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Catherine Rodríguez
Edgar Villa

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Calle 19A No. 1 – 37, Bloque W.
Bogotá, D. C., Colombia
Teléfonos: 3394949- 3394999, extensiones 2400, 2049, 3233
infocede@uniandes.edu.co
http://economia.uniandes.edu.co

Ediciones Uniandes
Carrera 1ª Este No. 19 – 27, edificio Aulas 6, A. A. 4976
Bogotá, D. C., Colombia
Teléfonos: 3394949- 3394999, extensión 2133, Fax: extensión 2158
infeduni@uniandes.edu.co

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proceditor@etb.net.co

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Catherine Rodriguez

cathrodr@uniandes.edu.co

Universidad de los Andes

Edgar Villa

e.villa@javeriana.edu.co

Pontificia Universidad Javeriana[1]

Abstract

Using a unique data set from the major Colombian cities collected between 2000-2003 and with information on more than 16,000 households, this paper studies the relationship between the kidnap risk a household faces with its migration decisions. We find evidence that exposure to such risk induces households to react sending some of their members to an international destination but not necessarily to a domestic one. This finding is robust to the inclusion of several household characteristics usual in the migration literature and an alternative measure of kidnap risk. The implication of our findings suggest a possible "brain drain" from Colombia.

Key words: Migration; Kidnaps

JEL classification: O15, O54

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Secuestros y Migración: Evidencia de Colombia

Catherine Rodriguez
cathrodr@uniandes.edu.co
Universidad de los Andes

Edgar Villa
e.villa@javeriana.edu.co
Pontificia Universidad Javeriana

Resumen

Utilizando una base de datos única de las principales ciudades colombianas entre los años 2000 y 2003 que contienen información de más de 16,000 hogares, este trabajo investiga la relación que existe entre el riesgo de ser secuestrado que cada hogar enfrenta y sus decisiones de migración. Encontramos evidencia que la exposición a dicho riesgo induce a los hogares a enviar al menos uno de sus miembros a un destino internacional pero no a uno nacional. Este resultado es robusto a la inclusión de los controles generalmente utilizados en la literatura de migración y a medidas alternativas en el riesgo de ser secuestrado. El resultado encontrado implica que durante estos años se pudo presentar una "fuga de cerebros" del país debido a este tipo de crimen.

Palabras Clave: Secuestros, Migración, Colombia
Códigos JEL : O15, O54

1 Introduction

Although not necessarily obvious, the migration and crime literatures may be related. Most migration studies concentrate on analyzing the effects of networks and wage differentials on migration decisions of individuals and/or households. However, migration decisions could also be influenced by factors such as the risks individuals are exposed to. Households in developing countries face several types of risks. Through different formal and informal mechanisms, some of these risks can be insured against upon. Nonetheless, violence risks are especially difficult to insure against since they involve both monetary and psychological costs making traditional safety nets not feasible. When these costs are perceived to be high, even life threatening, households may choose to migrate to escape them. One such risk that is present in developing countries is the risk of being kidnapped for ransom.

This paper studies the effect of kidnap risks on households' migration decisions in Colombia. Previous studies such as Schultz (1971), Morrison and May (1994) and Engel and Ibañez (2007) have found positive effects of homicides and armed conflict on migration. However, to the best of our knowledge, the influence of kidnap risks has not been addressed before in the migration literature. This risk is becoming more and more prevalent in some developing countries and is important to understand and quantify the consequences it may bring.[1] According to Castle Rock Global Corporation the top four countries where kidnaps take place are Mexico, Brazil, Colombia

[1]For example, the rapid increase of this type of crime in Mexico, which is now the country with the highest kidnap rate in the world, has induced current President Calderon to suggest the introduction of lifetime prison for people that commit this crime. Moreover, the private sector has now developed a micro-chip that is implanted in peoples' skin so they can be traced in case they are kidnaped. (http://news.bbc.co.uk/hi/spanish/latin_america/newsid_7562000/7562903.stm)

and Venezuela representing 50% of all kidnaps in the world.[2] However, this crime is also common in countries such as South Africa, Philippines, Nigeria, Afghanistan and Iraq among others. Colombia is an interesting country to study the relationship between migration and kidnap risks since it is known to be one of the countries with the highest kidnap rates in the world. According to País Libre, a non-profit NGO that offers counseling services to the kidnap victims in Colombia, 23,666 kidnaps were reported between 1997 and 2007, amounting to 0.05% of the country's population.

Using a unique micro level data set including over 16,000 households in the major Colombian cities we are able to link the migration and economics of crime literature through a growing type of crime. Given that the data set used includes questions on kidnap and migration at the household level, it is possible to empirically study the migration behavior of households that comes as a reaction against the threat of kidnaps. Naturally, this risk is unobservable for any given household and hence we first need to estimate it. This type of crime has a clear economic motivation behind it. For instance approximately 64% of the reported 23,666 kidnaps in Colombia had an economic motive in which a monetary ransom was demanded. Hence, kidnap risks lend themselves to be predicted based on household characteristics. Using idiosyncratic and neighborhood characteristics in which households reside and under the assumption that kidnappers target relatively wealthy households within each neighborhood we estimate the likelihood for each household to be a victim of this crime. With this constructed regressor we then estimate how such likelihood affects international and domestic migration decisions at the household level.

[2]Retreat from: http://www.castlerockinternational.com/news/casualty-insurance/casualty-categories/47-kidnap-and-ransom-insurance/104-top-10-kidnap-rated-countries-with-ransom-stats?start=1

The results suggest that relatively wealthier households within a given neighborhood are more likely to become kidnap victims. Moreover, this kidnap risk affects in a positive and significant manner international migration at the household level. Specifically, all else equal an increase of a standard deviation in the kidnap risk increases by 0.5 percentage points on average the probability of a household to send some member a*broad*. This result is robust to different specifications and to an alternative non parametric measure of kidnap risk that tackles with possible concerns of omitted variable bias and reverse causality among others. Evidence of the effect of such crime on *domestic* migration within Colombia is mixed being zero or positive and significant depending on the measure of risk used. A counter factual exercise estimates that if kidnap risks are eliminated the percentage of individuals with college education that would not migrate would increase by approximately 1%. Taken together, the results provide evidence for the view that the presence of kidnap risks "tax" more educated and wealthier households in Colombia inducing a non-negligible "brain drain" from the country.

The remainder of the paper is organized as follows. Section two introduces a conceptual and empirical framework linking migration decisions and kidnap risks. Section three describes the data set used while the fourth section reports the results. The fifth section checks some issues concerning robustness and selection bias. The sixth section draws some conclusions on the costs in terms of human capital loss from kidnap risks. Finally section seven concludes.

2 Conceptual Framework

2.1 Migration Model

Economists have long thought about migration decisions of households. In their seminal paper, Harris and Todaro (1970) developed a theoretical model in which the potential migrant compares the wage of remaining in the place of residence with the expected wage of migrating. Since then, the theoretical and empirical literature has expanded the set of variables that households might take into account in this decision process. Among them, we find personal and family characteristics such as education and age of the potential migrant. Similarly, other models have introduced migration and information costs induced by travel expenses and reduced by possible migration networks.[3] However, few studies have analyzed the effect that crime may have on migration decisions. Notable exceptions include Schultz (1971) who studies how homicides affects Colombian net migration rates; Morrison and May (1994) who study how political violence in Guatemala increased immigration outflows and Engel and Ibañez (2007) who analyze the determinants of displacement of rural households subject to political violence within Colombia. With the exception of the later paper, that concentrates on rural displacement, none of the previous studies used micro-level data to analyze the relationship between violence and household migration decisions.

This paper contributes to the existing literature by analyzing how a specific type of violence *risk*, namely kidnap risk, may or may not influence migration decisions of *urban* households. Many forms of violence such as homicides, suicides, or sexual assault are not primarily driven by economic motives and hence cannot be predicted

[3] Examples include among others: Becker (1964), Stark and Bloom (1985), Borjas (1987), Chiquiar and Hanson (2005), Epstein and Gang (2004) and Mckenzie and Rapoport (2007).

easily under an economic framework. Kidnaps however are driven usually by pecuniary considerations and can be predicted up to some extent by household observable variables. Moreover, this type of violence goes against one of the most basic human rights -the right of freedom- and has negative effects on households' wealth, moral and psychological well being. If the latter costs for the household are monetized, the kidnap risk should then be viewed as an additional cost that must be taken into account when evaluating the possibility of staying in the place of residence or migrating to another destination.

To model in a simple way the relationship between the kidnap risk a household perceives and its decision to send some of its members to another destination we use a standard household Becker type income pooling model. We assume households' preferences to be represented by a quasilinear utility function of the form

$$U_i = \ln A_i + \alpha \ln c_i + (1 - \alpha) \ln o_i + d_i \tag{1}$$

where $B_i = \exp X_i\beta$, X_i is a vector of household characteristics, (α, γ) are the preference weights on the non-durable c_i and durable d_i consumption good and o_i is leisure. We normalize the price of the non-durable good to one and denote by $P > 1$ the publicly known price of the durable consumption good.

Each household has a binary decision to make with respect to migration of any of the household members:

i) To work in the country in which the household resides which we call "non-migrants", or

ii) To send some members to another destination which we call "migrants".

These two choices will be denoted $a = 0, 1$ respectively. Migrant households will

incur in some migration costs denoted $m > 0$ per member sent. The pooled wealth of the household consist of non-labor income and assets

$$W_{i,a} \equiv \varpi_a (S_i) T_i + I_i + A_i$$

where ϖ_a denotes the real wage obtained by the household which depends on the migration decision the household takes and on the education level S_i of its members, T_i is total time endowment of the household (time endowment of h_i members, each providing 1 unit of time) which must be divided between leisure (o_i) and labor (L_i), $I_{i,a}$ denotes non-labor income which may consist of capital income and/or remittances from household members abroad among other things and finally $A_{i,a}$ represents assets such as bonds, stocks and properties.

Under these assumptions, the indirect utility function that the household would enjoy by choosing activity a is given by the following log-linear function

$$v_i (W_{i,a}, S_i, X_i) = X_i \beta - (1-\alpha) \ln \varpi_a (S_i) + \max \left(0, \frac{W_{i,a}}{P} - 1 \right) + \varepsilon. \qquad (2)$$

where $\varepsilon \equiv \alpha \ln \alpha + (1-\alpha) \ln (1-\alpha) + \ln P$.[4]

We view kidnappers as a criminal organization that target relatively wealthy households within a given neighborhood that are more likely to pay a demanded ransom. The problem is that a kidnapper may face an information constraint since the wealth level of a household i, denoted $W_{i,a}$, might be unobservable. The kidnapper will have to predict it based on observable information. We assume that what is

[4]The indirect utility function is derived by maximizing (1) subject to

$$c_i + o_i \varpi_a (S_i) + P d_i = W_{i,a}$$

in $c_i, L_i \equiv T_i - o_i$ and d_i. The demands are $c_i = \alpha P$, $o_i = \frac{P(1-\alpha)}{\varpi_a}$ and $d_i = \max \left(0, \frac{W_{i,a}}{P} - 1 \right)$. This last function makes sense because only households with high enough wealth relative to P will demand the durable good.

observable is the durable consumption good and the number of members of the household. Given that P is observable then a kidnapper will be able to infer a lower bound on the wealth level of the household within a neighborhood. Naturally, neighborhood characteristics in which the household reside, like mean wealth level, can help predict a better target for a kidnapper presumably because households self-select themselves into neighborhoods depending on their wealth.

Once a kidnapper selects potential households that are predicted to have the capacity to pay the demanded ransom in a given neighborhood, it is reasonable to assume that households with a larger number of members residing in the neighborhood are more vulnerable. For instance, consider two households that reside in the same neighborhood, consume the durable good, have the same predicted wealth but differ in the number of members. It is easier for a kidnapper to target the household that has the largest number of members since his probability of capturing any of its members is higher. The nature of a kidnap implies that in the extreme case in which there is only one member in the household the kidnapper would not abduct him because there would be no one left to pay the ransom. In this sense, sending members to another destination could in principle reduce the kidnap risk of the household as a whole. It is important to note that even though the victimization probability of a given household increases with the number of members, the individual probability of each member decreases with the number of members if the household is indeed targeted by a kidnapper.

Since households face uncertainty about being a kidnap victim we take an expected indirect utility approach similar to Day (1992). Let $p_i(h_i)$ denote the perceived kidnap probability of household i as a decreasing function of $h_i \in \mathbb{N}$ the number

of members of the household where $p_i(1) = 0$. In other words, we assume that if the household sends $0 < k_i < h_i$ members to another destination the perceived probability $p_i(h_i - k_i)$ is lower than $p_i(h_i)$.[5] If a member of household i is kidnapped and the household complies to pay, the gross wealth of the household is reduced in R_i which corresponds to the ransom demanded. Given that household wealth is assumed not to be observable by a kidnapper the demanded ransom should be a function of mean wealth ($\bar{W}$) and wealth inequality ($Gini$) within a neighborhood, i.e. $R_i = R\left(\bar{W}, Gini\right)$.

Household i prefers to send k_i members to another destination (allocation 1) to not sending any (allocation 0) if and only if it yields a higher expected utility

$$E\left[v_{i,1}|S_i, X_i, d_i > 0\right] \geq E\left[v_{i,0}|S_i, X_i, d_i > 0\right] \tag{3}$$

where

$$\begin{aligned} E\left[v_{i,1}|S_i, X_i, W_{i,a}, d_i > 0\right] &= X_i\beta - (1-\alpha)\ln\varpi_1(S_i) + \frac{W_{i,1} - p_i(h_i - k_i)R_i}{P} \\ E\left[v_{i,0}|S_i, X_i, W_{i,a}, d_i > 0\right] &= X_i\beta - (1-\alpha)\ln\varpi_0(S_i) + \frac{W_{i,0} - p_i(h_i)R_i}{P} - 1. \end{aligned} \tag{4}$$

Inequality (3) reduces to

$$\left(\varpi_1(S_i) - \varpi_0(S_i) - m\right)k_i + R_i\left[p_i(h_i) - p_i(h_i - k_i)\right] - P(1-\alpha)\left(\ln\frac{\varpi_1(S_i)}{\varpi_0(S_i)}\right) \geq 0 \tag{5}$$

and has a straightforward intuition like a standard wage differential migration equation. If household i does not perceive a kidnap risk (i.e. $p_i = 0$ for all $0 < k_i <$

[5] This assumption goes well with anectodal evidence that suggest household members may not migrate all at the same time. For instance, households living in violent environments send their children to another country searching for safer environments while the heads of the households stay behind to look after their business'.

h_i) and foresees a large enough wage differential $[\varpi_1(S_i) - \varpi_0(S_i)] > 0$ it would choose to send k_i members to another destination if the marginal gain of doing so $(\varpi_1(S_i) - \varpi_0(S_i) - m)\, k_i$ is greater than the marginal cost of not sending them $P(1-\alpha)\left(\ln \frac{\varpi_1(S_i)}{\varpi_0(S_i)}\right)$ (measured as total leisure forgone multiplied by P). On the other hand, if household i perceives a kidnap risk (i.e. $p_i > 0$ for all $0 < k_i < h_i$) then inequality (5) is more likely to be satisfied under $[\varpi_1(S_i) - \varpi_0(S_i)] > 0$ the greater is the perceived difference $R_i[p_i(h_i) - p_i(h_i - k_i)]$. This perceived kidnap risk can even overturn a migration disincentive of not migrating under $[\varpi_1(S_i) - \varpi_0(S_i)] < 0$ and $-P(1-\alpha)\left(\ln \frac{\varpi_1(S_i)}{\varpi_0(S_i)}\right) > 0$ if $R_i[p_i(h_i) - p_i(h_i - k_i)]$ is large enough. In this sense, it is like a push factor that makes households decide to migrate in a more likely way for a given (positive or negative) perceived wage differential.

2.2 Empirical Approach

From the conceptual framework we find that given a wage differential (postive or negative) a positive relation arises between perceived kidnap risks at the household level and its migration likelihood. In order to evaluate this relation we assume that the household's indirect utility function $V_{i,a}$, unobservable for the econometrician, that comes from equation (4), can be decomposed in the following manner

$$V_{i,a} = E[v_{i,a}|S_i, X_i, W_{i,a}, d_i > 0, Z_i] + \mu_i$$

where $Z_i = \left(\bar{W}, Gini\right)$ and the random component μ_i represents the effect that unobservable characteristics for the econometrician have on household i's utility assumed to be normal and i.i.d. over the population. Given that we only observe a binary variable that specifies whether or not a member of household i has migrated in the

six months previous to the survey, we follow a standard latent variable approach. Let

$$M_i = \begin{cases} 1 & \text{if } V_{i,1} \geq V_{i,0} \\ 0 & \text{if } V_{i,1} < V_{i,0} \end{cases} \tag{6}$$

where M_i is an indicator function equal to one if at least one member of household i migrates and zero otherwise. Therefore, the estimated probability that at least one member of household i migrates to an international destination is given by the following probit specification

$$\begin{aligned} P(M_i = 1 | X_i, S_i, W_{i,a}, p_i, Z_i) &= \Phi\left(\gamma p_i + X_i\beta + \alpha S_i + \theta W_{i,a} + \eta Z_i + \mu_i > 0\right) \quad (7) \\ &= \Phi\left(\mu_i > -\gamma p_i - X_i\beta - \alpha S_i - \theta W_{i,a} - \eta Z_i\right). \end{aligned}$$

The empirical model that comes from (7) uses a pool of cross sections of households:

$$\begin{aligned} Mig_i &= \zeta + \gamma \hat{p}_i + \alpha Educ_i + \theta Wealth_i + X_i\beta + Z_i\eta \quad (8) \\ &\quad + \delta_1 Dtime_t + \delta_2 Dcity_h + \delta_3 Dstrata_{h,t} + \mu_{h,t} \end{aligned}$$

for $i = 1, .., H$, where Mig is a binary variable that takes value one if household h sends one or more members to either an international or a domestic destination and zero otherwise; $\hat{p}_i$ is the estimated kidnap risk household i faces. The model also proxies S_i as $Educ$ which measures the years of education of the household head; proxies W_i by a vector of variables $Wealth$ that captures the wealth of household i such as the quality of the houses they live in, asset ownership, ownership of durable goods like cars and whether the household has a business of their own. The vector X includes household characteristics such as unemployment measures, time living in the city among others. Following recent literature we include in X variables that

capture networks as the proportion of people that migrate to other destinations within the neighborhood which could help migration of other households. In vector Z we include neighborhood measures of inequality and mean wealth. Finally, $Dtime$ is a full set of time dummies, $Dcity$ is a full set of city dummies, $Dstrat$ is a set of geographical strata dummies that control for self-selection of households based on their wealth within cities at time t and μ is the error term. The parameter of interest is γ which is conjectured to be positive as argued in the conceptual framework. Since the dependent variable is a binary one we estimate the parameters using a maximum likelihood probit estimation procedure.

Evidently kidnap risks are non observable and hence need to be estimated. In this paper we propose a parametric measure of such risk denoted p^p which generates what Wooldridge (2001) calls a *generated regressor* and should not be confused with an instrumental variable. Given that p^p is obtained using data, the standard errors for (7) are corrected to account for the error in the first stage estimation through bootstrapping methods.[6]

This measure is defined in a structural way and can be thought of emerging from a theoretical model in which kidnappers choose their potential victims in a way that maximizes their profits based on observable characteristics of the potential victims. In general, it is expected that households will be more or less likely to suffer from such crime depending on their wealth level, which the kidnapper can observe through durable goods, working activities and ownership of assets. Similarly, such victimization probability should be negatively affected by government deterrence or

[6] A recent example of such constructed regressors with clustered bootstrap standard errors may be found in Banerjee et al. (2009).

punitive policies. Under these assumptions we estimate p^p as the fitted values of a model that includes household observable characteristics and deterrence measures as determinants of a kidnap as shown in the following specification:

$$\begin{aligned} Kidnap_i &= \pi_0 + \pi_1 Educ_i + \pi_2 Wealth_i + \pi_3 Deter_t + \pi_4 X_i + \pi_5 Z_i \\ &\quad + \pi_6 Dtime_t + \pi_7 Dcity_t + \pi_8 Dstrata_i + v_i \end{aligned} \tag{9}$$

where $Kidnap$ is a binary variable that takes value one if household i is a kidnap victim and zero otherwise and $Deter$ represents two government deterrance measures proxied by the rate of state homicide captures and antinarcotics operations at the municipality level. The other variables included in (8) X and Z are the same ones used above. Again, since $Kidnap$ is a binary variable we estimate the parameters using a maximum likelihood probit estimation procedure.

Identification of the effect of kidnap risk rests on the exclusion restriction that the variables included in $Deter$ affect migration decisions only through the kidnap victimization probability given the set of controls used. We argue this is the case for household migration decisions given that the identifiyng excluded variables are either at the state level (homicide captures) or are undercover operations (antinarcotic operations) which are only known in a later stage for specific households who are very interested in deterence actions taken by the government. A critique to this approach is that there could be remaining correlation between the unobservables from specification (8) that capture violence incidence or perceptions and our deterrence measures. To minimize this possibility, we included in all specifications a variable that proxies for the level of insecurity perceived by each household in their respective

city. Moreover, in the robustness checks we also include other measures of crime at the neighborhood level.

3 Data

Colombia is known to be one of the most violent countries in the world. It has had one of the highest kidnaps rates and according to an article in The Economist of 2004 "... half of all the world's kidnaps occur in Latin America and Colombia has long been the world leader: Kroll (a security company based in New York) reckons 4,000 kidnaps took place there (just 2,043, said the government). But Mexico is in second place, with 3,000 cases, ahead of Argentina (2,000), according to Kroll."[7] Figure 1 shows data reported by País Libre where it can be seen that reported kidnaps in Colombia increased at a significant rate until the year 2000, when it reached a total of 3,572. Since then, it has steadily decreased and it is estimated that in 2007 there were 521 kidnaps in the country. These high levels of kidnaps and the existence of a rich data set that includes information on kidnaps and migration decisions at the household level makes Colombia an ideal country to empirically verify if migration decisions respond to kidnap risks.

The data base used in this study is the *Encuesta Social*. This is an ongoing Colombian household survey developed by Fedesarrollo and the World Bank in a semiannual basis since 1999 whose objective is to measure the living standards of urban households and their opinions about different aspects of their daily life. Up to 2003, eight surveys were fielded in the four major cities of Colombia (Bogotá, Medellín, Barranquilla and Cali) and in some of the rounds additional cities were also occasionally included (Bucaramanga, Cartagena, Ibague and Manizales).

[7] "Fear of captivity." The Economist, June 17th 2004 printed edition.

The Encuesta Social is a unique data set suited for this study in several aspects. In contrast to macro-level data sets previously used in other studies of violence[8] the Encuesta Social is a micro-level data survey which contains detailed information on both violence and migration at the household level and allows us to answer questions about the behavior that comes as a reaction against kidnap threats. In view of the fact that questions about both kidnaps and migration were only introduced in September of 2000 we restrict the sample to the last six rounds with information on 16,801 randomly sampled urban households for the period 2000-2003.

3.1 Kidnap and Migration Data from Encuesta Social

The questions related to violence asked every household whether in the past six months any of its members had been a victim of some form of violence. If they answered yes to this question, they were then asked to specify the type of crime(s) they were victims of. Table 1 shows that 15.8% of the households had at least one member who was a victim of some kind of crime. More than 80% of these households were victims of a robbery while nearly 3% of them lost a member through homicide. The data also shows that 0.17% of all households in the major cities in Colombia were victims of a kidnap. It should be pointed out that during this same time period, País Libre reported a total of 11,902 kidnaps implying that approximately 0.02% of Colombian households were victims of this crime. Hence, even though the 0.17% observed kidnaps in the sample may seem a small percentage it is non trivial when compared with the reported kidnap statistics for the whole country.[9]

[8] Previous studies of violence have focused on explaining cross country or cross city differences using macro-level data sets. Examples include Fajnzylber et al. (2000a) and Bourguignon (1998). Similarly, Schultz (1971) and Morrison and May (1994) also use macro-level data.

[9] It is estimated that the total population of Colombia is around 43 million.

Information about migration in the survey comes from two questions asked to households. The questionnaire asks the respondent if any household member had migrated in the past six months seeking better income opportunities. In case the answer was affirmative the respondent specified if the migration occurred to another city or town within Colombia or if it was to another country. This question was only introduced in round IV of the survey and hence information on both violence and migration is only available for 14,172 households. Within these households the lower panel of Table 1 shows that 10.27% of them had a member who had migrated in the past six months; 5.92% immigrated while the 4.35% migrated to a domestic destination within Colombia.

3.2 Other Data

The Encuesta Social has a rich set of variables that allowed us to obtain detailed observable characteristics of households and neighborhoods in which they reside. For household characteristics we used as controls variables which could proxy for the wealth of the family and hence their likelihood of kidnap and migration. Among them we include the education of the household head, the mean per capita expenditure, ownership of durable goods such as motor vehicle and the quality of the house they live in. We also included a dummy weather the head of the household is a patron or if they own a business with more than five employees. The Encuesta Social also has information on employment status of every member of the household and hence we were able to construct an indicator variable of whether there was a member of the household unemployed at the time of the interview. Even though information about the length of unemployment is not available, we constructed an alternative variable

indicating the number of members in the household that are unemployed at the time of the interview. Finally the survey contains information of whether the household feels insecure in the city in which they reside. We used this information to construct a dummy variable that equals one if the household head reports feeling insecure and zero other wise.

We use the information from the survey to also construct control variables at the neigborhood level. Cities in Colombia are divided into six different areas called "estratos", numbered in an ascending order from one to six. It is a division that is used, among other things, to cross-subsidize the costs of public services. More importantly, they are geographically dispersed within the city boundaries creating variation across space. It is the case that wealthier households normally reside in higher estratos (estratos 5 and 6) where both the basic living costs and the average costs of real state are higher compared to the lower ones (estratos 1 and 2). According to this division 46.81% of the households reside in a low income strata (estratos 1 and 2), 45.07% in a medium income strata (estratos 3 and 4) and only 8.12% reside in a high income strata (estratos 5 and 6). Interestingly, kidnappers do not seem only to target households that reside in the relatively wealthier neighborhoods. Specifically, 14% of the kidnaps observed in the data set were committed against households residing in the low income strata, 50% in the medium income strata and 36% in the high income strata.

We used this exogenous partition of the six strata for each city to create the clusters or neighborhoods within them. The clusters are defined by strata, round survey and cities which gives a total of 83 clusters.[10] Based on these clusters mean monthly

[10]Since the estimations are done by pooling cross sections by the round of the surveys we consider

expenditure and the gini coefficient at the cluster level were created. The migration information allows us to also construct a proxy for an international migration network within the neighborhood. Specifically, we calculated the proportion of households that sends one or more of its members to another country relative to those that send their members to a domestic destination. As shown in Table 2 while the mean proportion of international migrants within neighborhoods is 0.55 the standard deviation shows a significant variation within neighborhoods.

Table 2 displays the mean and standard deviation of all control variables.[11]

This household and neighborhood data is complemented with information on measures of law enforcement efforts obtained from the Centro de Estudios sobre Desarrollo Económico (CEDE). The information available is the yearly rate of homicide captures at the state level for every 10,000 inhabitants in the cities covered by the survey for the period 2000-2003. The mean and standard deviation of this variable is also presented in Table 2. As mentioned, the basic identifying assumption used in this paper is that while such deterrence measure should decrease the rate of kidnaps in Colombia, controlling for households characteristics it should not directly influence migration decisions.

as two different neighborhood's the same strata within a city in two different time periods.

[11] Given that some control variables are absent for some households, in the estimations of migration we end with approximately 12,600 observations.

4 Results

4.1 Kidnap Risks for the Household

As mentioned, in order to understand the effect that kidnap risks may have on the migration decisions of the household, the former variable needs to be estimated. Table 3 reports several specifications of model (9), our parametric estimation of such likelihood. The first specification includes household characteristics that proxy their wealth levels. Intuitively, these should all in principle be relevant variables that kidnappers observe when they choose their potential victims. Notice also that the self reported feeling of insecurity in the city is positive and statistically signifcant: households who feel more insecure have a higher likelihood of being kidnap victims. Using a likelihood ratio test all these variables are jointly significant at the 1% as determinants of the household kidnap risk with a chi-square (10 degrees of freedom) of 68.94. As expected, households where the head has a higher education level, own assets such as motor vehicles and live in better quality houses or apartments have a higher kidnap risk. The second specification includes neighborhood wealth characteristics such as mean neighborhood income and neighborhood gini coefficient. None of them appear to be statistically significant at any standard level suggesting that kidnap risk is mostly determined by household characteristics.

The third specification includes our identifying variables included in *Deter* for the kidnap risk. A chi-square test shows that the rate of state homicide captures and antinarcotics operations at the municipality level are jointly significant at the 10% level. The goodness of fit of the last specification is quite good since the percentage of times that the predicted outcome matches the actual one is 81.7% for households

with no kidnap victims and 76.5% for households with at least one member being subject to this crime.[12]

4.2 Kidnap Risks and Household Migration

Table 4 reports several specifications of (8). Throughout models one to four the dependent variable is a binary variable indicating whether a member of household i immigrates in the past six months. The first column shows that if a member of the household was *actually* kidnapped the probability that at least one of them migrates to another country is statistically higher relative to households not subjected to this crime, even after controlling for several characteristics. Specifically, all else equal households that had a member who was *actually* kidnapped are 18.4 percentage points more likely to send one or more of its members abroad. This result is not surprising given the nature of the crime in terms of its monetary and psychological costs it entails. However, our interest is not to assess this effect but to evaluate how the *risk* of a kidnap affects the household migration decision.

Using the last specification of Table 3, we predict the kidnap risk for every household in the survey. With these estimates of $\hat{p}^p$, we then estimate equation (8) to obtain an estimate of γ. The first specification is the simplest one in which only the fitted value of the kidnap likelihood is included as an explanatory variable. As shown, this kidnap risk measure is a statistically significant determinant of international migration for urban households residing in Colombia´s major cities.

The second specification includes several household characteristics that the mi-

[12]To obtain these measures we considered a household being a victim of kidnap if the predicted kidnap probability obtained after the probit estimation was higher than the actual kidnap likelihood in the sample (around 0.18%).

gration literature has shown to be important determinants of such decision. We included the education level of the household head, household's mean expenditure and its square, number of members, ownership of assets and durable goods among others. These variables are jointly significant at 1% level. More importantly, Table 4 shows that the coefficient of the kidnap risk decreases pointwise from 8.12 to 5.18 but is still statistically significant, suggesting there were problems of omitted variables in Model 2.

As several migration studies have emphasized, households tend to migrate to insure themselves against negative income shocks.[13] These shocks might be correlated with the unemployment level that the household faces. For example, if a member of the household loses his/her job, given that there are no unemployment welfare benefits in Colombia, it might be reasonable to believe that the migration likelihood of the household might increase. This could be a factor that if not adequately controlled for might affect indirectly the kidnap risk generating a bias in our results. Hence, model four in Table 4 includes a measure of unemployment. As observed, unemployment does not seem to have a significant impact on migration decisions of the household since it is not significant at any usual significance level.

The fourth specification of Table 4 also includes community characteristics such as neighborhood inequality, mean neighborhood income and our measure of international networks at the cluster level. These three variables are jointly significant at the 1% level in line to what previous studies such as Borjas (1987) and Mckenzie and Rapaport (2007) have found: wealth distribution in the place of origin and migration networks are important determinants of migration decisions. As can be observe the

[13] See Borjas (1987) and Taylor (1986).

coefficient associated to the kidnap risk remains positive and statistically significant after the inclusion of these variables.

Finally, a possible critique to our exclusion restriction is that the deterrent measures are correlated with the error term in the second stage through the channel of general insecurity that households perceive in the city they live in. For instance, if homicide captures increase in a given city households might perceive a safer environment and have lower incentives to migrate. As argued above, we believe our exclusion restrictions are exogenous given that they are decided by the law enforcement agencies and there are not easily observed by the common citizen. However, we include the reported perception of insecurity by each household as an additional control variable to address this possible critique. As shown in all specifications of Table 4 we find that this control is always positive and statistically significant implying that households with higher insecurity perceptions immigrate more. However, more importantly, the point estimate of the kidnap risk is robust to the inclusion of this variable.

For this last specification, the marginal effect on the probability of sending a member abroad increases by 0.5 percentage points on average for a household given a one standard deviation increase (roughly 0.009) in the kidnap risk. The standard deviation for international migration in the sample is 0.22 and therefore such an effect will increase the international migration probability in around 0.02 standard deviations. Alternatively, one out of every 200 migrant households is induced to migrate due to a one standard deviation increase in the percieved kidnap risk.

Specifications (5) through (8) of Table 4 show the effect of kidnap risks on *domestic* migration decisions. Although in principle domestic migration could reduce the kidnap risk a household faces, given that kidnaps at that time were all across

provinces in Colombia, such strategy may not be so useful after all.[14] Hence, it is likely to expect that migration to domestic destinations is not affected significantly by kidnap risks since the threat would still be present up to some extent regardless of the domestic destination chosen.[15] Specification (5) in Table 4 shows that, as conjectured, the *actual* fact of being kidnapped has no significant effect on domestic migration decisions in stark contrast to what was found for international migration. Similarly, specifications (6) through (8) show that the kidnap risk does not have any effect on domestic migration even after all the control variables are included.

A possible drawback of our empirical procedure is the fact that we could have selection bias due to missing information. Complete households that migrate together are not observable in our data set. The only observed households are those that migrate sequentially and hence the results obtained in this paper only apply to them. Although we do not have a way to control for this selection bias we can assess its direction under alternative scenarios.

Even though some households may migrate all together at the same time, we expect international migration to occur in a sequential form given that such a decision is both risky and costly.[16] Indirect evidence of this pattern of migration is the enormous

[14] According to statistics from *Pais Libre*, there are only two Colombian provinces out of the 32 that exist where no victim of this crime was reported. The two provinces are Amazonas and San Andres y Providencia. The former is a low density province in the southern part of the country where the Amazon River flows; while the latter is a caribbean island close to Nicaragua.

[15] It should be mentioned that even though Colombia has one of the highest number of displaced households in the world, most of them are rural households that leave their homes due to the direct threat of the armed groups within the country. The sample from Encuesta Social used in this study covers only urban households and hence such rural displacement, which does in fact occur at a national level as shown in Engel and Ibañez (2007), is not studied in this paper.

[16] A typical example is that in which one parent migrates first, finds a job, establishes him or herself and only later does the spouse and kids migrate. Another case, which occurs specially under a violent environment, is that in which parents in order to protect their children from harm send them out of the country while they stay behind taking care of their business' and assets.

amont of remittances that are sent to less developed countries every year. Specifically, according to Banco de la República (2005) for Colombia remittances between 1999 and 2003 had an increasing trend and were 520 million dollars per year on average. The study also shows that seven out of ten migrants sent money to their families.

If the fraction of households that migrate together is relatively small among the total flow of migrants our results would still hold. However, if this was not the case the direction of the bias could go either way. An upward bias of the coefficient on the kidnap risk may arise if those households that immigrate together do not take their migratory decision based on kidnap risks. On the other hand, a downward bias may arise if violence in general is an important determinant of the migratory decision for those households that migrate together. We believe the second case is more likely to occur for the Colombian case. For instance, Soto and Walker (2002) report that in a survey conducted in the United States to Colombian migrants, 48% mentioned violence and the political situation in the country as a major reason for migrating abroad. Under this scenario our estimates could have a downward bias.

4.3 Robustness Checks

4.3.1 Omitted Variable Bias

The results presented above could be subject to an omitted variable bias critique. This could stem from the exclusion restriction used to generate the kidnapping likelihood for each household and identify γ in specification (8). Specifically, even after controlling for reported general perception of insecurity, it may be the case that remaining unobserved factors related to violence at the cluster level could be correlated with kidnap risks determining also household migration through different channels

not considered. This would potentially cause a correlation between our *Deter* variables and the error term in (8) invalidating our identifying strategy. To account for this potential critique we used information on homicides and robberies available in Encuesta Social to create a non-parametric murder and robbery risk at the cluster level to control for possible unobservable violence factors. Each measure was estimated by dividing the total number of households suffering from each specific crime by the total household population in the cluster according to the sample. These two variables were included in (8) among the control variables.

Table 5 presents the coefficients of interest with these additional violence risk variables including all control variables from specifications (4) and (8) of Table 4 for international and domestic migration respectively. As can be observed, only the non parametric likelihood of being robbed affects in a positive and significant manner the likelihood of a member of the household to migrate abroad. Moreover, the results on the kidnap risks are robust to these inclusions giving us more confidence in our exclusion restriction and reducing worries on omitted variables.

4.3.2 Non-parametric Measure of Kidnap Risk

An alternative method to estimate the effect of kidnap risks on migration decisions is to use a non parametric measure of the former. Denoted by $\hat{p}_i{}^{np}$, this measure is defined at the neighborhood level where the household resides and consists of the number of households that were kidnap victims divided by total number of households that reside within the same neighborhood. Again, we define the neighborhood or cluster of a household by strata, city and survey period. Importantly, this non-parametric measure assigns the *same* risk to all households that live in the same

cluster and hence it is a valid measure if kidnappers choose their victims more or less randomly within a given cluster.[17]

This measure can be used to address a possible critique to our approach related with possible reverse causality. Indeed, under this framework of generated regressors we are implicitly assuming that there is no reverse causality between migration decisions and the kidnap likelihood of the household. One could think of a reverse story in which kidnappers observe migration of households and based on this indicator decide whether or not to kidnap any of the non-migrant members remaining in the city. This could be motivated by the potential remittances sent by members of the household living abroad that could be demanded as ransom.

Even though this is a logical possibility we believe this is not the case. First, anecdotal evidence from Colombia and Mexico suggests that during the late nineteen nineties many families considered international migration of some of its members as a safeguard option to protect themselves.[18] This is so because a logical strategy for kidnappers is not to kidnap the household income provider and asset owner but a close enough relative that will force him or her to pay the ransom. General kidnap figures for Mexico from the Federal Police Force between 2001 and 2007 show that more than half of the reported kidnap victims were children and young adults. Moreover for Colombia *Fundación Pais Libre* reports that between 2000 and 2008 around 20% of kidnap victims were housewives and children. Second, supposing this reverse

[17] Alternatively, such non parametric likelihood can be thought of measuring the effect of how the possibility of knowing others have been kidnapped influence households decisions following the ideas behind Epstein and Gang (2006).

[18] Abelardo, a Mexican summer student at Boston University during 2004, told us that he was living in the United States because his parents sent him away to avoid a possible kidnap which had already occured in his extended family. We know of similar stories for several other Colombian households.

causality was true it would necessarily imply that kidnappers know too many details of their potential victims, like if the household is receiving remittances from a migrant member. It is reasonable to assume that kidnappers can estimate the wealth of their potential victims through direct observation of the durable goods they possess. Knowing however if the migrant member sends remittances or even when and in what situation a member of the household had migrated abroad is an assumption more difficult to believe and defend. Finally, remittances in Colombia actually follow an increasing trend from 1999 to 2008 contrary to reported kidnaps which have decreased since the year 2000 as shown in Figure 2. If the reverse causality was true, one would have expected a positive correlation between these two variables.

Nontheless, we can use this non parametric measure to avoid reverse causality between migration decisions and kidnap risks since it is a measure for the whole cluster and not for a given household. Presumably kidnappers would not have access to information at the cluster about the number of households that have migrant members abroad. Moreover, we further use our *Deter* variables in an instrumental variable estimation strategy for $\hat{p}^{np}$ to account for both simultaneity bias and omitted variable bias as discussed above.

Specifications (1) and (3) in Panel A of Table 6 present the effect of our second measure of kidnap risk, $\hat{p}^{np}$, on international and domestic migration decisions using all control variables from specification (4) of Table 4. As can be observed the effect of this alternative measure continues to be positive and statistically significant for international migration only. The estimated effect is similar to the one obtained with the parametric measure: 0.5 percentage point increase in the non parametric kidnap risk (roughly a standard deviation) in a given neighborhood increases international

migration of the households in 0.5 percentage points on average. The similar results suggest that it could be the case that kidnappers are more or less randomly choosing their victims within a given neighborhood.

Addressing the possible reverse causality and simultaneity bias the specifications (2) and (4) in the first panel of Table 6 present the results of the effect of the non parametric kidnap risk instrumented by our *Deter* variables. The first stage regression shows that these two variables are statistically significant at the 5% level. Under specification (2), the estimated marginal effect, for a one standard deviation increase in the non parametric kidnap risk in a given neighborhood, for international migration of households is around 0.12 standard deviations, a six fold increase with respect to what has been found above suggesting a possible downward bias in previous results. Furthermore, contrary to the previous results, the dometic migration estimated effect now is also positive and highly significant statistically. However, the effect is roughly half compared to the effect on international migration likelihood suggesting that kidnap risks are more important for international migration decisions.

Panel B of Table 6 shows the same specifications as those in Panel A but under a linear probability model. Under these specifications the magnitude of the effect reduces marginally. Specifically, for international migration it is estimated that a standard deviation increase in the kidnap risk in a given neighborhood increases international migration in 0.01 and 0.08 standard deviations for the linear and IV regressions respectively. For domestic migration the effects are 0.01 and 0.04 respectively. Taken together the results suggest that international migration responds more to kidnap risks than domestic migration.

5 Implication: Human Capital and the Costs of Kidnaps

If the kidnap risk at the household level causes international migration of the wealthiest and more educated urban population of the country, a "brain and capital drain" may be taking place reducing the possibilities of economic growth. To *assess* the magnitude of this effect on the distribution of education for the Colombian cities, we compare the actual distribution of education of those urban households that decide not to send any of its members abroad with a hypothetical one where no kidnap risk exists.

To do this, we divided households in four education groups according to the standard education system in Colombia. The first group is composed by head of households without any formal education; the second group, which we call *Primary*, consists of households whose head has at most 5 years of formal education while the third group, called *Secondary*, are those who have at least 5 years of education and at most 11. Finally, households whose head has at least some years of college education conform the last group. Figure 3 shows both the actual distribution of education of those households where none of its members decided to migrate and the predicted distribution given by our fourth specification in Table 4.[19] As can be seen, the model does a good job predicting the education distribution of households that decide not to send any of its members abroad.

What will be the effect on the predicted schooling distribution of households that decide to *stay* in Colombia if no kidnap risk existed in the country? Using the

[19]To obtain this estimated distribution we considered a "non-migrant" household if the predicted international migration probability obtained after the probit estimation was lower than the actual international migration likelihood in the sample (around 5.92%).

same coefficients obtained under the fourth specification in Table 4 but assuming that the probability of being a kidnap victim is zero for everyone, the answer to this questions is depicted in Figure 4 and the result is quite interesting. Without kidnap risks, on average the distribution of education for those households who decide not to immigrate would shift to the right. The percentage of individuals with college education would increase by almost 0.9%.[20] This result shows that besides the obvious costs that kidnaps bring to human life it also causes a decrease in human capital that may have a negative impact on the growth path of the country and its development.

Importantly, it must be clarified that this counter factual exercise holds under certain *implicit* assumptions: international migration does not affect domestic wages and potential remittances received would not alter the education level of the household. As for the first assumption, Prada (2006) shows that average returns to secondary and college education in Colombia for the years 1985 and 2000 were very similar, suggesting that these returns in Colombia are not volatile.[21] This suggests that the effect of migration on returns to education could be small. As for the second assumption, even though Acosta et al. (2008) have previously shown that in Latin America remittances are sometimes invested in education it must be taken into account that our results show that households with heads that have higher levels of education are the ones who are migrating. It is reasonable to assume that members of these households would invest in education even if no remittances were sent and hence our results would still hold.

[20] The result with the non parametric measure of kidnap risk increases to 1.7%.

[21] Of course, Prada (2006) shows that the returns over this period varied according to economic cycles but the difference in average returns to education after fifteen years was lower than 1%.

6 Conclusions

This paper provides an interesting link between the existing crime and migration literature. The results seem to support the idea that kidnap risks of urban Colombian households affect international household migration decisions while not always domestic ones. This finding is robust to the inclusion of household unemployment rates and alternative kidnap risk measures. Moreover, our results show some evidence that wealthier and more educated households are the ones who are leaving Colombia avoiding the kidnap "tax". This in turn suggests that there must exist economic loses of human capital for the Colombian economy which could eventually have a significant impact on its growth path and future economic development.

Even though kidnap risks have been increasing in some parts of the developing world this is not the only form of violence that could induce household migration. According to Harbom and Wallensteen (2007) 32 armed conflicts in 23 different locations were present in 2006 in the world. Future research on migration could also take into account how these other forms of violence affect decisions and hence increase the scarce empirical evidence available at the household level.

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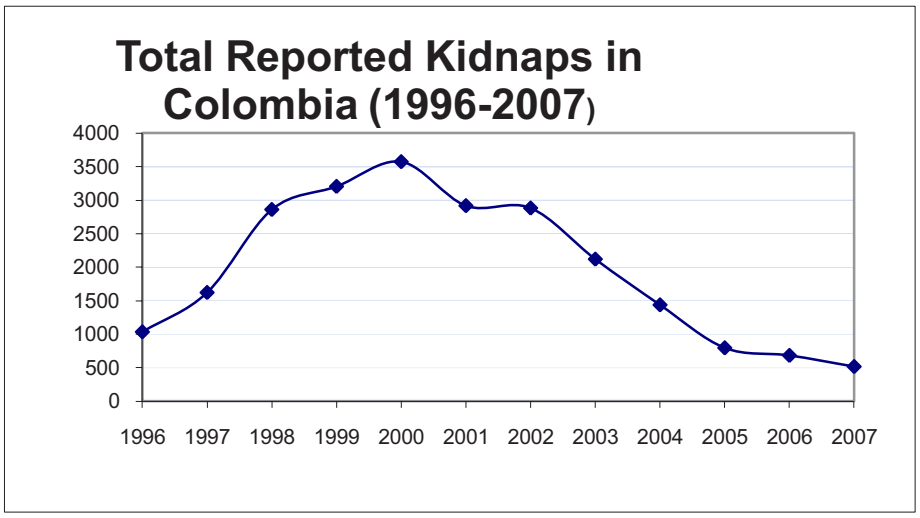
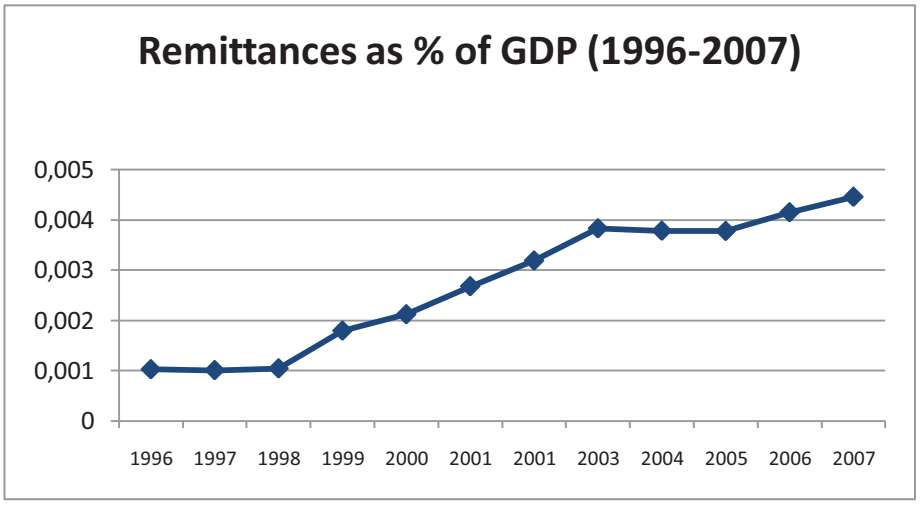
Figure 1



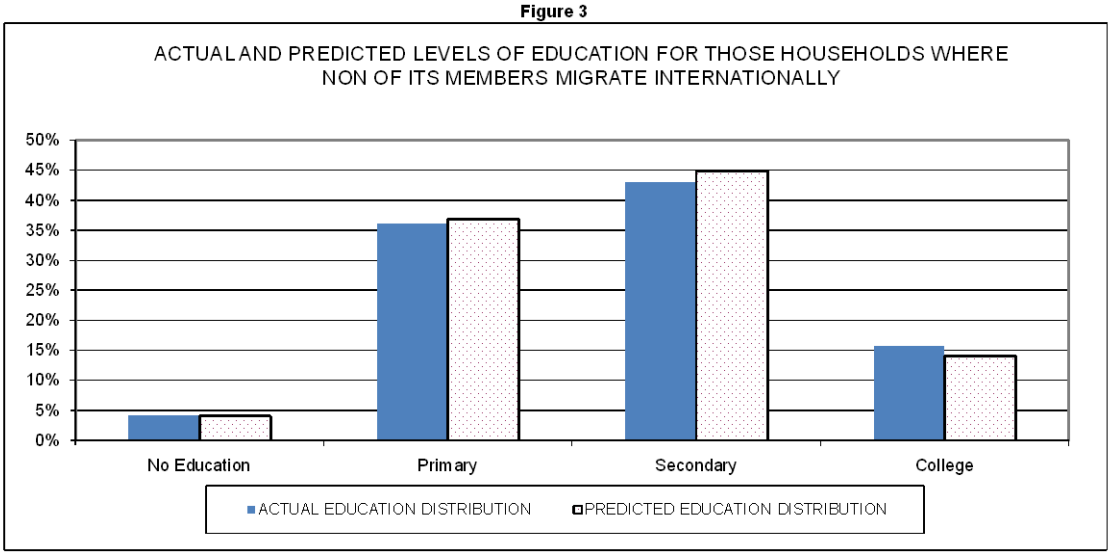
Source: Pais Libre

Figure 2



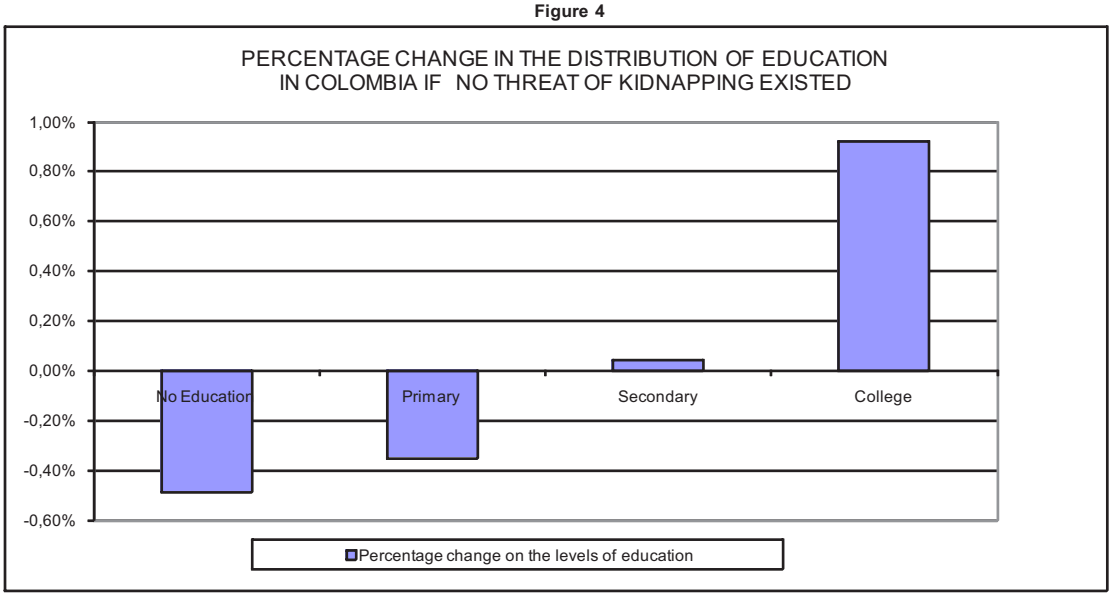
Source: Banco de la República

Figure 3



Source: Encuesta Social Etapa III-VII

Figure 4



Source: Encuesta Social Etapa III-VII

Table 1: Violence and Migration Characteristics

	Number of Households	Percentage of Households
Households victims of any type of crime	2.654	15,80%
Specific Crime		
Kidnapping	28	0,17%
Robbery	2.129	12,67%
Homicide	87	0,52%
Others	410	2,44%
Total Number of Households	**16.801**	**100%**
Household where one of its members migrated	1.455	10,27%
Type of migration		
Domestic	*616*	4,35%
International	*839*	5,92%
Total Number of Households	**14.172**	**100%**

Table 2: Summary statistics

	Mean	Sd
Education of household head	8,01	4,47
Expenditure per capita (Millions)	0,08	0,09
Number of people in household	4,03	1,80
† Quality of house or apartment	0,03	0,18
† Head of household is a patron	0,39	-
† Motor vehicle ownership	0,14	-
† Household business ownership	0,02	-
† Ownership of the house they live	0,54	-
† Has always lived in the same city	0,61	-
† Someone in the household is unemployed	0,15	-
Number of people in household unemployed	0,19	0,51
Proportion of migrating households that choose an international destinations	0,55	0,50
† Proportion of households that feel insecure in the city	42,18	-
Gini Coefficient within cluster	0,59	0,09
Mean monthly expenditure within cluster (Millions)	0,08	0,06
Rate of homicide captures (10,000 inhabitants)	0,78	0,40

† Denotes dummy variables.

*Source: Encuesta Social Etapa III-VII

Table 3: Probability of Being Kidnapped
Dependent binary variable: Household member being a victim of a kidnap

	Probit Regression		
	(1)	(2)	(3)
Rate of Homicide Capture (per 10,000 inhabitants)			-2.351***
			[0.648]
Rate of Antinarcotics Operations (per 10,000 inhabitants)			9,489
			[12.894]
Feeling of insecurity in the city	0.472*	0.469*	0.477*
	[0.278]	[0.273]	[0.277]
Mean monthly expenditure (in each Cluster)		0,222	0,121
		[1.615]	[1.990]
Gini coefficient (in each cluster)		-0,545	0,028
		[1.326]	[1.624]
Education of the Household Head	0,013	0,013	0,014
	[0.034]	[0.034]	[0.033]
Monthly expenditure	-1,378	-1,382	-1,296
	[1.016]	[1.042]	[1.083]
Monthly expenditure squared	0,158	0,178	0,140
	[0.408]	[0.381]	[0.407]
Number of members of the household	0,015	0,016	0,021
	[0.040]	[0.039]	[0.038]
†Quality of house or apartment	0.871***	0.862***	0.865***
	[0.290]	[0.295]	[0.293]
†Head of Household is a boss	0,322	0,317	0,319
	[0.236]	[0.232]	[0.227]
†Ownership of motor vehicle	0,385	0,382	0,382
	[0.245]	[0.244]	[0.245]
†Ownership of business with more than 5 employees	0.868***	0.866***	0.833**
	[0.326]	[0.321]	[0.342]
†Ownership of the house they live in	-0,154	-0,155	-0,157
	[0.232]	[0.231]	[0.229]
Always lived in same city	-0.640***	-0.638***	-0.651**
	[0.247]	[0.246]	[0.253]
Netwrok Effect (Proportion International Migration)	0,171	0,274	0,568
	[0.494]	[0.554]	[0.629]
†Someone in the household is unemployed	0,507	0,508	0,495
	[0.321]	[0.322]	[0.320]
Observations	12.627	12.627	12.627
Pseudo R-squared			

All specifications include time (round survey), strata and city dummies.
† Denotes dummy variables.
Cluster Standard errors in parenthesis. Cluster defined by city, round of survey and strata.
(***), (**) and (*) denote significance levels at 1%, 5% and 10% respectively.
*Source: Encuesta Social Etapa III-VIII

Table 4: Probability of International and Domestic Migration
Dependent binary variable: Household member migrated internationally or domestically in past 6 months

	Probit Regressions							
	International Migration				Domestic Migration			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Actual Kidnap	0.919**				0,492			
	[0.421]				[0.464]			
Parametric Kidnap risk		8.122***	5.185*	4.715*		-2,094	-4,646	-3,306
		(2,080)	(2,509)	(2,606)		(2,780)	(3,569)	(3,305)
Feeling of insecurity in the city	0.096**		0.088*	0.09*	0.145***		0.155***	0.151**
	[0.047]		(0,049)	(0,049)	[0.053]		(0,056)	(0,056)
Education of the Household Head	0.026***		0.025***	0.026***	0,008		0,010	0,008
	[0.007]		(0,007)	(0,007)	[0.006]		(0,007)	(0,007)
Monthly expenditure	0,333		0,258	0,370	0,028		-0,113	0,001
	[0.374]		(0,386)	(0,394)	[0.407]		(0,500)	(0,512)
Monthly expenditure squared	0,225		0,191	0,212	0.589***		0.571*	0.588*
	[0.237]		(0,233)	(0,247)	[0.197]		(0,288)	(0,285)
Number of members of the household	0.021*		0,018	0,020	0.037**		0.038**	0.037**
	[0.012]		(0,014)	(0,015)	[0.017]		(0,014)	(0,015)
†Quality of house or apartment	0,055		-0,038	0,010	-0.287**		-0.255*	-0.251*
	[0.122]		(0,127)	(0,128)	[0.117]		(0,147)	(0,143)
†Head of Household is a boss	-0,013		-0,027	-0,022	0,014		0,028	0,022
	[0.061]		(0,050)	(0,051)	[0.045]		(0,056)	(0,056)
†Ownership of motor vehicle	0.297***		0.282***	0.283***	0,015		0,026	0,027
	[0.053]		(0,067)	(0,068)	[0.086]		(0,080)	(0,079)
†Ownership of business with more than 5 employees	0.254*		0,159	0,158	-0,255		-0,153	-0,170
	[0.141]		(0,168)	(0,169)	[0.171]		(0,194)	(0,201)
†Ownership of the house they live in	0.104**		0.109**	0.104*	-0,066		-0,070	-0,068
	[0.048]		(0,048)	(0,048)	[0.088]		(0,054)	(0,055)
Always lived in same city	-0,028		-0,020	-0,013	-0.161**		-0.168***	-0.175***
	[0.040]		0,054	(0,055)	[0.070]		(0,060)	(0,060)
Network Effect (Proportion International Migration)	0.993***			0.971***	-1.074***			-1.065***
	[0.233]			(0,163)	[0.168]			(0,195)
†Someone in the household is unemployed	0,035			0,036	(0,049)			(0,061)
	[0.071]			(0,075)	[0.080]			(0,087)
Gini coefficient (in each cluster)	0,061			0,033	-0,581			-0,585
	[0.316]			(0,472)	[0.472]			(0,588)
Mean monthly expenditure (in each Cluster)	-1.371**			-1,377	-1.506**			-1,502
	[0.582]			(0,933)	[0.655]			(1,245)
Observations		12.629	12.629	12.629		12.629	12.629	12.629
Log Likelihood		-2899	-2833	-2815		-2096	-2066	-2043

All specifications include time (round survey), strata and city dummies.
† Denotes dummy variables. Bootstrap standard errors are in parenthesis for models (2)-(4) and (6)-(8).
(***), (**) and (*) denote significance levels at 1%, 5% and 10% respectively.
*Source: Encuesta Social Etapa III-VIII

Table 5: Probability of International and Domestic Migration
Dependent binary variable: Household member migrated internationally or domestically in past 6 months

	Probit Regressions					
	International Migration			Domestic Migration		
	(1)	(2)	(3)	(4)	(5)	(6)
Parametric Kidnap Risk	4.984*	4.617*	4.992*	-1,850	-3,170	-1,839
	(2,552)	(2,603)	(2,552)	(3,005)	(3,196)	(3,000)
Non-parametric Robery Risk	2.256***		2.253***	0,703		(0,701)
	(0,752)		(0,753)	(0,988)		(0,967)
Non-parametric Murder Risk		3,544	0,196		0,685	0,117
		(5,588)	(5,704)		(5,435)	(5,299)
Observations	12.629	12.629	12.629	12.629	12.629	12.629
Log Likelihood	-2807,363	-2814,495	-2807,348	-2042,886	-2043,613	-2043,365

All specifications include time (round survey), strata and city dummies and the control variables in Previous Tables.
† Denotes dummy variables. Bootstrap standard errors are in parenthesis.
(***), (**) and (*) denote significance levels at 1%, 5% and 10% respectively.
*Source: Encuesta Social Etapa III-VIII

Table 6: Probability of International and Domestic Migration under a Non Parametric Kidnap Risk
Dependent binary variable: Household member migrated internationally or domestically in past 6 months

	Probit Regressions			
	International Migration		Domestic Migration	
	(1)	(2)	(4)	(5)
Panel A - Non-parametric Kidnap Risk Likelihood				
Non-Parametric Kidnap risk	10.801*		10,315	
	(5,994)		(7,747)	
Non-Parametric Kidnap risk (IV)		94.794***		72.327***
		(28,912)		(25,403)
Observations	12.629	12.629	12.629	12.629
Log Likelihood	-2814	-2041	-2811	-2040
Panel B - Non-parametric Kidnap Risk and Linear Probability Model				
Non-Parametric Kidnap risk	2.449***		1.255***	
	[0.686]		[0.237]	
Non-Parametric Kidnap risk (IV)		12.464***		5.902**
		[3.355]		[2.381]
First Stage				
Rate of Homicide Capture (per 10,000 inhabitants)		-0.007***		-0.007***
		[0.000]		[0.000]
Rate of Antinarcotics Operations (per 10,000 inhabitants)		0.057***		0.057***
		[0.010]		[0.010]
F-Statistic		203,99		203,99
Hansen J Statistic		0,038		0,038
Chi2-Pvalue		0,8464		0,8464
Endogeneity Test		11,196		11,196
Chi2-Pvalue		0,001		0,001
Observations	12.629	12.629	12.629	12.629
Uncentered R^2	0,002	0,003	0,002	0,003

All specifications include time (round survey), strata and city dummies and the control variables in Previous Tables.
† Denotes dummy variables. Bootstrap standard errors are in parenthesis.
(***), (**) and (*) denote significance levels at 1%, 5% and 10% respectively.
*Source: Encuesta Social Etapa III-VIII