



# Conflict and negotiation in Colombia: Are pre-donations useful?<sup>☆</sup>



Hernando Zuleta<sup>a,\*</sup>, Marta Juanita Villaveces<sup>b,1</sup>, Veneta Andonova<sup>c,d</sup>

<sup>a</sup> Universidad de los Andes, Department of Economics, Colombia

<sup>b</sup> Universidad del Rosario, Department of Economics, Colombia

<sup>c</sup> Universidad de los Andes, Department of Business, Colombia

<sup>d</sup> American University in Bulgaria, Bulgaria

## ARTICLE INFO

### Article history:

Received 3 September 2012

Received in revised form 6 September 2013

Accepted 14 September 2013

### JEL classification:

D31

D74

H29

H39

### Keywords:

Conflict

Distribution

Cease-fire

Colombia

## ABSTRACT

We model conflict between two agents in which each one has two possible strategies: cease-fire or rejection of the truce. We use the concept of pre-donations, namely, a redefinition of the game in which each agent commits to transfer a share of its output to the other agent (Sertel, 1991). Conditions are established under which a system of pre-donations may facilitate a truce. In particular, for conflicts involving high costs there is a distributive mechanism, acceptable for both parties, whereby cease-fire is the best strategy for both of them. However, in many cases the conditions are not right for such a scheme of pre-donations to be effective. Some limitations of the framework are analyzed and the model is extended to deal with certain shortcomings in the basic setup. To illustrate the relevance of the theoretical results, we briefly describe the circumstances that have characterized the negotiation processes between the Colombian government and various illegal groups in this long-lasting armed conflict.

© 2013 The Authors. Published by Elsevier Inc. Open access under [CC BY-NC-ND license](http://creativecommons.org/licenses/by-nc-nd/4.0/).

## 1. Introduction

Why do some internal conflicts succeed in reaching a truce, demobilization or a negotiated settlement while in others the combatants withdraw from the negotiating table and return to war or do not even consider the possibility of a truce? Why do some processes fail, even when they have managed to get opposing parties to sit down to talk? These questions are posed in a growing body of literature on internal conflict and peace processes that points out several reasons for the failures and successes of conflict resolution efforts. Among the explanatory factors are the type and terms of the settlement, lack of third-party support, the significance of ethnic and

religious identities, and economic and political incentives. In addition, a number of sensitive points in the peace process have been identified as possibly complicating the process. They include the strategies and objectives of each party, ongoing hostilities during the peace process and the design of the negotiation agenda.

The literature on civil war termination and conflict resolution has two main streams. The first one is the *rational choice* approach, which considers negotiated settlement as a function of economic, institutional or military conditions that may encourage combatants to initiate dialog. From this perspective, the success of negotiations largely depends on the presence of specific, or even unique conditions. The second approach, which relies on *conflict resolution techniques*, underlines the ability of parties to solve their conflicts. In other words, once dialog is initiated, the success of the process relies on parties' ability to put an end to the inner reasons for war. In this paper, we follow the former approach, rational choice.

We study conflict between two agents, a guerrilla group and the government. We assume that the conflict is triggered by distributive issues, namely, guerrillas fight in order to expropriate legal agents' income and thus increase their own income. Legal agents are represented by the government and they can invest in defense in order to reduce the appropriated share. Each agent has two possible strategies: cease-fire or rejection of the truce. For the guerrilla group, the cease-fire implies relinquishing the appropriated income but also reducing confrontation-related costs. For the

<sup>☆</sup> This study received financial support from the European Commission through the Integrated Project CIT3-513420, and from the Spanish Ministry of Science and Innovation, through grants ECO2008-01116, ECO2010-20829 and ECO2011-29445. The authors take full responsibility for any remaining errors.

\* Corresponding author. Tel.: +57 1 6209750.

E-mail addresses: [h.zuleta@uniandes.edu.co](mailto:h.zuleta@uniandes.edu.co), [hernando.zuleta@gmail.com](mailto:hernando.zuleta@gmail.com) (H. Zuleta), [marta.villaveces@urosario.edu.co](mailto:marta.villaveces@urosario.edu.co) (M.J. Villaveces), [vandonova@aubg.bg](mailto:vandonova@aubg.bg) (V. Andonova).

<sup>1</sup> Tel.: +57 1 2970200.

government, the cease-fire strategy implies a reduction in defense expenditure but also a higher appropriated share if the guerrilla group chooses the no-truce strategy.

In this setting, we use the concept of pre-donations, namely, a redefinition of the game in which an agent may commit to transfer a share of its output to the other agent (Sertel, 1991, 1992), and explain the conditions under which a system of pre-donations may facilitate a truce. We find that for conflicts involving high costs there is a pre-donations scheme, acceptable for both parties, which makes cease-fire the best strategy. However, in many cases the conditions are not right for the scheme of pre-donations to be effective. Given that we adopt a broad concept of wealth which includes political power, a pre-donations scheme, which normally implies transfer of wealth, may also imply transfer of political power.

We also analyze some limitations of the proposed framework and extend the model in order to deal with some of these shortcomings. First, we consider the case of different perceptions about the strength of the parties which reduces the possibility of an acceptable pre-donations scheme. In particular, overconfidence may explain why some agents in conflict do not accept a peaceful settlement. Second, we consider the relation between military expenditure and appropriated share, assuming that the strength of the parties depends on the money invested in weapons, military organization, etc. In this case a pre-donations scheme is useful to reduce military expenditure and, therefore, the intensity of the conflict. However, escalation of warfare may be the appropriate strategy for both parties in order to increase the chances of an acceptable pre-donations scheme. Finally, illegal groups may have other income sources (e.g. coca and poppy crops), in which case the success of a pre-donations system depends not only on the costs of the conflict, but also on the income that rebels draw from non-appropriative activities. In this case, the efforts of the government may be directed at destroying illegal sources of income.

In general, the feasibility of a successful pre-donations system depends on the relationship between the costs of the conflict and the income of legal agents, as well as on the perceptions of the two parties of their relative strengths and the trust between them. In, general, the feasibility of the pre-donations solution increases with the costs of the conflict. Additionally, the presence of a trusted mediator may increase the likelihood of a successful pre-donation solution when there is lack of trust and different perceptions.

Finally, in order to illustrate the relevance of the theoretical results, we briefly describe some of the circumstances that have characterized the negotiation processes between the Colombian government and various illegal groups. In particular, we refer to the negotiation attempts with the Revolutionary Armed Forces of Colombia (known by the acronym FARC) between 1991 and 1998, the successful negotiation with and eventual demobilization of the M-19 guerrillas at the end of the 1980s, and the negotiation process between the Colombian government and the right-wing paramilitary group United Self-Defence Forces of Colombia (known by the acronym AUC) in 2003. We also refer briefly to the negotiation process started in 2012 between FARC and the government known as *Diálogos de La Habana*.

The rest of the paper is organized as follows: In Section 2, we review the related literature. In Section 3 we present the basic game and results. In Section 4, we extend the basic model and, finally, we conclude in Section 5.

## 2. Literature review

### 2.1. Theory and international evidence

In the literature on conflicts, income inequality is usually considered to be one of the determinants of economic conflicts. Russet

(1964) was one of the first scholars to test the correlation between inequality and violence, and found evidence of a linear relation between the Gini coefficient and the number of violent deaths between 1950 and 1962. After Russet (1964), several studies have addressed the issue of inequality and conflicts. However, there is no consensus about the empirical results. Some authors claim that inequality in the distribution of assets increases the likelihood of social conflicts (Alesina and Perotti, 1996), while others find no such causal relation (Collier, 1999; Collier and Hoeffler, 1998, 1999, 2004).

In recent decades, scholars have refined research techniques and narrowed the object of studies repeatedly finding that, while vertical income inequality does not increase the risk of war onset (Collier and Hoeffler, 2004; Fearon and Laitin, 2003), horizontal inequalities, i.e. social and economic disparities between societal groups, seem to be positively related with the outbreak of conflict (Stewart, 2002; Østby, 2008).<sup>2</sup>

On the theoretical side, Jack Hirshleifer made one of the first attempts to model economic conflicts. The economic theory of conflict follows, in general terms, the framework built by Hirshleifer (1987, 1988, 1989) and is based upon the assumption that agents involved in conflicts optimally split their resources between productive activities and conflict.<sup>3</sup>

Following this approach, some authors study the effectiveness of income re-distribution as a way to solve conflicts. Grossman (1995) claims that the redistribution of property income to the working class may be the optimal response of the propertied class to the threat of illegal appropriation. Along the same lines, Mejía and Posada (2006) explain that ruling elites in oligarchic societies may rely on income redistribution to the poor in order to prevent them from attempting a revolution.

Other authors<sup>4</sup> have shown that land reforms, changes in fiscal policy and other ways of redistributing income or wealth may be in the interest of the agents who are giving up a share of their wealth. Finally, Noh (2002) brings new elements to the analysis, showing that the best way to end a distributive conflict may be a combination of income transfers and military expenditure.

One of the main problems regarding civil conflict is that the agents in conflict are often not willing to settle. So, in order to understand the real possibilities of a settlement, the issue of negotiation must be addressed. On the one hand, there is no complete information; therefore perceptions about the probability of victory differ among agents, reducing the likelihood of a settlement. On the other hand, the demands of the rebels often go beyond income re-distribution to include political power. Manson and Fett (1996) address the first issue. Assuming a simple model of rational calculation of the utility and cost of war and settlement, they introduce uncertainty in the analysis. In this setting, the likelihood that both parties will agree to a settlement depends to a great extent on each party's estimate of its probability of victory.

Other authors have studied the problem of asymmetric information. Zartman (2001) argues that incentives to settle can come in two forms, as current or as contingent modifiers of present values. Contingent incentives must be credible, "both as to their own feasibility and as to the willingness of the other party to implement them". Dal Bó and Powell (2007) claim that insiders often have better information about an organization's resources

<sup>2</sup> Other branches of the literature find that inequality affects crime, homicides, robbery and imprisonment (Dollar et al., 2000; Fajnzylber et al., 1998, 1999, 2002; Jacobs and Helms, 1996).

<sup>3</sup> Several studies have extended Hirshleifer's basic model. See, among others, Grossman (1991), Skaperdas (1992), Neary (1997), Garfinkel and Skaperdas (2007), Dixit (2004), Spolaore (2004), Zuleta (2004), Caruso (2006) and Zuleta (2008).

<sup>4</sup> See Azam (1995), Roemer (1998) and Zuleta (2004), among others.

than outsiders do and this informational asymmetry may lead to inefficient conflict over the distribution of such resources. From another perspective, [Shanchez-Pages \(2009\)](#) argues that, in an environment of incomplete information, the conflict may open the door to agreement if the uninformed agent is optimistic, but confrontation persists if the uninformed agent is pessimistic.

Regarding the demand for political power and institutional change, [Shugart \(1992, p. 122\)](#) considers the rational calculation of ending a conflict by democratic means: “Institutional change may lower barriers to entry for new participants in the political market, therefore, negotiations over the institutional rules of the game are usually crucial components of any electoral settlement”.

Political reform and stalemate are two main components that change parties' behavior and incentives. The prospect of inclusive political reform, accommodation and devolution reduces the benefits of war, so increases the chances of negotiation. On the other side, mutually hurting stalemate can get the process started by pushing parties to listen to incentives and negotiate. In addition, both types of incentives have to be credible, and mediation by a third party may provide the required credibility.

Finally, [Collier and Hoeffler \(1998\)](#) and [Collier \(2000\)](#) state that civil wars occur where rebel organizations are financially viable, mostly in countries with low income, low growth and economies based principally on the export of commodities. The way to end a civil war depends on how public policies reduce the economic risk factors: changing economic patterns, diversifying production and establishing international cooperation to reduce illegal trade, with sanctions making the economic and military circumstances of rebellion more difficult. In addition, [Berdal and Malone \(2000\)](#) expose the political economy of civil war (the rebels' economic system and the opportunities generated by war) and they suggest that one way to end war is to “deactivate the belligerents' financial spigot” ([Berdal and Malone, 2000](#), p. 14). The greater the benefits of the war economy, the less likely it is that a negotiated settlement will be initiated.

We introduce a simple framework (pre-donations) that allows the majority of the elements discussed above to be considered from a rational choice perspective. We are aware of the limitations of the analytical tools, which nevertheless help to model economic conditions and define the strategies and incentives faced by the agents.

## 2.2. The role of third parties in a pre-donations scheme

A peace agreement often cannot be reached because the parties do not even consider the possibility of negotiating. Sometimes, even when negotiation is possible, lack of trust between the parties proves to be a permanent obstacle to reaching agreements. In these circumstances, intervention by a trusted third party may be useful to facilitate both the beginning of a negotiation process and the reaching of agreements. In other words, a third party may be instrumental in a successful pre-donations scheme.

Third party interventions have been studied by several authors using a variety of frameworks.<sup>5</sup> [Bercovitch \(2009\)](#) defines third-party intervention as “a process of conflict management, related to but distinct from the parties' own negotiations, where those in conflict seek the assistance of, or accept an offer of help from, an outsider to change their perceptions or behavior, and to do so without resorting to physical force or invoking the authority of law.” The outsider may be an individual, a group, an organization or a state.<sup>6</sup>

<sup>5</sup> See [Gershenson \(2002\)](#), [Siqueira \(2003\)](#), [Amegashie and Kutsoati \(2007\)](#), [Chang et al. \(2007b\)](#), [Chang and Sanders \(2009\)](#) and [Amegashie \(2010\)](#) among others.

<sup>6</sup> Intervention by third parties may take place in labor disputes ([Hillman et al., 1987](#)), competition for public goods ([Siqueira and Sandler, 2004](#)), trade disputes

The success or failure of conflict negotiation varies directly with the presence or absence of an outside mediator. According to [Rothchild \(2003\)](#), third parties may regulate the use of coercive (diplomatic pressures and incentives, sanctions and military force) and non-coercive (purchase, insurance, legitimation and promise of economic support) incentives in the process of prevention and solution of conflict. In addition, [Walter \(2002\)](#) suggests that third parties have an active role in terms of mediation, verification and coercion to create a credible commitment between the parties. Moreover, she suggests that the success of mediation goes beyond the accord and that it is necessary to involve third parties in the peace-building process.<sup>7</sup>

Third-party participation appears to be a growing necessity in peace processes. However, third-party participation is not a condition sine qua non as it may foster confidence but may also reduce it. Third parties also have incentives and interests of their own regarding conflict resolution, so their intervention may not be philanthropic per se but may aim to satisfy specific interests.

According to [Yilmaz \(2001\)](#), a third party intervening in internal conflicts uses three modes to accomplish her goal: ‘communication’, ‘formulation’, and ‘manipulation’. When direct contact between the parties is impossible, the third party serves as communicator, facilitating contacts. During negotiations the third party may formulate ideas or possible solutions when the parties are deadlocked. When the third party acts as a manipulator, it uses its power to bring the parties to an agreement.

When the third party acts as a communicator, wording, accuracy and confidentiality are essential. The third party as a formulator must be capable of thinking of ways to unblock the thinking of the parties. Also, it must be convincing and persistent because the characteristics of the conflict often prevent the parties from finding solutions and may also prevent them from seeing the value of the third-party's suggestions at first hearing. The third party as a manipulator needs to use political and economic punishments and rewards to push the parties toward a solution ([Zartman and Touva, 1996](#)).

In our basic framework, the third party facilitates negotiation (communicator) and suggests the pre-donation scheme (formulator). Additionally, the usefulness of a third party becomes more important when there is neither a commitment device nor trust and when the parties have different perceptions about their relative strength. Although we do not explicitly model the behavior of the third party, the influence of mediators is reflected in some of the variables and parameters of the model.

In Colombia third parties have been present in all negotiation processes. Representatives of two or more countries have often accompanied negotiations. Colombian politicians and social leaders have also served as facilitators. Mediation was sometimes successful, sometimes not. In the next sections we relate the results of different processes considering the role played by mediators.

## 2.3. Understanding the case of Colombia

Traditionally, academic discussion about the internal conflict in Colombia has primarily focused on the social and political meaning

([Busch and Reinhardt, 2006](#)), litigation over property rights ([Robson and Skaperdas, 2008](#)), among others. However, we focus this section on third-party intervention in armed conflicts.

<sup>7</sup> [Walter \(2002\)](#) exposes two critical barriers to civil war settlement: short-term demobilization and rebuilding national armed forces and long-term devolution of rebel-controlled territory: “This dual process creates two opportunities for exploitation, and this is the reason so many civil wars fail to end with successful settlements . . . Settlements of civil wars, therefore, have the unintended and unfortunate effect of forcing factions through a highly risky implementation period that may leave them significantly worse off than they would have been had they kept their armies and continued to fight”.

of Colombian violence. One of the pioneer studies was published in 1983 by a multidisciplinary group of social scientists known as the *violentólogos*. Among other hypotheses, the *violentólogos* related the growing violence to a number of causes, including economic deprivation. In the absence of alternative explanations, they became part of the conventional wisdom.

A decade later, three quantitative studies by Gaitán (1995), Rubio (1995), and Montenegro and Posada (1995) presented a different approach and challenged the *violentólogo* theory. Since then, scholars and social scientists have approached the issue from different perspectives.<sup>8</sup>

### 2.3.1. Causes

In general, identification of the causes is the first step in providing elements for resolving the conflict. Castillo and Salazar (1999) argue that rebels have abandoned their ideological and social dimension, moving toward an emerging economic and military dimension. Gorbaneff and Jacome (2000), following Grossman (1991, 1994), model rational decisions of the three agents: peasants, government and insurgents. Decisions are based on the gains of participating with competing groups, represented by wage. Finally, Zuleta and Andonova (2009) use a general equilibrium model à la Grossman (1991). They find a low-wage equilibrium with guerrilla activity and a peaceful, high-wage equilibrium and argue that, by means of compensation policies, entrepreneurs and not the government might be able to protect their assets against expropriation.<sup>9</sup>

These models identify some of the economic causes of the Colombian conflict. However, other authors find others. Cante (2003), following Elster (2001), argues that civil society decisions are affected by personal and social compromises that may be more complex than simple economic gains.

Isaza and Campo (2005) calibrated a dynamic model of war trying to match the Colombian data. They pay special attention to the population that chooses to enroll in illegal armed groups and find that it is more efficient to undertake programs focusing on the population deemed at risk than to focus exclusively on military strategy as a way to solve conflicts.

Recently, some authors have aimed to identify the causes of the conflict using empirical methods. Angrist and Kugler (2005) find that, in the early 1990s when coca production shifted from other nations to Colombia, violent deaths increased substantially in coca-growing regions.<sup>10</sup> Dube and Vargas (2006) show that negative price shocks in the international coffee market exacerbated civil conflict in Colombia. They present evidence supporting the idea that municipal expenditure reduced the effects that the crisis had on guerrilla attacks. Finally, they show that poverty is associated with greater violence.<sup>11</sup>

Although the literature about the causes of the conflict seems disperse, from the above review it is possible to identify three factors: unease produced by income inequality and institutional arrangements, poverty and the existence of easy sources of income (like illegal crops).

### 2.3.2. Costs

According to Collier (2000), there are three main channels through which civil wars affect the economy: destruction of

resources, disruption caused by the suppression of civil liberties and diversion of expenditure from productive activities. In Colombia, Rubio (1995), Londoño and Guerrero (1999) and Mejía and Posada (2003) among others, provide calculations of these costs.

Trujillo and Badel (1998) build on Rubio (1995) and quantify the gross costs of the conflict. According to them, terrorist actions by guerrilla groups have focused on the electricity infrastructure. They estimate repair costs at US\$ 18 million during 1999 and 2000. However, these replacement costs may be small compared to the costs of suspending transmission and generation. Mejía and Posada (2003) argue that the total damages from attacks to the Caño Limón – Coveñas oil pipeline during 2000 amounted to US\$ 12.3 million.

Levitt and Rubio (2000) present a summary of the literature on the costs of violence in Colombia. The estimated public costs of security and justice represent 5% of GDP. Guerrero and Londoño (1999) calculate that direct material losses in Colombia are 6.4% of GDP and the costs of violence determined by lost productivity and investment are 2% of GDP.

Although there are no calculations of investments forgone due to violence and uncertainty in Colombia, the cross-country empirical evidence is significant regarding the negative effect that violence has on investment decisions (Alesina et al., 1996).

Summarizing, there is enough empirical evidence indicating that the costs of the conflict are immense for Colombian society. However, to the best of our knowledge there is no evidence at all regarding the costs faced by guerrilla and paramilitary groups. This data is instrumental to determine their real incentives.

### 2.3.3. Third party

The Colombian government has gone through several negotiation processes with different results. In some cases there was no need for a third party while in other cases the role of the mediators was key to the success or failure of the process.

The example that best illustrates the importance of third parties is the experience with the FARC.

In the early 1980s negotiations between the Betancur administration and the FARC ended in amnesty and cease-fire. The cease-fire was initially respected by both parties, but the FARC did not completely demobilize. A new political party, the UP (Union Patriótica), was founded and several FARC members were among its founders. However, by 1987, the UP's leadership was being gradually but increasingly decimated by violent attacks and assassinations carried out by drug lords, paramilitary groups and some members of the government's armed forces. Meanwhile, the cease-fire was gradually collapsing due to regional guerrilla and Army skirmishes. All these episodes of violence destroyed the trust between the two parties and made any negotiation attempt impossible for several years.

In the early 1990s, the end of the Cold War together with the peace processes in Guatemala and El Salvador gave some hope about the chances of a new negotiation process. Both the Venezuelan and the Mexican government played the role of facilitators. However, the lack of trust plus the distance between the parties involved made any agreement impossible. On top of that, Mexico and Venezuela did not act as formulators so their presence did not help to bring positions closer.

In 1997 three political leaders, including Juan Manuel Santos, made contact with international delegates of the FARC. But it was Alvaro Leyva Durán<sup>12</sup> who finally served as facilitator for the first

<sup>8</sup> See Castillo and Salazar (1999), Posada and Gonzalez (2000), Cante (2003), Zuleta (2004), Isaza and Campo (2005), Zuleta (2008), among others.

<sup>9</sup> Andonova and Zuleta (2007) present a case study that is consistent with this hypothesis.

<sup>10</sup> Deininger (2003) and Barron et al. (2004) provide empirical studies for other countries.

<sup>11</sup> This evidence is consistent with the findings of Miguel and Sergenti (2004) and Zuleta (2008).

<sup>12</sup> Alvaro Leyva is a Colombian politician who had had contacts with different guerrilla groups for several years before the Pastrana administration began dialog with guerrillas.

contact between Andrés Pastrana and the guerrilla leaders. However, Leyva did not play any role during the negotiations.

The negotiation process began in 1998, and international intervention was limited to the U.S.A. through the Plan Colombia and, in the late phase of the peace talks, the European Union countries. Furthermore, the FARC disliked the international community and viewed it as explicitly supporting the Colombian state. They were skeptical about the international community's neutrality so preferred to keep it out of the negotiation. The FARC only accepted a hypothetical participation of the international community as verifiers of signed commitments between the parties.

In January 2001, FARC accepted international participation under the arrangement of a "Facilitating Group". The main role of this group was to guarantee no military "invasion" in the negotiating zone and to guarantee its security. Its next task was to participate in the cease-fire negotiations, but the FARC decision to hijack a commercial airline and kidnap the head of the Colombian Senate's Peace Commission overshadowed active participation by the international community in the dialog. However, by any standard, the third-party attempt to generate confidence among the parties was timid. More importantly, the subsequent Plan Colombia, understood as international participation, was not aiming to end the conflict in a negotiated way but by military means. In fact, the Plan Colombia did not contemplate any peace initiatives and, instead of creating confidence among the parties, it exacerbated distrust.

The 2012 negotiation with the FARC in La Habana in Cuba presented a different perspective on the importance of third-party participation. In August 2012, after about one decade of armed conflict and escalation of violence between the FARC and the military forces, President Santos announced an existing secret dialog with the FARC as a preamble to peace talks in Oslo, Norway and La Habana, Cuba. These talks were attended by representatives from Norway, Venezuela, Chile and Cuba. According to Yilmaz (2001), Venezuela may also have played the role of manipulator: Venezuela is an important trade partner of Colombia; it can serve as a shelter for the rebels and it has a great influence over other Latin-American countries. Additionally, FARC leaders are increasingly adopting the discourse of Hugo Chavez, Venezuela's late president, and present their case as a Bolivarian Revolution. Reciprocally, the government of Venezuela refuses to include the FARC in the list of terrorist groups. Therefore, if the Colombian government does not honor the agreements, the government of Venezuela can commercially isolate the country and shelter the guerrillas. On the other hand, if the FARC does not honor the agreements, the government of Venezuela can include it in the list of terrorist groups and deny shelter and protection to its leaders.

### 3. The basic game

We use a theoretical game approach. There are two agents: government and rebels. Each agent chooses between two possible strategies: confrontation (war) and truce. If both agents choose a truce, then both total income and income distribution are given. If the rebels choose confrontation, they have to pay a cost but they may get a bigger share of total income; that is, there may be a redistribution of total income in their favor. If the government chooses a truce while the rebels choose confrontation, then peaceful citizens lose a share of their income in favor of the rebels. Finally, if both agents choose confrontation, then both agents pay costs, net income is reduced and income distribution depends on the relative military power of the agents.

Note that the task of the government is to defend the citizens of the country and the main objective is to guarantee protection of property rights. In other words, the government does not

want to expropriate illegal agents. When the illegal armed agents honor the cease-fire, the income they receive does not come from expropriating illegal agents. Therefore, their income does not depend on whether the government honors the cease-fire or not. However, if the illegal armed group does not honor the truce, then any military action taken by the government would reduce the income of illegal groups as part of their income comes from illegal activities.<sup>13</sup>

We define below the variables, the strategies, the basic game and some of the results.

#### Definitions

$I_L$ : Legal agents' initial income.

$I_I$ : Illegal armed group's initial income.

$C$ : Illegal armed group's operational costs.

$T$ : Defense costs. In Collier terms (2000),  $T$  represents the costs of repressing and deterring criminal activities.<sup>14</sup>

$P_0$ : Share of income appropriated by guerrilla groups when the government does not invest in defense.

$P_1$ : Share of income appropriated by guerrilla groups when the government invests in defense.

No truce: Strategy in which the agent invests in war.

**Assumption 1.** There is only one guerrilla group and it behaves like one agent.

**Assumption 2.** The government represents the interests of legal agents.

Assumptions 1 and 2 allow us to model the problem with only two agents.

The basic game is described as follows.

#### Results

1. If  $P_0 \cdot I_L > C$ , then Cease-Fire, Cease-Fire (CF,CF) is not a Nash equilibrium.

The proof is straightforward: If  $P_0 \cdot I_L > C$ , then  $(I_L - C) + P_0 \cdot I_L > I_I$  so when the government chooses Cease-Fire the best strategy for the rebels is No Truce.

2. No Truce, No Truce (N,N) is a Nash equilibrium if:

$$P_1 \cdot (I_L - T) > C \text{ and } I_L(P_0 - P_1) > T(1 - P_1)$$

The proof is straightforward:

If  $P_1 \cdot (I_L - T) > C$  then  $I_L - C + P_1 \cdot (I_L - T) > I_I$  so when the government chooses No Truce the best strategy for the rebels is No Truce

If  $I_L(P_0 - P_1) > T(1 - P_1)$  then  $(I_L - T)(1 - P_1) > I_L(1 - P_0)$  so when the rebels choose No Truce the best strategy for the government is No Truce.

In this setting the possibility of a truce depends on:

- How effective the guerrilla group is with appropriation (parameters  $C$  and  $P_0$ )
- How effective the government is in defense: (parameters  $T$  and  $(P_0 - P_1)$ )
- How wealthy the representative legal agent  $I_L$  is.

<sup>13</sup> We deal with the case of illegal sources of income in Section 4.

<sup>14</sup> According to Collier (2000), there are three types of cost. We are not explicitly modeling costs of destruction and the negative impact that violence has on investment decisions. If we were to include these costs explicitly for the outcomes N,N and CF,N, the variable  $I_L$  would be multiplied by a factor lower than one. However, given that we are considering  $P_0 < 1$ ,  $P_1 < 1$  and  $C > 0$ , the inclusion of such a multiplier would be qualitatively redundant and would complicate notation.

Game 1.

		Illegal armed group			
		Cease-Fire		No Truce	
Government	Cease-Fire	$I_L$	$I_I$	$I_L(1 - P_0)$	$(I_I - C) + P_0 \cdot I_L$
	No Truce	$(I_L - T)$	$I_I$	$(I_L - T)(1 - P_1)$	$(I_I - C) + P_1 \cdot (I_L - T)$

These results are similar to those obtained by Hirshleifer (1991a,b, 1994), Skaperdas (1992) and Skaperdas and Syropoulos (1997). However, in our framework the strategy of the guerrilla group depends on the income of legal agents and on the appropriated share and not directly on income distribution. Therefore, the equilibrium N,N is possible even if  $I_I > I_L$ .<sup>15</sup>

From now on, we assume that under the initial conditions, and in the absence of additional mechanisms, N,N is a Nash Equilibrium and is unique:

**Assumption 3.**

$$P_0 \cdot I_L > C$$

**Assumption 4.**

$$P_1 \cdot (I_L - T) > C$$

**Assumption 5.**

$$I_L(P_0 - P_1) > T(1 - P_1)$$

The continuing climate of no-truce, no-negotiation by the Armed Revolutionary Forces of Colombia (FARC) between 1992 and 1998 fits into the logic of the basic game and is consistent with Assumptions 1–5.

At that time, the end of the Tlaxcala talks pushed this group into strengthening its armed forces and implementing a violent escalation against the government, the army and civil society. Neither the FARC nor the government suggested reinitiating talks or a cease-fire.

Following the basic game, the FARC was in a situation in which the share of income appropriated by it was greater than its operational costs. Basically, the FARC managed to increase the number of combatants in its ranks due to the linkage between the guerrillas and the illicit drugs industry, which boosted its resources and made it increasingly difficult to adopt a strategy of withdrawing from its illegal and illicit activities.

In the same way, the government, which found itself in a troubled institutional situation, did not suggest peace talks. Because of its defence costs at the time and the share of income appropriated by the guerrilla group, it had no possibility of changing its strategy and got stuck in a no truce strategy.

3.1. Sertel–Azam–Roemer solution

Assume that a third party, accepted by both players, proposes a re-definition of the game where legal agents can choose to pre-donate a share  $\lambda$  of their income (see Sertel, 1991, 1992).<sup>16</sup> In this new setting, the game is described as follows,

<sup>15</sup> This result may be striking at first sight as many authors claim that inequality is one of the determinants of civil conflicts. However, in Colombia, guerrilla groups control coca crops so have an important source of income that is unrelated to appropriative activities. As will become apparent, this fact reduces the efficacy of the pre-donations scheme.

<sup>16</sup> Sertel (1992) proves that, in many games, pre-donations are a useful mechanism for inducing the optimum.

**Proposition 1.** A system of pre-donations induces guerrilla groups to cease fire if the pre-donated amount is such that  $\lambda > (1 - \frac{C}{P_0 I_L})$ .

The guerrilla group is willing to cease fire if the pre-donated amount in scenario CF,CF is bigger than the appropriated amount plus the pre-donated amount in scenario CF,N minus the cost of belligerence. In other words, the illegal armed group is willing to cease fire if  $\lambda I_L > P_0 I_L + \lambda I_L(1 - P_0) - C$ , rearranging,  $\lambda > (1 - (C/P_0 I_L))$ .

Similarly, if  $\lambda > (1/(C/(P_1(I_L - T))))$ , when the strategy of the government is N, then the best strategy for the guerrilla group is CF.

Assumption 5 implies that  $C/I_L P_0 < C/((I_L - T)P_1)$ . Therefore, pre-donations are an efficient mechanism if  $\lambda > (1 - (C/(P_0 I_L)))$ .

**Proposition 2.** A system of pre-donations is acceptable by legal agents if the pre-donated amount  $\lambda$  is such that  $(T + P_1(I_L - T))/I_L > \lambda$ .

Legal agents are willing to pre-donate if their equilibrium payoff in the redefined game is better than the equilibrium payoff in the initial game. Formally, if  $I_L(1 - \lambda) > (I_L - T)(1 - P_1)$ , then legal agents are willing to pre-donate. The condition can be rearranged as follows,

$$T + P_1(I_L - T) > \lambda I_L$$

Therefore, the pre-donations mechanism is convenient for both players if the pre-donated equilibrium amount is lower than the defense costs,  $T$ , plus the appropriated amount,  $P_1(I_L - T)$ .

**Proposition 3.** If  $C/((1 - P_1)P_0) > I_L - T$ , then there is a feasible and effective pre-donation mechanism.

According to Propositions 1 and 2, the pre-donation system must satisfy the following condition:  $(T + P_1(I_L - T))/I_L > \lambda > (1 - (C/P_0 I_L))$

Now, if  $C/((1 - P_1)P_0) > I_L - T$  then  $(T + P_1(I_L - T))/I_L > (1 - (C/P_0 I_L))$ .

Therefore, if  $C/((1 - P_1)P_0) > I_L - T$ , there is a pre-donation system that is feasible and desirable for both parties.

Summarizing, the success of a pre-donations system depends on the costs of the conflict,  $C$  and  $T$ , compared to the income of legal agents,  $I_L$ .

In other words, for any conflict involving high costs there is a distributive mechanism, acceptable for both parties, such that the best strategy for both parties is Cease-Fire. This result is similar to those obtained by Azam (1995) and Roemer (1998) in different settings.

The Sertel–Azam–Roemer solution is a change in the bargaining problem, where the agents have the possibility to make transfers before the bargain is reached. Following Sertel (1992), we will assume that the pre-donations are not only monetary but may also be non-monetary.

The case of government negotiation with the United Self Defense Forces of Colombia (AUC) in 2003 shows a pre-donation that reshaped the bargaining among the groups and clearly presented a transfer between them. There were two types of pre-donations:

- a. Pre-donation that increased the share of income appropriated by the illegal armed group – AUC – by means of an income (wage) if they demobilized. This income was given individually to ex-AUC members replacing the cost of mobilization.

Game 2.

		Illegal armed group			
		CF		N	
Government	CF	$I_L(1-\lambda)$	$I_L + \lambda I_L$	$I_L(1-P_0)(1-\lambda)$	$(I_L - C) + P_0 \cdot I_L + \lambda I_L(1 - P_0)$
	N	$(I_L - T)(1 - \lambda)$	$I_L + \lambda(I_L - T)$	$(I_L - T)(1 - P_1)(1 - \lambda)$	$(I_L - C) + P_1 \cdot (I_L - T) + \lambda(I_L - T)(1 - P_1)$

b. Pre-donation that increased the share of income appropriated by leaders of the illegal armed group – AUC – by means of judicial benefits stemming from the promise and credibility of the future peace negotiation.

Both pre-donations fit into the model as they take place before the negotiation and are a condition for cease-fire and for initiating peace talks.

With Uribe's election as President in 2002, the AUC began to reshape its armed strategy. It reduced the scale of violence, turning from massacres to selective assassinations. On December 1, about 4 months after president Uribe took office, the leader of AUC declared a cease-fire and the government announced the initiation of contacts to negotiate demobilization.

The government, representing peaceful citizens, offered a framework that moderated the existing laws and sentences for major crimes.<sup>17</sup> The AUC expected to obtain a blanket pardon for major drug traffickers inside the AUC, to secure amnesty for past massacres and violence, and to legalize its growing economic involvement in the agricultural sector.

As a result of a pre-donation scheme, demobilization was reached and almost 15,000 combatants have been demobilized since 2003.

Another case that fits in this framework was the successful negotiation with three illegal armed groups during the late eighties. At that time, president Barco (1986–1990) offered a specific unilateral peace proposal in exchange for the demobilization of guerrilla groups. The M-19 entered negotiation with two aims: amnesty and political inclusion. In 1989, the M-19 demobilized and gave birth to a new political party, the Democratic Alliance M-19, with reasonable popular support.

As a result of the negotiated settlement with M-19, President Gaviria (1990–1994) initiated talks with other small groups that subsequently demobilized: the People's Liberation Army (EPL), the Quintín Lame, and the Revolutionary Workers' Party (PRT). During this time two events set the stage for demobilization: a successful peace accord with the M-19, and elections for the National Constituent Assembly (in order to write the new political constitution). The M-19 accord was a unique peace agreement for Colombia because it opened up a new perspective for combatants, with the possibilities of amnesty and reincorporation into civil society. The election for a National Constituent Assembly provided former combatants with the opportunity to be co-authors of an inclusive constitution, and fight for their interests in the democratic arena.

<sup>17</sup> Law of Peace and Justice in June 2005. This law has been deeply criticized (Amnesty International, Human Rights Watch, domestic human rights NGOs, scholars and civil society among others) because it significantly reduces criminal sentences associated with massacres, human rights violations, kidnappings and terrorist activities (prison terms of twenty years reduced to around five to eight years). In addition, the law does not include the obligation to reveal the truth of past illegal actions: there is no requirement for combatants to confess their war crimes or reveal any existing connection with civilians or politicians.

<sup>18</sup> This section builds on Dal Bó and Powell (2007) who claim that insiders often have better information about an organization's resources than outsiders do and this informational asymmetry may lead to inefficient conflict over the distribution of such resources.

### 3.2. Absence of a commitment device and lack of trust<sup>18</sup>

If there is no commitment device that enforces (or guarantees) the promise of a transfer then the government may decide not to make the promised transfer. In this case a problem of trust arises. We model this lack of trust assuming that the pre-donation expected from the illegal groups  $\lambda_e$  is smaller than the one promised by the government,  $\lambda_e < \lambda$ . Under these conditions, the game is described as follows,

In this case, the beliefs of the rebels change the set of acceptable schemes. We show this formally in Proposition 1a:

**Proposition 1a.** A system of pre-donations induces guerrilla groups to cease fire if the expected pre-donated amount is such that  $\lambda_e > (1 - \frac{C}{P_0 I_L})$ .

Proposition 2 holds.

The expectations of the rebels are likely to be endogenous. In other words, the members of the illegal group form their expectations according to the actions of the government. If the government does not make the promised transfer then the rebels adjust their expectations and, accordingly, intensify the fight.

Under these circumstances, the possibilities of new negotiations are reduced and, as long as a feasible and desirable pre-donation scheme exists, the government would be worse off. Here, we assume that the costs of confrontation are large enough to induce the government to hold its promises.

Clearly, in this case a mediator can facilitate both the beginning of a negotiation process and the reaching of an agreement. In terms of the game, the third party can convince the rebels that the government is going to fulfill its promises and can use the "third-party threat" i.e. political and economic punishments and rewards, in order to force the government to fulfill its promises.

As we stated before, the case which best illustrates this situation is the attempt to negotiate with the FARC in the early 1990s. After the failed process of the 1980s and the violent attacks and assassinations of UP leaders there was no trust between the parties. Additionally, international mediators had neither the will nor the power to use the "third-party threat".

## 4. Extending the game

The results presented in the previous section offer a first step for resolving conflicts. However, sometimes reality may be more complex for a number of reasons: first, perceptions about relative military power,  $P_1$  and  $P_0$ , may be different for illegal armed groups and legal agents; second, military expenditure and appropriated share are likely to be correlated with military spending; third, agents within groups are very often heterogeneous and, finally, illegal groups often have income sources which are illegal (coca and poppy crops) but are not directly related to appropriative activities. In this section we extend our framework in order to deal with some of these limitations.

### 4.1. Different perceptions

In order to model different perceptions we need to introduce new elements in the game:

Game 2a.

		Illegal Armed Group			
		CF		N	
Government	CF	$I_L(1 - \lambda)$	$I_I + \lambda_e I_L$	$I_L(1 - P_0)(1 - \lambda)$	$(I_I - C) + P_0 \cdot I_L + \lambda_e I_L(1 - P_0)$
	N	$(I_L - T)(1 - \lambda)$	$I_I + \lambda_e(I_L - T)$	$(I_L - T)(1 - P_1)(1 - \lambda)$	$(I_I - C) + P_1 \cdot (I_L - T) + \lambda_e(I_L - T)(1 - P_1)$

**Definitions**

$P_{0I}$ : Illegal armed groups’ perception about the share of income appropriated by illegal armed groups when the government does not invest in defense.

$P_{1I}$ : Illegal armed groups’ perception about the share of income appropriated by illegal armed groups when the government invests in defense.

$P_{0L}$ : Government perception about the share of income appropriated by illegal armed groups when the government does not invest in defense.

$P_{1L}$ : Government perception about the share of income appropriated by illegal armed groups when the government invests in defense.

We assume that  $P_{0I} > P_{0L}$  and  $P_{1I} < P_{1L}$ . Otherwise the differences in perceptions would actually facilitate the truce, as will become apparent below. We also assume that each agent knows only its perceptions and not those of the opponent.

In this setting, even though illegal armed groups and the government are the parties in conflict, they have different ex-ante perceptions about the share of income appropriated by guerrilla groups.

The different perception about the strength of the two parties reduces the possibilities of an agreement because the set of acceptable pre-donations schemes is reduced. This result is formally presented in [Propositions 4 and 5](#).

**Proposition 4.**  $C > (1 - P_{1L})P_{0I}(I_L - T)$  is a sufficient condition for the pre-donation mechanism to be feasible and effective.

Following the same reasoning that we use above, we find the conditions for CF,CF to be an equilibrium.

Illegal armed groups are willing to Cease Fire if  $\lambda > (1 - (C/P_{0I}I_L))$ , and legal agents are willing to pre-donate if  $T + P_{1L}(I_L - T) > \lambda I_L$ . Therefore, it is possible to find a pre-donations system that is acceptable for both parties if  $C > (1 - P_{1L})P_{0I}(I_L - T)$ . This condition is more restrictive than the one found in the Sertel–Azam–Roemer solution because  $P_{0I} > P_{0L}$  and  $P_{1I} < P_{1L}$ . Thus, even if there are “objective conditions” for a pre-donations system to generate the CF,CF equilibrium, different perceptions may destroy the effectiveness of the mechanism. Indeed, we can find critical levels for the perception about the share of income appropriated by illegal armed groups:

If  $P_{1L} < (1 - (C/((I_L - T)P_{0I}))$  then there are no pre-donation schemes acceptable for both parties.<sup>19</sup>

In this case an informed and trusted mediator can facilitate the negotiation process. The facilitator can help the parties to see their mistakes and revise their perceptions. In terms of the game, the third party can reduce the distance between  $P_{0I}$  and  $P_{0L}$  as well as the distance between  $P_{1I}$  and  $P_{1L}$ .

The situation described above shows that opponent groups have no incentives to stop the conflict unilaterally unless they receive an enormous pre-donation that would not be acceptable for the rival group. This might have been the case of the peace

negotiation process between the Armed Revolutionary Forces of Colombia (FARC) and the Government in the late nineties and early 2000.

At that time, the government was very confident about the possibility of reaching an accord. It offered a non-monetary pre-donation to the FARC of territorial control (a demilitarized zone) while war continued plus legal guarantees. In return, the FARC offered to free 350 kidnapped policemen and to discuss the proposed political agenda.

Contacts between the FARC and the presidential candidate Andres Pastrana took place in 1998 during the presidential campaign. Once the Pastrana government was in office, the parties established the conditions for initiating negotiations. During the negotiation process, there was a perception that the government conceded too much without demanding anything. The FARC demanded the demilitarization of a region of Colombia [42,000 km<sup>2</sup>], known as the *Zona de Distension* (demilitarized zone), the removal of some officers from the military, and a crackdown on the paramilitaries. Meanwhile, the war continued as they did not agree to a cease-fire during the negotiation period.

On 9 January 1999, the peace talks were officially inaugurated. However, from the start, Manuel Marulanda, the FARC leader, made it clear that his movement had more to demand than to offer. The negotiation agenda<sup>21</sup> showed the parties’ interest in the talks. Talks started after this agenda had been defined and the bargaining began with the fifth point (economic and social structure), specifically economic reforms concerning unemployment. During the following three years, the negotiation stuck on the same point without obtaining an agreement or moving to another point.

The talks were held up by severe problems. The FARC showed its unwillingness to bargain and presented its demands in such a strong way that the government had to fulfill them if it wanted to negotiate. The role of third parties was very timid because the FARC leaders did not trust international mediators. It suspended the talks three times, pushed the government to maintain the demilitarized zone and extended the deadline for it without any counterbalancing commitment. Pastrana’s government tried to keep the talks going at any price, meeting almost all the guerrilla demands without achieving any agreement.

In terms of the model, the government was trying to set a  $\lambda$  high enough to be acceptable for the rebels. However, military power of the rebels was perceived to be higher by illegal armed groups than by legal agents ( $P_{0I} > P_{0L}$  and  $P_{1I} < P_{1L}$ ). Therefore, the scheme offered by the government was acceptable for both parties according to its perceptions but not acceptable for the rebels according to their perceptions.

<sup>20</sup> 3.67% of the Colombian territory, an area almost the size of Switzerland and the largest area in the hands of the FARC ever since.

<sup>21</sup> The agenda “A Common Agenda for Change Toward a New Colombia” contained the following points: (1) Negotiated Political Solutions; (2) Protection of Human Rights is a Responsibility of the State; (3) Integral Agrarian Policies; (4) Exploitation and Conservation of Natural Resources; (5) Economic and Social Structure; (6) Justice Reforms: the Fight Against Corruption and Drug-Trafficking; (7) Political Reform and the Expansion of Democracy; (8) Reform of the State Agreements on International Humanitarian Law; Armed Forces International Relations Formalizing Agreements Signed 6 May 1999 in La Machaca (Demilitarized Zone).

<sup>19</sup> Note that the expressions  $P_{1L} < (1 - (C/((I_L - T)P_{0I}))$  and  $P_{0I} > (C/((I_L - T)(1 - P_{1L}))$  are equivalent.

In addition, approval of the Plan Colombia<sup>22</sup> widened the gap between the parties and further diminished the trust between them. According to the FARC, the *Plan Colombia* contradicted the government position. It suggested that, on the one hand, the government called for peace while, on the other, it followed a strategy of “peace diplomacy” aimed at strengthening the armed forces and fighting against drug traffickers.<sup>23</sup>

According to Zartman, the failure of negotiation highlights his hypothesis that incentives can only be “effective when parties are sufficiently dissatisfied with their present costs” (Zartman, 2001, p. 301). Talks with the FARC showed that they had not been damaged enough and were not sufficiently pessimistic about the future to be tempted by the incentives of the dialog process. Additionally, the income that the rebels derived from coca and poppy crops was an impediment for agreement on demobilizing the FARC. Along the same lines, Rangel (2003) suggests that the FARC had greater incentives for staying at war than for signing an accord because they did not feel militarily powerless. This view ties in with Zartman’s idea: the FARC saw its negotiation position as a way of strengthening its military power rather than as an incentive mechanism to make peace offers.

The situation described above is therefore consistent with the logic of the extended game with different perceptions. The FARC and the army did not reach a truce because, on the one hand, the FARC was demanding too much and was unwilling to give anything up and, on the other, the government had a wrong perception about the willingness of the FARC and was over-confident about an agreement.

#### 4.2. Military expenditure and appropriated share

So far, we have assumed that military expenditures,  $C$  and  $T$ , do not affect military power  $P_0$  and  $P_1$ . However, this assumption can be relaxed as it is reasonable to assume that the appropriated share positively depends on the expenditure of the illegal armed group and negatively on the expenditure of the government, that is,

$$P_0 = F(C) \text{ where } F_C(\cdot) \geq 0$$

$$P_1 = G(C, T) \text{ where } G_C(\cdot) \geq 0, G_T(\cdot) \leq 0.$$

For simplicity, let us assume the following function for  $P_1$ :

$$G(C, T) = \frac{C}{C+T} \text{ so } G_C(\cdot) = \frac{T}{(C+T)^2}, \quad G_T(\cdot) = -\frac{C}{(C+T)^2} \text{ and}$$

$$G_{CT}(\cdot) = \frac{T-C}{(C+T)^3}.$$

In other words, the strength of the parties depends on the money invested in weapons, military organization, etc.; when one party increases its investment, the productivity of the money invested by the other party is reduced.

Now, suppose that N,N is a Nash Equilibrium and that it is unique. Under these circumstances, rebels and government choose  $C$  and  $T$  respectively in order to maximize their income in the case of

N,N equilibrium. If this is the case, in the absence of pre-donations the Government’s problem is the following:

$$\text{Max}_T(I_L - T)(1 - G(C, T)). \text{ So,}$$

$$T = I_L - \frac{1 - G(\cdot)}{G_T(\cdot)} \tag{1}$$

Given that  $G_T(\cdot) \leq 0$ , condition (1) implies that, when military spending by the rebels grows, the optimal response is an increase in military spending.

The problem of the rebels is  $\text{Max}_C(I_L - C) + G(C, T)(I_L - T)$ . So

$$\frac{1}{G_C(\cdot)} = (I_L - T) \text{ so } C = \sqrt{T(I_L - T)} - T \tag{2}$$

Condition (2) implies that the reaction function of the rebels is not linear. For low values of  $C$ , the relation between  $C$  and  $T$  is positive but it turns negative for high values of  $C$ . Therefore, there may be multiple equilibria. However, if an internal equilibrium exists, it is characterized by Eq. (3)

$$\frac{G_T(\cdot)}{G_C(\cdot)} = -(1 - G(\cdot)) \text{ so } T^2 = (\sqrt{T(I_L - T)} - T)I_L \tag{3}$$

#### 4.2.1. The effect of Pre-donations

Under a pre-donations scheme the problems are:

$$\text{Max}_T(I_L - T)(1 - G(C, T))(1 - \lambda) \text{ for the government and } \text{Max}_C(I_L - C) + G(C, T)(I_L - T) + \lambda(I_L - T)(1 - G(C, T)) \text{ for the rebels.}$$

It is straightforward to see that the reaction function of the government does not change but the reaction function of the rebels does change:

$$C = \sqrt{T(I_L - T)(1 - \lambda)} - T \tag{4}$$

Comparing Eqs. (2) and (4), it is clear that, with pre-donations, the guerrilla groups have incentives to reduce military spending. Consequently, the government also has incentives to reduce military spending. So a pre-donations scheme is useful to reduce military expenditure and, therefore, the intensity of a conflict. The next question is: can a change in military expenditure be helpful to get a feasible and desirable pre-donations scheme?

#### 4.3. Spending to get a good deal<sup>24</sup>

Under the assumptions we are making, the condition for the pre-donations system to be acceptable reads,  $C > T/(C+T)F(C)(I_L - T)$   
Rearranging,

$$C - \frac{T}{C+T}F(C)(I_L - T) > 0 \tag{5}$$

The relation between the left hand side of equation 5 and the expenditure made by the parties is not evident. Moreover, the relation can be characterized by non-linearity. In order to explore this possibility, we characterize below the behavior of the left hand side of Eq. (5).

Define:

$$\Omega(C, T) = C - \frac{T}{C+T}F(C)(I_L - T)$$

So, derive with respect to  $T$ , (6)  $\Omega_T(C, T) = F(C) \frac{T^2}{(C+T)^2} \left(1 - \frac{C}{T} \left(\frac{I_L}{T} + 2\right)\right)$

Therefore, if  $C < T^2/(2T + I_L)$  then any increase in the military expenditure made by the government  $T$  increases LFS in Eq. (5).

<sup>22</sup> In 2000, after several meetings the U.S Congress approved \$1.3 billion to support the Plan Colombia. Of this, \$911 million was to reinforce the war against drugs (aerial fumigation, destruction of coca labs and military training and strengthening), \$106 million to support alternative programs and the remaining \$302 million for human rights and justice. Behind the Plan Colombia was the idea that guerrillas are major drug dealers so, by eliminating drug trafficking, Colombia would achieve two goals, the end of illicit traffic and a victory over the guerrillas.

<sup>23</sup> The FARC was also involved in the coca and poppy business so had a very large source of income. This fact made it even more difficult to achieve an agreement (see subsection iii).

<sup>24</sup> This section is closely related to Noh (2002) who shows that the availability of income transfers to the other party results in equilibrium where both defense and income transfer are utilized.

In other words, by increasing  $T$ , the government may generate the conditions for a pre-donations scheme to be acceptable for both parties. By investing more, the government increases the costs of the conflict but the increase in military expenditure reduces the appropriated share so also increases incentives to negotiate for guerrilla groups.

Guerrilla groups may also invest some money in order to get a better deal. To see the effect of an increase in military expenditure by the rebels, take function  $\Omega_C(C, T)$  with respect to  $C$ ,

$$\Omega_C(C, T) = 1 + \frac{T}{(C+T)} \left( \frac{1}{(C+T)^2} F(\cdot) - F_C(\cdot) \right) (I_L - T) \quad (7)$$

Note that  $\Omega_C(C, T)$  may be positive or negative:

- (A) If  $\frac{F(\cdot)}{F_C(\cdot)} \geq (C+T)^2$  or  $I_L < T + \frac{C+T}{T} \frac{1}{(C+T)F_C(\cdot) - F(\cdot)}$  then  $\Omega_C(C, T) > 0$ , and any increase in military expenditure by the illegal armed group increases LHS in Eq. (5) and increases the chances of success for pre-donation schemes.
- (B) If  $\frac{F(\cdot)}{F_C(\cdot)} < (C+T)^2$  and  $I_L > T + \frac{C+T}{T} \frac{1}{(C+T)F_C(\cdot) - F(\cdot)}$  then  $\Omega_C(C, T) < 0$ , and any increase in military expenditure by the illegal armed group decreases LHS in Eq. (5) and decreases the chances of success for pre-donation schemes.

An increase in  $C$  generates a rise in the costs of conflict paid for by the legal agents, increasing their incentive to negotiate. Additionally, the cost paid by illegal armed groups grows so they have more incentives to negotiate. However, as the appropriated share increases, the illegal armed group's income grows so the incentive to negotiate decreases.

The dominant effect depends on the shape of the function  $F(\cdot)$  and on the initial conditions.

If the income of legal agents is big, that is,  $I_L > T + (C+T)/T(1/((C+T)F_C(\cdot) - F(\cdot)))$ , then by increasing  $C$  the guerrillas reduce the possibility of a pre-donations scheme being acceptable for both parties.

Consider the case where  $F_{CC}(\cdot) < 0$ . When  $C$  is high the term  $((C+T)/T)(1/((C+T)F_C(\cdot) - F(\cdot)))$  is also high, so condition A is likely to hold. In other words, by increasing  $C$ , guerrillas may generate conditions for a pre-donations scheme to be acceptable for both parties.

Now, if under the initial conditions  $C$  is low, then by increasing  $C$  guerrillas may worsen the conditions for a pre-donations scheme to be acceptable for both parties.

In other words, if the costs of conflict are consuming a big share of the income of the legal agents then, by increasing their military power, illegal armed groups may force the government to accept a pre-donations scheme and cease fire.

These results suggest that war escalation may be a dominant strategy for the parties in order to increase the chances of a pre-donations scheme being acceptable to them both.

The behavior of the FARC and the government during the peace talks fits into this logic. The FARC demanded demilitarization of a region of Colombia, the removal of officers from the military, and a crackdown on the paramilitaries while it was substantially increasing the number of guerrillas and its destructive power. The government, with the approval of the Plan Colombia, reinforced the war against drugs and increased the strength of the army with the idea that the guerrillas were major drug dealers so, by eliminating drug trafficking, the government would achieve two goals, the end of illicit traffic and a victory over the guerrillas.

#### 4.4. Other sources of income

As stated above, illegal groups often have income sources that are illegal (coca and poppy crops) but are not directly related to

appropriative activities. This fact may affect the parties' incentives and increase the complexity of the problem.

In general, the government is not interested in expropriating the rebels' income. However, in the outcome of N,N the government can use its military power in order to reduce the income of the rebels.

We now introduce these issues in the original model. In order to do so, we must first define:

$I_{10}$ : Illegal armed groups' initial income.

$I_{11}$ : Illegal armed groups' income under confrontation.

$\phi$ : The share of Illegal armed groups' income which effectively goes to illegal groups when the government fights in order to reduce the income of the rebels.

We also assume that  $I_{11} > I_{10}$ . In other words, we assume that once the rebels are undertaking appropriative activities they get involved in other illegal business in which profitability is high.

Under these assumptions, the game with pre-donations is described as follows,

**Proposition 5.** A system of pre-donations induces guerrilla groups to cease fire if the pre-donated amount is such that  $\lambda > 1 + ((\phi I_{11} - I_{10} - C)/P_0 I_L)$ .

The guerrilla group is willing to cease fire if the pre-donated amount in the scenario CF,CF is bigger than the appropriated amount plus the pre-donated amount in the scenario CF,N minus the cost of belligerence. In other words the illegal armed group is willing to cease fire if  $\lambda > (1 + (\phi I_{11} - I_{10} - C)/P_0 I_L)$ .

Note that this condition is more restrictive than the analogous condition in Proposition 1 because  $I_{11} > I_{10}$ . Moreover, if  $\phi I_{11} - I_{10} > C$ , then there is no feasible pre-donations scheme ( $\lambda < 1$ ) that will be acceptable for the rebels. However, this condition also implies that the government may use its military power in order to reduce the income of the rebels and generate conditions for a pre-donations scheme to be acceptable.<sup>25</sup>

The incentives of the legal agents are not affected by this assumption so Proposition 2 is valid in this setting.

**Proposition 6.** If  $\frac{C - (\phi I_{11} - I_{10})}{(1 - P_1) P_0} > I_L - T$  then there is a feasible and effective pre-donation mechanism.

Therefore, the success of a pre-donations system depends not only on the costs of the conflict,  $C$  and  $T$ , and the income of legal agents,  $I_L$ , it also depends on the income that the rebels derive from non-appropriative illegal activities.

Proposition 6 may explain why the FARC has not accepted a peaceful settlement whereas other guerrilla groups did. While other groups were not actively involved in drug production and trafficking activities, the FARC became involved after the demise of the large drug cartels in the middle of the 1990s. In a sense, if this explanation is correct, then the conflict between the FARC and the Colombian government is more than a distributive conflict. Similarly, Proposition 6 may explain why the Plan Colombia had important effects on the balance of power.

#### 4.5. Future RESEARCH

##### 4.5.1. Military expenditure appropriated share and asymmetric information in repeated games

So far, we have modeled the problem as a one-shot game, treating the information problems and the link between military expenditure and appropriated shares separately. However, it can be argued that the military conflict and the negotiation process are

<sup>25</sup> The condition holds for low values of  $\phi$ .

Game 4.

		Illegal armed Group		
		CF		N
Government	CF	$I_L(1 - \lambda)$	$I_{10} + \lambda I_L$	$I_L(1 - P_{0L})(1 - \lambda)$
	N	$(I_L - T)(1 - \lambda)$	$I_{10} + \lambda(I_L - T)$	$(I_L - T)(1 - P_{1L})(1 - \lambda)$
				$(I_{11} - C) + P_{0L}I_L + \lambda I_L(1 - P_{0L})$
				$(\phi II_1 - C) + P_{1L}(I_L - T) + \lambda(I_L - T)(1 - P_{1L})$

characterized by consecutive actions and reactions. Additionally, in a repeated game, the strategy of both players gives information about their actual perceptions so their strategies may change with time as might the equilibrium in the game. Admittedly, in order to approach these problems in a formal way we would need a broader theoretical framework.

The dynamics of the Colombia conflict and, in particular, the behavior of the FARC over the last decade may be better understood using a dynamic setting in which perceptions are endogenous.

The breakup of negotiations with the FARC in 2001 added to an atmosphere of insecurity, while the urgency of military actions against guerrilla groups was the main topic of discussion during the 2002 presidential campaign. President Uribe won the 2002 elections on the basis of a military and security agenda against illegal armed groups. His agenda of so-called “democratic security” included stepping up military expenditure by means of a tax on wealth (democratic security tax). This tax allowed the government to finance the emergency plan (*plan de choque*), that is, the increase in troops, special rapid deployment units, mountain-warfare battalions and urban Special Forces. The Democratic Security strategy increased military expenditure by 1.3 additional points, reaching 5.7% of GDP in 2008. In addition, the number of troops increased by 28% (these included anti-guerrilla troops as well as policemen sent to police outposts in isolated regions, to complete the territorial presence of the armed forces all over the country).

This military expenditure was followed by significant changes in statistics for kidnappings (from 3.572 in 2000 to 521 in 2007); massacres (from 236 to 26 in 2007); attacks against pipelines and terrorist assaults against towns (from 1549 to 387 in 2007). In addition, armed forces operational results showed an increase in ammunition, weaponry and communication equipment seized and in rebels captured and killed. Also, demobilization of FARC rebels rose by 460% from 2002 to 2008.<sup>26</sup>

Following the theoretical framework, increasing military expenditure can be expected to have an effect on the FARC’ armed strategy. The FARC has been significantly affected, moving from mostly offensive actions to a movement back toward its strategic rear guard. In fact, in 2013 the FARC decided to join the Colombian government in La Habana negotiations.

#### 4.5.2. Heterogeneity within groups

Guerrilla groups are often heterogeneous. In particular, income distribution may be unequal in such groups. If this is the case, a successful pre-donations system must take into account the differences among members. If income is the only source of heterogeneity, a successful pre-donations scheme can be easily adapted to make it acceptable for every single rebel.

If, however, there are more sources of heterogeneity, the problem becomes more complicated. For instance, if the hierarchies and the distribution of power within groups are based on military skills then, after a peace agreement, some of the leaders would lose power. In this case, the incentives to negotiate are also

heterogeneous and any effective pre-donations scheme would be so complicated that it would be impossible to implement. Admittedly, this is an important issue and the framework we develop in this paper is insufficient to analyze this problem.

#### 4.6. La Habana talks

The 2012 negotiation process between FARC and the Colombian government seems to be producing unprecedented results. At the conclusion of the ninth round of the La Habana talks, the parties announced important progress in the negotiation process. After more than six months, they had reached an agreement on land and rural development. This was the first time the government and the FARC had ever agreed on a substantive topic. Additionally, for the first time ever, the FARC representatives admitted that they shared responsibility for the suffering of the victims of the Colombian conflict.

Many of the elements discussed in our theoretical framework indicate that this time the negotiation process may end with a successful pre-donations scheme. First, public spending in defense went from 3.6% to 6.1% of GDP from 1999 to 2007. Accordingly, the relative strength of the FARC was substantially reduced. Consistent with equation (6), by enhancing investment the government increases the costs of the conflict while the increase in military expenditure reduces the appropriated share of illegal groups, so it also creates incentives to negotiate for guerrilla groups. Second, the government seems to be preparing the country for the post-conflict. On the one hand, in 2011 the parliament passed the Law of Victims and Land Restitution, defining the process of returning victims to their homes. On the other hand, the Legal Framework for Peace incorporates transitional justice into the constitution, as part of a potential peace agreement which brings an end to the armed conflict. Even though guerrilla members expressed reservations about the suitability of such laws, it seemed that the government was determined to respect the agreements and fulfill its promises. Third, the active participation of Venezuela as ‘communicator’ and ‘manipulator’ might be increasing changes in a successful pre-donation scheme. This topic, however, deserves a detailed analysis on its own and therefore goes beyond the scope of the paper at hand.

### 5. Conclusions

We study economic conflicts using game theory reasoning. We model conflict between two parties where each has two possible strategies: cease-fire or rejection of the truce. In this setting, we use the concept of pre-donations, namely, a redefinition of the game in which agents commit to transfer a share of their output to the other agent (Sertel, 1992). We explain under which conditions a system of pre-donations may facilitate a truce. We find that for conflicts involving high costs there is a distributive mechanism, acceptable for both parties, making cease-fire the best strategy for both.

We also find that different perceptions about the strength of the parties reduce the possibilities of an agreement because the set of acceptable pre-donations schemes is reduced. However, if the costs of conflict represent a big share of the income of legal agents then, by increasing their military power, illegal armed groups may force

<sup>26</sup> Source: Colombian Ministry of Defense Statistics (2008) on Results of armed and security force operations to counter terrorism, violence and crime. In: <http://www.minddefensa.gov.co/descargas2/anexos/2644.Avançe.de.La.Política.de.Defensa.y.Seguridad.ingles.pdf>.

the government to accept a pre-donations scheme and cease fire. Similarly, by increasing defense expenditure, the government may change the conditions of the game and increase the possibility of a cease-fire. Of course, the conditions of the post-conflict arrangement would depend on the relative strength of the parties, that is, by increasing their military power, the parties would also increase their bargaining power.

These results suggest that escalation of war may be an optimal strategy for the parties to increase the chances of a pre-donations scheme being acceptable for them both.

We also show that the success of a pre-donations system also depends on the income that rebels derive from non-appropriative illegal activities. Our results may explain why the FARC, heavily involved in drug production, has not accepted a peaceful settlement whereas other guerrilla groups did.

In general, we illustrate the relevance of the results described with historical episodes in the Colombian conflict. In particular, we refer to the attempts at negotiation between the government and the FARC, as well as talks and peace processes with M-19, EPL and AUC.

## References

- Alesina, A., Perotti, R., 1996. Income distribution, political instability, and investment. *European Economic Review* 40 (6), 1203–1228.
- Alesina, A., Ozler, S., Roubini, N., Swagel, P., 1996. Political instability and economic growth. *Journal of Economic Growth* 1 (2), 189–211.
- Amegashie, J.A., 2010. On third-party intervention in conflicts: an economist's view. *Peace Economics, Peace Science and Public Policy* 16 (2), 1–10, Article 11.
- Amegashie, J.A., Kutsuati, E., 2007. (Non)intervention in intra-state conflicts. *European Journal of Political Economy* 23, 754–767.
- Andonova, V., Zuleta, H., 2007. The effect of enforcement on human resources practices: a case study in rural Colombia. *International Journal of Manpower* 28 (5), 344–353.
- Angrist, J., Kugler, F.A., 2005. Rural windfall or a new resource curse? Coca, income and civil conflict in Colombia. *The Review of Economics and Statistics* 90 (2), 191–215, 03.
- Azam, J.-P., 1995. How to pay for the peace? A theoretical framework with references to African countries. *Public Choice* 83 (April), 173–184.
- Barron, P., Kai, K., Pradhan, M., 2004. Local Conflict in Indonesia: Measuring Incidence and Identifying Patterns. Mimeo. World Bank.
- Bercovitch, J., 2009. Mediation and conflict resolution. In: Bercovitch, J., Kremenyuk, V., Zartman, I.W. (Eds.), *The SAGE Handbook of Conflict Resolution*. Sage, London, pp. 340–354.
- Berdal, M., Malone, D.M., 2000. Greed and Grievance: Economic Agendas in Civil Wars. Lynne Rienner, Boulder, CO.
- Busch, M.L., Reinhardt, E., 2006. Three's a crowd: third parties and WTO dispute settlement. *World Politics* 58, 446–477.
- Cante, F., 2003. Racionalidad y dignidad en la Guerra Irregular. *Economía y Desarrollo* 2 (1), 169–176.
- Caruso, R., 2006. A trade institution as a peaceful institution? A contribution to integrative theory. *Conflict Management and Peace Science* 23 (1), 53–72.
- Castillo, M., Salazar, B., 1999. Tres juegos para el conflicto armado colombiano. *Controversia* 175, 40–57.
- Chang, Y.-M., Potter, J., Sanders, S., 2007b. War and peace: third-party intervention in conflict. *European Journal of Political Economy* 23, 954–974, 27.
- Chang, Y.-M., Sanders, S., 2009. Raising the cost of rebellion: the role of third-party intervention in intra-state conflict. *Defence and Peace Economics* 20, 149–169.
- Collier, P., 2000. Rebellion as a quasi-criminal activity. *Journal of Conflict Resolution* 44, 839–853.
- Collier, P., Hoeffler, A., 1998. On the economic causes of civil war. *Oxford Economic Papers* 50, 563–573.
- Collier, P., Hoeffler, A., 1999. Justice-seeking and Loot-seeking in civil war, Working paper. World Bank.
- Collier, P., Hoeffler, A., 2004. Greed and Grievance in Civil Wars. *Oxford Economic Papers* 56, pp. 563–595.
- Dal Bó, E., Powell, R., 2007. Conflict and Compromise in Hard Times. WP, UC Berkeley.
- Deininger, K., 2003. Causes and Consequences of Civil Strife: Micro-Level Evidence from Uganda. *Oxford Economic Papers* 55, pp. 579–606.
- Dollar, D., Easterly, W., Gatti, R., 2000. What Causes Political Violence? A Research Outline, Development Research Group. Mimeo. World Bank.
- Dube, O., Vargas, J.F., 2006. Resource curse in reverse: the coffee crisis and armed conflict in Colombia DOCUMENTOS CEDE 003460, UNIVERSIDAD DE LOS ANDES-CEDE.
- Dixit, Avinash K., 2004. Lawlessness and Economics, Alternative Modes of Governance. Princeton University Press, Princeton.
- Elster, J., 2001. *Some notes of his seminar Conceptual Foundations of Rational Choice-Theory*. Fall, Columbia University, New York.
- Fajnzylber, P., Lederman, D., Loayza, N., 1998. Determinants of Crime Rates in Latin America and the World: An Empirical Assessment. World Bank, Washington [www.worldbank.org/laccrime](http://www.worldbank.org/laccrime)
- Fajnzylber, P., Lederman, D., Loayza, N., 1999. Inequality and Violent Crime. Mimeo. World Bank, Washington [www.worldbank.org/laccrime](http://www.worldbank.org/laccrime)
- Fajnzylber, P., Daniel, L., Norman, L., 2002. What causes violent crime? *European Economic Review* 46 (7), 1323–1357.
- Fearon, J.D., Laitin, D., 2003. Ethnicity, insurgency, and civil war. *American Political Science Review* 97, 75–90.
- Gaitán, F., 1995. Una Indagación sobre las Causas de la Violencia en Colombia. En Deas, M., Gaitán, F. *Dos Ensayos Especulativos sobre la Violencia en Colombia*. Tercer Mundo Editores, Bogotá.
- Garfinkel, M., Skaperdas, S., 2007. Economics of Conflict: An Overview, *Handbook of Defense Economics*. Elsevier.
- Gershenson, D., 2002. Sanctions and civil conflict. *Economica* 69, 185–206.
- Orbanef, Y., Jacome, F., 2000. El conflicto armado en Colombia, Una aproximación a la teoría de juegos. *Archivo de Macroeconomía*. No. 138. Departamento Nacional de Planeación.
- Grossman, H., 1991. A general equilibrium model of insurrections. *American Economic Review* 81 (4), 912–921.
- Grossman, H., 1994. Production, appropriation and land reform. *American Economic Review* 84 (3), 705–712.
- Grossman, H., 1995. Robin Hood and the redistribution of property income. *European Journal of Political Economy* 11 (3), 399–410.
- Hillman, A.L., Katz, E., Rosenberg, J., 1987. Workers as insurance: anticipated government assistance and factor demand. *Oxford Economic Papers* 39 (4), 813–820.
- Hirshleifer, J., 1987. *Economic Behaviour in Adversity*. Wheatsheaf Books Ltd., Brighton, pp. 11.
- Hirshleifer, J., 1988. The Analytics of Continuing Conflict, *Synthese*, vol. 76, no. 2, pp. 201–233. reprinted by Center for International and Strategic Affairs, CISA, University of California.
- Hirshleifer, J., 1989. Conflict and rent-seeking success functions, ratio vs. difference models of relative success. *Public Choice* 63, 101–112.
- Hirshleifer, J., 1991a. The paradox of power. *Economics and Politics* 3, 177–20, reprinted in Hirshleifer (2001): 43–67.
- Hirshleifer, J., 1991b. The technology of conflict as an economic activity *American Economic Review*. AEA Papers and Proceedings 81 (2), 130–134.
- Hirshleifer, J., 1994. The dark side of the force. *Economic Inquiry* 32 (1), 1–10.
- Isaza, J.F., Campos, D., 2005. March. Modelos dinámicos de guerra. El conflicto colombiano. *Revista de la Academia Colombiana de Ciencias Exactas. Físicas y Naturales*.
- Jacobs, D., Helms, R., 1996. Toward a political model of incarceration: a time-series examination of multiple explanations for prison admission rates. *American Journal of Sociology* 102, 323–357.
- Levitt, S., Rubio, M., 2000. Understanding Crime in Colombia and What Can Be Done About It, WORKING PAPERS SERIES. DOCUMENTOS DE TRABAJO 003735, FEDESARROLLO.
- Londoño, J.L., Guerrero, R., 1999. La violencia y sus costos en América Latina. Documento de Trabajo R-375. Red de Centros de Investigación. Banco Interamericano de Desarrollo.
- Manson, D., Fett, P., 1996. How civil wars end: a rational choice approach. *The Journal of Conflict Resolution* 40 (4), 561–564.
- Mejía, D., Posada, C.E., 2003. Capital Destruction, Optimal Defense and Economic Growth Borradores de Economía 257, Banco de la República de Colombia.
- Mejía, D., Posada, C.E., 2006. Populist policies in the transition to democracy. *European Journal of Political Economy* 23, 932–953.
- Miguel, E.S.S., Sergenti, E., 2004. Economic shocks and civil conflict: an instrumental variables approach. *Journal of Political Economy* 112 (4), 725–753.
- Montenegro, A., Posada, C.E., 1995. Criminalidad en Colombia. *Coyuntura Económica* XXV (1 (March)).
- Neary, H.M., 1997. Equilibrium structure in an economic model of conflict. *Economic Inquiry* 35 (3), 480–494.
- Noh, S.J., 2002. Production, appropriation, and income transfer. *Economic Inquiry* 40 (2), 279–287.
- Østby, G., 2008. Polarization, horizontal inequalities and violent civil conflict. *Journal of Peace Research* 45 (2), 143–162.
- Posada, C.E., Gonzalez, F., 2000. Defense, justice and security spending. *Revista de Economía Institucional* 2 (2), 2000.
- Rangel, A., 2003. *Guerreros y Políticos*. Intermedio, Bogotá.
- Robson, A., Skaperdas, S., 2008. Costly enforcement of property rights and the Coase theorem. *Economic Theory* 36, 109–128.
- Roemer, J.E., 1998. Why the poor do not expropriate the rich: an old argument in a new garb. *Journal of Public Economics* 70, 399–424.
- Rothchild, D., 2003. Third-party incentives and the phases of conflict prevention. In: Sriram, C.L., Wermester, K. (Eds.), *From Promise to Practice. Strengthening UN Capacities for the Prevention of Violent Conflict*. Lynne Rienner Publishers, London.
- Rubio, M., 1995. Crimen y Crecimiento en Colombia. *Coyuntura Económica* XXV ((1 March)).
- Russett, B.M., 1964. Inequality and insurgency: the relation of land tenure to politics. *World Politics* 16, 442–454.
- Shanchez-Pages, S., 2009. The use of conflict as a bargaining tool against unsophisticated opponents. *Economic Journal* 119 (539), 1189–1207, 07.

- Sertel, M.R., 1991. Unpublished Lecture Notes on Manipulation of the Nash, Kalai-Smorodinsky, Maschler-Perles, Egalitarian and Utilitarian Bargaining Solutions. Boğaziçi University, Istanbul.
- Sertel, M., 1992. The Nash bargaining solution manipulated by pre-donations is Talmudic. *Economics Letters* 40 (1), 45–55.
- Shugart, M.S., 1992. Guerrillas and elections: an institutionalist perspective on the costs of conflict and cooperation. *International Studies Quarterly* 36, 121–152.
- Siqueira, K., 2003. Conflict and third-party intervention. *Defence and Peace Economics* 14, 389–400.
- Siqueira, K., Sandler, T., 2004. Collective goods, common agency, and third-party intervention. *Bulletin of Economic Research* 56, 3307–3378.
- Skaperdas, S., 1992. Cooperation, conflict and power in the absence of property rights. *American Economic Review* 82 (4), 720–739.
- Skaperdas, S., Syropoulos, C., 1997. Distribution of Income in the Presence of Appropriative Activities. *Economica* 64 (253), 101–117.
- Spolaore, E., 2004. Economic integration, international conflict and political unions. *Rivista di Politica Economica* IX–X, 3–50.
- Stewart, F., 2002. *Horizontal Inequalities: A Neglected Dimension of Development*. Working Paper Series No. Queen Elisabeth House, pp. 81.
- Walter, B., 2002. *Committing to Peace: The Successful Settlement of Civil Wars*. Princeton University Press.
- Yilmaz, M., 2001. Successful interventions in internal conflicts: a framework. *Journal of Law and Conflict Resolution* 3 (1), 1–6.
- Zartman, W., 2001. Negotiating international conflict. Incentives and Intractability. *International Negotiation* 6, 297–302.
- Zartman, I.W., Touval, S., 1996. International mediation in the post-cold war era. In: *Managing global chaos*, edited by Chester A. Crocker and Fen Osler Hampson (with Pamela Aall). United States Institute of Peace, Washington, DC, pp. 445–461.
- Zuleta, H., 2004. Persistence and expansion of guerrilla activities: the case of Colombia. *Journal of Income Distribution* 13, 105–115.
- Zuleta, H., 2008. Poor people and risky business, peace economics. *Peace Science and Public Policy* 14 (1), Article 5.
- Zuleta, H., Veneta, A., 2009. Beyond moral hazard: the effect of firm-level compensation strategies on economic conflict. *Peace Economics, Peace Science and Public Policy* 15 (1), Article 5.