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# Migration, Violence and Welfare Programmes in Rural Colombia

IFS Working Paper W09/19

Alice Mesnard

## **Migration, violence and welfare programmes in rural Colombia.**

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### **Abstract**

This paper studies migration decisions of very poor households in an environment of high level of violence. By matching detailed retrospective data on violence levels in Colombian rural municipalities with a household survey collected for the evaluation of the “*Familias en Acción*” welfare programme, the empirical analysis takes into account possible selection problems of the sample and the key issue of endogeneity of violence. The main results show that high levels of violence encourage households to leave their municipality of residence but that welfare programmes may mitigate these flows, provided that the incidence of violence is not unduly high. This is consistent with the fact that the households under study are liquidity constrained: when violence is high, cash transfers may enable them to leave their municipality of residence, whereas, in more normal circumstances, receiving cash transfers increases the benefits to stay where they are registered. Further evidence using household shocks and wealth confirm that liquidity constraints play a large role in explaining such heterogeneous impacts of the programme along violence levels. Other important determinants of migration are the type of property rights and the health insurance rural households can benefit from.

**Key words: migration, welfare programme, violence, displacement, Colombia**

**JEL classification: D1, J6, Z0, O1, H8**

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## 1 Introduction

Colombia's civil conflict over the last 40 years has displaced many families and individuals from their villages of origin. Estimates vary, but it is clear that the problem has become, especially in recent decades, a very important one. At least 1.8 million individuals were involuntary displaced during the last 15 years, which corresponds to 4.3 percent of the country's population and 14 percent of the rural population (Arboleda and Correa, 2003). Casual visits to the main cities in Colombia provide abundant evidence of the problem: displaced individuals are visible in poor neighbourhoods and more generally on the streets. The consequences of such displacement can be dramatic. In addition to the direct act of violence that causes the displacement, individuals often lose their livelihood, productive assets and valuable skills, the human capital they possess is often inadequate in the new environments, children are removed from school, young people leave rural villages and so on and so forth. Evidence has accumulated showing that migrants to the main cities in the 1990's fared worse than the urban poor, in contrast with the traditional migrant profile (see Vélez, 2002, Table 7) and that displaced population are as poor as the poorest population of Colombia even if they are from more heterogeneous backgrounds with higher education levels of household heads (Attanasio, Castro, Mesnard, 2005). They are particularly vulnerable to malnutrition and health problems such that their average rate of mortality is 6 times higher than the national average (World Food Program, 2003).

Recently policy makers have shown an increasing interest in building policy interventions to mitigate these flows. Discussions have mainly focused on whether and how to encourage displaced households to return to their origin villages. For example the Colombian government has already considered granting compensation conditional on the return of displaced households. One possible alternative is to discourage displacement in the first place by making everyone better off at home. In this prospect, welfare programmes may contribute to stabilise the socio-economic environment in rural villages by encouraging households to remain in their municipalities of origin. This may also undermine one systematic strategy used by rebels groups, whose aim is to take control over destabilised areas by terrorising civilians.

In this paper, we leave aside the question as to whether or not migration of very poor households should be encouraged in such a context and adopt, instead, a positive approach. To understand better the decision made by very poor households of leaving small towns affected by violence, we measure the relative contribution of different factors in this decision, including household and community variables, policy measures and violence incidence. Aside from the large set of variables we are able to use given the richness of our survey and the size of our sample, the main originality of this work is to allow violence levels to interact with policy interventions, as well as with other migration determinants.

Importantly, we do not want to focus exclusively on episodes that lead to displacement, but rather put these episodes within the context of a set of different incentives, which include economic incentives. For this reason, throughout the paper, the concept of mobility we use is different from that used in the literature on violence and displacement, which focuses on the displaced individuals that arrive in big cities after large shocks and violent experiences (Engel and Ibanez, 2007). While this is surely important, it is also important to start from the small communities and check what happens to individuals that, while affected by violence and other problems, do not necessarily move to the big cities but to other places or stay in their municipalities of residence. These decisions are not necessarily entirely forced but may still be directly affected by the high levels of violence prevailing in Colombian municipalities.

The first aim of the paper is to assess whether traditional motives for economic migration apply to households living in the particularly unstable and violent environment characterising rural Colombia. This is because migration for economic reasons may have different determinants from forced migration, as developed in the next section. To do so we study how migration determinants change when the incidence of violence varies, using its variation across municipalities we observe in our survey. Moreover, our data allow us to capture several dimensions of violence, as well as other shocks affecting household income that may interact with migration determinants.

The second aim of the paper is to assess the impact on migration of policy interventions such as the *Familias en Acción* (hereafter FA) program we consider in this paper. Run by the Colombian

government with a loan from the IADB and the World Bank, the programme is modelled after the Mexican PROGRESA and consists of conditional cash transfers that aim at improving the nutrition and education of the poorest Colombians. Although FA was not designed specifically to affect migration behaviour, there are many ways in which household mobility might respond to it. On one hand, receiving the benefits of the programme makes living in a municipality where the programme operates (hereafter “treated municipality”) more attractive than living in a municipality where it does not (“control municipality”). On the other hand, receiving cash transfers may also help relaxing financial constraints of very poor households, and, hence, allow them to finance their migration if migration returns are high relative to its costs. Since these two effects play in opposite direction, the effect of receiving the programme on a household mobility is *a priori* ambiguous.

To test the model’s predictions and address the first question, the empirical analysis allows the FA programme to affect differently migration decisions in municipalities characterised by different levels of violence. The heterogeneous impacts we find suggest that different mechanisms are into playing depending on the level of violence. In a nutshell, our results show that cash transfers are discouraging very poor households to migrate out of their municipality of residence. But this is only the case if violence is not unduly high. Where violence is very high, we find some evidence that cash transfers loosen liquidity constraints and allow very poor households to leave their municipality of residence. These results suggest that compensatory cash transfers to households affected by violence could be envisaged as a way of curbing migration from unstable areas provided violence levels in such areas are not too high.

The rest of the paper is organized as follows. Section 2 presents the literature, which motivates the empirical model of household migration under violence we estimate. Section 3 presents the data, Section 4, the empirical strategy, Section 5, the main results on the impacts of violence on migration and its interaction with the programme effects, while Section 6 discusses other determinants explaining migration decisions of the very poor households in our sample. Section 7 concludes by establishing policy recommendations based on our main findings.

## **2 Migration of very poor households under violence**

There is a large economic literature on the determinants of migration, which has recently expanded to study displacement. However, to our knowledge, very few economists have studied the impact of policy interventions such as welfare programmes on migration decisions and there is no study of how these impacts may differ in environments characterised by high levels of violence. After reviewing briefly the related strands of literature, this section motivates why migration responses to the programme may depend on the level of violence.

## **2.1 literature on migration and displacement**

The framework established by Harris and Todaro (1970) to explain economic migration postulates that individuals compare their present wage with that available in a potential destination area, adjusted for the probability of finding a job. Models have since been expanded to take into account more complex determinants of migration decisions, such as individuals' heterogeneity in education and age, which affect migration's returns over the life-cycle in line with Sjaastad, 1962 or problems linked to incomplete information, which may be an important factor in explaining repeated or sequential migration (Pessino, 1991), as individuals accumulate human capital together with information (Da Vanzo, 1983).<sup>2</sup> More recently, economists and sociologists have outlined the role played by the family and other social networks. In line with Stark (1992), the "New economic of migration" considers migration as a household strategy to diversify risk by sending some members to distant areas while keeping others working close by on farm. There has been a recent upsurge of interest in the role of social networks, which may help migrants to cross the borders (Espinosa and Massey, 1997) or propose them services in destination areas, such as to find more easily jobs and accommodation. This may diminish migration costs (Massey et al., 1987, Munshi, 2003), which, in turn, become endogenous to the migration process (Carrington et al., 1996).

The economic literature on the impact of violence on migration is not very developed, partly due to the scarcity of available data, partly because this field was left under the domain of political scientists until very recently. However, in a seminal paper, Schultz (1971) finds a positive effect

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<sup>2</sup> For a more detailed review see, for example, Greenwood, 1997.

of the incidence of homicides on net internal migration rates from 1951 to 1964 in Colombia. Morrison and May (1994) use an expected utility framework, which postulates that households leave their area of origin when their utility to stay is smaller than their utility to move, taking into account all socio-political and economic benefits and costs attached to different locations. Their estimates show that political violence is a key determinant of internal migration rates in Guatemala. Using aggregate data, however, these authors cannot capture easily the microeconomic underpinnings of household migration decisions in violent context, which is the main objective of our study.

However, there has been a growing attention paid to the consequences of civil conflicts on displacement and asylum seekers (see for example Azam and Hoeffler, 2002, Hatton, 2004, or Czaika and Kis-Katos, 2009). Although we may argue that forced migration and economic migration are of different nature, we cannot exclude that these two decisions have common factors. This may explain why, very often, only part of households from communities targeted by illegal armed groups decides to move. To capture this feature Engel and Ibanez (2007) model displacement decisions and show that predictions of such models are sometimes opposite to those of traditional migration models. For example, households with immobile assets like large plots of land that can be easily seized by rebels may feel more threatened by violence and, hence, are encouraged to move first, contrary to what the standard economic literature would predict. Similarly, risk aversion may induce individuals to displace in a violent context, whereas the same individuals would not have migrated in a stable context, because of the uncertainties involved by migration decisions (Fischer et al, 1997). Or individuals with political responsibilities in their municipalities may be the first targeted by rebel or paramilitary forces in their strategies to destabilise rural areas and take control over them. This also outlines the complex role that social capital is likely to play in the migration decision under violence. Then any advantage to belong to a society (and may discourage migration) like active participation in community activities or high education levels may also turn into a risk factor and encourage displacement.

Similarly to Engel and Ibanez (2007) or Czaika and Kis-Katos (2009), the model we estimate combines factors linked to violence and economic determinants to explain migration decisions. Furthermore, it allows the level of violence to affect not only directly the well-being of



households attached to a given location and, hence, their migration decisions, but also the migration incentives associated to other factors. This argument, firstly outlined by Morrison and May (1994), has not been fully exploited since to study migration decisions in more normal circumstances than displacement.

## **2.2 Impacts of conditional cash transfer programmes on migration under violence**

Among these factors, we will focus on the role played by welfare benefits that are not necessarily available everywhere or require specific conditions to be eligible, such that they are not easily transferable to a destination area.<sup>3</sup> To our knowledge, only one paper by Angelucci (2005) investigates the impacts of a welfare programme, the PROGRESA conditional cash transfer programme in Mexico, on migration decisions. However, its focus on international migration of workers from Mexico, where communities have experienced large international labour migration flows in the past and formed important migration networks in the US, is very different from this paper on internal migration of very poor households living in rural areas in Colombia highly affected by violence.<sup>4</sup>

Welfare programmes, such as FA under study, may affect ambiguously the incentives for poor households to migrate out of their residence municipality. We may, first, expect that they increase the attractiveness of living in municipalities receiving welfare benefits through several channels. Apart from the unconditional monetary supplement of 46,500 pesos (around US\$20) eligible households receive complementary cash transfers, which are conditional on school attendance of children -14,000 pesos (US\$6) and 28,000 pesos (US\$12) per child going to primary and secondary school respectively.<sup>5</sup> These transfers are thus a substantial part of household income, representing more than 20% of the average monthly labour income of

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<sup>3</sup>To be eligible for the FA programme in 2002 a household needs to be registered in a municipality receiving the treatment and to be very poor as indicated by a household poverty index established in 1999 for the last time before the programme started.

<sup>4</sup>Our model's predictions differ from Angelucci (2005) who investigates *individual* migration financed by families. As a consequence, the unconditional part of the transfers is not lost if a household member is sent away to work. Her results differ from ours in a number of points and, in particular, in that the PROGRESA programme in Mexico does not affect significantly *internal* migration of Mexican workers.

<sup>5</sup>These amounts are to be compared with the average monthly labour income in our sample, around 250,000 pesos. These are the amounts in 2002, with an average annual exchange rate of \$US1=2,275 Colombian pesos.

families in our sample. Aside from increasing household income through cash transfers, these welfare programmes may also mitigate aggregate (village) risk by giving poor households a certain source of income and have spillover effects on non beneficiary households (Angelucci and De Giorgi, 2009). As in the first two years of the programme, the programme was not implemented everywhere (340,000 households were registered to participate in 622 municipalities of Colombia), one can easily understand that being exposed to the programme may discourage migration of the very poor households eligible for it.

Second, cash transfers may contribute to relax household liquidity constraints and increase household mobility if migration benefits are higher than migration costs. In these conditions, as the violence incidence varies a lot across the rural areas under study, the programme may affect differently migration incentives of households depending on their environment and threats they receive. This is because, by relaxing cash constraints, the programme may allow some households to migrate when violence levels are high, whereas the same households would not be willing to migrate in a more stable environment. After showing below that the households under study are very likely to be liquidity constrained in their migration decisions, we will test for possible heterogeneous programme impact on migration depending on violence levels, as well as for other interaction effects between political violence and household socio-economic characteristics.

### **3 Data**

#### **3.1 Data collection**

We use a large and high quality data set, whose collection was started in 2002 with the purpose of evaluating the *Familias en Acción* programme. The FA survey collected information on 11,612 households living in 122 (relatively small) representative rural municipalities, 57 of which were receiving the programme based on the requisites that they had less than 100,000 inhabitants, at least a bank and a minimum level of health and education infrastructure and 65 of which were not. Within each municipality, all families in the poorest quintile of the population according to a basic welfare indicator, the “SISBEN”, and with children between 0 and 17 years

old, were potential beneficiaries of the programme. A sample of about 100 households was surveyed from each municipality for the evaluation.

The first data collection (which we refer to as the baseline data) was done just before the start of the new programme.<sup>6</sup> For the second data collection, which was executed in 2003, we invested a considerable amount of resources to track down households that had moved since the baseline survey and, to these households, a newly designed module on mobility was administered, from which information on migration costs and main reasons of migration are described below. Moreover, we constructed extensive locality questionnaires that were administered to three ‘local’ authorities (such as the mayor, the programme official and the priest), which are used extensively to control for local amenities and violence incidence in the empirical model. All variables are summarised in Table 1 in Appendix.

To assess the impact of violence on migration decisions, different sources of information from the FA data have been used. The first type of variables comes from the part of the FA questionnaire on public infrastructure that gives information on the presence of taskforce desertion and taskforce strike due to violence in any health centre of the municipality. Secondly we use three variables that describe the perception by the surveyors of some problems linked to violence when they visited the municipalities. These are three dummy variables equal to one if, respectively, there was a curfew, if there were some paramilitaries/FARC/or ELN forces, or if there were some problems related to violence in the municipalities. The last type of variables measuring the levels of violence comes from the special module of the questionnaire applied to the municipality leaders who mention whether some displaced households have left and joined the municipality during the year before the baseline survey.

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<sup>6</sup> The evaluation and the survey were organized by a consortium made of Econometria, IFS and SEI. In some of the ‘treatment’ towns, the programme was started by the government before the baseline survey. These issues and the data collected for the evaluation are discussed in detail in Attanasio et al. (2006).

Table 1 shows that migrant households live in more violent municipalities where health centres are more often affected by violence, where curfews, problems of public order and illegal armed groups are more frequently reported, and from where more displaced households have left in the recent past, as represented also in Figure 2.

Finally, it should be mentioned that some basic information dated to 1999 exists for all the households in the survey and a set of other households that were in the village in 1999 but had left as of the 2002 data collection.<sup>7</sup> We will use this information as well as retrospective information on violence incidence in municipalities coming from the Police in order to control for potential selection problems in the FA survey.

The first follow up survey to the *Familias en Acción* database was a success: attrition was relatively low at 6%. This was partly due to the mechanisms we put in place to track households and partly to low mobility rate between 2002 and 2003 that we now turn to describe.

### **3.2 Definition of the sample**

The empirical analysis focuses on a sample of 434 households who have moved out of their municipality of residence between the baseline and the first follow-up survey -hereafter called “migrants”- as well as 11178 households who have not, the “non migrants” and the information given by these households at baseline.<sup>8</sup>

To identify the households who have moved out of their municipality of residence, we use detailed reports by the surveyors on the reasons why some households can not be found at follow-up. In total, among the 710 households that cannot be re-interviewed, 434 households are reported as having moved out of the village. For the remaining 276, interviewers were not able to establish the reason for non-contact in the follow up. In total, therefore, only 434 households or 3.7% of the sample have changed municipality for sure between the baseline and the follow-up

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<sup>7</sup>The 2002 sample was obtained by first sampling more than 21600 households from the 1999 SISBEN lists in the relevant municipalities. Of these households, on which we have a set of about 8 variables dated 1999, more than 11600 were still living in the same village and entered the sample.

<sup>8</sup>The reasons why we do not study household mobility within the municipality of residence nor individual migration are explained in the appendix.

surveys. Moreover, among these 434 households, 114 households were eventually tracked by the interviewers and administered a special questionnaire on migration, which we use to describe their self-reported motivations to migrate in the Appendix and their migration costs below.

Concerning this very low migration rate a few remarks are important to note. One possibility considered is to add the remaining 276 households that were not surveyed again at follow up for unknown reasons to the sample of “migrants”, in which case the migration rate in the sample would be around 6%. However, we checked that these 276 households are different from the sample of migrants in a number of dimensions (in particular they have good health insurance (see below for the discussion of this variable) and they live in municipalities with low violence incidence), which probably reflects that they have not migrated out of their municipality of origin, or other more complex selection issues. For these reasons we decided not to add these households to the sample of migrants.

Second, we have to bear in mind that these migration flows are not representative of all migration flows in Colombia but only of the mobility among the poorest households in Colombia targeted by the programme, which are likely to be liquidity constrained. Migration costs reported by migrants to the interviewers are sizeable: median costs are around 50,000 pesos and mean costs around 103,037 pesos, which represent respectively 13% of the median monthly expenditure (including auto-consumption) and 24% of the mean monthly expenditure of households in the sample at baseline (the distribution of migration costs of the 114 successfully tracked households is represented in Figure 1). Moreover, to finance their migration, 2/3 of households used their own funds, 1/3 was helped by friends or relative and none relied on any kind of credit or loan. As the households in the sample are very poor and it is difficult to get loans to finance migration, it is perhaps not too surprising to observe low migration rates. .

Third, we may suspect the FA sample to be not a fully random sample of very poor households as more than 40 % of the households that were present in the municipalities in 1999 for the SISBEN survey were no longer available in July 2002, when the baseline survey of the FA started. As we are effectively observing a sample of ‘stayers’ it might be that mobility for them is

particularly low. Not controlling for this source of possible selection of our sample would, hence, result in biased estimates, a key issue we address in the empirical strategy below.

#### 4 Empirical analysis

To estimate the impacts of the FA welfare programme on household migration and their interactions with violence levels in the municipalities, we estimate a Probit model of migration, as follows :

$$Y_{ij} = 1 \left\{ \alpha_1 + \alpha_2 \text{Treat}_{ij} + \alpha_3 \text{Violence}_{ij} + \alpha_4 \text{Violence}_{ij} * \text{Treat}_{ij} + \alpha_5' X_{ij} + \varepsilon_{ij} > 0 \right\} \quad (1)$$

where :

$Y_{ij}$  = 1 if household  $i$  moves out of the municipality of residence  $j$  between the baseline and the follow up surveys, 0 otherwise;

$\text{Treat}_{ij}$  = 1 if household  $i$  lives in a treated municipality at baseline, 0 otherwise;

$\text{Violence}_{ij}$  violence level in the municipality  $j$  where household  $i$  lives at baseline;

$X_{ij}$  vector of control variables for household and village characteristics at baseline;

$\varepsilon_{ij}$  error term, correlated across households within municipalities.

Note that we do not observe the destinations chosen by most migrant households –apart from those successfully tracked-, such that we cannot control for pull factors in destination areas (so index  $j$  refers to origin municipality where household  $i$  lives at baseline)

In equation (1)  $\alpha_2$ ,  $\alpha_3$  and  $\alpha_4$  yield consistent estimates of the programme and violence impacts and their interaction under the assumption that, conditional on observed characteristics,  $X_{ij}$ , there are no unobserved factors affecting migration that are correlated to these variables. Concerning the programme impacts, we should stress that although the programme was not allocated randomly across municipalities, control municipalities have been chosen so to be as similar as possible to the treated municipalities and political distortions in the implementation of the programme linked to migration are unlikely as migration was not considered among the main

objectives of the programme.<sup>9</sup> Moreover, we control for many observable variables, both at the municipality and household level, which should attenuate such concerns. However, we cannot rule out that violence levels in municipalities may be determined by unobserved factors that also affect household migration decisions, in which case the estimates of the parameters of interest are likely to be biased. Another concern introduced above with the definition of the sample is that the households in our sample may have been selected along unobserved characteristics that also explain their subsequent relatively low mobility rate. If selection is systematically related to  $\varepsilon_{ij}$ , estimating equation (1) on the sample at hand can result in inconsistent estimators of the parameters of interest. We tackle these two issues in the next two sub-sections.

#### 4.1 Selection of the sample

To investigate for possible selection problems we estimate by maximum likelihood a bivariate Probit model with censored selection by estimating equation (1) simultaneously with the following selection equation:

$$S_{ij} = 1\{\gamma'K_{ij} + v_{ij} > 0\} \quad (2)$$

where  $S_{ij} = 1$  when the household in the SISBEN survey (1999) is present also in the FA survey in 2002, and equal to 0 if the household has dropped out in 2002. We allow for possible correlation between the error terms of equations (1) and (2) and estimate:

$$\rho = \text{corr}(\varepsilon_{ij}, v_{ij})$$

The regressors  $K_{ij}$  we use in the selection equation come mainly from the base SISBEN survey that gathers general information on households that were registered in 1999, such as the type of social insurance they have, their size and number of children below 18 years old, the age and education level of the head and whether he is directly affiliated to a social insurance scheme. A summary of these variables is presented below :

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<sup>9</sup> A more complete discussion of the implementation of the programme can be found in the report on the evaluation results (Attanasio et al, 2006).

<i>Variable</i>	<i>Description</i>	<i>Mean</i>	<i>St.dev.</i>
	<i>Data from SISBEN survey (1999):</i>		
Affiliated	affiliated to social security	5.47%	
Urban	lives in urban area	49.04%	
educ2	head has primary education level	61.05%	
educ3	head has secondary education level or more	7.26%	
Female	head is female	25.48%	
Persfami	household size	5.05	2.12
no_under17	number children	2.63	1.55
	<i>Data from the Police:</i>		
displaced	number of displaced people per 100,000 inhabitants	50.66	87.69
Victims	Victims of massacre per 10,000 inhabitants	0.14	0.50
Kidnap	number of kidnapped people per 10,000 inhabitants	1.03	2.44

Notes : number of observations is 19819.

In order for the model to be non parametrically identified, the selection equation should have at least one variable that we can exclude from the main probit equation.<sup>10</sup> For this purpose, we use an additional data set from the Department of National Planning that provides us with information on violence levels in each municipality in the years prior to the SISBEN survey, based on reports given by the Police. We use the three additional regressors for our selection equation that are going to serve as our identifying instruments as we believe they do not appear in the migration Probit equation (1): the numbers of victims of massacre, of displaced people, and of kidnapped people per 10,000 inhabitants in each municipality. Hence, our identifying assumption is that such pre-1999 information does not explain migration decisions between the baseline and follow up surveys (i.e. post 2002) once controlling for violence incidence in the two years preceding the survey and many other control variables measured at baseline survey (post 2002) we have in the FA survey, which are described above and in Table 1 of the Appendix. This seems justified if there is no past dependency between migration decisions and violent events occurring in the municipality more than three years before the survey. Given the high volatility of violence that is observed in the years preceding the survey, we believe that this assumption is justified a priori. The results of the selection equation presented in the table below show that, under our identifying assumptions, the chosen instruments are relevant as high levels of violence have decreased strongly and significantly the probability to remain in the sample of households interviewed in 2002. Other factors increase, perhaps not surprisingly, the probability to remain in the sample, such as living in an urban part of the municipality, in a larger household, with a

<sup>10</sup> Otherwise the model is identified only by a functional form.



larger proportion of children, higher education levels of household head and being affiliated to the social security. Interestingly, female headed households are more likely to attrit, which may capture the high rates of displacement of such households in Colombia.

### Determinants of the selection equation

	<i>Coefficients</i>	<i>Std. Err.</i>	<i>z statistic</i>
Affiliated	0.110	0.040	2.75
Urban	0.032	0.019	1.72
educ2	0.063	0.020	3.15
educ3	0.248	0.038	6.55
Female	-0.061	0.023	-2.69
Persfami	0.149	0.021	7.13
Persfami squared	-0.008	0.002	-5.15
no_under17	0.126	0.024	5.19
no_under17squared	-0.011	0.003	-3.52
displaced	-0.001	0.0001	-13.08
Victims	0.010	0.018	0.57
Kidnap	-0.031	0.004	-8.10
_cons	-0.676	0.054	-12.57

Notes: Coefficients obtained with a Probit model. Number of observations 19819

Estimating equations (1) and (2) jointly by maximum likelihood gives an estimated coefficient of correlation between the error terms  $\hat{\rho} = 0.23$ , which is not significantly different from 0 (with a Wald test of independence rejecting its significance at 31% level). This suggests that we may safely ignore possible selection problems. Therefore, for the rest of our paper, we estimate equation (1) independently, without having to worry about equation (2).

### 4.2 Endogeneity of violence due to omitted factors

The other important issue in estimating equation (1) is that the incidence of violence may be correlated to unobserved factors that also affect directly household migration, which would lead to spurious correlations between violence incidence and our outcome of interest.<sup>11</sup> This problem

<sup>11</sup> The literature on the impact of violence on economic outcomes sometimes ignores the important problems of omitted variables and considers that violence incidence/civil strife measured at community level may be reasonably considered as exogenous to household decisions as it does not suffer from the problem of reverse causality (see for example Deiniger, 2003). We cannot rule out, however, the problems of endogeneity due to omitted variables, which is a general concern that applies to all empirical studies on the relationship between civil conflict and population size (Blattman and Miguel, 2008).

may be particularly worrying for our empirical analysis as our main proxy for violence is the number of displaced households who left the municipality of residence in the year preceding the survey. Even though endogeneity biases are less likely to pose problems with our proxies measuring past levels of violence at municipality level rather than contemporaneous shocks affecting households, we cannot rule out that such proxies may be correlated to unobserved heterogeneity at municipality level explaining current household migration decisions. For example, the number of displaced households who left the village in the past may capture other unobserved factors explaining current migration, such as the intensity of networks living in destination areas.

To tackle these issues, we adopted an instrumental variable approach and used the past evolution of violence in the municipalities, measured by one and two lagged past levels of violence to instrument the level of violence and purge our estimates from any bias due to omitted variables at municipality level. From a large set of retrospective data on political violence from the National Institute for Statistics (DANE) processed by CERAC (Colombia), we chose to proxy lagged past levels of violence in the municipalities of our sample by the number of killings related to the armed conflict in 2000 and 2001 and the number of armed conflict related events in 2000 and 2001. Our exclusion restriction is that these proxies for the past evolution of violence are less likely than the number of displaced households to reflect unobservables that would affect current migration decisions through, for example, a network effect but they affect directly the migration decisions through the increased level of violence they capture.<sup>12</sup> Hence, the model we estimate separately in control and treatment municipalities becomes

$$Y_{ij} = 1\{\beta_1 + \beta_2 \text{Displaced}_{ij} + \beta_3 \mathbf{X}_{ij} + \psi_{ij} > 0\} \quad (3)$$

$$\text{Displaced}_{ij} = \partial_1 \text{Violence}_{ij}^{t-1} + \partial_2 \text{Violence}_{ij}^{t-2} + \delta_3 \mathbf{X}_{ij} + \eta_{ij} \quad (4)$$

$$\tau = \text{corr}(\eta_{ij}, \psi_{ij})$$

where  $\text{Displaced}_{ij}$  is the number of displaced households who left the municipality of residence  $j$  of household  $i$  in the year before the baseline survey ;

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<sup>12</sup> Other instruments for violence levels such as violence in neighbouring municipalities would not be valid based on a priori reasons as migration is also likely to be determined by “pull” omitted factors, which may be correlated to the observed levels of violence in neighbouring municipalities.

and  $Violence_{ij}^{t-1 (t-2)}$  are the DANE statistics on the levels of violence in each municipality  $j$  in 2001 (and, respectively, 2000).

Under the assumption that our instruments are valid, the results of the instrumental regressions presented below show that the chosen instruments are powerful (relevant) in explaining the number of displaced households in the past (they are jointly significant at less than 5 percent levels).<sup>13</sup>

#### Determinants of the instrumental regressions :

	<i>Control areas</i>	<i>Treatment areas</i>
events2001	0.006 (0.028)	0.006 (0.006)
events2000	-0.066** (0.032)	0.013** (0.006)
killings2001	0.002 (0.008)	0.003 (0.003)
killings2000	0.011** (0.005)	0.001 (0.002)
Observations	3937	6370
R-squared	0.647	0.707

Note : The determinants of the number of displaced households are estimated separately in treated and control municipalities by OLS. Standard errors clustered at municipality level in parentheses. \*\* significant at 5 % level. Only the coefficients associated to the identifying instruments are presented. The other control variables are the same as in the main analysis (see Table 2 , specification (1) in the Appendix).

After estimating equations (3) and (4) jointly by maximum likelihood, we find that the coefficient of correlation between the error terms is not significantly different from 0 in treatment municipalities (with a point estimate of 0.03 and a Wald test of independence rejecting its significance at 38 percent level), or, similarly, in control municipalities (with a point estimate of 0.08 and a Wald test of independence rejecting its significance at 26 percent level), such that we do not need worrying about possible endogeneity problems of violence incidence in the rest of the paper.<sup>14</sup>

<sup>13</sup> Standard over-identification tests in ivProbit models reported by STATA come out with a P value of 51 % in control municipalities and of 68% in treatment municipalities, which suggests that the instruments are valid though these tests do not take full account of the clustering in the observations.

<sup>14</sup> We also considered testing for endogeneity problems in the interacted model described by equation (1). However, this would have assumed that the effects associated to all other control variables are the same in control and treatment areas, which is not *a priori* justified, and is tested below.

## 5 Main Results : Impacts of violence and welfare programme on migration

### 5.1 Impacts of violence on migration

To estimate the effects of violence on migration, we first estimated equation (1) without allowing for the interaction between the violence incidence and the programme, hence constraining  $\alpha_4$  to be zero.

<i>Marginal effects</i>	(1)	(2)	(3)	(4)
Treatment area	-0.347 (0.515)	-0.315 (0.486)	-0.577 (0.505)	-0.341 (0.512)
Number of displaced households	0.034 (0.012)***	0.033 (0.012)***	0.032 (0.011)***	0.034 (0.012)***
1 if curfew\ 0 otherwise	0.796 (0.545)	0.828 (0.520)	0.671 (0.537)	0.704 (0.523)
1 if presence of illegal armed groups\ 0 otherwise	0.875 (0.507)*	0.800 (0.483)*	0.631 (0.476)	0.890 (0.507)*
1 if health centre suffered taskforce desertion due to violence\ 0 otherwise	0.998 (0.609)	0.835 (0.572)	0.965 (0.574)*	0.972 (0.600)

Notes: Marginal effects of a Probit model are reported in percentage points. The number of observations is 10330 due to missing answers for some of the regressors. Robust standard errors clustered at municipality level in parentheses. \* significant at 10% \*\* significant at 5% \*\*\* significant at 1%. See Table (2) for the complete list of control variables : specification (1) presents the main results. Specification (2) adds some control variables for occupation of the household head. Specification (3) controls for social capital in the municipalities in addition to the control variables used in specification (1). Specification (4) controls for household income shocks in the year preceding the baseline survey in addition to the control variables used in specification (1).

The main results reported in the table above show that violence level, as measured by the number of displaced households who left the municipality in the past, has a strong positive impact on household migration decisions: increasing violence levels in municipalities such that the number of displaced households increases by one standard deviation increases significantly the probability to leave the municipality by around 0.5 percentage points, which is large as compared to the probability to migrate measured in our sample at around 3.7%. This result is robust

whatever the set of other control variables used in specifications (1) to (4), presented in Table (3) of the Appendix and discussed with the other determinants of household migration in the remaining of the paper. In addition to this effect, the presence of illegal armed groups in the municipality increases household migration by more than 0.8 percentage point, but the effect is weakly significant (at less than 10 % level) in most of all specifications -i.e. (1) (2) and (4)- that do not control for social capital in the municipality. Instead, in specification (3), the effect of violence associated to task force desertion in health centres of municipalities becomes weakly significant and strong in magnitude (around 1 percentage point). All these results show that violence incidence measured at municipality level by several proxies increases strongly and significantly the probability of household migration.

We also tested for possible quadratic effects associated to the number of displaced households. The negative coefficient associated to the square of this variable turned out to be weakly significant at 10 % level or not significant depending on the set of controls which motivated our choice of a linear specification.

This table provides also no evidence that receiving welfare benefits in the treatment areas affects household migration. This remains true when using more variability in the treatment by exploiting an interesting feature of the implementation of the programme: as it did not reach all municipalities at the same time, at follow up surveys, the municipalities have received different number of payments, which we enter linearly and quadratically among the regressors.<sup>15</sup> We also tested for possible interaction effects of the programme with demographic characteristics of the households, as they determine the maximum amount of benefits they are entitled to. As we could not find any significant effects associated to these interactions, we do not present the results.

## **52 heterogeneous impacts of the programme along violence incidence**

The lack of evidence for programme impacts we found so far is perhaps not surprising as the households under study live in environments with varying levels of violence and are credit constrained. In these conditions, receiving cash transfers may help some of them to relax their

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<sup>15</sup> These turned out to be not significant, as shown in Table 3 in Appendix for the linear specification.

financial constraints and encourage them to migrate, in particular when violence level is unduly high, whereas, in more normal circumstances, welfare benefits may discourage them to leave their municipality of residence. This may generate heterogeneous impacts of the programme that we now turn to study. To investigate this question we parametrised the impact of the programme as a function of violence, as shown in equation (1). The results, displayed in Table 4 in Appendix show that receiving programme benefits decreases significantly the probability to migrate and that violence incidence counteracts this effect. Moreover, programme impacts are attenuated in municipalities where violence incidence is high, as shown by the significant and positive effect associated to the interaction of violence with the programme effect. These results are confirmed when we interact the number of payments received (or intensity of the programme) with the proxies for violence, as shown in Table 5.

As the estimates from a Probit model are difficult to interpret, we used them to compute the change in the probability to migrate due to the programme at different levels of violence, in order to assess the magnitude of these effects.<sup>16</sup> Figure 3 shows that the negative impact of the programme on migration decisions becomes less important the higher the degree of violence, as measured by the number of displaced households in the past. The implied change is between -1 percentage points in municipalities with very low levels of violence and + 2 percentage points where violence is high. However, positive effects only affect a minority of municipalities with unduly high level of violence. The figure remains similar whatever the set of control variables we choose. We then performed the same computations but adding to the programme impact and its interactions with violence the direct impact of past displacement on migration. Figure 4 shows that, for the large majority of treated villages, the negative effect of the programme more than offsets the effect of violence. The total effect becomes positive when more than 20 households have left the village in the past, which corresponds to violence levels observed in the 10% most violent municipalities of our sample.

### **5.3 Robustness checks**

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<sup>16</sup> This was computed at the mean characteristics of the sample.

We now use indicators of different types of shocks affecting households in our survey, including violence and death of some household members, and proxies for household wealth to provide further evidence on the role of violence and its interactions with household liquidity constraints in explaining migration decisions.

We, first, ask whether households affected by violence are more likely to leave their municipality of residence. The table below shows that households have been more frequently exposed to negative income shocks due to crop losses (27% of the sample for shocks occurring in the last two years preceding the survey or 16 % of the sample for shocks occurring in the last year) or to illnesses of some of their members (17% in the last two years - 10 % in the last year) than to other shocks due to violence (3.3 % - 1.4 %) or death (5.5% - 2.6 %). However, while interpreting our results, we should keep in mind that shocks due to violence or death of a household member may be under-reported, in particular when households receive death threats, which is one of the reasons why we preferred to use for our main results violence incidence measured at municipality level.

<i>Dummy variable equal to 1 if household income was affected by:</i>	<i>Shocks in 2002</i>		<i>Shocks occurring in 2000/2001/2002</i>	
	Mean	St. dev.	Mean	St.dev.
Death	0.026	0.159	0.055	0.228
Illness	0.104	0.306	0.169	0.375
Crop loss	0.161	0.368	0.266	0.442
Business loss	0.014	0.116	0.025	0.155
Fire, flood or other natural disaster	0.016	0.126	0.036	0.187
Violence, robbery or displacement	0.014	0.119	0.033	0.177

Notes : number of observations : 10303.

As shown in column (4) of Table (2) households affected by a shock due to violence in the year preceding the survey are more likely to migrate out of their municipality of residence. The impact of such shock is around 3.8 percentage points, which is a very large as compared to the 3.7% migration rate observed between baseline and follow-up. Moreover, a shock due to death increases the probability to migrate by 1.7 percentage points, but this impact is weakly significant, at less than 10 %. Other shocks on household income that occur more frequently such as crop losses or illness of a household member do not have significant impacts on household mobility. Note that we also considered the impacts of shocks occurring earlier in the past, but found weaker impacts, which were significant at less than 10% level. This motivates

why we only kept in our final specification the proxies for shocks occurring in the year preceding the survey.

Results in Table 2 also show that shocks due to crop losses, business losses, fire, flood or other natural disaster, which may mainly impact migration decisions through tightening the liquidity constraints, have negative impacts on household migration, although the impacts are not significant. This suggests that the positive impacts of shocks due to violence or death on migration decisions may be even larger (and positive) for households that are not liquidity constraints, which is what we now turn to investigate.

We then address whether liquidity constraints are binding for households affected by violence by interacting the proxies for household wealth with the shocks due to violence. The survey includes several proxies for household wealth as it has detailed data on the value of house and land owned by the households, on the amount of their debts they incurred to buy these assets and on other debts as well as on their savings. However, while interpreting our results, we have to keep in mind that the accumulation of assets or savings at any given date are likely to be endogenous to other life-cycle decisions such as migration, which is the reason why we keep these results separate from the main results. In order to have an indicator of permanent household wealth we use the value of house and land owned by the households, net of household debts. The results presented in Table 6 show that household wealth increases significantly the migration of households affected by a shock due to the death of one of their members in the year preceding the survey (column 2) or of households living in a municipality where illegal armed groups are present (column 3). But household wealth does not have significant impacts on migration, when it is not interacted with such proxies for violence, as shown in column (1). This suggests once again that liquidity constraints are binding for households affected by violence.

One caveat is that the significant positive interaction effect we find between violence and household wealth may also capture the fact that illegal armed groups may have targeted the richest households in the village, in line with Engel and Ibanez (2007). Although we cannot rule out this interpretation, we will see below that there are no other significant interaction effects between violence incidence and proxies for household socio-economic characteristics, which



would lend further support to this explanation. Moreover, the relatively high migration costs of the households in our sample, their lack of access to formal sources of credit, as well as the heterogeneous impacts of the programme along violence levels we found are all consistent with the first interpretation based on liquidity constraints.

## **6 Other determinants**

### **6.1 How do the very poor households in our sample respond to other economic motives for migration?**

The literature has emphasized the importance of economic determinants in migration decisions. This is confirmed by the significant negative impacts we find associated to hourly wages in rural parts of the municipality. Table (2) in the Appendix shows that an increase of such wages by 1,000 pesos (which represents more than 1.5 standard deviations from the mean hourly wages in our sample) decreases the probability to migrate by around 0.4 percentage point.

Geographic factors make also some areas more attractive than others: for example, the positive impact of altitude on migration decisions may indicate that low returns to agriculture in the mountains and economic isolation of such areas lead to out-migration. Moreover, to capture unobserved factors that may affect migration and differ across regions we control for regional effects. Table 2 shows that households living in the Pacific area have a lower probability to migrate out of their municipality of residence as compared to households living in the Atlantic area, the missing category.

Apart from household size, few household demographic variables determine significantly migration decisions of the poor households under study. We find that larger households have a lower probability of migrating out their municipality of residence, which may capture the negative impact of migration costs. We also find that households headed by young people are more likely to migrate, which is easy to interpret in a life-cycle model of economic migration.

The effects associated to education levels of household heads and spouses are not individually or jointly significant. This remains true when we disaggregated the education levels into more categories (results not shown). The absence of significant effects associated to education may be somehow puzzling if migration is motivated by differential in returns to human capital (Borjas, 1987). However, there is not much variation in education levels in the sample of very poor households under study, such that it is not clear that the education levels of household head and spouse capture well enough their job related motives. Therefore we added some indicators of the occupation of household head in specification (2) presented in column (2) of Table 2. We find that being a self-employed worker or an employer diminishes the probability to migrate, as compared to not working, the missing category, which we can easily explain with job related motives. Moreover, working in agriculture has a negative impact on migration decisions, which is what we expect if human or physical capital accumulated in agriculture is difficult to carry to the destination areas of migration, which are most often very large cities. We cannot, however, over-interpret these findings in a causal way since occupations are surely endogenous to household migration decisions. Therefore, column (2) presents the results with these additional controls for occupation separately from the main results in column (1).

Another important determinant of migration emphasized by the literature is the presence and the size of networks in origin and destination areas. Although we do not have a direct measure of such networks in our data, we included proxies for the level of social capital in the village that are likely to affect migration decisions in complex ways. On the one hand social capital may be considered as a positive amenity that increases the well-being to live in some municipalities and may be viewed as a social asset that is not easily transferable to another community. On the other hand, social capital may be correlated to the presence of strong networks, which may facilitate migration by decreasing its costs, as mentioned before. Results presented in column (3) of Table 2 show that social capital, measured by the proportion of women in the municipality participating in collective activities, increases significantly household migration<sup>17</sup>. Moreover, we tried to add household level variables measuring mother's participation in collective activities. As these turned out to be not significant, we did not keep them in our final specification reported

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<sup>17</sup>We use a detailed module of the questionnaire applied to household mothers, which describes participation of women in political, religious, sport, neighbourhood or other types of associations.

in column (3) of Table 2. As we are worried that all proxies for social capital may be strongly correlated to violence levels and migration decisions, we present these results separately from the main results.

Moreover, our results outlines the importance of less known factors in explaining migration of the very poor households of our sample, such as the types of health insurance they have. Having an unsubsidised health insurance -which is most often attached to a good job in formal sector-, decreases strongly the probability to leave the municipality of residence (the impact is around 3.3 percent points, which is very close to the migration rate in the sample). However, only 4 % of the sample have access to such insurance scheme, which provides them with the best risk coverage. The large majority of households in our sample (around 70%) have, instead, a subsidised health insurance. The table below shows that this second best type of insurance also discourages household migration, but the effect is weakly significant (at less than 10 % level) and smaller in magnitude. These results suggest that health insurance may play an important role in migration decisions of the vulnerable households of our sample. However, they could also reflect confounding unobserved factors such as risk aversion, which makes this correlation difficult to interpret without caution.

<b>Marginal effect</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
1 if =unsubsidized health insurance ("best" type), 0 otherwise	-3.335 (1.071)***	-3.432 (1.057)***	-3.468 (1.056)***	-3.396 (1.063)***
1 if =subsidized health insurance (2 <sup>nd</sup> best type) ,0 otherwise	-1.060 (0.599)*	-1.130 (0.585)*	-1.177 (0.575)**	-1.014 (0.597)*
1 if (3 <sup>rd</sup> best type), 0 otherwise	-0.188 (0.674)	-0.194 (0.653)	-0.252 (0.638)	-0.115 (0.670)

See notes of Table 2 describing the number of observations and list of control variables used in specifications (1) to (4).

Other strong determinants of household migration reported in the table below are associated to the type of property rights these households have on their dwelling: paying something for living in a house (either a rent, mortgage or having a house in usufruct) increases household mobility as compared to owning the house, the missing category. This result is, perhaps, not too surprising if

ownership reflects household intentions to stay. Moreover, households who occupy a house without legal agreement have a lower probability to migrate, which may simply reflect their difficulties to find similar informal agreements, if they migrate.

	(1)	(2)	(3)	(4)
1 if house is rented or in mortgage, 0 otherwise	1.924	1.749	1.779	1.883
	(0.544)***	(0.520)***	(0.520)***	(0.526)***
1 if house is occupied without legal agreement, 0 otherwise	-2.530	-2.679	-2.662	-2.513
	(1.484)*	(1.457)*	(1.464)*	(1.459)*
1 if house is in usufruct, 0 otherwise	1.042	0.925	0.938	1.027
	(0.391)***	(0.384)**	(0.387)**	(0.387)***

See notes of Table 2.

## 6.2 Does violence incidence modify other economic incentives to migrate?

We have already outlined that the programme impacts on migration are not the same depending on the levels of violence. More generally, it is also questionable whether political violence affects differently migration incentives of households with different characteristics, as may be the case when households are displaced by violence (Engel and Ibanez, 2007). To address this issue, we interacted the proxies for violence discussed above with household characteristics.

We did not find any significant effects associated to the interactions of violence with socio-economic characteristics like education levels of the head and the spouse, or indicators of working on family businesses, contrary to what we would have expected if such households were more likely to be threatened by violence. Nor did we find any significant interaction effects of violence levels with indicators of household participation in collective activities, which we would have expected if households with strong social connections were strategically targeted by illegal armed groups. Hence households in our sample seem to behave differently than if their mobility were entirely forced. One possible explanation for these findings is that the households in our sample that are eligible for the FA programme are the most deprived households living in

rural areas of Colombia. This is thus maybe not too surprising if illegal armed groups did not particularly target them in their strategy to destabilise these areas.

## **7 Conclusions**

We have shown that household migration decisions respond strongly and positively to the level of violence and other socio-economic factors. These results are very interesting as they stress that both socio-economic factors and violence incidence are playing an important role in explaining household migration in rural areas of Colombia. Although similar results have been found by Engel and Ibanez (2007) and Czaika and Kis-Katos (2009), what is particularly interesting in our context is that the households of our sample are extremely poor, such that migration decisions are likely to be severely liquidity constrained. In this context, we find that receiving welfare benefits such as conditional cash transfers of the FA programme discourages household migration only if violence incidence is not unduly high. For the large majority of households in our sample, our estimates show that receiving welfare benefits more than offsets the positive impact of violence on migration measured by the number of displaced households who left the municipality of residence in the past. However, if violence becomes unduly high, receiving welfare benefits increases household probability to migrate.

The paper shows further evidence on the role played by liquidity constraints in migration decisions, as wealthier households are more likely to migrate after a recent shock due to the death of a household member or from municipalities where illegal armed groups are present. Such interaction impacts between liquidity constraints and violence incidence give a consistent explanation of our results showing that receiving welfare benefits tends to discourage households to migrate, unless violence levels are particularly high.

Our results have interesting policy implications if a government's aim were to control migration flows out of some municipalities destabilised by the civil conflict. Even though welfare programmes such as FA may be used as a way of curbing out-migration flows in some areas, they are not effective at mitigating migration flows in municipalities with very high level of

violence. This warns us to be careful when extrapolating our results to advocate policy interventions in emergency situations that lead to large flows of displaced population.

We also find that migration decisions of the very poor households in our sample are strongly determined by their property rights, by the type of health insurance and jobs they hold. This further suggests that policy measures oriented towards access to housing market and health insurance and rural development, would also contribute to stabilise fragile areas affected by civil wars.

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## Appendix : Complementary details on the definition of the sample

The FA data allow us to identify a sample of 434 households that have moved out of their municipality of residence between the two surveys and 1316 households that have changed location within their municipality of residence. In this study we focus only on household decision to leave the municipality of residence for two main reasons. First, the data do not give us information on the levels of violence across different parts of the municipality and the FA programme is administrated homogenously everywhere within each municipality, such that we cannot test our model predictions for migration decisions “within” the municipality. Second, on *a priori* grounds, these two types of migration decisions have different economic determinants since migration costs and benefits involved are not the same. This is also what is reported by the migrants themselves, as described below:

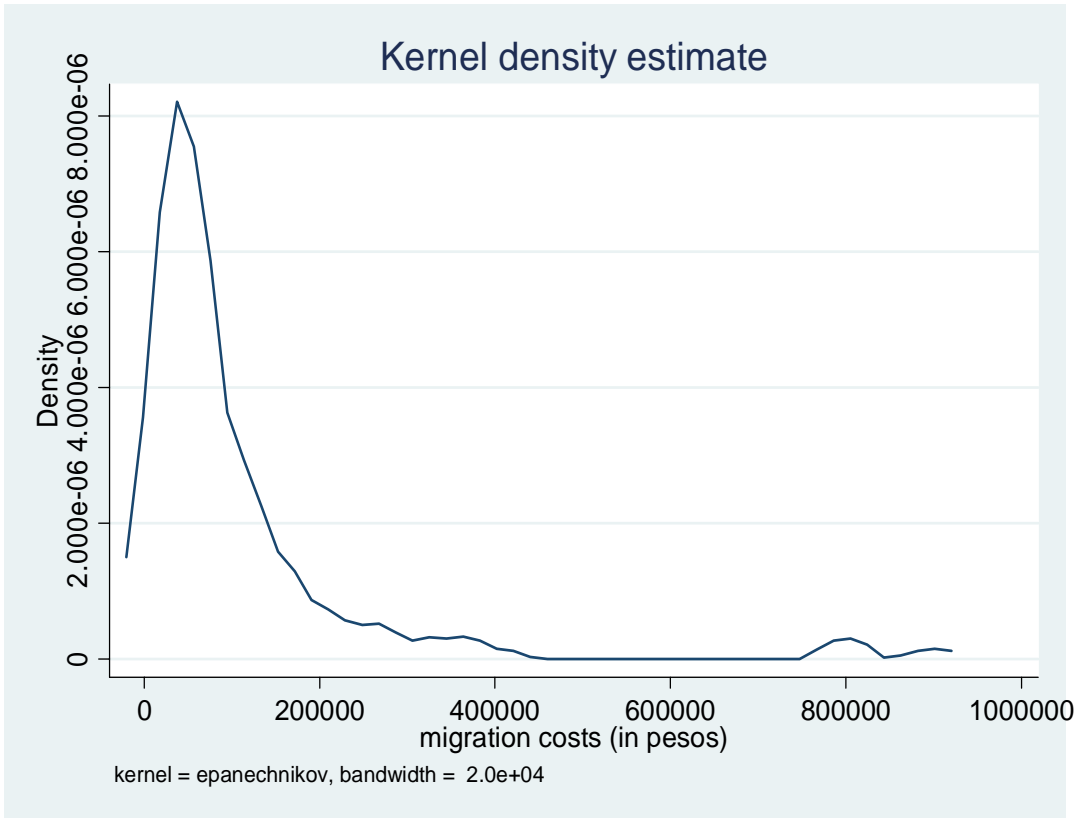
<i>Main reason for having migrated between baseline and follow-up</i>	<i>(1) % of answers</i>	<i>(2) % of answers</i>
Violence	1.9	14.9
For job related reasons	16.9	54.4
To find better accomodation	22.8	2.6
To live closer to relatives	8.3	14.0
To live closer to the centre	1.0	0.0
To live closer to college	3.8	3.6
Others	45.3	10.5

Notes: (1) Households who migrated “within” the municipality. (2) Households who migrated “out” of their municipality. In total 114 households have migrated “out” of their residence municipality and are successfully tracked by the surveyors for the follow-up survey. See text for more details.

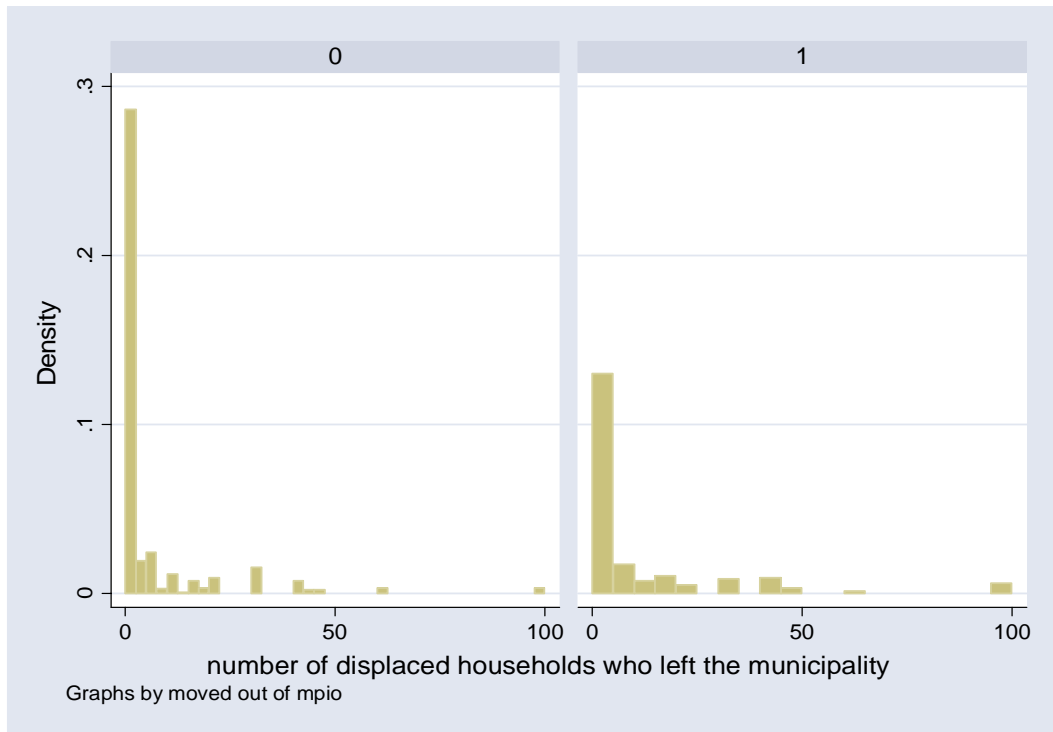
The table shows that motives linked to violence are only mentioned by 2 % of the households who relocated within their municipality of residence, as compared to 15% of the households who migrated out of their municipality of residence. Moreover, it is likely that a large fraction of households who moved out of their municipality of residence to escape from threats of violence did not want to leave their address to their neighbours or relatives, in which case the sizeable proportion of reasons related to violence (14.9%) may be underestimated in the sub-sample of migrants who were successfully tracked at the first follow-up.

Note that there is also a limited source of information on individual migration in the first survey, which reports if household members have left their household but does not report where they

resettled. We can identify 3237 departures of individuals, which represent approximately 11.7 % of the sample followed by the surveyors for the first follow-up. However, we were worried that most of these departures are relocations within the municipality of residence. To check for this problem, a variable was added in the second follow-up survey, which allows us to assess that half of the individuals who have left their household between the second and the third surveys are still living in the same municipalities. Therefore we choose not to use the information on individual migration in our analysis, and focus, instead, on migration decision of the whole household.

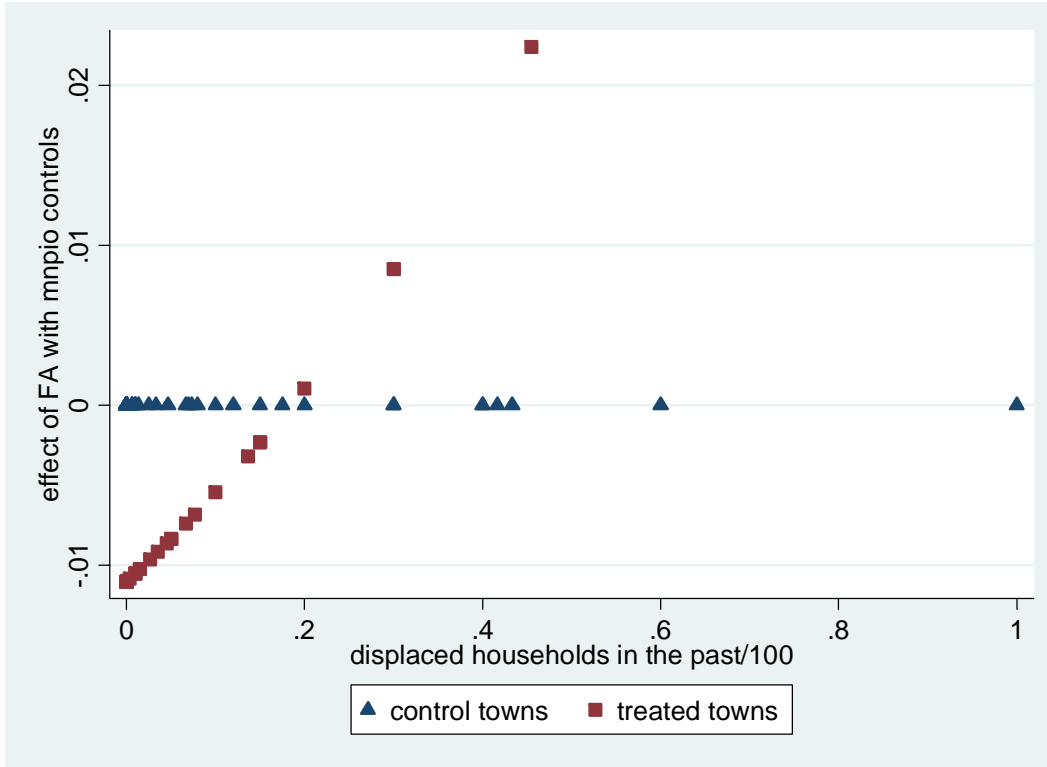


**Figure 1** distribution of migration costs

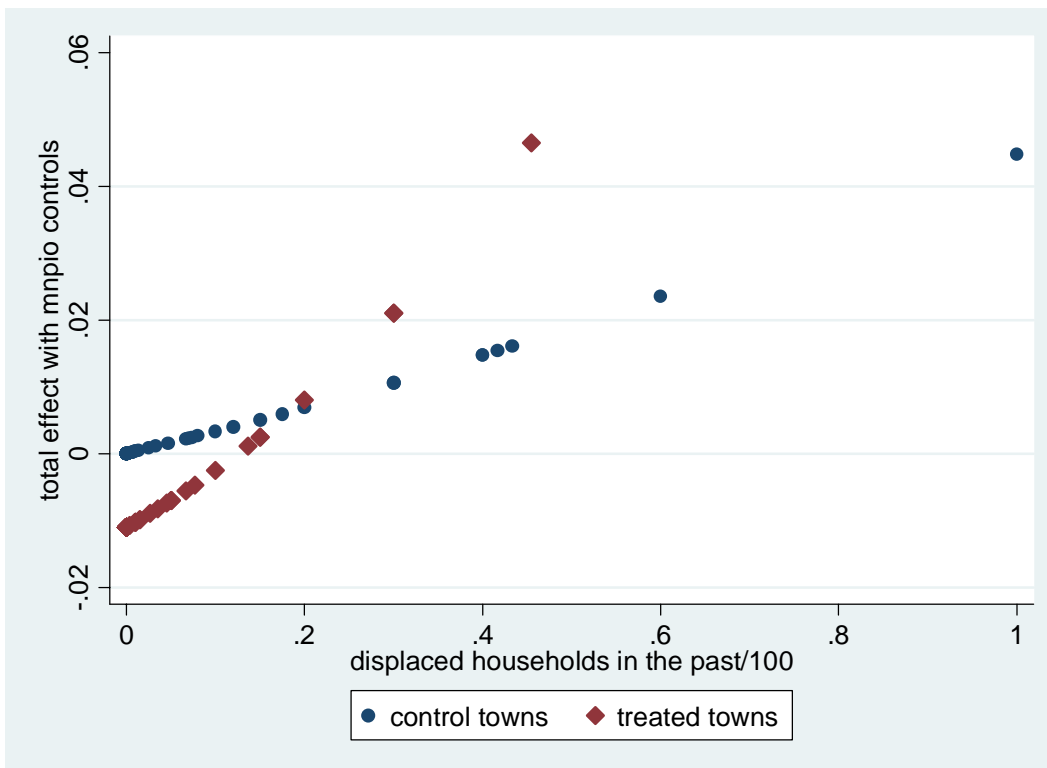


**Figure 2**

**Distribution of number of displaced households who left the municipality of residence of non migrants (on the left) and migrants (on the right)**



**Figure 3 effect of the programme and its interaction with violence incidence**



**Figure 4 adding the direct effect of violence to the programme effect and its interaction with violence**

**Table 1: Dictionary of variables of the FA survey and description of the sample**

<i>Variables</i>	<i>(1) Mean (sd)</i>	<i>(2) Mean (sd)</i>	<i>Variable description</i>
treat	0.58 (0.49)	0.60 (0.49)	1 if treated municipality\ 0 otherwise
expo	3.58 (3.47)	3.56 (3.35)	number of payments received at follow-up in municipality
wagem_r	1236.03 (710.22)	1248.15 (569.8)	Average hourly wage in rural part of municipality
wagem_u	1174.53 (323.94)	1200.6* (287.72)	Average hourly wage in urban part of municipality
urbr_1	0.49 (0.50)	0.49 (0.50)	1 if lives in urban\ 0 otherwise.
urbr_2	0.41 (0.49)	0.40 (0.49)	1 if lives in a rural but disperse part of the municipality\ 0 otherwise
urbr_3	0.10 (0.29)	0.11 (0.31)	1 if lives in a rural but populated part of the municipality\ 0 otherwise
pershog	6.10 (2.44)	5.55* (2.55)	Number of people in the household
age_head	45.95 (13.13)	43.10* (13.27)	Age of the head of household
single	0.20 (0.40)	0.26* (0.44)	1 if the household head is single\ 0 otherwise
ss_h1	0.04 (0.21)	0.02* (0.15)	1 if head of household has unsubsidized health insurance\ 0 otherwise
ss_h2	0.69 (0.46)	0.63* (0.48)	1 if head of household has subsidized health insurance\ 0 otherwise
ss_h3	0.17 (0.38)	0.24* (0.43)	if head of household has a letter from the municipality that is similar to subsidized health insurance\ 0 otherwise
eduh	0.25 (0.43)	0.26 (0.44)	1 if head of household has at least completed the primary school\ 0 otherwise
edus	0.24 (0.43)	0.24 (0.43)	1 if the spouse has at least completed the primary school\ 0 otherwise
edu_h1	0.27 (0.44)	0.24 (0.43)	1 if head of household has not education\ 0 otherwise
edu_h2	0.46 (0.50)	0.47 (0.50)	1 if the head of household has primary not completed\ 0 otherwise
edu_h3	0.14 (0.35)	0.14 (0.34)	1 if head of household has completed primary school\ 0 otherwise
edu_h4	0.09 (0.29)	0.11 (0.31)	1 if head of household secondary not completed\ 0 otherwise
edu_h5	0.04 (0.19)	0.04 (0.19)	1 if head of household secondary completed or more\ 0 otherwise
houseown_1	0.69 (0.46)	0.53* (0.50)	1 if house is owned\ 0 otherwise
houseown_2	0.06 (0.24)	0.18* (0.38)	1 if house is rented or in mortgage\ 0 otherwise
houseown_3	0.05 (0.21)	0.02* (0.13)	1 if house is occupied without legal agreement\ 0 otherwise
houseown_4	0.20 (0.40)	0.26* (0.44)	1 if house is in usufruct \ 0 otherwise
Region : Oriental	0.21 (0.41)	0.23 (0.42)	1 if lives in region:Oriental\ 0 otherwise

Region : Central	0.24 (0.43)	0.33 (0.47)	1 if lives in region:Central\ 0 otherwise
Region : Pacific	0.13 (0.34)	0.09 (0.28)	1 if lives in region:Pacific\ 0 otherwise
altitude	595.86 (735.94)	642.15 (717.26)	altitude to the sea level in metres
cab2002	15382.8 (17921.	13677.12 (15285.00)	population in the urban part in 2002
res2002	14034.3 (11151.	13695.38 (9754.95)	population in the rural part in 2002
#urban schools	8.41 (8.72)	7.89 (7.49)	number of urban public schools in the municipality
#rural schools	35.97 (27.15)	41.94* (30.77)	number of rural public schools in the municipality
#hospitals	0.74 (0.44)	0.80* (0.40)	number of public hospitals in the municipality
#centros	0.89 (1.20)	0.82 (1.06)	number of public centros
#puestos	4.88 (4.61)	5.51* (5.46)	number of public puestos
#pharmacies	8.64 (6.70)	8.79 (7.09)	number of pharmacies
d_desertion	0.09 (0.29)	0.17* (0.38)	1 if in any health center of our sample in the municipality suffered taskforce desertion, due to violence\ 0 otherwise
d_strike	0.25 (0.43)	0.30* (0.46)	1 if in any health center of our sample in the municipality suffered taskforce strike\ 0 otherwise
curfew	0.12 (0.32)	0.15* (0.35)	1 if curfew in municipality\ 0 otherwise
eln_farc_pm	0.61 (0.49)	0.73* (0.44)	1 if ELN, FARC or paramilitary groups in the municipality \ 0 otherwise
probl_op	0.65 (0.48)	0.78* (0.42)	1 if problems of public order in municipality\ 0 otherwise
number displaced households	5.42 (13.51)	10.19* (20.52)	Number of displaced households from the municipality during the year before baseline
group	0.28 (0.17)	0.31 (0.18)	% of women participating in collective activity in the village
work	0.82 (0.38)	0.77* (0.42)	1 if head works\ 0 otherwise
farm	0.46 (0.49)	0.38* (0.48)	1 if head works in agriculture\ 0 otherwise
familywork	0.01 (0.10)	0.01 (0.09)	1 if head works in family enterprise\ 0 otherwise
employer	0.03 (0.16)	0.02 (0.14)	1 if head is an employer\ 0 otherwise
self_employed	0.40 (0.49)	0.29* (0.46)	1 if head is self-employed\ 0 otherwise
employed	0.35 (0.48)	0.39* (0.49)	1 if head is employed\ 0 otherwise
Observations	11177	435	Total number of observations

Column (1) households who have not migrated

Column (2) households who migrated out of their municipality of residence between baseline and follow-up surveys.

Significantly different as compared to the group of non migrants

**Table 2 Determinants of household migration**

	(1)	(2)	(3)	(4)
treat	-0.347 (0.515)	-0.315 (0.486)	-0.577 (0.505)	-0.341 (0.512)
number of displaced households	0.034 (0.012)***	0.033 (0.012)***	0.032 (0.011)***	0.034 (0.012)***
curfew	0.796 (0.545)	0.828 (0.520)	0.671 (0.537)	0.704 (0.523)
Presence of eln/farc/pm	0.875 (0.507)*	0.800 (0.483)*	0.631 (0.476)	0.890 (0.507)*
wage in urban	0.009 (0.009)	0.008 (0.009)	0.009 (0.009)	0.009 (0.009)
wage in rural	-0.004 (0.002)*	-0.004 (0.002)*	-0.004 (0.002)*	-0.004 (0.002)*
edus	-0.819 (0.605)	-0.729 (0.586)	-0.753 (0.583)	-0.897 (0.599)
eduh	-0.014 (0.666)	-0.117 (0.635)	-0.126 (0.631)	0.022 (0.656)
pershog	-0.731 (0.205)***	-0.749 (0.203)***	-0.754 (0.200)***	-0.766 (0.203)***
pershogsq	0.035 (0.011)***	0.036 (0.011)***	0.037 (0.011)***	0.037 (0.011)***
unsubsidized health insurance	-3.335 (1.071)***	-3.432 (1.057)***	-3.468 (1.056)***	-3.396 (1.063)***
subsidized health insurance	-1.060 (0.599)*	-1.130 (0.585)*	-1.177 (0.575)**	-1.014 (0.597)*
informally subsidised insurance	-0.188 (0.674)	-0.194 (0.653)	-0.252 (0.638)	-0.115 (0.670)
age_head	-0.030 (0.012)**	-0.036 (0.013)***	-0.036 (0.013)***	-0.030 (0.012)**
single	0.639 (0.405)	-0.144 (0.434)	-0.120 (0.436)	0.584 (0.395)
rented house	1.924 (0.544)***	1.749 (0.520)***	1.779 (0.520)***	1.883 (0.526)***
occupied house	-2.530 (1.484)*	-2.679 (1.457)*	-2.662 (1.464)*	-2.513 (1.459)*
house in usufruct	1.042 (0.391)***	0.925 (0.384)**	0.938 (0.387)**	1.027 (0.387)***
Region: Oriental	-0.987 (0.750)	-0.779 (0.732)	-1.109 (0.742)	-0.988 (0.744)
Region : Central	0.621 (0.561)	0.724 (0.532)	0.330 (0.608)	0.648 (0.559)
Region : Pacific	-1.923 (0.968)**	-1.932 (0.931)**	-1.963 (0.897)**	-1.940 (0.956)**
altitude	0.001 (0.000)**	0.001 (0.000)**	0.001 (0.000)**	0.001 (0.000)**
urban population	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
rural population	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)*	-0.000 (0.000)

#urban schools	-0.068 (0.052)	-0.057 (0.050)	-0.020 (0.057)	-0.065 (0.052)
#rural schools	0.019 (0.010)*	0.020 (0.010)*	0.022 (0.010)**	0.017 (0.010)*
#hospitals	0.833 (0.738)	0.709 (0.738)	0.583 (0.704)	0.767 (0.737)
#centros	0.106 (0.202)	0.071 (0.193)	0.075 (0.194)	0.091 (0.204)
#puestos	0.078 (0.045)*	0.078 (0.045)*	0.073 (0.044)	0.080 (0.046)*
#pharmacies	0.054 (0.054)	0.050 (0.051)	0.031 (0.056)	0.049 (0.053)
task force desertion	0.998 (0.609)	0.835 (0.572)	0.965 (0.574)*	0.972 (0.600)
task force strike	-0.010 (0.490)	0.010 (0.470)	0.144 (0.459)	0.015 (0.491)
disperse rural	2.267 (50.510)	45.653 (52.351)	46.736 (52.023)	2.356 (50.015)
populated rural	93.516 (61.740)	115.090 (60.303)*	125.248 (60.707)**	100.935 (61.960)
farm		-1.034 (0.451)**		
domestic_employee		0.494 (0.920)		
employee		-0.575 (0.556)		
self_employed		-1.527 (0.501)***		
own_business_farm		-2.440 (1.081)**		
family_work		0.367 (1.579)		
shock due to death				1.664 (0.893)*
shock due to illness				0.158 (0.598)
shock due to crop losses				-0.515 (0.427)
shock due to business losses				-0.429 (1.597)
shock due to fire, flood, natural disaster				-0.998 (1.526)
shock due to violence				3.768 (1.002)***
group			0.025 (0.012)**	

Notes : Marginal effects from a dProbit are reported in percentage points. Number of observations : 10330. Robust standard errors clustered at municipality level in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Specification (1) presents the main results. Specification (2) adds some control variables for occupation of the household head. Specification (3) controls for social capital in the municipalities in addition to the control variables used in specification (1). Specification (4) controls for household income shocks in the year preceding the baseline survey in addition to the control variables used in specification (1).



**Table 3: migration determinants with intensity effects of the programme**

	(1)	(2)	(3)	(4)
Programme Intensity (number of payments)	-0.067 (0.072)	-0.051 (0.068)	-0.071 (0.068)	-0.064 (0.071)
Number of displaced households	0.034 (0.012)***	0.033 (0.012)***	0.033 (0.011)***	0.034 (0.012)***
curfew	0.702 (0.536)	0.746 (0.513)	0.546 (0.536)	0.612 (0.513)
Presence of eln/farc/pm	0.859 (0.500)*	0.785 (0.477)*	0.621 (0.478)	0.874 (0.499)*

Notes : Marginal effects from a dProbit are reported. Number of observations : 10330. Robust standard errors clustered at municipality level in parentheses. All other control variables not reported in the Table are the same as in Table 2. All parameters and standard errors have been multiplied by 100.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 4: heterogeneous impacts of the programme along violence levels**

	(1)	(2)	(3)
Programme effect (treat)	-15.284 (10.051)	-14.273 (10.064)	-17.062 (9.577)*
Interaction effect of programme with violence	0.826 (0.249)***	0.827 (0.262)***	0.869 (0.229)***
violence effect	0.388 (0.148)***	0.375 (0.144)***	0.351 (0.143)**

Notes : The coefficients from a Probit model are multiplied by 100 with robust standard errors clustered at municipality level in parentheses. Number of observations : 10330. Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Violence incidence is measured by the number of displaced households who left the municipality.

We only report the impact of violence associated to the number of displaced households and its interaction with the programme as other proxies for violence (and their interactions) do not have significant impacts at conventional levels.

The specification in column (1) includes the main control variables, Column (2) adds some controls for occupations of household heads, and column (3) adds controls for social capital (see Table 2).

**Table 5: heterogeneous impacts of the programme along violence levels with intensity effects of the programme.**

	(1)	(2)	(3)
Intensity effect of the programme (number of payments)	-2.346 (1.346)*	-2.129 (1.360)	-2.238 (1.276)*
Interaction effect of intensity of programme with violence	0.142 (0.049)***	0.136 (0.051)***	0.145 (0.044)***
violence effect	5.220 (10.656)	4.442 (10.462)	3.433 (10.185)
observations	10303	10303	10303

See Notes of Table 4 . The programme effect is now measured by the number of payments received in the municipality.

**Table 6 Interaction impacts between household wealth and violence**

	(1)	(2)	(3)
number of displaced households in municipality	0.479 (0.170)***	0.482 (0.169)***	0.477 (0.169)***
presence of illegal armed groups in municipality	12.125 (7.100)*	11.904 (7.085)*	6.767 (7.892)
shock in 2002 due to violence	51.355 (13.799)***	56.725 (14.388)***	
shock in 2002 due to death	21.746 (12.550)*	17.387 (13.080)	
Value of property	0.450 (0.296)	0.096 (0.399)	-1.219 (1.091)
Value of property interacted with shock due to death		0.941 (0.399)**	
Value of property interacted with shock due to violence		-1.344 (1.182)	
Value of property interacted with presence of illegal armed groups			1.889 (1.107)*

Notes : The coefficients from a Probit model are multiplied by 100 with robust standard errors clustered at municipality level in parentheses. Number of observations : 10330. Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Violence incidence is measured by the number of displaced households who left the municipality.

We only report the interactions of violence incidence at municipality level with household wealth that are significant at conventional levels. Additional control variables not shown in the table are the same as for the main results presented in specification (1) of Table 2.