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THE EFFECTS OF AGRICULTURAL INCOME ON INTERNALLY DISPLACED PERSONS: THE CASE OF COLOMBIA

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Abstract

Colombia has the largest population of Internal Displaced Persons (IDPs) in the world. They are mainly expelled from rural areas and small municipalities characterized by high levels of poverty. Besides the welfare loss suffered by IDPs after migration, they also generate an enormous cost to the Colombian society in several respects. The purpose of this study is to estimate the impact of agricultural income at on the number of IDPs expelled from Colombian municipalities. To address the possible endogeneity and omitted variables bias, we use an instrumental variables' approach. The standardized deviation of precipitation from its mean serves as an instrument for municipal agricultural income, given that it is a source of exogenous variation. Our main result indicates that agricultural income has a negative and statistically significant impact on forced displacement: an increase in agricultural income of one percent reduces forced displacement in the municipality by 1.2%. As a robustness check, we use alternative definitions of economic activity at the municipality level such as agricultural loans, GDP, and energy consumption and find that results hold for these dependent variables as well.

Key Words: Agricultural income, forced displacement, instrumental variable, precipitations, Colombia.

1. Introduction

Colombia has the largest population of IDPs in the world. According to the United Nations High Commissioner for Refugees (UNHCR), 7.4 million people were in this condition in 2017. Official figures, provided by the state agency Unidad de Víctimas (Victims' Unit) through the National Information Network (RNI), report 8.3 million of IDPs, which represent about 18% of the country's population. Most IDPs are vulnerable population as evidenced by the fact of those expelled in 2016, more than two-thirds either belong to ethnic minorities or were peasants (UNHCR, 2017). It is also worth noticing that 92% of Colombian municipalities have a positive rate of IDPs expulsion.

Colombian IDPs are a result of a long tradition of confrontation between a variety of armed groups from different ideological positions, which consciously target civilians and induce forced migration. Colombia has been immersed in an armed conflict with political origins since the middle of the last century. Since the 80s, drug trafficking became a trigger that intensified the confrontation since it generated cash flows for illegal armed groups who control the territories where illicit crops are grown (Ibáñez & Vélez, 2008). The government's response, with military and intelligence assistance from the United States through the so-called Plan Colombia, was to increase the fight directly with the insurgent groups, causing displacement numbers to grow at a faster pace than before.

The main groups generating IDPs have been the United Self-Defense of Colombia (AUC), a far-right paramilitary group, the Revolutionary Armed Forces of Colombia (FARC) a Marxist-Leninist revolutionary guerrilla organization, the National Liberation Army (ELN) a revolutionary Marxist guerrilla group and the Colombian Army (FF.AA). A demobilization process with the AUC was took place in 2006, and the Colombian government signed a peace agreement with the FARC in 2017. Ongoing negotiations with the ELN came to a stop due to the change of president.

The recognition of 8.3 million victims of forced displacement has an enormous cost for Colombia. First, it has been estimated that the welfare losses caused by displacement represent 37% of the net present value of rural lifetime aggregate consumption in addition to the socio-emotional damage caused by violence (Ibáñez & Vélez, 2008). Second, Law 1448 of 201 or "Victims' Law" expanded the benefits and the measures of attention, assistance and integral reparation to the victims of the armed conflict, like the IDPs, with the aim of restoring this population as citizens in full exercise of their rights and duties.[1] These benefits and their application until 2021 have an approved budget of USD 19 billion by CONPES 3726 (National Council for Economic and Social Policy). Third, destination municipalities usually lack the resources and infrastructure to properly comply with the Victims' Law mandates for IDPs. Therefore, they may generate

[1] The previous law, Law 387 of 1997, provided benefits that were more restrictive.

congestion costs by competing with residents for access to health services, housing and access to the labor market.

Regarding the causes of displacement, there is evidence of a direct relationship between the level of violence and the IDPs: illegal armed groups and their actions against civilians are mainly responsible for forced displacement (Azam & Hoeffler, 2002; Engel & Ibáñez, 2007; Ibáñez & Vélez, 2008; Morrison & May, 1994; Schultz, 1971). However, there is also evidence that IDPs in Colombia come from poorer municipalities and rural areas with a lack of state presence regarding services such as security, education, public services, health, etc. (Engel & Ibáñez, 2007; Ibáñez & Vélez, 2008). In the Colombian case, rural areas are the focus of the armed struggle, and they lack the economic, social and institutional conditions necessary to guarantee acceptable standards of living. Therefore, it seems reasonable to believe that IDPs are affected by both violence and economic conditions. Consequently, it is essential to determine if the displaced population is explained by phenomena related to violence, income level or both.

This document seeks to address three questions. First, it establishes whether the number of IDPs are affected by changes in agricultural income, conflict intensity, or both. Second, it identifies the impact of the conflict intensity on agricultural income. Third, it extends these questions to other measures of the level of economic activity, such as agricultural credits, GDP, and energy consumption.

To answer these questions, we use an Instrumental Variable (IV) methodology to address the possible endogeneity due to a double causal relationship between agricultural income and IDPs, and omitted variables bias. The standardized deviation of precipitations from its mean is used as an instrumental variable for municipal agricultural income since this variable is an exogenous source of variation.

We find that agricultural income is strongly and negatively related to forced displacement: a one percent increase in agricultural income of reduces forced displacement in the municipality around 1.2%. The conflict intensity, as expected, has a positive effect on the number of IDPs. The standardized deviation of precipitations from its mean affects the agricultural income negatively. The conflict intensity does not affect agricultural income. These results are consistent with other economic activity measures such as agricultural credits, GDP, and energy consumption.

This paper is organized into five sections. In Section 2 we present a literature review on migration, displacement and the use of weather as an instrumental variable. Section 3 discusses the data and the methodology strategy used to estimate the impact of agricultural income on IDPs. Section 4 presented the results and their discussion and contrasted with those obtained from the literature and Section 5 concludes.

2. Literature Review

In this section we briefly review the most relevant papers related to migration, displacement and the use of weather as an instrumental variable to capture exogenous variations in income. Forced displacement can be

considered as a particular kind of migration given that people do not make a completely voluntary decision, but rather they react to a violent signal. In any case, we consider economic migration as the theoretical basis to develop a model of forced displacement.

2.1. Economic Migration

Internal and rural-urban migration was considered a socially beneficial process in the seminal development economics literature. Lewis (1954) presented a two-sector model, where the industrial sector absorbs the surplus labor from traditional or agricultural sectors when the marginal productivity of labor is insignificant, zero or negative. Ranis and Fei (1961) followed this theoretical methodology, but they reformulated the assumptions underlying the Lewis unlimited supply curve of labor.

Migration, seen as a decision process, involves comparing alternative locations and choosing the one that provides the larger net benefits. This idea was formalized by Sjaastad (1962), who place human migration in an investment context where individuals compare the difference in the present value of the income flow and the cost of moving to any location.

Todaro (1969) included the concept of migration cost, discount rate, the probability of employment at the destination and the attractiveness of urban jobs compared with rural employment due to the expected income differentials. The urban real income rises faster than the rural one, attracting a steady stream of peasants searching for job opportunities in urban areas.

Later refinements to Todaro's model were focused on finding which factors affect migration, especially individual characteristics related to the cost and benefits associated with the migration process. Among those are social networks, socio-economic characteristics, and discrimination in the reception place, as well as higher levels of education. The inclination to migrate is stronger for individuals with longer planning horizons (Fischer, P. A., Martin, & Straubhaar, 1997; Stark & Levhari, 1982; Todaro & International Labour Office., 1976; Todaro & Maruszko, 1987; Yap, 1977).

Fischer et al. (1997) in an interdisciplinary study found that risk aversion has an important role in migration and displacement process, since uncertainty at destinations may dissuade individuals from migrating, while violence induces people to migrate. Additionally, assets and social networks reduce incentives to migrate, but in a violent context land ownership and high levels of social capital are factors that might cause displacement. Armed conflicts alter the migration logic because the population is subject to violence and personal threats. In this environment, individuals do not make completely rational decisions and may find it difficult to evaluate all costs and benefits related to displacement properly.

2.2. Forced migration

Migration is usually associated with economic factors and forced displacement with violence. The violence adds additional considerations in the migration process that impact the risk, including the danger of losing one’s life, the death of other household members, the possibility of suffering some other kinds of violent

acts, the risk of losing property and high levels of stress. These factors may trigger decisions without complete information and evaluations (Engel & Ibáñez, 2007).

The literature recognizes violence as the main determinant of forced migration flows of refugees or internally displaced; people abandon their homes when they fear for their relatives, liberty, physical person, or lives (Engel & Ibáñez, 2007; Ibáñez & Vélez, 2008; Moore & Shellman, 2004; Schmeidl, 1997). The violent behavior of governments and dissidents and political violence are the primary determinants of forced migration flows. Empirical evidence from Colombia, Guatemala, and Africa support this hypothesis (Azam & Hoeffler, 2002; Morrison & May, 1994; Schultz, 1971).

In the Colombian context, land holdings and social capital at the place of origin reduce migration, but they may also increase displacement indirectly by increasing the household's likelihood of becoming the victim of direct threats (Engel & Ibáñez, 2007). The presence of illicit crops and programs to eradicate them may also produce displacement (Ibáñez & Vélez, 2008).

In many cases violence is a territorial war strategy in contested lands for clearing territories, expand controlled areas and weaken the support of the opponent (Reyes, A. & Bejarano, 1998). This behavior is a significant source of involuntary migration aimed at appropriating valuable land.

Additionally, families without public services or access to child education are more likely to move, while the economic attractiveness, level of consumption, institutional strength, formal property rights and fiscal performance reduces displacement (Dueñas, Palacios, & Zuluaga, 2014; Engel & Ibáñez, 2007)

2.3. Weather as an Instrumental variable

Weather events have a strong influence on a variety of economic outcomes, from both the economic theory and empirical perspectives (Dell, Jones, & Olken, 2014). Those are the reason why climate-economic literature explores the relationship between weather fluctuations and different kinds of outcomes, including aggregate output, agriculture, labor productivity, industrial output, health, energy, political stability, and conflict.

Cross-sectional studies have found a negative relationship between temperature and precipitation and economic activity or income in cross-country studies (Dell, Jones, & Olken, 2009; Gallup, Sachs, & Mellinger, 1999; Nordhaus, 2006). However, some authors argue that this correlation is driven by spurious associations of the climatic variables with national characteristics (Acemoglu, Johnson, & Robinson, 2002). Panel studies use the exogeneity of cross-time weather variation, allowing for causal identification which helps to solve the possible endogeneity problem and the biased associated with unobserved determinants (Dell et al., 2014).

With this methodology, researchers have measured how variations in temperature and precipitations affect economic growth. Barrios, Bertinelli, and Strobl (2010) use weather anomalies (changes from country means, normalized by country standard deviations) and find that higher rainfall is associated with faster

growth in these sub-Saharan African countries, but not elsewhere. On the other hand, Hsiang (2010), using annual temperature variation, found that national output falls 2.5% per 1°C warming in a sample of 28 Caribbean countries.

Dell, Jones, and Olken (2012) examine how the annual variation in temperature and precipitation affects per capita income, they indicate that temperature affects growth rates in developing countries; meanwhile variation in mean precipitations has no significant effects.

An important group of studies has provided evidence of the relationship between weather and conflicts and political stability. Miguel, Satyanath, and Sergenti (2004) show that annual per capita income growth is positively predicted by current and lagged rainfall growth. They use rainfall variation as an instrument to study non-climatic relationships, such as the link between poverty and civil conflict, which uses rainfall as an instrument for GDP.

Similarly, other works use variation in precipitation and temperature as instruments for per capita income growth to explain democratization. Burke and Leigh (2010) examine the relationship between economic growth and moves toward and away from greater democracy. Their results indicate that more rapid economic growth reduces the short-run likelihood of institutional change towards democracy; in this study, the temperature is a strong predictor of income, while precipitation is a weak one. Bruckner and Ciccone (2011) show that democratic change may be triggered by transitory economic shocks. They find that negative rainfall shocks are followed by significant improvements in democratic institutions and democratic change.

There is a natural relationship between agricultural productivity and temperature and water, given their role in crops growth. Researches in agriculture use a production function to specify a relationship between climate and agricultural output (Dell, Jones, & Olken, 2012). Deschênes and Greenstone (2007) use this approach to estimate whether agricultural profits are affected when the year is hotter or wetter compared to historical means. They do not find a statistically significant relationship between weather and the U.S. agricultural profits. These effects are different in developing countries. For instance, Schlender and Lobell (2010) find that higher temperatures tend to reduce yields using weather fluctuations in sub-Saharan Africa. Weather shocks may be linked to migration through agricultural output since agricultural producers may respond to a negative weather shock, which reduces their income, by emigrating. Munshi (2003) indicate that lower precipitations increase migration from Mexico to the United States in the following years. Similarly, Gray and Mueller (2012) find that large migrations are due to rain-related crop failure in Bangladesh. Feng, Krueger, and Oppenheimer (2010), by the use of temperature and precipitation variation for Mexican states as instruments for crop yields, find that lower crop yields increase emigration. These effects are important in settings where agriculture is a large share of aggregate output.

3. Data and Methodology

To conduct the analysis, we compiled detailed data to construct a municipal-level panel on IDPs, agricultural income, rainfall precipitations, conflict intensity, coca bush cultivated areas, and other income variables, like agrarian credits, municipal-GDP, and energy consumption. This section describes the data, sources and reports summary statistics. It also defines the methodological strategy.

a) Data

i) IDPs

The National Information Network (RNI, for its name in Spanish) database provides official figures for the number of IDPs in Colombia. The RNI is the instrument used to keep track of all the victims of violations of Human Rights or International Humanitarian Law of the Colombian armed conflict. Its main objective is to collect the information necessary to look after and integrally repair the victims of the armed conflict. One of the categories of victimization contained in the RNI database is forced displacement by municipality and year of occurrence. Between 1997 and 2017, 7.6 million displaced persons were registered.

ii) Agricultural Income

Our main independent variable of interest is agricultural income, which is measured as the annual weighted crop revenue by the municipality, in the spirit of Hidalgo et al. (2010). The agricultural income is calculated using the 17 agricultural products that contributed the most to the national GDP in 2016, according to the Annual National Accounts report from the National Administrative Department of Statistics (DANE).[2] For each municipality-year, we take a weighted sum of the revenue generated by each crop (Hidalgo, Naidu, Nichter, & Richardson, 2010; Jayachandran, 2006; Kruger, 2007).

Volumes of production are taken from the Municipal Agricultural Evaluations (EVA) performed by the Ministry of Agriculture. Their prices are taken from the Price Information System of the Agricultural Sector (SIPSA for its name in Spanish) and, in some cases, from associations of producers. Table 1 provides more detailed information on the data sources.

Table 1: Products and price sources for Agricultural Income

Product	Price Source:
Cotton	Ministry of Agriculture - Sector Reports*
Rubber	Ministry of Agriculture - Sector Reports*
Tobacco	Ministry of Agriculture - Sector Reports*
Wheat	Ministry of Agriculture - Sector Reports*
Cocoa Beans	National Cocoa Federation (FEDECACAO)**

[2] This report is a statistical synthesis that aims to provide a quantified representation of the economy through the sum of the value added generated in economic activity, or all goods and services produced by the country in a given period.

Coffee Beans	National Federation of Coffee Growers (FNC)**
Oil Palm	National Federation of Palm Growers (FEDEPALMA)**
Panela	National Federation of Paneleros (FEDEPANELA)**
Rice	National Federation of Rice Growers (FEDEARROZ)**
Avocados	SIPSA***
Bananas	SIPSA***
Export Bananas	SIPSA***
Corn	SIPSA***
Potatoes	SIPSA***
Pineapple	SIPSA***
Plantain	SIPSA***
Cassava	SIPSA***

* The Ministry of Agriculture periodically evaluates the situation of the agricultural sector, including the prices paid to producers.

** National associations gather producers of specific products that are affiliated to improve their representativeness.

*** Price Information System of the Agricultural Sector (SIPSA). These prices are calculated as the annual average for wholesalers in local markets.

iii) Instrumental Variable: Deviation of precipitations from its mean

We use the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) precipitations database as a source of exogenous weather variations. The IDEAM provides information on monthly rainfall gauge measure in millimeters, for each weather station since the year 1986. We have precipitation from 2046 stations located in 808 municipalities (out of 1.122). To construct a municipal-level measure of rainfall, we match municipalities to the nearest weather station in the case that there is no weather station associated to the municipality.

The wide range of climatic variation in the country is likely to invalidate the use of precipitation levels as an instrument. Instead, we construct a standardized measure of the deviation of precipitations from its 32-year mean. The variable is defined as:

$$R_{it} = \frac{r_{it} - \overline{r_i}}{s_i} \qquad (1)$$

Where r_{it} is the annual precipitation for municipality i and year t, $\overline{r_i}$ is its mean, and s_i is the standard deviation of the rainfall data for a 32-year period (1985-2016). Standardization also makes precipitation measurements comparable across municipalities since agricultural production is likely to be adapted to the average level and variance of rainfall in each municipality (Hidalgo et al., 2010).

For robustness, we also examine additional measures of precipitations and estimate their impact on agricultural income. A second rainfall measure we use is the deviation of precipitations from its mean, given by:

$$I_{it} = r_{it} - \overline{r_i} \qquad (2)$$

The third measure of precipitations is a dummy variable, which takes the value of 1 when the deviation of the precipitation from its mean is larger than one standard deviation. We refer to this variable as the positive precipitation shock, defined as:

$$S_{it} = \begin{cases} 1 & if \quad R_{it} > 1 \\ 0 & otherwise \end{cases} \qquad (3)$$

iv) Conflict Intensity

The conflict intensity variable is constructed as the sum of the number of terrorist acts and the number of subversive actions. These events are registered by the Ministry of National Defense for the period 2003-2017. Specifically, National Center of Historical Memory defines the terrorist acts, as indiscriminate attacks perpetrated with explosives against civilian objects in public places, while subversive actions are military events that imply an armed interaction between armed groups and the public force, such as attacks, combats, armed contacts, harassment and incursions into towns. This variable aims to capture the level of exposure to violence for each municipality-year observation.

v) Coca Bush Cultivated Area

Coca bush cultivated area information comes from the United Nations Office on Drugs, Crime (UNODC), and the Integrated Illicit Crop Monitoring System (SIMCI). This information is available for the period 1999-2016.

vi) Other Municipal Income Variables

Agricultural credits by municipality come from the *Banco Agrario de Colombia,* which is an entity affiliated to the Ministry of Agriculture. Its main objective is to provide banking services to the rural sector. This data is available from years 2004 to 2017 and includes all disbursements to all types of producers.

Municipal-GDP is provided by the DANE. It is defined as the distribution of the department's added value between each of its municipalities, based on a structure with direct and indirect indicators for each sector. The relative weight is obtained as the difference between the value of gross production and the intermediate consumption used. Likewise, it requires total aggregate value by a branch of economic activity that corresponds to the greater value created in the production process due to the combination of factors.

Energy consumption by the municipality was obtained from the Superintendence of Public Services (SUPERSERVICIOS) through the Unique Information System (SUI), which is the official system of the domiciliary public services sector in Colombia that processes and publishes information reported by the

companies providing services and territorial entities. We have the consumption in kWh for the years 2005 to 2016.

b) Descriptive statistics

Table 2 presents the descriptive statistics for all the variables. The average Log (IDPs) is 3.035, ranging from 0.726 to 5.344. The magnitude of Log (Agric. Income) is 22.692. The mean conflict intensity variable is 0.733 subversive actions or terrorist attacks.

Table 2: Descriptive statistics:

Variable	Mean	Std. Dev.
Log (IDPs)	3.035	2.309
Log (Agric. Income)	22.692	1.575
Log (Agric. Credits)	7.340	1.513
Log (GDP)	4.786	1.361
Log (Energy Consum.)	15.535	1.704
Conflict Intensity	0.733	2.975
Log (Coca cult. area)	0.736	1.858
Log (Rural Population)	8.795	1.104
Precipitation Deviation Standardized	-2.E-09	0.984
Precipitation Deviation Standardized 2	-8.E-10	0.984
Precipitation Deviation	-1.E-07	521.101
Positive Shocks	0.144	0.351

c) Empirical Strategy

The main objective of this study is to estimate the impact of agricultural income on the expulsion of IDPs in a violent conflict context. To do so, we used a panel data set with the variables described in the previous section at the municipality level. Our strategy is based on the use of the instrumental variable method to correct the problem of endogeneity between agricultural income and forced displacement.

We estimate the following regression in the second stage of the IV methodology:

$$D_{it} = \alpha_{2i} + \mu_2 \widehat{y_{it}} + \beta_2 M_{it} + \varepsilon_{it} \qquad (4)$$

Where α_{2i} captures time-invariant municipal factors that may be related to forced displacement and D_{it} corresponds to the natural logarithm of the number of IDPs from municipality i in year t. The coefficient of interest is μ_2, the elasticity of the log IDPs with respect to the log agricultural income. M_{it} is a set of control variables that includes coca bush cultivated area, conflict intensity and rural population. The term ε_{it} is a disturbance term cluster at the state level which adjusts for arbitrary within-municipal correlations along both the cross-sectional and time-series dimensions (Feng, Oppenheimer, & Schlenker, 2012; Hidalgo et al., 2010) .

The agricultural income $\widehat{y_{it}}$, may be correlated with ε_{it} due to the existence of reverse causality with the IDPs. A low level of agricultural income can induce the migration of the inhabitants of a municipality, but the agricultural income could also be affected by the departure of individuals who actively participate in the labor market. Another potential source of bias is the fact that agricultural income may be correlated with omitted variables. In order to correct for this problems, we use the precipitation as an instrumental variable for municipal agricultural income as a source of exogenous variations in weather. In many empirical studies precipitations have been used as an instrument for economic activity (Feng et al., 2012; Gray & Mueller, 2012; Hidalgo et al., 2010; Miguel, Satyanath, & Sergenti, 2004; Munshi, 2003; Paxson, 1992) .

The first-stage equation (5) models the relationship between rainfall and agricultural income:

$$y_{it} = \alpha_{1i} + \gamma_1 R_{it} + \beta_1 M_{it} + \epsilon_{it} \qquad (5)$$

In the first stage regression, the weather variation measured as the standardized deviation of rainfall concerning its municipal average, R_{it}, is used to instrument of the agricultural income y_{it}. The other variables included in the structural equation (4) are used in this stage, municipal controls M_{it}, fixed effects α_{1i}, and an error term ϵ_{it} clustered at the municipal level.

4. Results and Discussion

In this section, we analyze the results obtained from the methodological framework proposed in the previous section. First, we discuss results from the ordinary least squares (OLS) estimation and then we present estimations from the Instrumental Variables (IV) model. At the end, we perform some robustness checks.

Results from the OLS estimation, presented in Table 3, indicate that there is a negative relationship between agricultural income and forced displacement at 99% confidence. The estimated elasticity is -0.3: a 1% increase in agricultural income reduces forced displacement in the municipality by 0.3%. This relationship is robust to the inclusion of control variables and municipality fixed effects. Regarding control variables, each standardized deviation of precipitation concerning its municipal mean increases the forced displacement by 0.04%. The conflict intensity variable has a positive effect on forced displacement: a terrorist act or subversive action heightens it by 1.7%. The coca cultivated area increases forced displacement: a 1% increase in this variable increases forced displacement by 0.06%. We also find that a 1% increase in the rural population reduces forced displacement in 0.76%.

Table 3: OLS estimation (agricultural Income on IDPs)

Dependent			**Log (IDPs)**		
Variable:	**OLS (1)**	**OLS (2)**	**OLS (3)**	**OLS (4)**	**OLS (5)**

Log (Agric. Income)	-0.303***	-0.304***	-0.300***	-0.301***	-0.320***
	(0.024)	(0.024)	(0.024)	(0.024)	(0.028)
Conflict Intensity		0.020***	0.020***	0.020***	0.017***
		(0.004)	(0.004)	(0.004)	(0.005)
Log (Coca cult. area)			0.065***	0.062***	0.062***
			(0.021)	(0.021)	(0.024)
Log (Rural population)				0.762*	2.132***
				(0.448)	(0.301)
Prec. Dev. Standardized					0.040***
					(0.010)
Cons	10.500***	10.495***	10.370***	3.664	-7.983***
	(0.539)	(0.539)	(0.536)	(4.003)	(2.789)
R-sq: within	0.035	0.037	0.039	0.045	0.066
R-sq: between	0.150	0.128	0.048	0.218	0.348
R-sq: overall	0.098	0.081	0.024	0.206	0.315
Number of obs	10,910	10,910	10,910	10,910	7933
Number of groups	1,104	1,104	1,104	1,104	799
Obs per group avg	9.9	9.9	9.9	9.9	9.9
Mun. fixed effect	Yes	Yes	Yes	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

As mentioned before, OLS estimates may be biased due to the endogeneity problem. To correct this problem, we use an IV methodology. The IV estimation includes two stages. In the first stage, the variable with endogeneity problems, agricultural income, is estimated using the standardized deviation of rainfall

from its mean as an instrument, as well as other control variables. The second stage uses the estimated agricultural income from the first stage as an explanatory variable for IDPs. Table 4 presents results from the 2-stage IV estimations.

In the first stage, the instrumental variable shows that a standardized deviation of rainfall with respect to its municipal mean has a negative impact on the agricultural income of 4%. This result is statistically significant and robust to the inclusion of municipal controls. A larger cultivated area of coca is negatively associated with lower agricultural income. The other control variables, conflict intensity, and rural population, are not statistically significant in the first stage.

The second stage estimation, as the OLS estimation, exhibits a negative relationship between agricultural income and forced displacement at 99% percent confidence, indicating that higher levels of income are associated with less forced displacement. We find that the estimated elasticity of IDPs concerning income is -1.23: a 1% increase in agricultural income reduces forced displacement by 1.23%. Compared with the OLS methodology, the coefficient has the same sign, but IV estimations show a larger coefficient between agricultural income and forced displacement.

Table 4: IV Estimations (Agricultural Income on IDPs)

	IV (1)	**IV (2)**	**IV (3)**	**IV (4)**
First State Dependent Variable: Log (Agric. Income)				
Prec. Dev. Standardized	-0.044***	-0.044***	-0.044***	-0.044***
	(0.007)	(0.007)	(0.007)	(0.007)
Conflict Intensity		0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)
Log (Coca cult. area)			-0.043**	-0.043**
			(0.021)	(0.021)
Log (Rural population)				0.047
				(0.211)
Cons	22.863***	22.862***	22.896***	22.478***
	(0.001)	(0.002)	(0.017)	(1.892)
R-sq: within	0.009	0.009	0.011	0.011

R-sq: between	0.000	0.001	0.002	0.043
R-sq: overall	0.001	0.002	0.000	0.035
IV Dependent Variable: Log (IDPs)				
Log (Agric. Income)	-1.313***	-1.318***	-1.311***	-1.234***
	(0.266)	(0.266)	(0.270)	(0.261)
Conflict Intensity		0.018***	0.019***	0.018***
		(0.005)	(0.005)	(0.005)
Log (Coca cult. area)			0.020	0.022
			(0.031)	(0.029)
Log (Rural population)				2.175***
				(0.331)
Cons	33.894***	33.985***	33.809***	12.570*
	(6.074)	(6.081)	(6.178)	(6.644)
R-sq: within	.	.	.	.
R-sq: between	0.153	0.147	0.139	0.062
R-sq: overall	0.101	0.097	0.091	0.068
Number of obs	7,933	7,933	7,933	7,933
Number of groups	799	799	799	799
Obs per group avg	9.9	9.9	9.9	9.9
Mun. fixed effect	Yes	Yes	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

These results are in line with those found by Feng, Krueger, and Oppenheimer (2010), who find a 1% reduction in crop yields would lead an additional 0.2% of the population to migrate. Gray and Muller (2011) conclude that crop failures unrelated to flooding have strong effects on mobility given that households that are not directly affected by flooding but live in severely affected areas are more likely to move. Feng, Oppenheimer, and Schlenker (2012) found that a 1% decrease in agricultural yields leads to a 0.17% net reduction of the population through migration in the US.

The conflict intensity variable has a positive effect on forced displacement, a terrorist act or subversive action heightens it by 1.8%. A 1% increase in rural population increases forced displacement by 2.17%. The municipal coca crops are not statistically significant in this specification.

We believe our results indicate that forced displacement in Colombia is determined, not only by the level of violence but also by a lack of access to sources of income generation that guarantee acceptable living standards for rural populations.

4.1. Conflict Intensity and Agricultural Income

Our exclusion restriction implies that the only channel through which deviations of the precipitations from its mean affects IDPs is agricultural income. A violation of this restriction would occur if the precipitation variable affected the conflict intensity which in turn influences IDPs. Therefore, it is necessary to discard the causal channel through which rainfall can affect the intensity of the conflict. Results in Table 5 indicate that conflict intensity cannot be explained by deviations of precipitations from its mean, R_{it}, neither by agricultural income Y_{it}, or the other control variables M_{it}.

Table 5: Deviation of precipitations and

Dependent Variable:	**Conflict Intensity**			
	OLS (1)	**OLS (2)**	**OLS (3)**	**OLS (4)**
Prec. Dev.				
Standardized	-0.020	-0.010	-0.009	-0.009
	(0.021)	(0.019)	(0.019)	(0.019)
Log (Agric. Income)		0.021	0.015	0.015
		(0.037)	(0.037)	(0.037)
Log (Coca cult. area)			-0.113	-0.113
			(0.071)	(0.071)

Log (Rural population)				0.239
				(0.503)
Cons	0.883***	0.258	0.481	-1.658
	(0.003)	(0.848)	(0.859)	(4.892)
R-sq: within	0.000	0.000	0.001	0.001
R-sq: between	0.000	0.036	0.175	0.008
R-sq: overall	0.000	0.017	0.085	0.003
Number of obs	11,312	7,933	7,933	7,933
Number of groups	808	799	799	799
Obs per group avg	14.0	9.9	9.9	9.9
Mun. fixed effect	Yes	Yes	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

4.2. Robustness Checks

We perform three different robustness checks. In the first exercises, we complete our dataset by including municipalities that are not associated with a weather station. In the IDEAM dataset, weather stations are associated to the municipality where they are located. However, not all municipalities have associated weather stations, which may create a selection bias. To overcome this problem, we completed the dataset by imputing the precipitation level of the geographically nearest weather stations. This generalization allows us to increase the number of municipalities analyzed from 799 to 1104 of 1122.

Results are not altered when the completed dataset is used (1104 municipalities) instead of the original datasets (799 municipalities), as evidenced in Table 6. The instrumental variable, the deviation of rainfall from its mean, maintains a negative impact on the agricultural income of 0.04%. In addition, a larger cultivated area of coca keeps negatively associated with a greater agricultural income. Conflict intensity and rural population are not significant in the first stage. In the second stage estimation, a 1% increase in agricultural income reduces forced displacement by 1.1%; This coefficient is slightly lower compared with previous estimations.

Table 6: Results Using All Municipalities

	IV (1)	**IV (2)**	**IV (3)**	**IV (4)**
First State Dependent Variable: Log (Agric. Income)				

Prec. Dev. Standardized	-0.044***	-0.044***	-0.044***	-0.044***
	(0.006)	(0.006)	(0.006)	(0.006)
Conflict Intensity		0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)
Log (Coca cult. area)			-0.045***	-0.046***
			(0.017)	(0.017)
Log (Rural population)				0.054
				(0.060)
Cons	22.699***	22.698***	22.733***	22.254***
	(0.001)	(0.002)	(0.013)	(0.532)
R-sq: within	0.009	0.009	0.011	0.011
R-sq: between	0.000	0.000	0.003	0.053
R-sq: overall	0.001	0.001	0.001	0.041
IV Dependent Variable: Log (IDPs)				
Log (Agric. Income)	-1.124***	-1.129***	-1.125***	-1.091***
	(0.225)	(0.225)	(0.227)	(0.223)
Conflict Intensity		0.021***	0.021***	0.021***
		(0.004)	(0.004)	(0.004)
Log (Coca cult. area)			0.027	0.025
			(0.025)	(0.024)

Log (Rural population)				0.795*
				(0.426)
Cons	29.116***	29.232***	29.113***	21.317***
	(5.105)	(5.111)	(5.148)	(6.409)
R-sq: within	.	.	.	.
R-sq: between	0.150	0.144	0.133	0.016
R-sq: overall	0.098	0.094	0.085	0.004
Number of obs	10,910	10,910	10,910	10,910
Number of groups	1,104	1,104	1,104	1,104
Obs per group avg	9.9	9.9	9.9	9.9
Mun. fixed effect	Yes	Yes	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

As a second robustness check, we use alternative definitions of our instrumental variable. The first one is the deviation of precipitations from its mean, without standardization. The second one is the positive rainfall shock variable, which takes the value of one if the deviation of precipitation from its mean is larger than one standard deviation. Results using this alternative definition for the instrumental variable are not altered, as shown in Table 7.

Table 7: Results Using Other Rainfall Measures

	IV (1)	**IV (2)**	**IV (3)**
First State Dependent Variable: Log (Agric. Income)			
Prec. Dev. Standardized	-0.044***		
	(0.007)		
Prec. Deviation		-0.000091***	
		(0.000014)	
Positive shock			-0.079***

			(0.015)
Conflict Intensity	0.001	0.001	0.001
	(0.003)	(0.003)	(0.002)
Log (Coca cult. area)	-0.044**	-0.041**	-0.045***
	(0.021)	(0.021)	(0.017)
Log (Rural population)	0.047	0.043	0.052
	(0.211)	(0.211)	(0.063)
Cons	22.478***	22.512***	22.287***
	(1.892)	(1.888)	(0.557)
R-sq: within	0.011	0.011	0.006
R-sq: between	0.043	0.037	0.049
R-sq: overall	0.035	0.030	0.041
IV Dependent Variable: Log (IDPs)			
Log (Agric. Income)	-1.234***	-1.203***	-0.599**
	(0.261)	(0.266)	(0.284)
Conflict Intensity	0.018***	0.018***	0.020***
	(0.005)	(0.005)	(0.004)
Log (Coca cult. area)	0.022	0.024	0.048**
	(0.029)	(0.029)	(0.024)
Log (Rural population)	2.175***	2.174***	0.774*
	(0.331)	(0.328)	(0.439)

Cons	12.570*	11.861*	10.311
	(6.644)	(6.768)	(7.570)
R-sq: within	.	.	0.012
R-sq: between	0.062	0.069	0.019
R-sq: overall	0.068	0.074	0.029
Number of obs	7,933	7,933	10,910
Number of groups	799	799	1,104
Obs per group avg	9.9	9.9	9.9
Mun. fixed effect	Yes	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

As a third robustness check, we excluded the 13 main cities of Colombia from the analysis, considering that most forced displacement occurs in rural areas. Table 9 shows results from this robustness check. Our main findings are not altered.

Table 9: IV- Results excluding 13 metropolitan areas

	IV (1)	**IV (2)**
First State Dependent Variable: Log (Agric. Income)		
Prec. Dev. Standardized	-0.044***	-0.044***
	(0.007)	(0.007)
Conflict Intensity	0.001	0.002
	(0.003)	(0.003)
Log (Coca cult. area)	-0.044**	-0.044**
	(0.021)	(0.021)
Log (Rural population)	0.047	0.048
	(0.211)	(0.212)
Cons	22.478***	22.449***
	(1.892)	(1.895)
R-sq: within	0.011	0.011
R-sq: between	0.043	0.043

R-sq: overall	0.035	0.035
IV Dependent Variable: Log (IDPs)		
Log (Agric. Income)	-1.234***	-1.249***
	(0.261)	(0.265)
Conflict Intensity	0.018***	0.020***
	(0.005)	(0.005)
Log (Coca cult. area)	0.022	0.022
	(0.029)	(0.030)
Log (Rural population)	2.175***	2.183***
	(0.331)	(0.334)
Cons	12.570*	12.828*
	(6.644)	-6.718
R-sq: within	.	.
R-sq: between	0.062	0.053
R-sq: overall	0.068	0.060
Number of obs	7,933	7,822
Number of groups	799	787
Obs per group avg	9.9	9.9
Mun. fixed effect	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

We identify other measures associated with the level of economic activity of the municipalities, such as agricultural credits, GDP, and energy consumption. When we replace the initial agricultural income with these variables, we find that the main results are maintained, as shown in Table 8. This implies that with alternative measures of the level of economic activity of the municipality, the negative and statistically significant relationship between forced displacement and income is maintained.

Table 8: IV – Alternative measures of economic activity

	IV (1)	IV (2)	IV (3)	IV (4)
First State Dependent Variable: Other measures of municipal income				
Prec. Dev. Standardized	-0.044***	-0.046***	-0.053***	-0.054***
	(0.007)	(0.009)	(0.003)	(0.005)
Conflict Intensity	0.001	0.001	-0.001	0 .003
	(0.003)	(0.007)	(0.002)	(0.003)
Log (Coca cult. area)	-0.044**	-0.051	-0.011	-0.013
	(0.021)	(0.032)	(0.014)	(0.024)
Log (Rural population)	0.047	-1.212***	-0.033	-0.062
	(0.211)	(0.304)	(0.196)	(0.161)
Cons	22.478***	18.454***	5.089***	16.268***
	(1.892)	(2.727)	(1.729)	(1.443)
R-sq: within	0.011	0.014	0.086	0.014
R-sq: between	0.043	0.158	0.150	0.168
R-sq: overall	0.035	0.125	0.046	0.081
IV Dependent Variable: Log (IDPs)				
Log (Agric. Income)	-1.234***			
	(0.261)			
Log (Agric. Credits)		-1.139***		
		(0.259)		
Log (GDP)			-0.112	

			(0.153)	
Log (Energy Consum.)				-1.128***
				(0.197)
Conflict Intensity	0.018***	0.028***	0.012***	0.029***
	(0.005)	(0.007)	(0.004)	(0.007)
Log (Coca cult. area)	0.022	0.067**	-0.01	0.099***
	(0.029)	(0.033)	(0.017)	(0.031)
Log (Rural population)	2.175***	1.211***	-0.044	2.467***
	(0.331)	(0.447)	(0.391)	(0.287)
Cons	12.570*	1.664	4.357	-0.562
	-6.644	-5.463	-3.567	-4.219
R-sq: within	.	.	0.001	.
R-sq: between	0.062	0.043	0.253	0.112
R-sq: overall	0.068	0.060	0.228	0.100
Number of obs	7,933	10,120	5,610	9,174
Number of groups	799	801	1,122	777
Obs per group avg	9.9	12.6	5.0	11.8
Mun. fixed effect	Yes	Yes	Yes	Yes

Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01

5. Conclusion

Colombia has the largest population of Internal Displaced Persons (IDPs) in the world who generate an enormous cost to the Colombian society in several respects. This study estimated the impact of agricultural income on the number of IDPs expelled from Colombian municipalities considering the possible endogeneity and omitted variables bias, using an instrumental variables approach. The standardized deviation of precipitation from its mean serves as an instrument for municipal agricultural income. The results allow us to conclude that agricultural income has a negative and statistically significant impact on forced displacement: an increase in agricultural income of one percent reduces forced displacement in the

municipality by 1.2%. We find similar results when alternative measures for economic activity at the municipality level such as agricultural loans, GDP, and energy consumption are used.

Although our results indicate that violence has the largest effect on IDPs, we have shown that agricultural income has a significant impact on forced displacement: a one percent reduction in agricultural income increases IDPs in 1.23%. The implications of this result are interesting because terrorist and subversive actions are specific events that trigger waves of displacement, while the impact of a low level of agrarian income is a more permanent condition that can motivate migration at any time.

Efforts to reduce IDPs should be aimed at both reducing the levels of violence and the promotion of initiatives to strengthen business initiatives and enterprises at origin municipalities. Rural poverty in Colombia is much greater than urban poverty and the violence that is concentrated in these areas, become a perfect combination to motivate displacement.

We recognize that our methodological strategy may be questionable because we do not take into account the complete productive supply of the Colombian agrarian sector. However, we use the 17 agricultural products that contribute the most to the national GDP, much more than those used by previous studies. To address this concern, we use alternative definitions of municipal income, such as agricultural credits, GDP, and electricity consumption, finding similar results. We should also point out that future studies should include additional instruments such as temperature, which is usually used together with precipitations. This was not possible for this study since the IDEAM does not enough information on this variable.

6. References

- Paxson, C. H. (1992). Using Weather Variability to Estimate the Response of Savings to Transitory Income in Thailand. *The American Economic Review*. American Economic Association. https://doi.org/10.2307/2117600
- Feng, S., Oppenheimer, M., & Schlenker, W. (2012). *Climate Change, Crop Yields, and Internal Migration in the United States*. Cambridge, MA. https://doi.org/10.3386/w17734
- Kruger, D. I. (2007). Coffee production effects on child labor and schooling in rural Brazil. *Journal of Development Economics*, *82*(2), 448–463. https://doi.org/10.1016/J.JDEVECO.2006.04.003
- Jayachandran, S. (2006). Selling Labor Low: Wage Responses to Productivity Shocks in Developing Countries. *Journal of Political Economy*, *114*(3), 538–575. https://doi.org/10.1086/503579
- Hidalgo, F. D., Naidu, S., Nichter, S., & Richardson, N. (2010). Economic Determinants of Land Invasions. *Review of Economics and Statistics*, *92*(3), 505–523. https://doi.org/10.1162/REST_a_00007

- Feng, S., Krueger, A. B., & Oppenheimer, M. (2010). Linkages among climate change, crop yields and Mexico-US cross-border migration. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(32), 14257–14262. https://doi.org/10.1073/pnas.1002632107
- Gray, C. L., & Mueller, V. (2012). Natural disasters and population mobility in Bangladesh. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(16), 6000–6005. https://doi.org/10.1073/pnas.1115944109
- Munshi, K. (2003). Networks in the Modern Economy: Mexican Migrants in the U. S. Labor Market. *The Quarterly Journal of Economics*, *118*(2), 549–599. https://doi.org/10.1162/003355303321675455
- Schlenker, W., & Lobell, D. B. (2010). Robust negative impacts of climate change on African agriculture. *Environmental Research Letters*, *5*(1), 014010. https://doi.org/10.1088/1748-9326/5/1/014010
- Deschênes, O., & Greenstone, M. (2007). The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations in Weather. *American Economic Review*, *97*(1), 354–385. https://doi.org/10.1257/aer.97.1.354
- Brückner, M., & Ciccone, A. (2011). Rain and the Democratic Window of Opportunity. *Econometrica*, *79*(3), 923–947. https://doi.org/10.3982/ECTA8183
- Burke, P. J., & Leigh, A. (2010). Do Output Contractions Trigger Democratic Change? *American Economic Journal: Macroeconomics*, *2*(4), 124–157. https://doi.org/10.1257/mac.2.4.124
- Dell, M., Jones, B. F., & Olken, B. A. (2012). Temperature Shocks and Economic Growth: Evidence from the Last Half Century. *American Economic Journal: Macroeconomics*, *4*(3), 66–95. https://doi.org/10.1257/mac.4.3.66
- Hsiang, S. M. (2010). Temperatures and cyclones strongly associated with economic production in the Caribbean and Central America. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(35), 15367–15372. https://doi.org/10.1073/pnas.1009510107
- Barrios, S., Bertinelli, L., & Strobl, E. (2010). Trends in Rainfall and Economic Growth in Africa: A Neglected Cause of the African Growth Tragedy. *Review of Economics and Statistics*, *92*(2), 350–366. https://doi.org/10.1162/rest.2010.11212
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *The Quarterly Journal of Economics*, *117*(4), 1231–1294. https://doi.org/10.1162/003355302320935025
- Dell, M., Jones, B. F., & Olken, B. A. (2009). Temperature and Income: Reconciling New Cross-Sectional and Panel Estimates. *American Economic Review*, *99*(2), 198–204. https://doi.org/10.1257/aer.99.2.198

- Nordhaus, W. D. (2006). Geography and macroeconomics: new data and new findings. *Proceedings of the National Academy of Sciences of the United States of America*, *103*(10), 3510–3517. https://doi.org/10.1073/pnas.0509842103
- Gallup, J. L., Sachs, J. D., & Mellinger, A. D. (1999). Geography and Economic Development. *International Regional Science Review*, *22*(2), 179–232. https://doi.org/10.1177/016001799761012334
- Dell, M., Jones, B. F., & Olken, B. A. (2014). What Do We Learn from the Weather? The New Climate-Economy Literature †. *Journal of Economic Literature*, *52*(3), 740–798. https://doi.org/10.1257/jel.52.3.740
- Dueñas, X., Palacios, P., & Zuluaga, B. (2014). Forced Displacement in Colombia: What Determines Expulsion and Reception in Municipalities? *Peace Economics, Peace Science and Public Policy*, *20*(4), 585–597. https://doi.org/10.1515/peps-2014-0037
- Reyes, A., & Bejarano, A. M. (1998). Conflictos agrarios y luchas armadas en la Colombia contemporánea. *Análisis Político, 5*(6), 6–27.
- Azam, J.-P., & Hoeffler A. (2002). Violence Against Civilians in Civil Wars: Looting or Terror? *Journal of Peace Research*, *39*(4), 461–485. https://doi.org/10.1177/0022343302039004006
- Fischer, P. A., Martin, R., & Straubhaar, T. (1997). Should I stay or should I go. *International Migration, Immobility and Development: Multidisciplinary Perspectives*, 49–90.
- Schmeidl, S. (1997). Exploring the Causes of Forced Migration: A Pooled Time-Series Analysis, 1971-1990. *Social Science Quarterly*. University of Texas Press. https://doi.org/10.2307/42864338
- Moore, W. H., & Shellman, S. M. (2004). Fear of Persecution. *Journal of Conflict Resolution*, *48*(5), 723–745. https://doi.org/10.1177/0022002704267767
- Todaro, M. P., & Maruszko, L. (1987). Illegal Migration and US Immigration Reform: A Conceptual Framework. *Population and Development Review*, *13*(1), 101. https://doi.org/10.2307/1972122
- Stark, O., & Levhari, D. (1982). On Migration and Risk in LDCs. *Economic Development and Cultural Change*, *31*(1), 191–196. https://doi.org/10.1086/451312
- Yap, L. Y. L. (1977). The attraction of cities: A review of the migration literature. *Journal of Development Economics*, *4*(3), 239–264. https://doi.org/10.1016/0304-3878(77)90030-X
- Todaro, M. P., & International Labour Office. (1976). *Internal migration in developing countries : a review of theory, evidence, methodology and research priorities*. International Labour Office. Retrieved from http://agris.fao.org/agris-search/search.do?recordID=US201300554241
- Todaro, M. P. (1969). A Model of Labor Migration and Urban Unemployment in Less Developed Countries. *The American Economic Review*. American Economic Association. https://doi.org/10.2307/1811100

- Sjaastad, L. A. (1962). The Costs and Returns of Human Migration. *Journal of Political Economy*, *70*(5, Part 2), 80–93. https://doi.org/10.1086/258726
- Ranis, G., & Fei, J. C. H. (n.d.). A Theory of Economic Development. *The American Economic Review*. American Economic Association. https://doi.org/10.2307/1812785
- LEWIS, W. A. (1954). Economic Development with Unlimited Supplies of Labour. *The Manchester School*, *22*(2), 139–191. https://doi.org/10.1111/j.1467-9957.1954.tb00021.x
- Engel, S., & Ibáñez, A. M. (2007). Displacement Due to Violence in Colombia: A Household-Level Analysis. *Economic Development and Cultural Change*, *55*(2), 335–365. https://doi.org/10.1086/508712
- Morrison, A. R., & May, R. A. (1994). Escape from Terror: Violence and Migration in Post-Revolutionary Guatemala. *Latin American Research Review*. The Latin American Studies Association. https://doi.org/10.2307/2503595
- UNHCR. (2017). *Actualización de la Situación Colombia*. Retrieved from http://www.acnur.org/5b05af144.pdf
- Schultz, T. P. (1971). Rural-Urban Migration in Colombia. *The Review of Economics and Statistics*, *53*(2), 157. https://doi.org/10.2307/1925711
- Miguel, E., Satyanath, S., & Sergenti, E. (2004). Economic Shocks and Civil Conflict: An Instrumental Variables Approach. *Journal of Political Economy*, *112*(4), 725–753. https://doi.org/10.1086/421174
- Ibáñez, A. M., & Vélez, C. E. (2008). Civil Conflict and Forced Migration: The Micro Determinants and Welfare Losses of Displacement in Colombia. *World Development*, *36*(4), 659–676. https://doi.org/10.1016/J.WORLDDEV.2007.04.013
- Deng, F. M. (1999). Guiding principles on internal displacement. *International Migration Review*, *33*(2), 484–493. Retrieved from http://www.jstor.org/stable/10.2307/2547706