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Carlos Bozzoli • Tilman Brück • Nina Wald

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Carlos Bozzoli

German Institute for Economic Research (DIW Berlin), and Households in
Conflict Network (HiCN)

Tilman Brück

German Institute for Economic Research (DIW Berlin), Humboldt University
Berlin, IZA and Households in Conflict Network (HiCN)

Nina Wald[*]

German Institute for Economic Research (DIW Berlin)

Abstract

Many Colombians are confronted with the ongoing conflict that influences their decision making in everyday life, including their behavior in labor markets. This study focuses on the impact of violent conflict on self-employment, enlarging the usual determinants with a set of conflict variables. In order to estimate the effect of conflict on self-employment, we employ fixed effects estimation. Three datasets are combined for estimation: the Familias en Acción dataset delivers information about individuals, a second dataset contains different indicators of the Colombian conflict at the municipality level and the third dataset includes taxes to measure a municipality's economic situation. Our results show that high homicide and displacement rates in the community of origin reduces self-employment, while a high influx of displaced increases the probability of self-employment in the destination municipality.

JEL classification codes: C23, J16, J24, O10
Keywords: self-employment, civil conflict, rural labor markets, Colombia

1. Introduction

Does violent conflict impact the share of (informal) self-employed workers in developing countries? To the best of our knowledge, there is no study that specifically deals with the effects of civil war on self-employment. For this reason our aim is to bridge this research gap by analyzing the effect of conflict on the probability to be self-employed.

We investigate this topic focusing on rural Colombia, an area with all the ingredients for this kind of study: on the one hand it has suffered a violent conflict for more than 40 years and, on the other hand, the share of self-employed increased from 20 to 30% over the last 20 years. Last, but not least, detailed datasets at the micro-level are available for multiple years, allowing us to use of panel data estimation techniques.

Our results show that the effects of conflict on self-employment vary by type of conflict indicator: high rates of displacement lower the probability of being self-employed in the community of origin and increase the share of self-employed in the municipality of destination. This finding implies that conflict – or to put it more accurately the consequences of conflict – has a geographically different impact on self-employment. Furthermore, it means that conflict not only impacts the self-employed living in directly-affected communities but also on self-employment shares in communities that experience the consequences of conflict but not the conflict itself. Additionally, we find some gender-specific differences: current and past homicide rates do have a strong negative impact on men's self-employment, but not for women.

The results of our study contribute to two strands of literature: the self-employment and the conflict literature. The literature in these areas is growing rapidly. Most research in self-employment focuses on the impact of earnings, access to capital as well as individual characteristics like gender, education, labor market experience and attitude to risk, but none of these studies investigate the effect of conflict on self-employment.

The conflict literature concentrates mainly on the impact of conflict on poverty, education, migration, health, household welfare and consumption (Justino and Verwimp 2006; Grun 2008; Ibáñez and Vélez 2008; Shemyakina 2006; Bundervoet et al. 2009; Rodríguez and Sánchez 2009). Research on the effects of civil conflict on labor markets, especially at the micro-level, is virtually not existent with only a few notable exceptions: Deininger (2003) detects that violent conflict leads to a reduction in investment of non-agricultural enterprises in Uganda; Kondylis (2007) finds a higher unemployment rate for displaced men in Bosnia-

Herzegowina; while the results of Calderón and Ibáñez (2009) suggest that a large number of internal refugees leads to an expansion of the informal economy at the community of destination, accompanied by a significant decrease in earnings in this sector.

The remainder of this paper is organized as follows. The next section gives an overview of the self-employment literature and introduces some background on Colombia's economy and its conflict. In the third and forth section we describe the datasets and present some descriptive statistics on the main variables of interest, respectively. The econometric results are presented and discussed in the fifth and sixth section. Section seven concludes.

2. Motivation

A. Related Literature

In the specialized literature, self-employed workers are defined as individuals who are not remunerated by a wage or a salary but who gain their income by working on their own account and bearing their own risk (Parker 2004). According to the definition, the self-employed comprise a highly heterogeneous group of workers: on the one hand there is the successful entrepreneur who runs a profitable business, invents new products and is constantly looking for new market opportunities. On the other hand, self-employment is a survival strategy for those who are not able to find a job. In practice, most data on self-employment rely on labor force and household surveys where individuals are asked to report their employment status.

The core question in that area of research is: what motivates an individual to become self-employed? From an economist's point of view, an individual will make a rational choice decision: He will prefer self-employment over the alternatives of wage-employment, unemployment or being economically inactive if the expected utility from being self-employed is greater than the utility from the alternative:

$E\{U\_self\text{-}employment(X)\} > E\{U\_wage\text{-}employment(X)\}$

$E\{U\_self\text{-}employment(X)\} > E\{U\_unemployment(X)\}$

$E\{U\_self\text{-}employment(X)\} > E\{U\_inactive(X)\}$

In industrialized countries, the utility of self-employment is often compared to the utility of wage-employment, assuming implicitly that a person has the possibility of taking a job as an employee at any time. However, Haile (2008) points out that this cannot be taken for granted in developing countries. Citizens of these countries, especially those with low levels of education, may only have the possibility to choose between self-employment and

unemployment in many cases. As there are no unemployment benefits in the majority of low- and middle-income countries, the expected utility of being unemployed is supposed to be zero and thus at all times people favor self-employment over unemployment. The choice between self-employment and being economically inactive is often relevant for the spouse and children in the household. Leibovich et al. (2006) observe that in Colombia secondary household members retire from labor markets when the head of household earns more.

The rational choice approach can be linked with a reduced-form model where different factors are postulated as determinants of self-employment. These can be grouped into three categories, namely (i) monetary parameters; (ii) individual abilities, tastes and preferences; and (iii) institutions and macroeconomic conditions. Perhaps one of the most prominent arguments from the first category is the so-called earnings differential, which states that people choose to be self-employed if their expected income is higher than it would be with wage employment. Empirical evidence for this hypothesis is provided by Bernhardt (1994) for Canada, Taylor (1996) for the UK, Johansson (2000) for Finland, and Destre and Henrard (2004) for Colombia, who find evidence of negative selection into self-employment. Evidence against this hypothesis is found in Hamilton (2000), who argues that self-employed earn a lower initial income and earnings grow at a lower rate than for paid employment, hence there must be non-pecuniary benefits as well.

Other monetary parameters that are mentioned in the literature of self-employment include initial wealth distribution (Banerjee and Newman 1993; Mesnard and Ravaillon 2001; Demirguc-Kunt et al. 2009) as well as access to credit and capital (Evans and Jovanovic 1989; and Bernhardt 1994).

Individual abilities, tastes, and preferences are comprised of attitudes to risk, education, labor market experience, family background, personal characteristics, preference for autonomy and gender. Empirical evidence on these factors is mixed. On the one hand, a number of studies for developed countries find that being white, male and married, having labor market experience and a self-employed parent increase the probability of becoming self-employed (Hundley 2000; Eren and Sula 2009). On the other hand, researchers conclude that women in Mexico, often without substantial labor market experience, tend to favor self-employment since it can be more easily combined with household chores and looking after children than wage employment (González and Villarreal 2006). A positive attitude to risk and preference for autonomy favors self-employment over wage employment (Hundley 2000; Hamilton 2000; Cramer et al. 2002; Fairlie 2002; and Kan and Tsai 2006). Possibly the most

controversial role is the influence of education on the probability to become self-employed. Some argue that education enhances managerial ability, which increases probability of entrepreneurship while others point out that higher levels of education generate better options in wage employment reducing self-employment with rising levels of education. On the contrary, in models where informal self-employment is considered as state of last resort, it is the least educated who (involuntarily) choose this occupation (see Jacobs (2007) for a theoretical model and van der Sluis et al. (2005) for an overview of empirical studies for developing countries).

The impact of age is not clear-cut as age affects the probability to become self-employed through various channels. With rising age, individuals accumulate physical and human capital that makes it easier to become self-employed successfully in a challenging environment. Yet, it is also observed that older people who become unemployed and do not have a real chance to get another job in the formal labor market choose to engage in self-employment activities to earn their living.

Until now, there is just a scarce literature on the impact of conflict on labor market outcomes in general. Deininger (2003) investigates the link between civil strife and non-agricultural micro-enterprises in Uganda, concluding that violent conflict leads to a reduction in investment and the establishment of non-agricultural enterprises. Additionally, two papers deal with the effect of displacement on labor market outcomes: Kondylis (2007) compares the displaced to stayers in post-war Bosnia-Herzegowina, finding a higher unemployment rate for displaced men. Calderón and Ibáñez (2009) investigate the impact of internal refugees on labor markets at urban area destinations in Colombia. They report that wages in the informal sector decrease due to an influx of additional labor, but wages remain constant in the formal sector because of a binding minimum wage. Moreover, the surge in labor supply due to the influx of displaced population in urban areas increases the likelihood of employment in the informal sector.

We also expect violent conflict not only to have an impact on wages and unemployment but also on the probability to become self-employed and/or to exit self-employment. There are various channels through which conflict, depending on the intensity, type and consequences, may influence self-employment. The direction of the impact not only depends on the conflict, but also on the economic structure of the municipality and whether the community is affected directly or indirectly by the conflict. A municipality is directly affected if it is attacked by illegally armed groups and suffers high homicide rates. As a consequence, some of the

population starts leaving the municipality and relocates to other municipalities. The municipalities receiving internally displaced persons are those that are indirectly affected by the conflict. Thus, the effects of conflict are not equal across the country and there are geographical differences. In the following, some possible effects of conflict on self-employment are discussed:

I. For directly-affected communities

Hypothesis 1: Conflict is likely to reduce self-employment activities in directly affected communities with a predominant (informal) subsistence economy through two channels. As soon as conflict reaches a municipality, the public order deteriorates in most cases. As a consequence of the worsening security situation, some individuals will decide to leave the municipality. Moreover, some families might not be able to move but come to the conclusion that it is better if secondary household members stop working because protection from conflict is better at home than at the working place. In developing countries, self-employment in agriculture or certain types of services might be especially risky in times of conflict. The consequence is a *decrease* in the share of self-employment relative to other forms of employment.

Hypothesis 2: There is no clear effect of conflict on self-employment in communities that are not just characterized by subsistence activities but also have a formal industrial and services sector. On the one hand, we might observe all the effects mentioned in hypothesis 1 leading to a *decrease* of self-employment. On the other hand, firms in the formal sector could close due to an unstable environment, thus leaving workers unemployed. Some of these workers, especially if they are the head of household and/or are not in a position to move to other municipalities, might become self-employed in order to earn a living for their family. This behavior leads to an *increase* in self-employment in conflict-affected communities. Which effect prevails, is an empirical matter and cannot be easily determined in advance.

II. For indirectly-affected communities

Hypothesis 3: Conflict increases the share of self-employment in indirectly-affected communities living on subsistence activities. This is due to an influx of people that has two effects. First, for internally displaced people reaching the community it is necessary to find a job in order to survive, since in developing countries state provided benefits for these people are limited.

Second, for the inhabitants of the community, the influx of people may represent an opportunity to gain some extra income by satisfying the increased demand for certain goods.

This, in turn, leads to an *increase* in self-employment, assuming that jobs mainly emerge in the informal sector. This is likely to be the case because in low and middle income countries the majority of jobs in the small scale services and agricultural sector are created in the informal economy.

Hypothesis 4: Conflict has an ambiguous impact on communities that do not just experience an influx of people but also a relocation of firms from conflict-affected regions. These municipalities undergo the same changes as in hypothesis 3 but the relocated firms will also create new jobs. This causes an increase in formal sector employment. The total effect depends on the share of internally displaced persons and the number of jobs created.

B. Colombia

I. Economics

In 1999, Colombia experienced its most severe recession of the 20th century, with GDP shrinking by 4.5%, and unemployment rates in urban areas nearing 20% (CEPAL 2000). As pointed out by Peña and Mondragón-Vélez (2008) self-employment rises with unemployment, but does not diminish when unemployment decreases. As a result of the economic crisis, the share of non-wage earners in the working population increased to more than 40%, an increase of more than 10% since 1992.

The self-employed tend to be less educated, are older and earn less than paid workers. Most self-employed are concentrated in the agricultural and services sector. Around 80% of Colombia's self-employed individuals are active in the informal sector (i.e. not contributing to the health system). Peña and Mondragón-Vélez (2008) conclude that self-employment in Colombia is not an initial step towards entrepreneurship, but that it is instead a subsistence activity.

During our period of study, 2002-2006, the Colombian economy recovered from its recession and grew at an average annual rate of 5% (National Administrative Department of Statistics). At the same time, extreme poverty in rural areas fell by 13% from 34.7% in 2002 to 21.5% in 2006 (Perfetti 2009).

Growth rates during the same period were highly heterogeneous across departments, ranging from -17% to more than 6%. Meléndez and Harker (2008) describe a link between economic growth and conflict: regions whose coca plantations were eradicated display the lowest growth rates while those where coca cultivation relocated and/or paramilitaries are present are

among those regions with the highest growth rates. With respect to the firm-level, the re-establishment of public order due to a termination of paramilitary violence favors investment.

II. Conflict

The Colombian conflict has its roots in the unequal distribution of land and wealth. It was fuelled by the establishment of two left wing guerrilla groups in the 1960s, the Revolutionary Armed Forces of Colombia (FARC) and the National Liberation Army (ELN) (Guigale et al. 2002). As to protect themselves against these groups, landowners and drug lords started right wing paramilitary groups. In the second half of the 1980s violence related to the narcotics business increased. In the 1990s, the guerrilla became involved in the drug business as well, which further intensified the ongoing conflict (Meléndez and Harker 2008).

As a result of the conflict between 1998 and 2008, 4.2 million people were internally displaced, representing about 10% of the population (Calderón and Ibáñez 2009).

In 2002, the beginning of our period of study, Álvaro Uribe was elected president of Colombia. He put an emphasis on democratic security policy to regain state control over the Colombian territory. This aim was achieved by increasing military spending, expanding police presence to all municipalities, eradicating coca cultivation, fighting the guerrillas and demobilizing the paramilitaries. Results of this policy are mixed: on the one hand the number of kidnappings, homicides and paramilitaries reduced significantly but on the other hand newly emerging armed groups as well as increasing armed contacts are a signal that the war is still ongoing (International Crisis Group 2003; Presidencia de la República and Ministerio de Defensa Nacional 2003).

3. The Data

We use three types of data: (i) a household survey by the *Familias en Acción* program; (ii) a municipality level dataset on violence and conflict; and (iii) a dataset describing the economic situation of municipalities. The first dataset was established in order to analyze the effects of a Conditional Cash Transfer (CCT) program on nutrition, health and education of poor children aged 0-17 implemented by the Colombian government, the World Bank and the Inter-American Development Bank. The baseline survey was conducted in 2002, the first follow-up carried out in 2003 and the second follow-up in 2005 or 2006. We used the first and the sixth module of the survey for our analysis. In these modules, information about the socio-economic structure of the household, housing conditions, household assets, education, access

to infrastructure, usage of healthcare services, household consumption, labor supply, income and transfers were collected.

The second dataset, assembled by the Center of Economic Development Studies (CEDE), at the Universidad de los Andes, includes information about violence and conflict intensity (which is discussed in more detail later) and it also contains municipality characteristics. These characteristics include the department the municipality is located in, the total inhabitants of each municipality, as well as the share of urban and rural population at municipality level. Since the homicide rates are missing for the years 2005 and 2006, we augment this dataset with data on homicide rates obtained from the National Administrative Department of Statistics (DANE) and the National Police.

The third dataset comes from Colombia´s National Planning Department (DNP) and comprises information on the municipality´s industrial and commercial taxes (ICA). Since taxes are reported in nominal Colombian pesos we converted them into real Colombian pesos using the Consumer Price Index (CPI) calculated by DANE. Tax collection indicators capture the municipality´s economic situation, which affects labor demand and may also impact the level of violence.

4. Descriptive Statistics

A. Self-Employment

The household survey data coming from the *Familias en Acción* dataset includes information on 57,764 individuals living in 9,526 poor households in 121 municipalities (baseline figures). Of these individuals, 68% are ten years or older in the baseline survey, meaning that they are part of the working age population, according to the Colombian definition for rural areas (Martínez 1998). Table 1 shows basic summary statistics on households.

[Insert Table 1 here]

The average household consists of six members. The mean age of the sample is 23.8 years. About 18% of the sample population is a head of household, 13% are a spouse and approximately 52% are the sons or daughters of the head of household. Looking at the age group of 10 years or older, about 15% of household members have no education, while 60% have some primary education (incomplete/complete), and 27% have some secondary education (incomplete/complete).

We study labor market outcomes of the working age population in the sample. For this purpose, we create two indicators: one describing the individual's labor market status, and the

second describing their employment status (only for employed individuals). According to DANE definitions, the labor market status comprises of three categories (Martínez 1998): working, being unemployed and being economically inactive. Working is defined as (i) having worked the last week; or (ii) the individual did not work during the last week but has a job; or (iii) the person participated in an activity in exchange for money; or (iv) the household member worked in a family / friend's enterprise without payment at least 15 hours per week. By definition an individual is unemployed if they searched for a job during the last week but do not currently hold a job. The "economically inactive" category includes all others, including, for example, pensioners, students, and stay-at-home spouses. The economically active population contains both working and unemployed individuals.

 [Insert Table 2 here]

Only between 2.4% and 2.8% of the labor force is unemployed. This is substantially lower than the average national unemployment rate during that same period. One possible explanation for this low unemployment rate is given by Attanasio et al. (2004), who point out that in Familias en Acción's case unemployment is defined as being unemployed or looking for a job only in the last week and excludes people who were looking for a job the weeks before. Perfetti (2009) mentions two possible factors for the low unemployment rate in rural areas of Colombia: on the one hand, many people are underemployed instead of unemployed meaning that they do not appear in unemployment statistics and on the other hand there are methodological problems that make measuring unemployment rates in rural areas difficult.

There is a shift from having a job to pursuing other activities across the waves, as shown in table 2. There are two possible explanations for this. First, the economy recovered from a recession during the period of study, which improved household economic situations. Leibovich et al. (2006) points out that household members, other than the head of household, withdraw from the labor market when the head of household earns a higher wage, which is likely the case when there is a period of economic recovery. Spouses return to take care of the children and to concentrate on household chores, while sons and daughters continue schooling instead of working. A second point is that the subsidy received by the program also makes the households better off financially, which raises the probability of a spouse staying at home. Furthermore, an explicit goal of the Familias en Acción conditional cash-transfer program is that older children return to school.

We classify employed individuals into three categories: having a paid job, working on one's own account or being an unpaid family worker. All categories require that an individual is

employed. Workers who report having a paid job are wage earners and domestic employees. In contrast, working on one's own account includes the subcategory of independent workers or as well as those having a small business or participating as a partner in such a type of business. In what follows, the terms self-employment and self-employed are used interchangeably for working on one´s own account. Analogously, the terms employees and employed are used for paid workers.

[Insert Table 3 here]

Table 3 describes the employment categories described above. In the baseline and the first-follow up, 52% are employed, and 43% declare working on their own account. Approximately 5% of employed individuals are unpaid family workers. At the second-follow up, we find that the share of self-employed fell to 37%, which is significantly lower than in the baseline or the first follow, while, at the same time, the share of paid workers rose to 60%. This pattern might be explained by the economic recovery during the period under study, which causes people to switch from own account to paid work. In fact, a recent survey by Perry et al. (2007) shows that only 41% of the independent workers in Colombia prefer that type of employment over paid work.

[Insert Table 4 here]

Table 4 shows the transition between being self-employed, employed or inactive between the baseline survey and the second follow-up. About 44% are self-employed in both waves, while 23% switched from self-employment to being economically inactive and the remaining 33% changed from working on their own account to being a paid worker. Only 11% of those being economically inactive in the first wave decided to pursue self-employment in the third wave and approximately 20% left their job as an employee to become self-employed. Persistence of self-employment is lower compared to being inactive (69%) or employed (56%). This supports the finding that self-employment is not the preferred activity for Colombians.

[Insert Table 5 here]

Table 5 shows that self-employment rises steadily with age: while only 14-20% of individuals aged 10-20 are self-employed, it increases to between 59 and 65% for individuals who are at least 60. Several explanations are possible for this finding. First, it may be the case that younger people lack sufficient physical and human capital to run a shop or a restaurant. Second, it is also important to take into account that a large share of self-employment is in agriculture. Thus, parents may own the farm and be self-employed in the agricultural sector while their children are employed either at their parent´s farm or work for another farm or

firm. When the parents retire, they pass their farm to their children, and the children change from employment to self-employment.

A third explanation is that it may be more difficult for older people to find a job as an employee once they became unemployed. As a result of unemployment, older individuals often have no other choice than to become self-employed. Additionally, many people in Colombia, especially the poor population working in the informal sector, do not contribute to a pension fund meaning that people must earn their living up to old age. In our survey, employment overwhelmingly takes place in the informal sector: none of the self-employed workers contribute to a pension fund; while 8.8% of the salaried employees do.

Concerning the working hours, about one third of the self-employed work 30 hours per week, or less, while around 40% work 30-50 hours per week. The remaining 27% work more than 50 hours per week. Self-employed men work more than self-employed women: while more than 50% of the women work 30 hours per week or less, more than half of the men work 40 hours or more.

The monthly income of self-employed workers is low: more than 70% have an income less than 300,000 pesos in the first wave, which is equal to US$123 using 2002 exchange rates. This figure is slightly below the minimum wage in Colombia, which was fixed at 309,000 pesos (US$127) in 2002. However, as Attanasio et al. (2004) points out, estimated consumption expenditure is greater than income. Likewise, it might be the case that respondents did not indicate their true level of income since they might have feared exclusion from the program. Perfetti (2009) argues that it is difficult to measure income of the rural population accurately.

[Insert Table 6 here]

Table 6 shows further disaggregation of self-employment into different categories: 41% to 49% of the self-employed have a farm or land to cultivate, depending on the wave in which the information was collected. Approximately 30-35% of the self-employed people work on their own account in the services sector. This share includes those with a shop, restaurant, or sewing room. The industrial sector plays only a minor role, with 5% working there. More than 50% of self-employed men are active in agriculture but only about 10-14% of self-employed women are. Women tend to be more active in the services sector, have a small shop or a restaurant or work in the industrial sector.

B. Violence and Conflict

There are a variety of conflict and violence indicators available for Colombia. For our analysis we use four: the homicide rate, displacement rate by receiving municipality, displacement rate by expulsing municipality, and the number of attacks against civilians committed by armed groups. Descriptive statistics for these indicators are presented in table 7. Although the homicide rate is not the most appropriate indicator for conflict, since about 80% of the homicides in Colombia are the result of common violence and drug trafficking, it is still correlated with other conflict variables (Restrepo et al. 2003; and Grun 2008). The other indicators can typically be traced back directly to the conflict.

[Insert Table 7 here]

The homicide rate is measured as number of homicides per 100,000 inhabitants. The average homicide rate in our sample is 44, with the minimum zero and maximum 683. The median is below the mean, with 28 homicides per 100,000 inhabitants and in 99% of the cases, the homicide rate is below 300 homicides, displaying a highly skewed distribution. The homicide rate consistently decreases across waves, which can be at least partly attributed to the implementation of President Uribe's democratic security policy.

Displacement is divided into two categories: by expulsing and by receiving municipality. From CEDE's displacement and population data, we calculate the displacement rate per 100,000 inhabitants. As displayed in table 7, there is a large difference between the mean and the median of displacement rates meaning that some municipalities experienced very high rates of displacement, while the majority of municipalities only experienced modest displacement. Only 5% of municipalities did not lose any inhabitants through displacement, while about 7.5% did not receive any displaced people.

About 33% of the municipalities experienced at least one attack against the civilian population during the period under study. On average, municipalities suffer one attack by an armed group per year. The Revolutionary Armed Forces of Colombia (FARC) commits the most attacks, followed by the United Self-Defence Forces (AUC) and the National Liberation Army (ELN).

C. Conflict and Self-Employment

Table 8 displays the share of self-employed individuals in both high and low level conflict areas using the aforementioned indicators. A municipality is in the "high" category if its homicide or displacement rate is above the median or if the municipality suffered at least one attack per year.

[Insert Table 8 here]

Self-employment rates are lower in municipalities that experience a high number of homicides and/or at least one attack against civilians. This result is in line with our hypotheses for the informal subsistence economy in table 1. However, the relationship between displacement and self-employment is not that clear. Communities that lost many inhabitants due to displacement exhibit a significantly lower share of self-employment than municipalities with low displacement in the first wave, but higher shares of own-account workers in the second and third wave. In the baseline, there is no difference in self-employment shares for communities receiving a high number of displaced persons compared to municipalities receiving a few refugees. In the first follow-up, there are significantly fewer people self-employed in municipalities that experienced a relatively high influx of displaced. In contrast, there are significantly more people working on their own-account in high displacement-affected (receiving) municipalities than in communities less affected by displacement.

[Insert Table 9 here]

Table 9 displays the shares of economically inactive, self-employed, and employed individuals at different levels of displacement for the baseline and the second follow-up in order to observe whether changes in the displacement level lead to changes in the shares of self-employment. Self-employment tends to be higher in the first wave than in the third wave across all levels of displacement. Self-employment drops strongly in those municipalities that received the displaced during the first wave, but did not experience high levels of displacement in the third wave.

5. Estimation Strategy

In this section, we investigate the impact of conflict on self-employment econometrically. We use fixed effects estimation to exploit the panel data structure that allows us to control for time-invariant individual heterogeneity, which may bias cross sectional results. We run regressions of the form

$$y_{it} = \beta_0 + X_{it}\beta + C_{it}\gamma + \alpha_i + \beta_t + u_{it}$$

where y_{it} is an indicator of self-employment, X_{it} is a vector of individual, household and municipality characteristics, C_{it} includes our vector conflict variables, α_i captures a time-invariant unobserved individual effect, β_t captures systematic variation across time (time fixed effect), and u_{it} is the usual error term. Standard errors are robust to heteroskedasticity. The

sample is restricted to individuals aged 10 years and above and to communities that have experienced conflict directly or indirectly.

We use two different indicators for self-employment: in tables 10, 12 and 13 the dependent variable takes the value 1 if the individual is self-employed and 0 for all remaining activities (including those not active in the labor market). In tables 11 and 14-16 we restrict the sample to the working population and code the dummy 1 for an own-account worker and 0 for paid employees or unpaid family workers. We run 7 different specifications: in the first column of tables 10 and 11 all covariates and conflict variables are included, column 2 drops individual and household characteristics, in column 3 municipality characteristics are excluded, columns 4-6 each leaves out one of the conflict variables and in the last specification only conflict variables are included. In order to observe if certain groups of the population are especially sensitive for the impact of conflict on self-employment, we interact displacement rates with age groups, gender, household position and educational level.   Additionally, we run all specifications separately for men and women to account for gender-specific differences. Moreover, we did some robustness-checks by running the regressions for different age groups.

6. Discussion of Results

[Insert Tables 10 and 11 here]

Looking at tables 10 and 11, regardless of the definition of the dependent variable and other variables, the homicide and the displacement rate by expulsing community always impacts self-employment negatively. The magnitude of this effect is constant across specifications and is of the same order for both independent variables. This result reinforces the observation that in regions with high homicide rates there are fewer own-account workers. Some explanations were given in section 2: when security and public order worsen, secondary household members might prefer to stay at home than engaging in risky self-employment activities. At the same time, some households with self-employed members might decide to leave the municipality and migrate to safer areas. This behavior reduces the share of self-employed at the location of origin.

Displacement by receiving community has a positive impact on the probability of self-employment. This means that in those municipalities that receive a large number of internal refugees, the share of self-employed increases. As mentioned in hypothesis 3 in section 2, there are two possible causes for this effect: on the one hand it might be the displaced

exercising self-employment in the municipality of destination. On the other hand, it could be that inhabitants exploit the opportunity of rising demand for some goods switching from being inactive or employed to self-employment activities.

[Insert Tables 12-15 here]

As we observe in tables 12-15, there are gender-specific differences: for men, homicide rates have a negative impact on the probability to be self-employed. For women, however, this effect vanishes almost completely. The homicide rate does not affect the probability of self-employment for the group of economically active women. For the entire female population (aged 10 and above), higher homicide rates in the past reduce the probability of current self-employment. This difference between men and women can be explained by the fact that it is mostly men who are directly affected by homicides. Some self-employment activities might be more exposed to being the victim of a homicide. As a consequence, men try to avoid these activities. This behavior decreases the share of self-employed men.

Women, on the other hand, might be more affected by the indirect effects of a high homicide rate. High homicides rate can, in the long run, undermine public order. When security situations deteriorate, women prefer to stay at home and exit self-employment. However, if women are reliant on working (as in the case of female headed households) it makes no difference for them whether they are self-employed or an employee.

Displacement rates, both by receiving and expulsing municipality, have the aforementioned effects for men and women, with the impact strongest for the group of employed women.

[Insert Table 16 here]

Table 16 shows regression results for interacting displacement rates with age groups, gender, household position, and educational level. By including these interaction variables we could determine if selected sub-groups of the sample are more susceptible to the (in-)direct effects of conflict on self-employment. There is a trend that the self-employment activities of 25 to 40 year-olds and their spouses are more affected by displacement than other age groups and household positions. We check whether these differences are statistically significant by performing an F-test. Results indicate that there is no significant difference for any of the groups. One explanation could be that our sample only comprises the poorest households, which are all equally vulnerable to conflict.

Control variables

We only could include time-variant control variables due to fixed effects estimation. Consequently we are not able to include control variables like education, gender and

household position as in the cross-section studies mentioned in section 2, since they have a very reduced within-individual variability, in fact measurement error (and the problems related to it) may be magnified by the fixed effect strategy. However, our estimation method controls for both observable and unobservable differences between individuals that are time-invariant, which is not possible with cross-sectional data. In our specifications we included age, squared age, household's dependency ratio, household size, population, an indicator that the person lives in the municipality's capital city (*cabecera*) to account for rural-urban differences, industrial and commercial taxes per capita that control for geographic variation in economic activity, and a treatment dummy to indicate whether an individual participated in the Familias en Acción program (which may affect our outcomes of interest). Most of the controls, especially municipality characteristics are insignificant which might be a result of fixed effects absorbing most of the overall variance. When significant, age has a positive effect on self-employment, a finding that is supported in other empirical studies about this subject. Household size has a negative impact on self-employment for men and is insignificant for women. This difference might be explained by the fact that in most households the man, as the head of household, is still the breadwinner of the family and working as an employee generally implies higher income than self-employment.

7. Conclusion

Do violent conflicts impact (informal) self-employed workers in developing countries? Our aim is to make a first attempt at resolving this question by analyzing the effects of conflict on the probability to be a self-employed worker in rural Colombia.

We compile a data set combining information from three preexisting datasets to obtain information on individuals, households, municipalities on the one hand and conflict information on the other hand. For conflict variables we include homicide rates, displacement rates and the number of attacks by illegal armed groups. Our results show that high homicide and displacement rates at the community of origin reduce self-employment while a high influx of displaced increases the probability of self-employment at the municipality of destination. Additionally, we detect some gender-specific differences with respect to the homicide rates.

There are three possible explanations for a decreasing share of self-employment workers in municipalities with high rates of homicides and/or displacement. First, if many people of a municipality get displaced, there is less demand for goods that might have previously been

produced or sold by self-employed individuals. As a consequence, some cease self-employment and start looking for other employment opportunities, resume studying, or just stay at home. Second, some of the self-employed are directly affected by displacement and cannot carry on with their former activity. An example for this case is self-employment in agriculture: at their municipality of origin the family owned land to cultivate but after displacement, family members must look for other occupations. Third, high homicide rates lead to a public order disruption. Men and women are affected in different ways: some self-employment activities bear a higher risk to be a homicide victim than other employment opportunities. This is especially true for men, who represent the majority of homicides. Thus, they switch immediately to other forms of employment in order to prevent their own death, which, in turn, decreases the share of self-employed men in regions with high homicide rates. Women, in turn, suffer from the municipality's worsening security and stay at home whenever possible.

In a nutshell, the answer to the question posed above is: yes, conflict impacts self-employed workers. This influence, however, depends on the geographical location of the community: conflict lowers self-employment rates in directly-affected municipalities and increases the share of self-employed in those only indirectly affected.

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8. Appendix

Table 1: Basic Summary Statistics Familias en Acción at Baseline

	Mean	SD
Age	22,72	18,14
Age by gender:		
Female	22,97	17,88
Male	22,47	18,40
Indicator: Person is…		
…Male	0,506	
…Head of household	0,164	
…Spouse	0,132	
…Son/daughter	0,520	
Household Size	6,85	2,76
Indicator: Person has…		
…No education (>=10 years)	0,142	
… by gender:		
Female	0,139	
Male	0,145	
…Some primary education (>=10 years)	0,596	
… by gender:		
Female	0,584	
Male	0,607	
…Some secondary education (>=10 years)	0,262	
… by gender:		
Female	0,277	
Male	0,247	
Indicator: Person has a job	0,632	
by gender:		
Female	0,398	
Male	0,803	
Hours worked per week	43,08	18,44
by gender:		
Female	38,77	20,98
Male	44,69	17,13
Total Household income (Pesos)	298.857	327.298
No. Rooms	2,77	1,20
Indicator: Household has access to/possesses…		
…Electricity	0,869	
…Gas	0,087	
…Aquaduct	0,616	
…Sanitation	0,243	
…Waste	0,304	
…Refrigerator	0,308	
…Sewing Machine	0,101	

Table 2: Labor Market Status for individuals aged 10 and above

	1. Wave		2. Wave		3. Wave	
	N	Percent	N	Percent	N	Percent
Unemployed	574	2,36	576	2,38	666	2,77
Working	15.340	63,19	13.664	56,45	12.963	53,87
Inactive	8.363	34,45	9.966	41,17	10.433	43,36
Total	**24.277**	**100,00**	**24.206**	**100,00**	**24.062**	**100,00**

Table 3: Employment Status for individuals aged 10 and above

	1. Wave		2. Wave		3. Wave	
	N	Percent	N	Percent	N	Percent
Paid worker	7.941	52,20	7.193	52,65	7.736	59,78
Own account worker	6.504	42,76	5.788	42,37	4.787	36,99
Unpaid family worker	767	5,04	680	4,98	418	3,23
Total	**15.212**	**100,00**	**13.661**	**100,00**	**12.941**	**100,00**

Table 4: Transition between activities between wave 1 and wave 3

1. Wave	3. Wave	Inactive	Self-Employed	Employed	Total
Inactive	N	4.515	697	1.355	6.567
	Percent	68,75	10,61	20,63	100
Self-Employed	N	1.221	2.363	1.781	5.365
	Percent	22,76	44,04	33,20	100
Employed	N	1.563	1.297	3.627	6.487
	Percent	24,09	19,99	55.91	100
Total	N	7.299	4.357	6.763	18.419
	Percent	39,63	23,65	36,72	100

Table 5: Summary Statistics for Own Account Workers

	1. Wave		2. Wave		3. Wave	
	Mean	SD	Mean	SD	Mean	SD
Indicator: Person works on his own account…	**0,429**	**0,495**	**0,423**	**0,494**	**0,368**	**0,482**
…By gender:						
Female	0,379	0,485	0,395	0,489	0,353	0,478
Male	0,447	0,497	0,433	0,495	0,374	0,484
…By household position						
Not head of household	0,323	0,468	0,326	0,469	0,269	0,443
Head of household	0,530	0,499	0,507	0,500	0,456	0,498
…By age						
10-20	0,201	0,401	0,203	0,402	0,144	0,352
20-30	0,327	0,469	0,313	0,464	0,243	0,429
30-40	0,452	0,498	0,439	0,496	0,374	0,484
40-50	0,531	0,499	0,514	0,500	0,459	0,498
50-60	0,586	0,493	0,563	0,496	0,507	0,500
>60	0,659	0,474	0,650	0,477	0,593	0,492

Table 6: Type of Self-Employment

	1. Wave		2. Wave		3. Wave	
	N	Percent	N	Percent	N	Percent
Farm/Cultivation	2.641	44,95	2.820	48.87	1.948	40.98
Shop	339	5,77	368	6,38	276	5,81
Restaurant	142	2,42	165	2,86	85	1,79
Sewing	52	0,88	52	0,90	43	0,90
Industry	293	4,99	311	5,39	263	5,53
Services	780	13,27	1.338	23,18	1.105	23.25
Other	1.629	27,72	717	12,42	1.033	21,73
Total	5.876	100	5.771	100	4.753	100

Table 7: Violence and Conflict Data

1. Wave			2. Wave			3. Wave			Total		
Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD
Homicide rate (per 100.000 inhabitants)											
32	50	66	31	52	61	23	32	31	28	44	55
Displacement (per 100.000 inhabitants, by expulsing municipality)											
409	1615	2410	304	912	1603	398	825	1183	368	1117	1840
Displacement (per 100.000 inhabitants, by receiving municipality)											
400	985	1520	181	464	843	221	422	531	245	624	1081
Number of attacks by armed groups (ELN, AUC, FARC)											
0,00	0,89	1,64	0,00	1,12	2,16	0,00	0,39	0,89	0,00	0,80	1,68

Table 8: Self-Employment and Conflict

	1. Wave		2. Wave		3. Wave	
	Mean	SD	Mean	SD	Mean	SD
Person works on his own account…						
…By homicide rate						
Low	0,488	0,499	0,446	0,497	0,386	0,487
High	0,380	0,485	0,404	0,490	0,349	0,477
T-test low vs. high		13,657		4,996		4,281
…By displacement (expulsing community)						
Low	0,463	0,499	0,399	0,490	0,332	0,471
High	0,401	0,490	0,454	0,498	0,403	0,491
T-test low vs. high		7,723		-6,460		-8,412
…By displacement (receiving community)						
Low	0,427	0,495	0,437	0,496	0,361	0,480
High	0,428	0,495	0,407	0,491	0,378	0,485
T-test low vs. high		-0,165		3,479		-2.044
…By attacks against civilians						
No	0,461	0,498	0,426	0,494	0,377	0,485
Yes	0,372	0,484	0,420	0,494	0,352	0,478
T-test		10,727		0,583		2,643

Table 9: Labor Market Status and Displacement Level

	1. Wave		3. Wave	
	N	Percent	N	Percent
Low level of displacement (receiving and expulsing) in both waves				
Inactive	1,413	40.57	1,610	47.20
Self-Employed	922	26.47	559	16.39
Employed	1,148	32.96	1,242	36.41
Total	3,483	100	3,411	100
High levels of displacement (receiving) in both waves				
Inactive	1,357	36.80	1,717	46.77
Self-Employed	919	24.93	673	18.33
Employed	1,411	38.27	1,281	34.90
Total	3,687	100	3,671	100
High levels of displacement (expulsing) in both waves				
Inactive	775	33.26	1,018	45.14
Self-Employed	717	30.77	577	25.59
Employed	838	35.97	660	29.27
Total	2,330	100	2,255	100
High levels of displacement (receiving and expulsing) in both waves				
Inactive	2,380	36.10	3,078	46.14
Self-Employed	1,672	25.36	1,426	21.38
Employed	2,540	38.53	2,167	32.48
Total	6,592	100	6,671	100
Low levels of displacement in the 1. wave to high levels of displacement (expulsing) in the 3. wave				
Inactive	259	39.30	287	42.33
Self-Employed	159	24.13	165	24.34
Employed	241	36.57	226	33.33
Total	659	100	678	100
High levels of displacement (expulsing) in the 1. wave to low levels of displacement in the 3. wave				
Inactive	235	31.80	324	45.89
Self-Employed	188	25.44	124	17.56
Employed	316	42.76	258	36.54
Total	739	100	706	100
High levels of displacement (receiving) in the 1. wave to low levels of displacement in the 3. wave				
Inactive	757	35.13	1,010	47.82
Self-Employed	878	40.74	408	19.32
Employed	520	24.13	694	32.86
Total	2,155	100	2,112	100
High levels of displacement (expulsing) in the 1. wave to high levels of displacement in the 3. wave				
Inactive	385	37.63	485	47.00
Self-Employed	260	25.42	195	18.90
Employed	378	36.95	352	34.11
Total	1,023	100	1,032	100
High levels of displacement in the 1. wave to high levels of displacement (expulsing) in the 3. wave				
Inactive	625	44.2	577	41.93
Self-Employed	360	25.46	299	21.73
Employed	429	30.34	500	36.34
Total	1,414	100	1,376	100
High levels of displacement in the 1. wave to low levels of displacement in the 3. wave				
Inactive	286	28.46	496	46.49
Self-Employed	209	20.8	136	12.75
Employed	510	50.75	435	40.77
Total	1,005	100	1,067	100

Table 10: Probability of Self-Employment

	1	2	3	4	5	6	7
Age	0,022		0,023	0,021	0,022	0,022	
	(5,80)**		(6,16)**	(5,84)**	(6,16)**	(5,79)**	
Age Squared	0,000		0,000	0,000	0,000	0,000	
	(6,66)**		(6,98)**	(6,82)**	(7,25)**	(6,64)**	
Treatment	0,107		0,098	0,093	0,091	0,107	
	(12,62)**		(11,92)**	(11,36)**	(12,17)**	(12,60)**	
Dependency Ratio	-0,001		0,000	-0,003	0,003	-0,001	
	(0,24)		(0,07)	(0,63)	(0,81)	(0,24)	
Household Size	-0,042		-0,049	-0,040	-0,041	-0,042	
	(2,70)**		(3,27)**	(2,74)**	(2,82)**	(2,69)**	
Population	-0,040	-0,046		-0,028	-0,041	-0,037	
	(2,08)*	(2,56)*		(1,62)	(2,26)*	(1,93)	
Cabecera	-0,001	0,000		-0,003	-0,005	-0,001	
	(0,13)	(0,03)		(0,73)	(1,07)	(0,13)	
Tax/capita	-0,008	-0,001		-0,001	0,005	-0,010	
	(1,71)	(0,30)		(0,20)	(1,35)	(1,94)	
Homicide Rate	-0,017	-0,013	-0,020		-0,013	-0,015	-0,016
	(5,15)**	(3,89)**	(6,24)**		(4,33)**	(4,93)**	(5,05)**
Lagged Homicide Rate	-0,016	-0,014	-0,010		-0,013	-0,016	-0,010
	(4,09)**	(3,59)**	(2,88)**		(3,77)**	(4,16)**	(2,68)**
Displacement (receiving)	0,017	0,013	0,016	0,015		0,017	0,012
	(6,48)**	(4,79)**	(6,14)**	(6,31)**		(6,43)**	(4,64)**
Displacement (expulsing)	-0,017	-0,020	-0,015	-0,017		-0,017	-0,017
	(4,26)**	(4,96)**	(3,66)**	(4,53)**		(4,20)**	(4,36)**
Attacks	0,003	0,002	0,004	0,000	0,002		0,003
	(1,54)	(1,29)	(2,30)*	(0,10)	(1,33)		(1,82)
Constant	0,369	0,804	-0,131	0,210	0,325	0,329	0,326
	(1,67)	(4,22)**	(1,29)	(1,06)	(1,60)	(1,50)	(12,62)**
Observations	53026	53496	54623	57468	59515	53026	55104
Number of Groups	26102	26282	26345	27359	28222	26102	26525
R-squared	0,02	0,01	0,01	0,01	0,01	0,02	0,01

* significant at 5%; ** significant at 1%

Note: The table reports fixed effects estimates for the probability to be self-employed. We use a binary dependent variable, taking the value 1 if a person is self-employed and 0 otherwise. All individuals aged 10 and above were included in the sample. Variables population, tax/capita, homicide rate, lagged homicide rate, and displacement rates are in logs. Cabecera is a dummy variable taking the value 1 if municipality's cabecera to account for urban-rural differences. Treatment is a dummy for participation in Familias en Acción. Time dummies were included. Estimation with robust standard errors, t-values in brackets.

Table 11: Probability of Self-Employment Conditional Being Employed

	1	2	3	4	5	6	7
Age	0,003		0,004	0,003	0,003	0,003	
	(0,42)		(0,59)	(0,55)	(0,49)	(0,39)	
Age Squared	0,000		0,000	0,000	0,000	0,000	
	(0,97)		(0,89)	(1,14)	(1,02)	(0,95)	
Treatment	0,162		0,139	0,145	0,134	0,162	
	(12,41)**		(10,91)**	(11,39)**	(11,63)**	(12,39)**	
Dependency Ratio	-0,001		0,002	-0,002	0,007	-0,001	
	(0,13)		(0,33)	(0,27)	(1,01)	(0,15)	
Household Size	-0,063		-0,075	-0,068	-0,065	-0,063	
	(2,50)*		(3,11)**	(2,80)**	(2,76)**	(2,49)*	
Population	-0,053	-0,069		-0,035	-0,103	-0,046	
	(1,72)	(2,26)*		(1,30)	(3,38)**	(1,51)	
Cabecera	-0,005	-0,004		-0,008	-0,01	-0,005	
	(0,60)	(0,51)		(1,05)	(1,38)	(0,60)	
Tax/capita	-0,016	-0,006		-0,003	0,018	-0,017	
	(2,01)*	(0,79)		(0,41)	(2,99)**	(2,27)*	
Homicide Rate	-0,030	-0,025	-0,029		-0,024	-0,027	-0,026
	(5,98)**	(5,05)**	(6,20)**		(5,02)**	(5,64)**	(5,42)**
Lagged Homicide Rate	-0,016	-0,015	-0,006		-0,010	-0,016	-0,006
	(2,70)**	(2,57)*	(1,12)		(1,83)	(2,76)**	(1,14)
Displacement (receiving)	0,024	0,016	0,023	0,024		0,024	0,016
	(5,74)**	(3,85)**	(5,51)**	(6,30)**		(5,67)**	(3,93)**
Displacement (expulsing)	-0,020	-0,023	-0,013	-0,023		-0,019	-0,017
	(2,99)**	(3,51)**	(2,09)*	(3,70)**		(2,91)**	(2,61)**
Attacks	0,005	0,005	0,006	0,001	0,005		0,006
	(1,95)	(1,90)	(2,52)*	(0,57)	(2,10)*		(2,28)*
Constant	0,959	1,205	0,523	0,832	1,617	0,875	0,542
	(2,68)**	(3,83)**	(3,17)**	(2,61)**	(4,76)**	(2,48)*	(12,27)**
Observations	30738	30909	31878	33307	34538	30738	32054
Number of Groups	16793	16882	17148	17780	18426	16793	17240
R-squared	0,02	0,01	0,02	0,02	0,02	0,02	0,01

 * significant at 5%; ** significant at 1%

Note: The table reports fixed effects estimates for the probability to be self-employed conditioning on being employed. We use a binary dependent variable, taking the value 1 if a person is self-employed and 0 for paid employment and unpaid family workers, respectively. All individuals aged 10 and above belonging to the working population were included in the sample. Variables population, tax/capita, homicide rate, lagged homicide rate, and displacement rates are in logs. Cabecera is a dummy variable taking the value 1 if municipality's cabecera to account for urban-rural differences. Treatment is a dummy for participation in Familias en Acción. Time dummies were included. Estimation with robust standard errors, t-values in brackets.

Table 12: Probability of Self-Employment for Men

	1	2	3	4	5	6	7
Age	0,024		0,025	0,025	0,025	0,024	
	(4,96)**		(5,12)**	(5,26)**	(5,29)**	(4,95)**	
Age Squared	0,000		0,000	0,000	0,000	0,000	
	(5,50)**		(5,53)**	(5,92)**	(6,04)**	(5,49)**	
Treatment	0,160		0,135	0,144	0,136	0,160	
	(13,03)**		(11,33)**	(12,05)**	(12,52)**	(13,01)**	
Dependency Ratio	-0,006		-0,004	-0,006	0,001	-0,006	
	(0,88)		(0,57)	(0,93)	(0,18)	(0,89)	
Household Size	-0,075		-0,085	-0,073	-0,072	-0,075	
	(3,19)**		(3,71)**	(3,21)**	(3,28)**	(3,18)**	
Population	-0,035	-0,050		-0,030	-0,036	-0,032	
	(1,25)	(1,80)		(1,17)	(1,33)	(1,13)	
Cabecera	-0,005	-0,006		-0,009	-0,012	-0,005	
	(0,74)	(0,76)		(1,29)	(1,76)	(0,74)	
Tax/capita	-0,016	-0,006		-0,006	0,008	-0,017	
	(2,24)*	(0,86)		(0,96)	(1,48)	(2,43)*	
Homicide Rate	-0,023	-0,017	-0,023		-0,017	-0,022	-0,017
	(4,97)**	(3,66)**	(5,08)**		(3,82)**	(4,82)**	(3,91)**
Lagged Homicide Rate	-0,018	-0,016	-0,009		-0,015	-0,019	-0,008
	(3,33)**	(2,87)**	(1,78)		(2,87)**	(3,37)**	(1,63)
Displacement (receiving)	0,020	0,013	0,018	0,018		0,020	0,012
	(5,06)**	(3,22)**	(4,64)**	(5,10)**		(5,01)**	(3,15)**
Displacement (expulsing)	-0,019	-0,023	-0,014	-0,019		-0,018	-0,018
	(3,08)**	(3,80)**	(2,27)*	(3,34)**		(3,03)**	(2,95)**
Attacks	0,003	0,002	0,004	0,000	0,003		0,003
	(1,25)	(0,93)	(1,88)	(0,14)	(1,15)		(1,36)
Constant	0,426	0,919	0,085	0,287	0,383	0,380	0,396
	(1,34)	(3,17)**	(0,67)	(1,00)	(1,29)	(1,21)	(10,51)**
Observations	29897	30148	30829	32408	33749	29897	31086
Number of Groups	14547	14640	14705	15276	15800	14547	14797
R-squared	0,03	0,01	0,02	0,02	0,02	0,03	0,01

* significant at 5%; ** significant at 1%

Note: The table reports fixed effects estimates for the probability to be self-employed. We use a binary dependent variable, taking the value 1 if a person is self-employed and 0 for paid employment and unpaid family workers, respectively. All individuals aged 10 and above belonging to the working population were included in the sample. Variables population, tax/capita, homicide rate, lagged homicide rate, and displacement rates are in logs. Cabecera is a dummy variable taking the value 1 if municipality's cabecera to account for urban-rural differences. Treatment is a dummy for participation in Familias en Acción. Time dummies were included. Estimation with robust standard errors, t-values in brackets.

Table 13: Probability of Self-Employment for Women

	1	2	3	4	5	6	7
Age	0,018		0,019	0,015	0,018	0,018	
	(3,56)**		(3,83)**	(3,11)**	(3,77)**	(3,55)**	
Age Squared	0,000		0,000	0,000	0,000	0,000	
	(4,07)**		(4,36)**	(3,59)**	(4,43)**	(4,06)**	
Treatment	0,032		0,047	0,022	0,027	0,032	
	(3,03)**		(4,52)**	(2,19)*	(2,87)**	(3,02)**	
Dependency Ratio	0,007		0,007	0,003	0,008	0,007	
	(1,18)		(1,29)	(0,60)	(1,48)	(1,18)	
Household Size	0,000		-0,009	-0,001	-0,002	0,000	
	(0,01)		(0,47)	(0,05)	(0,09)	(0,01)	
Population	-0,048	-0,047		-0,030	-0,050	-0,045	
	(1,85)	(1,97)*		(1,27)	(2,11)*	(1,75)	
Cabecera	0,006	0,007		0,004	0,005	0,006	
	(0,93)	(1,10)		(0,66)	(0,80)	(0,93)	
Tax/capita	0,006	0,007		0,008	0,004	0,005	
	(0,86)	(1,15)		(1,53)	(0,84)	(0,75)	
Homicide Rate	-0,007	-0,006	-0,015		-0,008	-0,006	-0,013
	(1,68)	(1,31)	(3,49)**		(2,01)*	(1,50)	(3,05)**
Lagged Homicide Rate	-0,011	-0,011	-0,012		-0,011	-0,012	-0,011
	(2,27)*	(2,24)*	(2,44)*		(2,53)*	(2,33)*	(2,43)*
Displacement (receiving)	0,014	0,013	0,014	0,011		0,014	0,012
	(4,07)**	(3,80)**	(4,08)**	(3,75)**		(4,05)**	(3,61)**
Displacement (expulsing)	-0,015	-0,017	-0,016	-0,015		-0,015	-0,017
	(2,95)**	(3,22)**	(3,05)**	(3,11)**		(2,92)**	(3,35)**
Attacks	0,002	0,002	0,002	0,001	0,001		0,002
	(0,88)	(0,91)	(1,17)	(0,44)	(0,66)		(1,12)
Constant	0,341	0,714	-0,203	0,163	0,343	0,310	0,234
	(1,15)	(2,85)**	(1,50)	(0,61)	(1,30)	(1,05)	(6,93)**
Observations	23124	23343	23789	25055	25761	23124	24013
Number of Groups	11664	11752	11751	12203	12538	11664	11840
R-squared	0,01	0,00	0,01	0,00	0,00	0,01	0,00

* significant at 5%; ** significant at 1%

Note: The table reports fixed effects estimates for the probability to be self-employed. We use a binary dependent variable, taking the value 1 if a person is self-employed and 0 for paid employment and unpaid family workers, respectively. All individuals aged 10 and above belonging to the working population were included in the sample. Variables population, tax/capita, homicide rate, lagged homicide rate, and displacement rates are in logs. Cabecera is a dummy variable taking the value 1 if municipality's cabecera to account for urban-rural differences. Treatment is a dummy for participation in Familias en Acción. Time dummies were included. Estimation with robust standard errors, t-values in brackets.

Table 14: Probability of Self-Employment for Men conditional on being employed

	1	2	3	4	5	6	7
Age	-0,001		0,001	0,002	0,000	-0,001	
	(0,13)		(0,17)	(0,25)	(0,03)	(0,16)	
Age Squared	0,000		0,000	0,000	0,000	0,000	
	(0,24)		(0,30)	(0,70)	(0,32)	(0,22)	
Treatment	0,192		0,160	0,173	0,157	0,192	
	(12,89)**		(11,08)**	(11,86)**	(11,95)**	(12,87)**	
Dependency Ratio	-0,005		-0,002	-0,006	0,004	-0,006	
	(0,59)		(0,18)	(0,75)	(0,46)	(0,61)	
Household Size	-0,077		-0,095	-0,083	-0,076	-0,078	
	(2,64)**		(3,35)**	(2,95)**	(2,78)**	(2,65)**	
Population	-0,037	-0,056		-0,023	-0,093	-0,031	
	(1,08)	(1,67)		(0,76)	(2,66)**	(0,90)	
Cabecera	-0,008	-0,007		-0,012	-0,014	-0,008	
	(0,86)	(0,79)		(1,40)	(1,64)	(0,86)	
Tax/capita	-0,018	-0,007		-0,006	0,021	-0,020	
	(2,06)*	(0,79)		(0,70)	(3,11)**	(2,30)*	
Homicide Rate	-0,033	-0,027	-0,032		-0,026	-0,031	-0,027
	(5,88)**	(4,85)**	(5,94)**		(4,91)**	(5,61)**	(5,08)**
Lagged Homicide Rate	-0,019	-0,018	-0,007		-0,012	-0,019	-0,007
	(2,81)**	(2,67)**	(1,09)		(2,00)*	(2,83)**	(1,10)
Displacement (receiving)	0,024	0,015	0,022	0,026		0,024	0,014
	(5,07)**	(3,10)**	(4,63)**	(5,95)**		(5,00)**	(3,04)**
Displacement (expulsing)	-0,015	-0,020	-0,007	-0,020		-0,015	-0,011
	(2,02)*	(2,61)**	(0,91)	(2,89)**		(1,94)	(1,46)
Attacks	0,005	0,005	0,007	0,001	0,006		0,006
	(1,73)	(1,67)	(2,30)*	(0,43)	(1,99)*		(2,05)*
Constant	1,017	1,086	0,467	0,747	1,775	0,938	0,465
	(2,55)*	(3,09)**	(2,45)*	(2,08)*	(4,64)**	(2,39)*	(10,08)**
Observations	22460	22579	23252	24326	25391	22460	23375
Number of Groups	11457	11511	11651	12061	12607	11457	11707
R-squared	0,03	0,02	0,02	0,02	0,02	0,03	0,01

* significant at 5%; ** significant at 1%

Note: The table reports fixed effects estimates for the probability to be self-employed conditioning on being employed. We use a binary dependent variable, taking the value 1 if a person is self-employed and 0 for paid employment and unpaid family workers, respectively. All individuals aged 10 and above belonging to the working population were included in the sample. Variables population, tax/capita, homicide rate, lagged homicide rate, and displacement rates are in logs. Cabecera is a dummy variable taking the value 1 if municipality's cabecera to account for urban-rural differences. Treatment is a dummy for participation in Familias en Acción. Time dummies were included. Estimation with robust standard errors, t-values in brackets.

Table 15: Probability of Self-Employment for Women conditional on being employed

	1	2	3	4	5	6	7
Age	0,021		0,014	0,011	0,022	0,021	
	(1,34)		(0,95)	(0,74)	(1,50)	(1,34)	
Age Squared	0,000		0,000	0,000	0,000	0,000	
	(1,93)		(1,50)	(1,23)	(1,94)	(1,92)	
Treatment	0,054		0,064	0,042	0,048	0,054	
	(2,01)*		(2,46)*	(1,63)	(2,02)*	(2,01)*	
Dependency Ratio	0,013		0,014	0,012	0,017	0,013	
	(1,08)		(1,23)	(1,07)	(1,49)	(1,08)	
Household Size	0,009		0,001	0,010	-0,008	0,009	
	(0,18)		(0,01)	(0,22)	(0,17)	(0,19)	
Population	-0,108	-0,105		-0,102	-0,144	-0,103	
	(1,52)	(1,49)		(1,61)	(2,30)*	(1,46)	
Cabecera	0,002	0,004		0,003	0,001	0,002	
	(0,15)	(0,28)		(0,22)	(0,05)	(0,15)	
Tax/capita	0,004	0,005		0,016	0,013	0,003	
	(0,26)	(0,34)		(1,15)	(1,06)	(0,20)	
Homicide Rate	-0,012	-0,011	-0,017		-0,012	-0,011	-0,016
	(1,12)	(1,06)	(1,68)		(1,18)	(1,02)	(1,60)
Lagged Homicide Rate	-0,011	-0,011	-0,009		-0,008	-0,012	-0,009
	(0,90)	(0,89)	(0,76)		(0,70)	(0,95)	(0,77)
Displacement (receiving)	0,025	0,022	0,026	0,019		0,025	0,023
	(2,92)**	(2,65)**	(3,16)**	(2,44)*		(2,90)**	(2,83)**
Displacement (expulsing)	-0,034	-0,035	-0,036	-0,030		-0,034	-0,037
	(2,53)*	(2,63)**	(2,75)**	(2,42)*		(2,53)*	(2,88)**
Attacks	0,002	0,003	0,003	0,001	0,002		0,003
	(0,48)	(0,53)	(0,52)	(0,28)	(0,42)		(0,55)
Constant	1,249	1,609	0,275	1,371	1,562	1,194	0,541
	(1,50)	(2,20)*	(0,68)	(1,83)	(2,17)*	(1,44)	(6,06)**
Observations	8276	8328	8624	8979	9145	8276	8677
Number of Groups	5386	5421	5547	5775	5875	5386	5583
R-squared	0,02	0,02	0,02	0,02	0,01	0,02	0,01

* significant at 5%; ** significant at 1%

Note: The table reports fixed effects estimates for the probability to be self-employed conditioning on being employed. We use a binary dependent variable, taking the value 1 if a person is self-employed and 0 for paid employment and unpaid family workers, respectively. All individuals aged 10 and above belonging to the working population were included in the sample. Variables population, tax/capita, homicide rate, lagged homicide rate, and displacement rates are in logs. Cabecera is a dummy variable taking the value 1 if municipality's cabecera to account for urban-rural differences. Treatment is a dummy for participation in Familias en Acción. Time dummies were included. Estimation with robust standard errors, t-values in brackets.

Table 16: Probability of Self-Employment conditional on being employed for subgroups of the population

The following tables show the effects of displacement rates (by expulsing and receiving community) interacted with certain different categories such as age, gender, education and household position. The dependent variable and the included independent variables (covariates, homicide rates and attacks) correspond to regressions displayed in table 10.

We performed an F-test to test for equality of coefficients displayed after each group of interactions. The hypothesis that coefficients are not significantly different, could never be rejected on the 5% level.

A. By age groups

	1	2	3	4	6	7
Displacement (receiving)*Age 10-25	0,020	0,009	0,020	0,019	0,019	0,011
	(2,62)**	(1,18)	(2,70)**	(2,80)**	(2,54)*	(1,41)
Displacement (receiving)*Age 25-40	0,029	0,021	0,029	0,029	0,029	0,023
	(4,91)**	(3,59)**	(5,08)**	(5,28)**	(4,85)**	(4,01)**
Displacement (receiving)*Age 40+	0,021	0,014	0,017	0,02	0,021	0,012
	(3,47)**	(2,33)*	(2,87)**	(3,73)**	(3,42)**	(1,96)
F-Test: Prob > F	0,453	0,3548	0,2275	0,3605	0,4489	0,1942
Displacement (expulsing)*Age 10-25	-0,018	-0,020	-0,012	-0,021	-0,017	-0,014
	(1,89)	(2,09)*	(1,31)	(2,48)*	(1,81)	(1,54)
Displacement (expulsing)*Age 25-40	-0,026	-0,029	-0,021	-0,030	-0,025	-0,025
	(3,40)**	(3,85)**	(2,88)**	(4,23)**	(3,33)**	(3,34)**
Displacement (expulsing)*Age 40+	-0,014	-0,018	-0,006	-0,016	-0,014	-0,010
	(1,78)	(2,30)*	(0,78)	(2,15)*	(1,74)	(1,29)
F-Test: Prob > F	0,2726	0,2803	0,1001	0,1154	0,2769	0,1049
Observations	30738	30908	31878	33307	30738	32053
Number of groups	16793	16882	17148	17780	16793	17240
R-squared	0,02	0,01	0,02	0,02	0,02	0,01

* significant at 5%; ** significant at 1%

B. By gender

	1	2	3	4	6	7
Displacement (receiving)*Male	0,025	0,017	0,023	0,026	0,025	0,016
	(5,44)**	(3,73)**	(4,99)**	(6,01)**	(5,37)**	(3,58)**
Displacement (receiving)*Female	0,018	0,010	0,020	0,017	0,018	0,014
	(2,28)*	(1,27)	(2,62)**	(2,30)*	(2,23)*	(1,77)
F-Test: Prob > F	0,4151	0,4145	0,7705	0,2694	0,4143	0,7648
Displacement (expulsing)*Male	-0,021	-0,024	-0,013	-0,023	-0,020	-0,017
	(2,88)**	(3,35)**	(1,87)	(3,48)**	(2,81)**	(2,34)*
Displacement (expulsing)*Female	-0,015	-0,019	-0,013	-0,019	-0,015	-0,017
	(1,40)	(1,73)	(1,26)	(1,94)	(1,34)	(1,60)
F-Test: Prob > F	0,6492	0,6520	0,9898	0,7210	0,6406	0,9715
Observations	30736	30907	31876	33305	30736	32052
Number of groups	16791	16880	17146	17778	16791	17238
R-squared	0,02	0,01	0,02	0,02	0,02	0,01

* significant at 5%; ** significant at 1%

C. By household position

	1	2	3	4	6	7
Displacement (receiving)*Head	0,022	0,015	0,020	0,019	0,021	0,015
	(4,08)**	(2,86)**	(3,85)**	(3,96)**	(4,02)**	(2,87)**
Displacement (receiving)*Son/Daughter	0,025	0,015	0,024	0,030	0,025	0,015
	(3,39)**	(2,00)*	(3,29)**	(4,45)**	(3,34)**	(2,08)*
Displacement (receiving)*Spouse	0,028	0,019	0,029	0,028	0,027	0,022
	(2,37)*	(1,62)	(2,52)*	(2,71)**	(2,34)*	(1,91)
Displacement (receiving)*Other	0,036	0,023	0,030	0,038	0,036	0,019
	(2,58)**	(1,64)	(2,10)*	(2,88)**	(2,56)*	(1,34)
F-Test: Prob > F	0,7741	0,9407	0,8431	0,3996	0,7740	0,9943
Displacement (expulsing)*Head	-0,016	-0,020	-0,010	-0,016	-0,016	-0,013
	(2,22)*	(2,69)**	(1,38)	(2,36)*	(2,15)*	(1,82)
Displacement (expulsing)*Son/Daughter	-0,022	-0,026	-0,016	-0,034	-0,022	-0,020
	(2,26)*	(2,61)**	(1,66)	(3,81)**	(2,22)*	(2,03)*
Displacement (expulsing)*Spouse	-0,030	-0,032	-0,026	-0,030	-0,029	-0,029
	(2,12)*	(2,31)*	(1,91)	(2,43)*	(2,09)*	(2,17)*
Displacement (expulsing)*Other	-0,028	-0,030	-0,019	-0,032	-0,027	-0,022
	(1,92)	(2,08)*	(1,29)	(2,43)*	(1,88)	(1,49)
F-Test: Prob > F	0,6935	0,7379	0,6303	0,1969	0,6900	0,6205
Observations	30736	30907	31876	33305	30736	32052
Number of groups	16791	16880	17146	17778	16791	17238
R-squared	0,02	0,01	0,02	0,02	0,02	0,01

* significant at 5%; ** significant at 1%

D. By education

	1	2	3	4	6	7
Displacement (receiving)*None	0,016	0,005	0,010	0,019	0,015	0,002
	(1,47)	(0,45)	(0,96)	(1,97)*	(1,43)	(0,16)
Displacement (receiving)*Primary	0,022	0,013	0,021	0,022	0,021	0,014
	(4,15)**	(2,58)**	(4,02)**	(4,54)**	(4,05)**	(2,71)**
Displacement (receiving)*Secondary	0,023	0,023	0,023	0,016	0,023	0,023
	(2,32)*	(2,31)*	(2,36)*	(1,71)	(2,32)*	(2,38)*
F-Test: Prob > F	0,8502	0,4555	0,6001	0,8204	0,8443	0,3221
Displacement (expulsing)*None	-0,013	-0,014	0,001	-0,021	-0,012	-0,001
	(0,74)	(0,79)	(0,07)	(1,25)	(0,67)	(0,04)
Displacement (expulsing)*Primary	-0,024	-0,029	-0,020	-0,026	-0,023	-0,024
	(2,83)**	(3,39)**	(2,47)*	(3,32)**	(2,76)**	(2,94)**
Displacement (expulsing)*Secondary	-0,041	-0,044	-0,031	-0,035	-0,041	-0,034
	(2,76)**	(2,92)**	(2,10)*	(2,49)*	(2,76)**	(2,34)*
F-Test: Prob > F	0,4490	0,4428	0,3718	0,7965	0,4183	0,3316
Observations	30738	30909	31878	33307	30738	32054
Number of groups	16793	16882	17148	17780	16793	17240
R-squared	0,02	0,01	0,02	0,02	0,02	0,01

* significant at 5%; ** significant at 1%