

Civil Conflict and Forced Migration: The Micro Determinants and Welfare Losses of Displacement in Colombia

ANA MARÍA IBÁÑEZ

Universidad de los Andes, Bogotá, Colombia

and

CARLOS EDUARDO VÉLEZ *

Inter-American Development Bank, Washington, United States

Summary. — Forced displacement in Colombia has soared due to the escalating internal conflict. The purpose of this paper is twofold: first, to identify adequate instruments for addressing the problem of displacement by estimating its determinants and comparing these findings with the standard migration literature; second, to estimate its welfare losses, thus providing evidence as to whether the response to this problem has been proportional to its size. We find that the welfare losses caused by displacement are 37% of the net present value of rural lifetime aggregate consumption. Our empirical findings also show that a violent environment modifies the net benefits of migration.
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Key words — forced displacement, migration, random utility model, welfare losses, Latin America, Colombia

1. INTRODUCTION

While international wars may attract greater global attention, the world today faces mostly civil wars (Collier *et al.*, 2003). As a direct consequence, the victims of conflict are increasingly civilian populations rather than military personnel (Cairns, 1997). Armed groups deliberately target civilians to induce forced migrations, both to acquire loot to augment resources and to reduce the fighting capacity of the enemy (Azam & Hoeffler, 2002). By 2005, due to civil conflicts, nearly 32 million people were forced to seek asylum, either within another country or within their own national borders; 21.0 million of them were displaced persons¹ (USCR, 2006).

Colombia has one of the largest displaced populations in the world. Nowadays, involuntary displacement is estimated at 2.9 million persons, corresponding to near 7% of the country's population and 29.1% of the rural population²

(USCR, 2006). Furthermore, the intensification of the political conflict and its expansion into a vast majority of Colombia's territory is causing displacement numbers to grow at a faster pace than before. As a result, by 2005, 94% of Colombian municipalities were expulsion or reception sites. The toll of displacement has fallen heavily upon vulnerable groups of the

* This paper does not necessarily reflect the views of the Inter-American Development Bank or the World Bank. We would like to thank Orazio Attanasio, Alice Mesnard, Andrew Morrison, Michael Spagat, Mauricio Rubio, and the participants of seminars held at the Universidad de los Andes, LACEA and Cornell University for helpful comments and discussions. The authors acknowledge and appreciate the permanent support and encouragement of Fernando Rojas (World Bank/LAC/PREM), the Manager of the Japanese Post-Conflict Fund, who provided financial support for this paper. Final revision accepted: April 12, 2007.

population—women and children who constitute 41% and 36% of this population, respectively.³ In fact, by the late 1990s, recent migrants (presumably, internally displaced persons) were faring worse than the urban poor, in clear contrast with the traditional migrant profile through 1995, wherein migrants enjoy better welfare than urban residents (see Vélez, 2002, Table 7).

This paper seeks to address three main questions. First, it establishes whether displacement is a casual by-product of the conflict, meaning that persons are randomly targeted, or is a war strategy, meaning that specific groups of the population are targeted. Second, it identifies the key determinants of the displacement process. Understanding the determinants of the process might shed some light on possible policy instruments for mitigating displacement. For example, does the impact of the presence of state armed forces outweigh the effect of violence? Are public interventions aimed at providing social services effective in deterring displacement? Conversely, can displacement only be halted once security conditions are restituted to prewar levels? Third, it estimates the burden of the displacement in monetary terms. The magnitude of welfare losses is relevant with respect to justifying policy interventions and investments. Moreover, the size of public resources used to alleviate displacement must take into consideration the extent of welfare losses induced by displacement. By addressing these issues, this paper provides empirical evidence on the behavioral responses of households when confronted by that violence and on the economic costs violence imposes on households.

We find that landowners, young individuals and households with fewer economic privileges—and therefore with a lower capacity to adopt defensive measures—are more likely to be terrorized. Econometric regressions for the determinants of displacement indicate that police and military forces assume differentiated roles in preventing displacement. While a police presence prevents displacement by reducing the likelihood of victimization, a military presence is not instrumental in halting the direct victimization of households. On the other hand, military forces can protect the population once violence occurs and displacement becomes imminent. Welfare losses from displacement are substantial. Compensating valuation per household is, on average, 37% of the net present value of rural aggregate consumption. Rel-

ative welfare losses are larger for the poorer segment of the displaced population and for reactive displacement.

The paper is organized as follows: Section 2 describes some facts about displacement in Colombia and provides hypotheses on the possible causes of displacement. In Section 3, we present a brief review of the migration literature, discuss its relevance for modeling displacement decisions, and present a random utility model for displacement. Section 4 presents the empirical results, and Section 5 concludes.

2. DISPLACEMENT IN COLOMBIA: SOME FACTS

Colombia has faced several episodes of civil conflict since its independence from Spain in the early 19th century. Two large civil conflicts developed during the 20th century. The first, denominated as *La Violencia*, initiated in the forties as a consequence of political confrontations between the two traditional Colombian Parties: *Liberales* and *Conservadores*. Although the conflict appeared mainly as a political confrontation, unresolved land issues since the 19th century and an unequal distribution of resources were some of its underlying causes. A power-sharing agreement between the two parties in the late fifties contributed to negotiate a peace deal, which halted violence somewhat during two decades.

Nevertheless, the underlying causes of the conflict never receded and the conflict resumed during the seventies with the emergence of left-wing guerrilla groups. Although the main goal of these groups was to overthrow the democratically elected government, their strength was limited; thus, their actions were targeted only to distant rural areas. The balance of power changed when illicit drug trade consolidated in Colombia during the early eighties. By providing financial resources to illegal armed groups, drug trade fueled the conflict and allowed its geographical expansion. In addition, drug barons and some large landowners in rural areas created paramilitary groups in the 1980s to protect economic interests and mitigate attacks from guerrilla groups. All these factors escalated violence against the civil population.

Violence has therefore continuously intensified since the 1970s, with homicide rates tripling during 1970–91. Forced migration reached, in

2005, 7% of the population, and today, the civil war involves a sizeable portion of the country's territory. However, the impact of violence differs between urban and rural areas. While urban areas mostly suffer from soaring homicide rates, the rural population endures armed confrontations, massacres, and forced displacements.

Few studies estimate the social and economic costs imposed by violence in Colombia. In fact, behavioral responses to violence, which may inflict large welfare losses upon the civil population, are seldom analyzed. *Gaviria and Vélez (2001)* examine the preventive responses of the Colombian urban population to the escalation of crime. Nevertheless forced migration, the most extreme and extended behavioral response to violence in Colombia, and other countries facing civil conflict, has been largely neglected in the economic literature. This section describes some stylized facts about the internally displaced population in Colombia.

Conflict related violence in rural areas,⁴ like massacres, and forced displacement are apparently strongly linked. To explore this, we classify Colombian rural municipalities into four categories: (i) those with a low incidence of displacement and a low incidence of massacres; (ii) those with a low incidence of forced displacement and a high incidence of massacres; (iii) those with a high incidence of forced displacement and a low incidence of massacres; and (iv) those with a high incidence of forced displacement and a high incidence of massacres rate.⁵ *Table 1* shows that high incidences of displacement and high incidences of massacres coincide in 66.2% of Colombian municipalities; conversely, municipalities with low incidences of forced migration also exhibit low incidence of massacres.

The intensity and nature of the conflict determine the level of violence directed against civilians. On the one hand, when the conflict escalates, increasing the number of crimes

directed against civilians becomes a low cost and effective strategy for clearing out territories, thus allowing illegal armed groups to strengthen their control of areas, as well as more easily transport weapons and develop illegal activities. On the other hand, crimes directed against civilians are more frequent in contested areas, where one finds the presence of antagonistic armed groups. Crimes directed against civilians include death threats, massacres, forced recruitment, temporary take-over of towns, and selected homicides.

The need of illegal armed groups for territorial strongholds has heightened and expanded the conflict across the country. As a consequence, nearly 94% of Colombian municipalities have received or forced out portions of the population; with the exception of one department,⁶ an island in the Caribbean Sea, all the departments have experienced displacement problems. Nevertheless, the intensity of the displacement⁷ is heterogeneous across and within departments, suggesting that regional characteristics partially determine the incidence of displacement.

What causes displacement in Colombia? The immediate causes or triggers are often the last incident in a chain of events producing the final decision to flee one's hometown. Nonetheless, the roots of displacement lie in the dynamics of the Colombian conflict. Forced displacement in Colombia is not a casual by-product of the internal conflict. Armed groups attack the civil population to strengthen territorial strongholds, expand territorial control, weaken the support of the opponent, and accumulate valuable assets (e.g., land or extraction of natural resources).

Consequently, illegal armed groups and their actions against civilians are mainly responsible for forced displacement. In 2001, paramilitary groups instigated half of all forced migrations, while guerrilla groups and the simultaneous presence of two armed groups were responsible for 20% and 22% of such migrations, respectively (*RSS, 2002*). Paramilitary groups not only bear the bulk of the responsibility, they are also more effective in instigating displacement. During 2001, paramilitaries caused 599 displacement events, corresponding to 91,380 displaced persons. By comparison, while guerrilla groups provoked a comparable number of events (570), only 36,217 people were forced to flee (*RSS, 2002*). Violent actions against civilians, like threats and selective homicides, trigger the decision to migrate. However, armed

Table 1. *Classification of Colombian municipalities according to displacement and incidence of massacres*

		Displaced population	
		Low incidence	High incidence
Massacres	Low levels	62.8	37.2
	High levels	33.7	66.3

Source: Authors' calculations based on municipal municipality-level data collected at *CEDE (2005)*.

confrontations (i.e., battles between paramilitary groups and guerrilla groups) have lately become an important trigger due to the recent intensification of the conflict in populated areas (RSS, 2002).

Land conflicts and violent land appropriation are considered an underlying source of involuntary migration (Reyes & Bejarano, 1998). Land occupation constitutes a crucial war strategy for clearing territories of opponents, expanding one's control of areas, and appropriating valuable land. This is particularly valid in contested territories, where armed groups attempt to establish hegemony. As a result, displaced persons report having lost 1.2 million hectares of land, two times the land distributed in Agrarian Reform Programs in Colombia during 1993–2002 (Ibáñez, Moya, & Velásquez, 2006).

Programs to eradicate illicit crops may also produce displacement. The aerial fumigation of illicit crops⁸ destroys farmers' assets, produces a temporary shock to their income, and, as they are generally implemented in combat zones, exacerbates violence in the region. Estimations indicate that 13,153 people were displaced in this fashion during 1999, in drug producing departments (Puyana, 1999).

Forcing out population as a war strategy aims at impeding collective action, damaging social networks, and intimidating and controlling civilian population. Attacks on the population weaken support for opponents and obstruct civilian uprisings (Henao, 1998). Lozano and Osorio (1999) estimate that 65% of displaced persons were active members of community organizations, and 11% participated in labor and political organizations in their hometown.

Rural families may involuntarily migrate to avoid forced recruitment of their children into illegal armed forces. Children as young as eight years old are currently recruited by illegal armed groups to fight as soldiers in the Colombian conflict (Salazar, 2001). After an engagement in October 2001, military forces found that 43% of dead guerrilla members and 41% of captured guerrilla members were below 18 years of age (USCR, 2001).

3. MODELING DISPLACEMENT AS MIGRATION

This section discusses migration theory and develops a theoretical model for forced displacement. One might ask, however, whether

a model developed for voluntary migration can be applied to an involuntary action. Displacement is a reaction to a violent attack and not a voluntary decision; families are fleeing to save their lives and to protect their assets. Nonetheless, we find that in towns with acute episodes of violence, some people migrate to seek refuge while others prefer to stay.

Why would people enduring episodes of extreme violence in their hometown prefer not to migrate? A possible hypothesis is that violence is not randomly targeted, but aimed deliberately at certain groups within the population, and it is these people who are forced to migrate. An alternative hypothesis is that some households engage in a decision-making process to analyze whether migration is the best possible option. During this process, in addition to considering security factors, families might also contemplate traditional migration variables. Both reasons are not necessarily exclusive. Indeed, a household may be targets of armed groups, yet still prefer to stay on in its hometown rather than face dire conditions in unfamiliar and hostile cities.

We attempt to test whether violence deliberately targets certain groups within the population; likewise, whether displacement is caused solely by violence, or if traditional migration variables also play a role. This section first examines the traditional migration literature and discusses whether its salient conclusions are applicable to forced displacement. Second, it develops a random utility model that combines traditional migration variables with characteristics typical of forced displacement.

(a) *Comparing migration and displacement incentives*

When migrating voluntarily, households must compare the benefits and costs of residing in the site of origin *versus* those of residing in the reception site, and choose the alternative with the larger net benefits. In the case of displacement, violence constitutes an additional factor in the decision-making process that modifies the costs of staying at the origin site. Consequently, it modifies the impact of other migration determinants. The purpose of this section is to analyze the variables identified in the literature as determinants of migration decisions and consider the possibility that, in the presence of terror, traditional migration incentives may be outweighed by other factors or become less important. The impact of migration

incentives is modified as violence reduces returns and increases risk in continuing to reside in the site of origin, particularly with respect to individuals more prone to victimization.

During the migration decision, individuals compare alternative locations and choose the one providing larger net benefits. Initial models (Sjaastad, 1962) formalized this idea by assuming that individuals compare the difference in the present value of income streams minus the moving costs between alternative locations. Restraining benefits from migration to income streams limited the application of the migration model. Later versions of this model included other determinants of migration, like the attractiveness of urban jobs *versus* rural employment (Todaro, 1969). According to Todaro's model, individuals move while searching for attractive job opportunities in urban areas.

Later refinements to these models accounted for other considerations related to the decision to migrate, which affects the benefits and costs of voluntary and forced migration. First, both the existence of contacts at the reception site and higher levels of education mitigate migration costs (Becker, 1975; Todaro, 1989; Todaro & Maruszko, 1987). By providing housing, support in finding employment, and social networks, contacts at the reception site diminish migration costs. Similarly, better-educated individuals may find employment more easily, thus generating larger incomes after migrating. On the other hand, potential discrimination upon arrival increases migration costs; thereby, discouraging migration⁹ (Fischer, Martin, & Straubhaar, 1997). Positive information about economic and social opportunities at the destination site improves the expected benefits from migration (Dustmann, 1992; Maier, 1985; Stark & Levhari, 1982). Conversely, information about poor social and economic conditions at destination sites raises the expected relative benefits of nonmigration.

The length of the planning horizon exerts similar incentives on the decision to migrate or displace, but the underlying motive differs. Since discounted benefits are larger, inclination to migrate is stronger for individuals with longer planning horizons (Becker, 1975; Todaro, 1989; Todaro & Maruszko, 1987). In the case of displacement, young people are the more probable targets of threats, forced recruitment and selective homicides than old people, and are therefore more likely to displace.

Risk aversion plays an asymmetric role in the decision to migrate and displace. The uncer-

tainties inherent in arriving at an unknown place may dissuade risk averse individuals from migrating (Fischer *et al.*, 1997). Violence, by contrast, may induce risk averse households to displace in spite of the complications with which they might have to cope at the reception site.

The standard migration literature considers location specific assets as rendering migration costly, and thus as reducing incentives to migrate (Fischer *et al.*, 1997). However, those incentives might be reversed in an environment where the rule of law is deficient, thus allowing illegal armed groups to violently appropriate land, particularly when left unprotected. Under these special circumstances, landownership becomes a possible factor with respect to victimization, and thus might cause displacement. Similarly, when the destruction of social networks is a war strategy, human capital turns into a risk factor. Analogously, permanent residency and active participation in community activities signify advantages when belonging to a society and thus discourage migration, inasmuch as this would entail giving up these accumulated advantages (Fischer *et al.*, 1997). However, when the destruction of social networks is a war strategy, high levels of social capital no longer constitute an asset, but rather a risk factor.

Because armed conflicts alter the benefits and costs for staying at the origin site *versus* leaving to a new destination—likewise their distribution across households' characteristics at the origin site—the standard results from the migration literature should not remain unchanged. On the one hand, the existence or nonexistence of contacts at reception sites, educational levels, the degree of discrimination, and the extent of the planning horizon all determine migration and displacement in the same direction. Violence, on the other hand, modifies the impact of access to information, risk aversion, and location specific assets on the migrating decision.

Empirical evidence on the impact of violence on migration is scarce and relies solely on aggregated figures. Schultz (1971) explores the causes of internal migration rates in Colombia and finds that violence, measured as the number of deaths per year, is associated with net out-migration. Estimates of the determinants of migration rates in Guatemala reveal political violence to be a key determinant of migration decisions in that country (Morrison & May, 1994). In some African countries, the raiding

of civilians appears to be used by the state as a substitute for fighting (Azam & Hoeffler, 2002).

(b) *A random utility model for displacement*¹⁰

Households displace when the expected utility from migrating is greater than the utility from staying at the origin site. Choices are based on

$$\begin{aligned}
 \text{prob}_i(\text{displace}) = \text{prob}_i(\alpha S_{id} + \beta_d Y_{id} + \delta C_{id} \\
 + \gamma_d Z_i + \varepsilon_{id} > \alpha S_{in} + \beta_d Y_{in} \\
 + \delta C_{in} + \gamma_n Z_i + \varepsilon_{in}). \quad (4)
 \end{aligned}$$

If we assume a logistic distribution for the error term and a linear utility function, the probability of displacement is

$$\text{prob}_i(\text{displace}) = \frac{\exp[\alpha(S_{id} - S_{in}) + \beta_d Y_{id} - \beta_n Y_{in} + \delta(C_{id} - C_{in}) + (\gamma_{id} - \gamma_{in})Z_i]}{1 + \exp[\alpha(S_{id} - S_{in}) + \beta_d Y_{id} - \beta_n Y_{in} + \delta(C_{id} - C_{in}) + (\gamma_{id} - \gamma_{in})Z_i]}. \quad (5)$$

the many dimensions influencing household welfare. First, households examine violence levels at both sites and evaluate the risk the family will face if they stay. Second, displaced families compare the economic opportunities in both places. Third, migration costs are assessed; the migration process demands economic and social investments, for instance, those related to the loss of social services and the leaving behind of location-specific assets. Lastly, socio-demographic characteristics shape the preferences of the household. Household *i* decides whether to migrate if the utility from displacement is greater than the utility from staying in the origin site:

$$U_{id} > U_{in}, \quad (1)$$

where U_{ij} denotes the indirect utility from alternative *j*, $j = d$ is the reception site, and $j = n$ is the origin site. The indirect utility is composed of the deterministic utility (v_{ij}) and a random term (ε_{ij}) with a mean of zero

$$U_{ij} = v_{ij} + \varepsilon_{ij}. \quad (2)$$

The decision to displace or remain at the origin site depends on many factors. First, households evaluate risks and generate expectations about security in the origin and destination region (S_{ij}). Second, households compare income generation possibilities (Y_{ij}). Third, migration and information costs influence the decision process (C_{ij}). Finally, household characteristics reflecting preferences on needs and risk aversion determine displacement behavior (Z_i). The observable utility is defined as

$$v_{ij} = \alpha S_{ij} + \beta_j Y_{ij} + \delta C_{ij} + \gamma_j Z_i. \quad (3)$$

Household *i* displaces when the expected utility from displacement is greater than the expected utility from staying at the origin site

Perceptions of security can be approximated with variables indicating whether the household was directly threatened and whether violence was taking place in nearby areas. Direct threats, however, are not randomly targeted. Aggression directed against the civilian population is a consequence of war, and not an accidental by-product of the civil conflict (Cairns, 1997). Deliberate attacks on civilians seek to depopulate territory to obtain loot or reduce the fighting capacity of the enemy. A careful designed strategy to appropriate assets, extract natural resources at ease, and prevent civilians from rising up, implies the targeting of particular groups within the population, such as landowners, active community members, or young household heads. The probability of being the victim of a direct threat is defined by

$$\text{Prob}_i(\text{Threat}) = f(L_{in}, V_{in}, A_{in} | Z_i), \quad (6)$$

where L_{in} denotes landownership in the place of origin, V_{in} represents ties in the place of origin, and A_{in} is a dichotomous variable indicating the presence of armed actors in the place of origin.

Presumably, households confront large welfare losses from forced migration. First, assets like land are often abandoned because households have to flee hastily to protect their lives, and most of the times do not have legal titles to the land.¹¹ Second, since displaced households are mostly rural and are trained to compete in rural markets, the returns relative to human capital are lower after migration to urban areas. Third, access to health services and education are not easily regained in reception sites. This implies losing the fix costs invested to access such services and, even worst, interrupting education. Lastly, the sequels of post-traumatic syndrome as a consequence of victimization can hinder the normal capabilities

of displaced households. These losses, although partially manifested in monetary terms, are likely to be one of the most significant costs of displacement for the Colombian society as a whole. If these costs to the displaced themselves are left out in evaluating the dimension of the problem, the policies implemented to alleviate displacement might remain insufficient.

We will estimate the welfare losses brought about by displacement based on methods used in environmental economics. To value the welfare losses stemming from goods and services not transacted in markets, environmental economists developed micro-based models to illustrate how individuals modify behavior to mitigate the impact of environmental shocks and to define the consequent welfare losses. The shock from displacement exhibits a similar structure to those caused by environmental problems. An external negative shock, in this case violence, induces changes in behavior, which in turn impose welfare losses on households. One way of measuring changes in utility in monetary units is compensating variation.¹² In this case, compensating variation can be interpreted as a measure of the willingness to accept income in exchange for a deterioration in security conditions. As shown by Hanemann (1982), compensating variation (CV) can be defined as the measure equating the expected maximum utility before and after displacement. For the model explained above, expected compensating variation can be defined as¹³

$$E[CV_i] = \frac{\alpha(S_{in} - S_{id}) + \beta_n Y_{in} - \beta_d Y_{id} + \delta(C_{in} - C_{id}) + (\gamma_{in} - \gamma_{id})Z_i}{\beta_n}$$

The theoretical contributions of the model defined above are twofold. First, the random utility model permits us to introduce variables never before considered in migration models—for instance, perceptions of security—and to establish behavioral responses to violent events. Second, the definition of welfare losses allows policy makers to decide whether intervention is necessary and establishes an upper bound for the investing of funds aimed at mitigating displacement. The random utility model defined above, typically used in environmental economics, allows us to retrieve the parameters of the utility function and, thereby to estimate welfare losses. Although these models have been widely used in environmental economics,

application to other public policy issues which produce goods and services not traded in markets, is scarce. A noteworthy example being a recent paper that estimates welfare benefits from reducing childhood obesity (Cawley, 2006). By estimating welfare losses imposed by forced displacement, this paper shows the merit of applying environmental valuation methods in other public policy issues.

4. DETERMINANTS OF DISPLACEMENT IN COLOMBIA AND ASSOCIATED WELFARE LOSSES

(a) *The data*

The purpose of the Survey for Internally Displaced Population¹⁴ (SIDP-2000), designed and applied by Kirchoff and Ibáñez (2001), was to identify the causes of displacement in Colombia. Surveys were conducted at origin and destination sites acquire information about displaced households and households who had not displaced despite living in conflict zones (hereafter, referred to as nondisplaced households). Two samples were constructed: a displaced sample and a nondisplaced sample. The questionnaires administered to these households covered issues ranging from the socio-economic characteristics of the household, victimization profiles, the presence of armed actors in the region, access to social services at the

origin and destination sites, land ownership, and agricultural production.

The sample for displaced households was selected at destination sites with the largest influxes of displaced population during 1999. The surveys were administered to 200 displaced households in Bogotá, Cartagena, and Medellín. The distribution of the sample among the three cities was based on the aggregate numbers of displaced population in each one. Questionnaires were applied only to households displaced from Antioquia and Córdoba, the departments with the highest records of population expulsion in 1999. The regional composition of the displaced sample was intentionally chosen with the objective of building a

counterfactual sample of nondisplaced households with a similar regional composition. Since displaced households tend to cluster in specific neighborhoods in each city, households included in the sample were randomly chosen in these neighborhoods. Before interviewing a household, the enumerator asked two screening questions. The first question elicited whether the household was indeed forced to migrate due to violence and the second question asked about the site of origin. The nondisplaced sample was based on a survey of 176 households residing in conflict zones traditionally affected by displacement, located in Antioquia and Córdoba and regions where the displaced households lived before migration. The size and distribution of the nondisplaced sample was chosen according to displacement figures produced by municipalities. Households in each expulsion municipality were randomly chosen. Although the survey provides valuable information about forced displacement in Colombia, the sample is not representative of the displaced population; therefore, results cannot be generalized.

As described above, the sample was constructed based on choices—displacement *versus* nondisplacement—rather than decision-makers. Thus, an exogenous sampling process, wherein decision-makers are selected and their choices observed, was not followed. A choice-based sample, if not treated adequately, renders biased parameter estimates. To address this problem, weights defined by Manski and Lerman (1977) were calculated and used to calculate descriptive statistics as well as to estimate the regressions.

To construct the weights for the displaced sample (w_i^d), we calculated the fraction of the displaced population selecting each municipality where the survey was conducted (Q_i^d)¹⁵ and the analogous fraction for the choice based sample (H_i^d). The weight applied to contribution i of the log-likelihood for the displaced sample is

$$w_i^d = Q_i^d / H_i^d.$$

The weight for the nondisplaced sample (w_i^{nd}) is

$$w_i^{nd} = Q_i^{nd} / H_i^{nd},$$

where Q_i^{nd} represents the fraction of the population that stayed in the municipality where the survey was conducted, and H_i^{nd} the analogous fraction for the choice-based sample. By weighing each contribution of the log-likelihood with

these weights, we obtain unbiased parameter estimates.

Table 2 presents the weighted descriptive statistics for the displaced and nondisplaced samples. The descriptive statistics provide some initial insights regarding displacement behavior. First, displaced and nondisplaced households were exposed to high violence levels. Nearly, 78% of the displaced households and 9% of the nondisplaced households faced direct threats while at the origin site. Moreover, few households have not confronted indirect violence¹⁶—99% of displaced households and 75% of nondisplaced households reported being victims of indirect violence. Second, nondisplaced households felt more protected than displaced households by government forces. In contrast to nondisplaced households, displaced households perceived a greater presence of paramilitary and guerrilla groups in their hometown and a weaker presence of police forces. Third, the evidence suggests that violence is not randomly targeted. Displaced households are more likely to be landowning, headed by younger heads, and have larger consumption aggregates¹⁷ than nondisplaced households. Land-size with respect to landowning households, however, is larger for nondisplaced ones, which may imply that illegal armed groups mostly target landowners with small farms, or that the opportunity cost from abandoning large land plots is larger. Lastly, nondisplaced households apparently have higher access to public investment because they are better educated and have more access to basic social services¹⁸ relative to displaced households.

(b) Estimation results

Aggression against civilians is not random. The previous section provides evidence illustrating that illegal armed group may attack households with particular characteristics; consequently, direct threats are endogenous. To correct for endogeneity of direct threats, we estimate the reduced form for the probability of being the victim of a death threat and the probability of displacement. Although we should include direct threats as a variable in the probability of displacement, we could not estimate the structural model because finding a variable determining the probability of direct threats, but not the probability of displacement, is difficult. Hence, we estimate the reduced form equation for the probability of displacement.

Table 2. *Descriptive statistics*^a

Variable	Displaced		Nondisplaced	
	Mean	Variance	Mean	Variance
Direct threat (=1 if any household member received a death treat, =0 otherwise)	0.78		0.09	
Indirect violence (=1 if respondent aware of other violent events in hometown or nearby town, =0 otherwise)	0.99		0.75	
Paramilitary presence (=1 if paramilitary presence)	0.97		0.66	
Guerilla presence (=1 if guerrilla presence)	0.96		0.50	
Military presence (=1 if Military presence)	0.92		0.90	
Police presence (=1 if Police presence)	0.58		0.90	
Contacts—destination site (=1 if family or friend in destination municipality)	0.87		0.74	
Years of residence—site of origin	15.53	4.10	21.01	1.04
Own land (=1 if owned land in origin site)	0.80		0.06	
Standardized land size (Hectares)	-0.22	0.12	0.01	0.02
Access to social services (=1 if access to education or health)	0.34		0.91	
Highest level of education in household (years of education)	7.37	0.49	9.01	0.30
Access to media (Number of categories of public media—radio, newspaper, television, periodicals, others—accessible to household at the place of origin)	2.79	0.42	3.35	0.11
Predicted rural annual consumption ^b	1.37	0.11	1.28	0.07
Predicted urban annual consumption ^b	2.14	0.29	1.51	0.08
Age household head	33.71	1.98	43.93	1.11
Male household head	0.90		0.60	
Number of organizations	0.26	0.13	0.27	0.04

Source: Authors' calculations based on SIDP-2000.

^a Calculated using Manski weights.

^b In million pesos.

(i) *The probability of being the victim of a death threat*

Table 3 reports the results for the probability of being the victim of a death threat. Strategies pursued by rebel groups, state presence, and household characteristics determine the probability of being the victim of a direct threat. Estimations indicate that households residing in zones where there exists a paramilitary presence have a larger probability of being threatened, whereas a guerrilla presence does not seem to have a significant effect on the likelihood of being threatened. This result should be carefully analyzed. When the SIDP-2000 survey was conducted, displacement occurred mainly as a consequence of paramilitary actions like threats and massacres. The dynamics of the conflict, however, have changed significantly during the last years, and today, guerrilla groups are responsible for many displacement events. Lately, guerrilla attacks on small and medium-sized municipalities have provoked large expulsions of respective populations.¹⁹

State presence, namely the presence of armed forces, is effective to protect households from being the victims of illegal armed groups. Police protection deters threats from illegal armed groups, thus preventing displacement. By contrast, a military presence does not reduce the likelihood of threats. This is not surprising, as protection of the civilian population requires a constant presence of the state, and a reliable institution with strong links to the community. While the police force embodies these conditions, the role of the military forces is to protect the population during armed conflicts. Thus, the presence of the latter should not be expected to be permanent in each Colombian municipality.

Because some particular households are more frequently targeted by armed groups or some are better able to adopt defensive measures, household characteristics influence the likelihood of being the victim of a direct threat. The most likely to be victims of direct threats are small landowners, families with young household heads, and female-headed

Table 3. *Probability of threats—reduced form^a*

Variable	Coefficient estimate (<i>t</i> -stat)
Indirect violence	-0.8100 (-1.00)
Presence of military forces	0.7161 (1.33)
Presence of police forces	-1.7135 (-3.63)*
Presence of paramilitary groups	1.5122 (2.21)**
Presence of guerrilla groups	1.1227 (1.56)
Contact at reception site	-0.6790 (-1.51)
Access to media	0.5406 (3.02)*
Years of residence—site of origin	-0.0124 (-0.75)
Land ownership	0.2962 (0.64)
Standardized land size	1.5118 (2.92)*
Access to social services	-0.9243 (-2.00)**
Household education	0.1401 (1.83)***
Rural consumption per capita ^b	-0.0039 (-4.37)*
Urban consumption per capita ^b	0.0024 (4.60)*
Age household head	-0.0112 (-0.61)
Male household head	-1.4209 (-2.54)*
Number of organizations	-0.4754 (-2.02)**
Number of observations	345
Pseudo- <i>R</i> ²	0.6435

Source: Authors' calculations based on SIDP-2000.

^a Estimated using Manski weights.

^b In thousand pesos.

* Significant at 1% level.

** Significant at 5% level.

*** Significant at 10% level.

households. Conversely, families with larger consumption aggregates are less likely to be terrorized, probably because they are better able to adopt defensive measures against illegal armed groups. These results confirm the hypotheses developed in the literature about displacement in Colombia—illegal armed groups violently appropriate land and threaten young members of the community as part of a war strategy. Surprisingly, the number of organizations, a proxy for the leadership of the household in the community, is significant, but decreases the odds of being threatened. Two interpretations are possible. On the one hand, illegal armed groups may target leaders in the community and the number of organizations is not an appropriate measure of leadership. On the other hand, membership in an organization can provide protection to its members, thus reducing the probability of victimization.

(ii) *Determinants of displacement*

The displacement model defined in Section 3 is estimated using maximum likelihood procedures. Three models are estimated. The first is the Aggregated Model, which makes no distinction between preventive and reactive displacement. In the following section, we estimate a model distinguishing preventive from reactive displacement.

Table 4 reports the estimation results for the Aggregated Model. The probability of displacement is determined by variables capturing the strategies pursued by rebel groups, state presence, income generation possibilities, and household characteristics. The presence and actions of illegal armed as well as risk variables, which render some households possible targets of their actions, trigger displacement. The existence of illegal armed groups—paramilitary or guerrilla—and the occurrence of indirect violence pushes household to flee their hometown. Risk variables, like landownership and the

Table 4. *Probability of displacement—reduced form^a*

Variable	Coefficient estimate (<i>t</i> -stat)
Indirect violence	2.4112 (3.77)***
Presence of military forces	-2.0446 (-4.04)***
Presence of police forces	-3.7317 (-4.49)***
Presence of paramilitary groups	4.3127 (5.89)***
Presence of guerrilla groups	2.1658 (5.77)***
Contact at reception site	0.4831 (1.56)
Access to media	-0.4316 (-3.57)***
Years of residence—site	0.0303 (2.82)***
Land ownership	1.4728 (3.05)***
Standardized land size	0.0510 (0.28)
Access to social services	-1.6638 (-3.92)***
Household education	-0.1349 (-4.22)***
Rural consumption per capita ^b	-0.0032 (-4.75)***
Urban consumption per capita ^b	0.0023 (3.81)***
Age household head	-0.0835 (-5.77)***
Male household head	-0.3281 (-1.21)
Number of organizations	1.0670 (3.90)***
Number of observations	345
Pseudo- <i>R</i> ²	0.6665

Source: Authors' calculations based on SIDP-2000.

^a Estimated using Manski weights.

^b In thousand pesos.

* Significant at 10% level.

** Significant at 5% level.

*** Significant at 1% level.

insertion of the family in the community, are push factors. First, landownership, which was not statistically significant for the direct threat estimations, is positive and significant, showing that landowners are targeted by illegal armed groups. Second, higher numbers of years of residence—an imperfect proxy for the depth of a households' insertion in the community—and greater levels of organization affiliation increase the probability of displacement. Because the regression estimates the reduced form coefficients, these three variables may be capturing the deliberate targeting of community leaders by illegal armed groups.

State presence, though significant, do not counterbalance the effects of violence at the origin site. Military and police presence dissuade displacement. Furthermore, households with access to basic social services are less likely to displace. However, the joint effect of both variables is not enough to compensate for the influence of indirect violence, let alone the presence of illegal armed groups in the region.

Income generation possibilities in origin and destination municipalities play a role in the migration decision, yet strategies pursued by illegal armed groups dominate the impact of these variables. Access to media dissuades displacement, probably by providing information about the difficulties families face in reception sites. Surprisingly, the availability of contacts at reception sites, something which reduces migration costs, is not statistically significant. Consumption indicators in the displacement decision behave similarly to those in migration models. Foregone consumption at the origin site decreases the chances of displacement, while consumption opportunities at the destination site induce displacement. Unlike the results in traditional migration models, better-educated household are less willing to displace; better-off households are most likely able to adopt protective measures or have more accurate information regarding the opportunities at reception sites, and thus prefer not to displace.

Household characteristics partially determine the decision to displace. Households with younger heads are more inclined to displace. As previously discussed, young individuals are likely to be possible targets of illegal armed groups. In addition, the tendency of younger heads to migrate may reflect the risk preferences of households, and is a standard result in the migration literature.

Empirical estimation confirms that violence modifies the benefits and costs of migration

when life threats, the lack of rule of law, and the violation of property rights prevail. Violence and aggression against the civilian population modifies the migration incentives of education, and location-specific assets, like land and social capital. Other migration determinants, like consumption indicators and access to basic social services, influence displacement decisions in the expected direction.

Military and police protection reduce displacement, although at different stages of the process. Police protection is paramount for easing the aggression of illegal armed groups against the civilian population. Once aggression against the civilian population unfolds, a military and police presence is important for halting displacement.

(c) *Modeling two displacement types: preventive and reactive*

The previous model is now estimated for preventive and reactive displacement. We refer to preventive displacement when households identify “fear despite not being threatened” as a reason for fleeing their hometown. Results for the preventive and reactive model are presented in Table 5.

Perceptions of security variables are similar in the preventive and reactive displacement models. Indirect violence continues to be an important determinant of displacement. The presence of government forces and illegal armed groups is also significant for both models, but more so for preventive displacement. These results may suggest that the more risk averse self-select into preventive displacement, since the mere presence of illegal armed groups prompts displacement, despite not being the victim of a threat.

Traditional migration determinants are stronger for preventive displacement. Education levels of household heads, consumption aggregates, and access to social services, although significant for both models, are much more so for preventive displacement. Moreover, the factor of contacts at reception sites, which was not significant for the aggregate model, is positive and significant for preventive displacement. When households displace preventively, the decision-making process is less hasty, allowing families to better assess the benefits and costs of migration. As a result, traditional migration variables are more important for preventive displacement.

On the other hand, the influence of access to the media and years of residence is different for

Table 5. *Probability of displacement—preventive and reactive displacement^a*

Variable	Preventive displacement Coefficient estimate (<i>t</i> -stat)	Reactive displacement Coefficient estimate (<i>t</i> -stat)
Indirect violence	2.4971 (2.50)***	3.2084 (5.53)***
Presence of military forces	-2.0451 (-2.79)***	-1.6154 (-2.18)**
Presence of police forces	-6.1604 (-4.59)***	-3.7243 (-1.73)*
Presence of paramilitary groups	6.0322 (5.30)***	4.2573 (2.51)**
Presence of guerrilla groups	2.4596 (4.57)***	2.2600 (6.13)***
Contact at reception site	1.3662 (3.00)***	0.1268 (0.41)
Access to media	-0.2676 (-1.28)	-0.4667 (-3.65)***
Years of residence—site of origin	-0.0325 (-1.93)**	0.0342 (2.63)**
Land ownership	3.4900 (3.97)***	0.7608 (1.90)**
Standardized land size	0.5517 (1.89)**	-0.3551 (-1.20)
Access to social services	-3.6541 (-2.58)***	-1.0627 (-2.37)**
Household education	-0.1789 (-2.06)**	-0.1471 (-3.06)**
Rural consumption <i>per capita</i> ^b	-0.0061 (-4.88)***	-0.0026 (-2.49)**
Urban consumption <i>per capita</i> ^b	0.0046 (4.46)***	0.0021 (2.28)**
Age household head	-0.1408 (-3.64)***	-0.0754 (-4.81)***
Male household head	-1.2832 (-2.97)***	-0.3837 (-1.30)
Number of organizations	1.3777 (3.53)***	1.0090 (3.23)***
Number of observations	233	281
Pseudo- <i>R</i> ²	0.7665	0.6954

Source: Authors' calculations based on SIDP-2000.

^a Estimated using Manski weights.

^b In thousand pesos.

* Significant at 10% level.

** Significant at 5% level.

*** Significant at 1% level.

reactive displacement in contrast to preventive displacement. Access to media is a deterrent for reactive displacement, whereas it is not significant as far as halting preventive displacement. Furthermore, the impact of access to media in reducing displacement outweighs variables like access to social services and the presence of military forces. Possibly, the perspective of facing dire conditions in reception sites is an effective instrument for deterring reactive displacement. Years of residence, while negative for preventive displacement, is positive for reactive displacement. The former might indicate the migration costs of leaving behind a web of social networks when migrating, whereas the latter may denote the insertion of the household in the community and, as a consequence, a higher risk of victimization.

Empirical findings show that violence, security perceptions, migration costs and traditional migration variables remain significant for both types of displacement. However, the behavior of preventive and reactive types is partially different. Security perceptions and traditional migration variables exert a stronger influence on preventive displacement, implying

that preventive displacement allows families to better analyze the benefits and costs of forced migration.

(d) *Welfare losses*

Welfare losses are estimated using the parameters from the probability of displacement for the aggregated model, the preventive model and the reactive model. Welfare losses are calculated for each household by incorporating the characteristics of the household using the definition for compensating variation derived in [Appendix I](#). Welfare losses are presented as the percentage of the net present value of rural aggregate consumption.²⁰ To estimate the net present value of rural aggregate consumption, we assume that the remaining life span of the household after displacement is equal to life expectancy in rural areas minus the age of the household head. Life expectancy is differentiated by gender.

Welfare losses from displacement are substantial. In fact, the costs from displacement amount to 37% of the net present value of aggregated rural consumption (see [Table 6](#)).

Table 6. *Welfare losses as a percentage of lifetime household consumption* mean and standard deviation*

	% of Lifetime consumption mean (s.d.)
Aggregated model	37% (66%)
Preventive displacement	20% (37%)
Reactive displacement	33% (55%)

Source: Authors' calculations based on SIDP-2000.
Note: (*) Net present value.

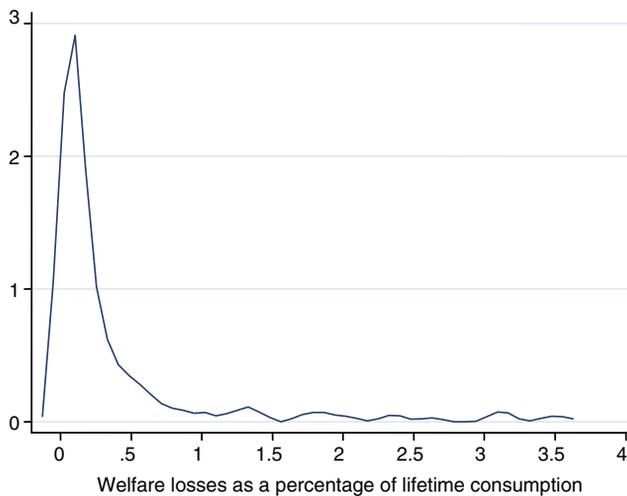
Figure 1 shows the cumulative distribution of welfare losses as a percentage of the net present value of rural aggregate consumption. Nearly, 80% of households experience welfare losses above 40% of the net present value of the aggregated rural consumption.

When welfare losses are estimated for preventive and reactive displacement, we find that preventive displacement generates lower welfare losses—20%, in contrast to reactive displacement, where it is 33% (Table 6). Because preventive displacement allows families to mitigate the impact of migration by selling assets, protecting land, and contacting family and friends in reception sites, welfare losses may be lower.

The economic burden of displacement is higher for poor households. Figure 2 plots the average welfare losses as a percentage of lifetime consumption per rural consumption quartile.²¹ Welfare losses as a percentage of lifetime

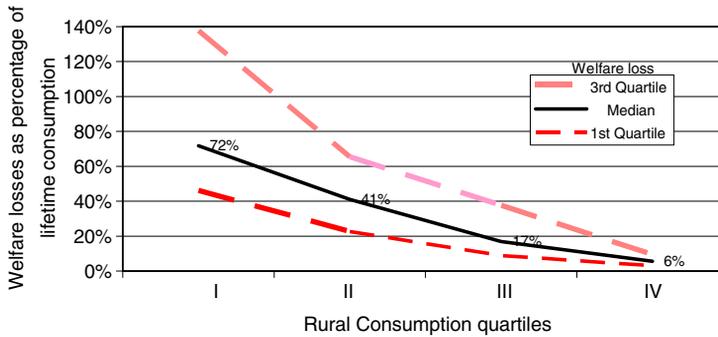
consumption decrease significantly as households become better off, with a particular steep decline for households located in the fourth quartile. While displaced households located in the first and second consumption quartile confront median losses near to 72% and 41% of lifetime consumption, welfare losses for households located in the fourth quartile average approximately 6%. Moreover, Figure 2 shows a larger dispersion of welfare losses among poor households and a greater frequency of cases of extremely high welfare losses.

Unfortunately, the economic literature does not provide similar estimations by which we might compare the size of welfare losses from displacement in Colombia. However, comparisons with estimates of the costs of diseases or crime show that the burden of displacement is much higher. Total economic losses to victims of crime, including medical costs and lost work time, during 1992 in the United States were measured at \$532 per crime (Klaus, 1994). Levitt (1996) obtained a much higher estimate of the cost of pain, suffering, and economic loss for the average crime in the United States, around \$3,000, equivalent to roughly 12% of GDP *per capita*. Londoño (1998) calculated human capital losses in Colombia originating from violence at around 4% of GDP each year. Other points of comparison are Rubio's (1997) estimates of total household expenditures on



Source: Authors' calculation based on SIDP-2000

Figure 1. *Kernel Density for Welfare Losses as a Percentage of Lifetime Consumption.*



Source: Authors' calculation based on SIDP-2000

Figure 2. *Welfare losses as a percentage of lifetime consumption by household and consumption quartile.*

protection and security, which amounts to 1.4% of the Colombian GDP, and the total burden of disease per year in Latin America, which amounts to 0.2 Disease Adjusted Life Years (DALYs) per person. In summary, displaced populations show a comparatively high index of vulnerability when compared to other types of risks that are addressed by publicly funded programs.

5. CONCLUSIONS

Forced displacement modeling diverges from traditional migration modeling. Many key determinants of migration have the opposite effect in the context of forced displacement. Our empirical findings confirm this hypothesis. Violence at the origin site modifies the migration incentives of education and location specific assets, like land and social capital.

Large welfare losses justify policy intervention. The economic costs of displacement are,

on average, 37% of the net present value of aggregated rural consumption. Moreover, poorer families experience larger welfare losses. In fact, some households present welfare losses above 80% of the net present value of aggregated rural consumption.

Our estimations provide evidence concerning possible policy instruments for preventing displacement. Violence and security perceptions are the major determinants of displacement and are, therefore, the key instruments in preventing displacement. Other types of intervention have a marginal effect on displacement and cannot compensate for the effect of violent conflict. However, police and military protection can mitigate displacement. While a police presence prevents direct threats, a military and police presence are instrumental for protecting the population once displacement is imminent. On the other hand, economic variables, like access to basic social services or to information, only mildly prevent displacement.

NOTES

1. The Interamerican Commission on Human Rights (1999) describes a displaced person as anyone who has been forced to migrate within national boundaries, leaving aside one's residence or one's habitual economic activities, because either one's life, physical integrity or freedom have been violated or threatened by situations such as armed conflict, generalized violence, the violation of human rights, or any other situation that may alter public order.

2. The real magnitude of forced displacement in Colombia is a large controversy in the country. Official figures from the Colombian Government estimate 1.772.971 people were forced to displace till the year 2005 (www.red.gov.co). CODHES, a Colombian NGO, estimates 3.720.873 people were forced to displace till the year 2005 (www.codhes.org). Lastly, USCR calculates the magnitude of forced displacement in Colombia till 2005 in 2.9 million.

3. www.red.gov.co. Lastly consulted in November 22nd 2006.
4. Municipal statistics for rural and urban areas are not available. To classify municipalities as rural and urban, we used information about the number of inhabitants in the municipality and an index indicating the percentage of the municipality that is rural. A municipality was classified as rural when the population was equal or less than 10,000 inhabitants and the rural index was greater than 50%.
5. Municipalities are the smallest administrative units in Colombia. Municipalities are considered to face high incidences of displacement or high incidence of massacres when the related figures fall above the national median.
6. Departments are equivalent to states.
7. The intensity of displacement is measured as the number of displaced persons per 100,000 inhabitants.
8. Programs to eradicate illicit crops follow two strategies: (i) the aerial fumigation of illicit crops; or (ii) manual and voluntary crop substitution. Some analysts consider aerial fumigation as causing displacement.
9. In Colombian urban centers, discrimination against displaced persons is particularly strong. Some native residents wrongly believe that displaced households belong to illegal armed groups and, in addition, perceive this population as diverting public resources previously allocated for the poor.
10. This model was developed in Kirchoff and Ibáñez (2001).
11. Ibáñez and Querubín (2004) found that nearly 53% of displaced households had legal title of their land; the remaining households had informal access to land.
12. Compensating variation for avoiding displacement is the amount of money necessary to leave the individual indifferent as far as displacement *versus* remaining in his hometown.
13. A complete derivation of the compensating variation is presented in Appendix I.
14. A detailed description of the survey can be found in Kirchoff and Ibáñez (2001).
15. These figures are available at www.red.gov.co.
16. A household was defined so as to confront indirect violence when nearby towns or friends and family were the victim of attacks by illegal armed groups, massacres, bombs or any other type of violence.
17. Appendix I describes the methodology used to predict rural and urban aggregate consumptions.
18. Access to basic social services is a dummy variable equal to one when the household has access to education and health.
19. For example, in May 2002, leftist guerrilla groups attacked Bojayá, a small municipality located along the Pacific coast. As a result of the attack, 119 people died and 4,284 people were forcibly displaced (CE, 2002). This is the best known episode of an uninterrupted sequence of armed group attacks against civilians up through 2005.
20. The estimation of aggregate consumption and the net present value of rural aggregate consumption is presented in Appendix II.
21. *Per capita* consumption quartiles for rural areas are calculated using the ECV, 1997.
22. The derivation of the compensating variation draws on Hanemann (1982).

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APPENDIX I. DERIVATION OF COMPENSATING VARIATION ²²

The utility from displacement for household i is defined as

$$U_{id} = \alpha S_{id} + \beta_d Y_{id} + \delta C_{id} + \gamma_{id} Z_i + \varepsilon_{id}.$$

On the other hand, the utility for household i from residency at the origin site is

$$U_{in} = \alpha S_{in} + \beta_n Y_{in} + \delta C_{in} + \gamma_{in} Z_i + \varepsilon_{in}.$$

Table II.1. Estimate for log of rural and urban consumption

Variable	Rural coefficient estimate (<i>t</i> -statistic)	Urban coefficient estimate (<i>t</i> -statistic)
Number of children under 2 years	-0.0810 (-1.32)	-0.112* (-1.77)
Number of children under 2 years squared	0.0310 (0.75)	0.0567 (1.27)
Number of children between 3 and 13 years	0.0324 (1.69)*	0.0146 (0.72)
Number of children between 3 and 13 years squared	-0.0027 (-0.73)	0.0000 (0.00)
Number of adults (14-65)	0.1989 (9.07)***	0.2137 (11.74)***
Number of adults (14-65) squared	-0.0119 (-3.44)***	-0.0173 (-5.96)***
Age household head	0.0093 (2.16)**	0.0183 (4.78)***
Age household head squared	-0.0001 (-3.37)***	-0.0002 (-5.63)***
Male household head	0.0975 (2.47)***	0.1758 (5.23)***
Years of education household head	0.0326 (3.74)***	-0.0020 (-0.31)
Years of education household head squared	0.0005 (0.70)	0.0024 (7.00)***
Years of education spouse	0.0274 (3.20)***	0.0001 (0.02)
Years of education spouse squared	0.0005 (0.83)	0.0019 (5.27)***
No spouse	-0.0623 (-1.70)*	-0.0155 (-0.45)
Standardized land size	-0.0137 (-0.61)	
Constant	14.4613 (85.91)***	14.5217 (135.29)***
Adjusted <i>R</i> ²	0.3029	0.3956
<i>F</i> -test	18.34	18.34

Source: Authors' calculation based on Encuesta de Calidad de Vida (1997).

*Municipal controls included.

* Significant at 10% level.

** Significant at 5% level.

*** Significant at 1% level.

The money value necessary to equate the utility before and after displacement is equivalent to

$$\alpha S_{id} + \beta_d Y_{id} + \delta C_{id} + \gamma_{id} Z_i + \varepsilon_{id} = \alpha S_{in} + \beta_n (Y_{in} - CV_i) + \delta C_{in} + \gamma_{in} Z_i + \varepsilon_{in},$$

which becomes

$$CV_i = \frac{\alpha(S_{in} - S_{id}) + \beta_n Y_{in} - \beta_d Y_{id} + \delta(C_{in} - C_{id}) + (\gamma_{in} - \gamma_{id})Z_i + \varepsilon_{in} - \varepsilon_{id}}{\beta_n}.$$

Since ε_{id} and ε_{in} are random variables with a mean of zero, the expected compensating variation is defined as

$$E[CV_i] = \frac{\alpha(S_{in} - S_{id}) + \beta_n Y_{in} - \beta_d Y_{id} + \delta(C_{in} - C_{id}) + (\gamma_{in} - \gamma_{id})Z_i}{\beta_n}.$$

APPENDIX II. PREDICTION OF CONSUMPTION AGGREGATE

To estimate the consumption aggregate of SIDP-2000 households, we estimated a regression for the micro determinants of consumption for urban and rural areas utilizing the Encuesta de Calidad de Vida—ECV (1997).

The coefficients from the estimation were used to predict urban and rural consumption for displaced households. To estimate the net present

value of rural aggregate consumption, we assume the remaining life span of the household after displacement is equal to life expectancy in rural areas minus the age of the household head. Life expectancy is differentiated by gender. According to the World Health Organization, life expectancy in Colombian rural areas is 76.3 years for women and 67.5 for men. A discount rate of 9.5% was used.

Based on Wodon (1999) and the results for Vélez (2002), we included the following deter-

minants of consumption: (i) regional controls; (ii) household size variables: the number of babies, children and adults; (iii) other demographic and gender variables such as gender and age of household head as well as family structure; (iv) education variables (education of the household head and of the spouse); and (v) the standardized amount of land owned in rural areas. Results for the urban and rural estimations are presented in Table II.1.

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