations 03/04
0
1 - 3
4 - 10
11 - 20
21 - 60
Conflict Intensity
Panama
Venezuela
Ecuador
Peru
Brazil
0
150
300
600 Km

Table 1

Summary statistics: All women who live with their partner					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Physical domestic violence	17319	0,1766846	0,3814125	0	1
Serious Threats	17319	0,1791674	0,3835035	0	1
Physical violence + threats	17319	0,2554997	0,4361543	0	1
Poorest	17319	0,2149662	0,4108108	0	1
Poorer	17319	0,2449333	0,4300601	0	1
Middle	17319	0,2187193	0,4133897	0	1
Richer	17319	0,181477	0,385424	0	1
Richest	17319	0,1399042	0,3468976	0	1
Rural	17319	0,2770368	0,4475477	0	1
No. of children	17319	2,17807	1,558069	0	12
No. of female adults in HH	17319	1,378775	0,7370249	0	8
Respondent's Age	17319	33,72019	8,746874	13	49
No Education	17319	0,0420348	0,2006743	0	1
Primary Education	17319	0,3633582	0,4809806	0	1
Secondary Education	17319	0,4495063	0,4974582	0	1
Higher Education	17319	0,1451008	0,3522126	0	1
Respondent currently working	17319	0,5033201	0,5000034	0	1
Earnings significant share in household spendings	17319	0,7822623	0,4127201	0	1
At least 6 months pregnant	17319	0,024424	0,1543661	0	1
Experienced violence in the past	17319	0,123506	0,3290266	0	1
Partner's age	17319	38,48998	10,43356	16	98
Partner's Education: None	17319	0,0551418	0,2282633	0	1
Partner's Education: Primary	17319	0,384722	0,4865436	0	1
Partner's Education: Secondary	17319	0,4122062	0,4922461	0	1
Partner's Education: Higher	17319	0,1384607	0,3453928	0	1
No. armed confrontations 03/04	17319	3,686067	6,044844	0	33

Table 2

Summary statistics: districts separated by conflict intensity											
	Low intensity conflict						High intensity conflict				
	Obs	Mean	Std. Dev.	Min	Max		Obs	Mean	Dev.	Min	Max
Physical domestic violence	11576	0,191	0,393	0	1		10060	0,225	0,418	0	1
Serious Threats	11576	0,211	0,408	0	1		10060	0,231	0,422	0	1
Physical violence + threats	11576	0,283	0,451	0	1		10060	0,312	0,463	0	1
Poorest	11576	0,258	0,438	0	1		10060	0,134	0,341	0	1
Poorer	11576	0,266	0,442	0	1		10060	0,232	0,422	0	1
Middle	11576	0,207	0,405	0	1		10060	0,256	0,436	0	1
Richer	11576	0,159	0,366	0	1		10060	0,213	0,410	0	1
Richest	11576	0,110	0,313	0	1		10060	0,166	0,372	0	1
Rural	11576	0,349	0,477	0	1		10060	0,144	0,351	0	1
No. of children	11576	2,237	1,632	0	12		10060	2,130	1,532	0	11
No. of female adults in HH	11576	1,490	0,829	0	8		10060	1,471	0,804	0	6
Respondent's Age	11576	34,103	8,780	13	49		10060	33,988	8,775	13	49
No Education	11576	0,050	0,218	0	1		10060	0,033	0,178	0	1
Primary Education	11576	0,382	0,486	0	1		10060	0,322	0,467	0	1
Secondary Education	11576	0,437	0,496	0	1		10060	0,483	0,500	0	1
Higher Education	11576	0,131	0,338	0	1		10060	0,162	0,368	0	1
Respondent currently working	11576	0,526	0,499	0	1		10060	0,572	0,495	0	1
Earnings significant share in household spendings	11576	0,804	0,397	0	1		10060	0,797	0,402	0	1
At least 6 months pregnant	11576	0,022	0,147	0	1		10060	0,022	0,146	0	1
Experienced violence in the past	11576	0,110	0,314	0	1		10060	0,137	0,344	0	1
Partner's age	9451	38,657	10,376	16	98		7868	38,290	10,499	16	98
Partner's Education: None	11576	0,065	0,246	0	1		10060	0,043	0,203	0	1
Partner's Education: Primary	11576	0,395	0,489	0	1		10060	0,332	0,471	0	1
Partner's Education: Secondary	11576	0,399	0,490	0	1		10060	0,448	0,497	0	1
Partner's Education: Higher	11576	0,122	0,328	0	1		10060	0,160	0,367	0	1
No. armed confrontations 03/04	11576	0,658	0,773	0	2		10060	7,364	7,527	3	33
High intensity: more than 2 armed confrontations in the considered time period											

Table 3

Domestic violence: Definitions			
Form of violence	**violence**	**threats**	**combined**
push / shake	x	-	x
hit with hand	x	-	x
hit with object	x	-	x
bite	x	-	x
kick/ drag	x	-	x
threaten with knife, gun other weapon	x	x	x
attack with knife, gun other weapon	x	-	x
try to strangle, burn	x	-	x
physically force for unwanted sex act	x	-	x
threatened with abandoning her	-	x	x
threatened to take away children	-	x	x
threatened to withdray economic support	-	x	x
used expressions like you are good for nothing	-	-	-
didn't allow to see friends	-	-	-
limited contact with family	-	-	-
wanted to know where she was all the time	-	-	-

Table 4

Probit regression; Dep. Variable: Physical domestic violence last 12 months					
	All districts		Small districts		Confront. adj.
	Living together	All women	Living together	All women	All women
No. armed confrontations 03/04	0.0013*	0.0022**	0.0024***	0.0033***	0.0682***
	(1.87)	(2.15)	(3.71)	(6.66)	(5.96)
Age respondent	-0.0032***	-0.0046***	-0.0036***	-0.0048***	-0.0046***
	(-6.28)	(-9.79)	(-6.36)	(-9.88)	(-9.88)
Resp. primary edu.	-0.0045	-0.0151	-0.0087	-0.0156	-0.0160
	(-0.30)	(-1.08)	(-0.49)	(-0.95)	(-1.14)
Resp. secondary edu.	-0.0206	-0.0266*	-0.0208	-0.0236	-0.0270*
	(-1.24)	(-1.77)	(-1.06)	(-1.34)	(-1.80)
Resp. higher edu.	-0.0481**	-0.0509***	-0.0540**	-0.0556***	-0.0508***
	(-2.48)	(-2.87)	(-2.49)	(-2.74)	(-2.86)
Resp. currently working	0.0296***	0.0491***	0.0310***	0.0510***	0.0495***
	(5.11)	(7.92)	(4.92)	(8.46)	(7.98)
Sign. share of HH earnings	-0.0043		0.0012		
	(-0.55)		(0.15)		
Min. 6 months pregnant	-0.0677***	-0.0690***	-0.0767***	-0.0869***	-0.0686***
	(-3.14)	(-3.03)	(-3.04)	(-3.13)	(-3.01)
Exp. of violence in past	0.0385***	0.0459***	0.0412***	0.0465***	0.0463***
	(3.85)	(4.38)	(3.71)	(3.88)	(4.42)
Partner's age	-0.0019***		-0.0019***		
	(-4.86)		(-4.53)		
Part. primary edu.	-0.0049	-0.0075	-0.0105	-0.0146	-0.0074
	(-0.38)	(-0.66)	(-0.75)	(-1.14)	(-0.64)
Part. secondary edu.	-0.0130	-0.0169	-0.0222	-0.0233	-0.0167
	(-1.00)	(-1.34)	(-1.52)	(-1.61)	(-1.32)
Part. higher edu.	-0.0626***	-0.0747***	-0.0700***	-0.0783***	-0.0737***
	(-3.66)	(-4.33)	(-3.69)	(-4.20)	(-4.26)
Income category 2	0.0005	-0.0008	0.0052	-0.0004	-0.0012
	(0.05)	(-0.08)	(0.46)	(-0.03)	(-0.12)
Income category 3	-0.0085	-0.0135	-0.0065	-0.0181	-0.0145
	(-0.70)	(-1.12)	(-0.45)	(-1.36)	(-1.21)
Income category 4	-0.0449***	-0.0363**	-0.0410***	-0.0427***	-0.0389***
	(-3.15)	(-2.53)	(-2.65)	(-3.03)	(-2.72)
Income category 5	-0.0523***	-0.0689***	-0.0497**	-0.0795***	-0.0730***
	(-2.82)	(-3.94)	(-2.51)	(-4.70)	(-4.19)
Rural area	-0.0403***	-0.0413***	-0.0443***	-0.0535***	-0.0428***
	(-4.17)	(-3.60)	(-4.44)	(-4.81)	(-3.79)
No. children	0.0087***		0.0114***		
	(3.75)		(4.34)		
No. female adults in HH	-0.0207***		-0.0209***		
	(-4.15)		(-3.70)		
Pseudo R^2	0.034	0.024	0.037	0.028	0.024
N	17319	21636	14176	17589	21636

Average marginal effects reported, standard errors are clustered at municipality level; t-statistics in parentheses; in the last column the armed confrontations variable has been divided by the square root of the distric size; asterisks denote the following significance levels: * p<0.10, ** p<0.05, *** p<0.01

Table 5

Probit regression; Alternative dependent variables				
	Threats		Threats and physical vio.	
	Living together	All women	Living together	All women
No. armed confrontations 03/04	0.0015**	0.0021**	0.0016**	0.0023*
	(2.38)	(2.13)	(2.08)	(1.83)
Age respondent	-0.0020***	-0.0029***	-0.0032***	-0.0050***
	(-3.58)	(-6.26)	(-5.49)	(-9.95)
Resp. primary edu.	-0.0250*	-0.0374***	-0.0207	-0.0308*
	(-1.79)	(-2.61)	(-1.20)	(-1.83)
Resp. secondary edu.	-0.0462***	-0.0534***	-0.0459***	-0.0481***
	(-3.05)	(-3.45)	(-2.61)	(-2.82)
Resp. higher edu.	-0.0658***	-0.0706***	-0.0769***	-0.0736***
	(-3.20)	(-3.67)	(-3.30)	(-3.31)
Resp. currently working	0.0271***	0.0541***	0.0333***	0.0575***
	(4.93)	(8.53)	(5.06)	(7.86)
Sign. share of HH earnings	-0.0138*	-0.0002	-0.0122	0.0024
	(-1.94)	(-0.03)	(-1.46)	(0.27)
Min. 6 months pregnant	-0.0392**	-0.0448**	-0.0583***	-0.0646***
	(-2.14)	(-2.52)	(-2.70)	(-3.10)
Exp. of violence in past	0.0510***	0.0519***	0.0677***	0.0711***
	(6.04)	(6.55)	(6.87)	(7.35)
Partner's age	-0.0008*		-0.0019***	
	(-1.92)		(-4.07)	
Part. primary edu.	-0.0129	-0.0236**	-0.0072	-0.0173
	(-0.98)	(-2.21)	(-0.46)	(-1.41)
Part. secondary edu.	-0.0279*	-0.0366***	-0.0180	-0.0243*
	(-1.92)	(-3.11)	(-1.14)	(-1.79)
Part. higher edu.	-0.0727***	-0.0813***	-0.0783***	-0.0855***
	(-3.91)	(-4.90)	(-3.71)	(-4.30)
Income category 2	0.0022	-0.0062	0.0021	-0.0057
	(0.21)	(-0.51)	(0.18)	(-0.46)
Income category 3	-0.0204*	-0.0303*	-0.0175	-0.0286*
	(-1.69)	(-1.93)	(-1.26)	(-1.84)
Income category 4	-0.0486***	-0.0569***	-0.0671***	-0.0705***
	(-3.49)	(-3.24)	(-3.97)	(-3.81)
Income category 5	-0.0739***	-0.1016***	-0.0777***	-0.1033***
	(-4.65)	(-5.06)	(-4.14)	(-5.13)
Rural area	-0.0590***	-0.0603***	-0.0677***	-0.0660***
	(-5.73)	(-4.76)	(-5.72)	(-4.89)
No. children	0.0147***		0.0143***	
	(6.70)		(5.80)	
No. female adults in HH	-0.0144***		-0.0234***	
	(-3.03)		(-3.89)	
Pseudo R^2	0.030	0.021	0.033	0.024
N	17319	21636	17319	21636

Average marginal effects reported, standard errors are clustered at municipality level; t-statistics in parentheses; asterisks denote the following significance levels: * p<0.10, ** p<0.05, *** p<0.01

Table 6

Negative Binomial regression; Dep. var. No. armed confrontations 2003/04			
	First stage of two-stage model	Alternative instruments	
Elevation range	0.0004***	0.0005***	0.0005***
	(4.47)	(11.22)	(10.83)
Oil region	0.7438***	0.8220***	0.8063***
	(3.54)	(7.30)	(6.97)
Area km2		0.0001***	0.0001***
		(3.55)	(3.31)
Perc. area with coca cultivation		2.0294***	2.0379***
		(5.00)	(4.97)
Perc. area forest covered		1.5742***	1.6556***
		(7.53)	(7.75)
National highway		0.2080*	0.1877
		(1.82)	(1.62)
Oil refinery		0.3460	0.2616
		(1.16)	(0.88)
Telephone coverage 2005		0.0147***	0.0142***
		(4.64)	(3.63)
Population density 2005			0.0000
			(0.37)
Oil pipeline			0.0815
			(0.66)
Mean distance to larger town			-0.0017*
			(-1.78)
Mean distance to next army base			0.0037*
			(1.65)
_cons	-0.0818	-1.8333***	-1.9289***
	(-0.41)	(-10.85)	(-9.15)
Pseudo R^2	0.0356	0.0711	0.0724
N	230	1116	1116

t-statistics in parentheses; asterisks denote the following significance levels: * p<0.10, ** p<0.05, *** p<0.01

Table 7

IV two-stage regression models			
	Base model	Two-stage process: NB - Probit	Two-Stage Least Squares
No. armed confrontations 03/04	0.0022**	0.0070***	0.0105***
	(2.15)	(7.84)	(7.94)
Age respondent	-0.0046***	-0.0046***	-0.0044***
	(-9.79)	(-13.91)	(-12.94)
Resp. primary edu.	-0.0151	-0.0142	-0.0130
	(-1.08)	(-1.01)	(-0.89)
Resp. secondary edu.	-0.0266*	-0.0260*	-0.0231
	(-1.77)	(-1.77)	(-1.51)
Resp. higher edu.	-0.0509***	-0.0509***	-0.0453***
	(-2.87)	(-2.97)	(-2.58)
Resp. currently working	0.0491***	0.0490***	0.0489***
	(7.92)	(8.58)	(8.40)
Min. 6 months pregnant	-0.0690***	-0.0699***	-0.0631***
	(-3.03)	(-3.56)	(-3.31)
Exp. of violence in past	0.0459***	0.0432***	0.0478***
	(4.38)	(5.44)	(5.67)
Part. primary edu.	-0.0075	-0.0080	-0.0056
	(-0.66)	(-0.73)	(-0.49)
Part. secondary edu.	-0.0169	-0.0174	-0.0128
	(-1.34)	(-1.50)	(-1.06)
Part. higher edu.	-0.0747***	-0.0767***	-0.0643***
	(-4.33)	(-5.25)	(-4.37)
Income category 2	-0.0008	-0.0021	-0.0066
	(-0.08)	(-0.23)	(-0.71)
Income category 3	-0.0135	-0.0165	-0.0268**
	(-1.12)	(-1.63)	(-2.50)
Income category 4	-0.0363**	-0.0391***	-0.0522***
	(-2.53)	(-3.53)	(-4.48)
Income category 5	-0.0689***	-0.0706***	-0.0826***
	(-3.94)	(-5.51)	(-6.28)
Rural area	-0.0413***	-0.0435***	-0.0354***
	(-3.60)	(-5.39)	(-4.23)
Pseudo R^2 / R^2	0.024	0.035	0.035
N	21636	17319	21346
Test statistics for first stage 2SLS: F=1432.73			
Test for overidentification 2SLS: Sargan (score) chi2(1) = .457807 (p = 0.4987)			

Average marginal effects reported except for 2SLS model; t-statistics in parentheses; asterisks denote the following significance levels: * p<0.10, ** p<0.05, *** p<0.01

Technical Notes

All the data used in this research was obtained before the first draft of this paper in May 2010. Since the first draft did not contain geographical instruments the data for those was downloaded and generated within a few months later. In these notes we do however provide links to where the data can be obtained now (March 2013).

All Colombian districts have a unique 5 digit identification number which consist of a two digit identifier for the federal state and then a 3 digit identifier for the municipality. These identifiers are assigned by the Colombian national statistics department (Departamento Administrativo Nacional de Estadística - DANE) in the codification of the political administrative division (Codificación de la división político administrativa – DIVIPOLA).

The data on armed confrontations was extracted from documents published by the 'Observatorio del Programa Presidencial de DDHH y DIH' called the 'Statistical Diagnostics' (Diagnóstico Estadístico) which are published separately for every federal state (available at: http://www.derechoshumanos.gov.co/Observatorio/Paginas/DiagnosticosDepartamento.aspx). Originally the data was gathered from the daily updates of the Administrative Security Department (DAS). The document versions used in this paper, were downloaded in 2010 and contain among other things the number of armed confrontations for each municipality between 2003 and 2008.

The information on armed confrontations was merged with the DHS data, based on the identification number of the municipality.

For all GIS related tasks, ArcGIS version 9 was used. The basis of all GIS based data collection and data generation, is a map of Colombia downloaded as a polygon shapefile in the ESRI shapefile format from SIG-OT. SIG-OT stands for Geographic information system for national, territorial planning and ordering (Sistema de Información Geográfica para la Planeación y el Ordenamiento Territorial Nacional). It is a joint project of different official Colombian institutions like the DANE and the Geographic institute Agustin Codazzi (IGAC). It provides access to geo-referenced information of different kinds through a web-interface. From this interface the data can be downloaded in different formats. (http://sigotn.igac.gov.co/sigotn/frames_pagina.aspx)

Many indicators were constructed by determining whether the features of interest were located in or overlap with the municipalities. The information on highways was obtained by downloading a line shapefile of the highway network from SIG-OT, calculating a 5 km buffer-zone around it and coding the municipalities that overlap with this buffer-zone. In much the same way the information on pipelines is available as a line shapefile and the location of refineries as points. A polygon shapefile indicating oil regions is directly downloadable to determine the overlaps.

Most of the other information on municipalities, like population density, telephone coverage and the unsatisfied basic needs index can be downloaded as shapefiles as well. For this data however a spatial identification was not necessary because the information contained in the database file inside the shapefile (dbase format) could be directly merged to the other data, based on the municipality identifier.

The elevation and forest coverage statistics for each municipality were calculated using the Zonal Statistics from the Spatial Analyst tools contained in ArcGIS. The elevation data is a raster-dataset obtained from the CGIAR CSIConsortium for Spatial Information (data downloadable here: http://srtm.csi.cgiar.org/Index.asp) with a 90m resolution. The statistics like the maximum, minimum and average value of the raster points, were calculated within the boundaries of the municipalities as they appear in the dataset from SIG-OT. The forest data comes from the Global Forest Resources Assessment 2000 (FRA 2000) conducted by the Food and Agriculture Organization of the United Nations and is also a raster dataset. For later assessments the original GIS data is not downloadable, therefore the year 2000 was used (downloadable here: http://www.fao.org/forestry/32203/en/). The calculation followed the same pattern as for the elevation data.

The location of military bases was determined on the town level. On their webpage the Colombian National Army presents each brigade with information in which town each of their battalions is based (http://www.ejercito.mil.co/?idcategoria=239185). The GPS coordinates of the towns where military bases were located, was then determined using the dataset of official (US-American) foreign names for Colombia published by the GEOnet Names Server and developed by the National Geospatial-Intelligence Agency. The data is a text-file containing the name, type and some more information about each listed location as well as the GPS coordinates (http://earth-info.nga.mil/gns/html/cntyfile/co.zip). The

coordinates were then checked for consistency and plausibility. The distance to the next base is then calculated as the average distance from every point in the municipality to the closest base. For this, a raster dataset was calculated, where the value of each raster point is the distance to the nearest military base. The average of those raster point values, within one municipality, was then determined with the same procedure as for the elevation data.

The same principle was used in the indicator distance to metropolitan area, except that there are only five metropolitan areas: Barranquilla, Bogota, Bucaramanga, Cali, Cartagena, and Medellin.