

**Exploring the impact of the disarmament, demobilisation and
reintegration process on post-conflict peace.**

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To my nieces, Mariana and Maria José.

To the memory of my uncles, Arquimedez and Deogracias.

To the memory of my grandparents, Vicente, Olivia, Lucrecia and Dario.

Preface and Acknowledgements

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Abstract

Disarmament, demobilisation and reintegration (DDR) is a milestone towards lasting peace, but not the solution for the roots of a conflict. It is considered a highly politicised process because DDR is a cost-increasing provision that not only contributes to the security, but also builds confidence among warring parties. The United Nations has highlighted that without DDR, and specifically demobilisation, civil wars cannot end. Thus, DDR is a crucial aspect of any peace settlement; its greatest challenge is to design a programme and a strategy that convinces both parties that they have guarantees for surrender and disbanding and that their vulnerability and limits will be respected.

This study tries to explain why not all agreements include DDR provision during peace negotiation, what determines this, and whether the DDR can explain the resumption of war or the emergence of new types of violence in post-conflict societies. This study contributes to a broader understanding of how DDR provision is determined by specific characteristics of the rebel group, country and conflict; how various components of DDR can have different impacts on the failure of peace and the new type of violence. The findings suggest that including DDR within a peace agreement, especially a reintegration programme, has a significantly positive impact on peace and shows evidence of the importance of military reintegration in the process of peace consolidation.

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Introduction

Why do some peace agreements negotiate a disarmament, demobilisation and reintegration (DDR)? Is a disarmament, demobilisation and reintegration provision an important factor to prevent the recurrence of war? Why do some civil wars have a negotiated DDR which has concluded, and yet these societies still present high rates of violence? Conversely, although the peace agreement in Zimbabwe between Zanu-PF and the government excluded a negotiated DDR, peace was achieved. The Colombian government has signed five peace agreements with different armed groups. These accords have a negotiated DDR provision, but peace was not achieved. Nicaragua, Guatemala and El Salvador signed a peace agreement with a DDR provision but currently these countries present higher rates of violence than during the civil war.

From 1975 until 2012, 129¹ peace processes with rebel groups were negotiated worldwide which included 260 peace agreements² (Escola de Cultura de Pau, 2016; Höglbladh, 2012). Figure 1 shows the chronological distribution of peace process and DDR provision for this time period.³ The green line displays the number of peace processes by rebel groups. Bars indicate the number of processes which have a

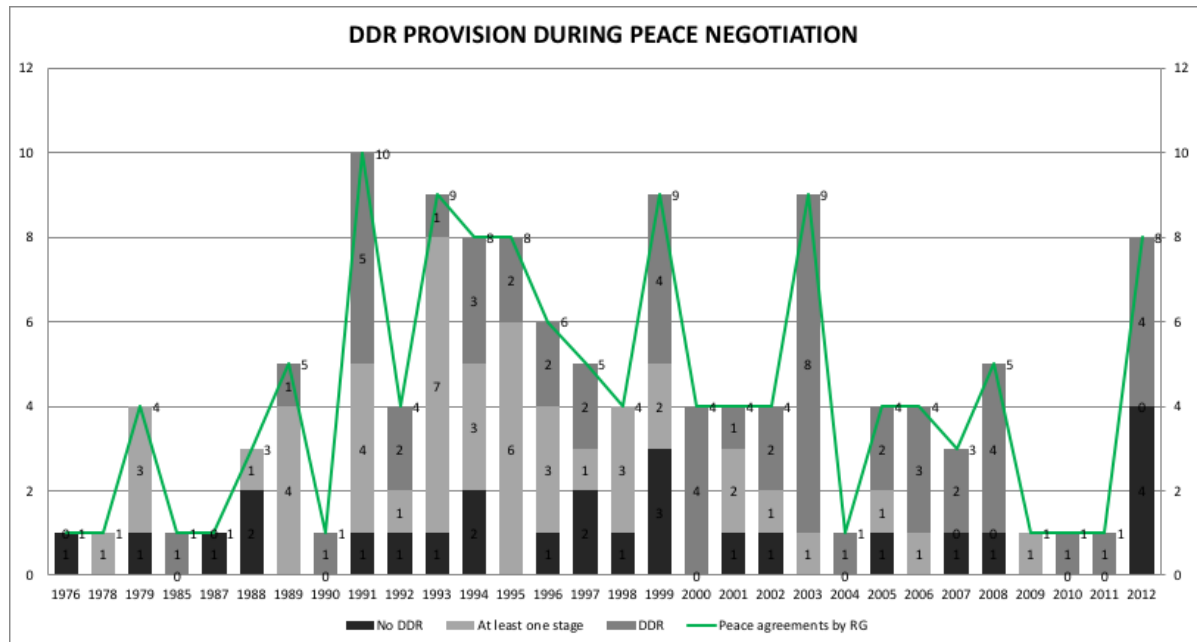
¹ The combined analysis undertaken within the database focuses on the peace process by rebel group. For instance, Cambodia has a peace process with KR, KPNLF and FUNCINPEC, and these were processed as distinct observations. A peace process can have many peace agreements. For example, the Guatemala case is one peace process featuring 16 peace agreements and only one rebel group. If the process only has ceasefire agreements, I drop these cases because they do not have any provision. See the dataset chapter for further detail.

² A peace agreement could be classified as ceasefire, pre-negotiation, interim, comprehensive or implementation (C. Bell, 2000).

³ It is important to highlight that the information is focused on the bargaining phase and not on the implementation stage (B. Walter, 2002, p. 19).

complete DDR provision, at least one stage of DDR or have no DDR. Of the 129 peace processes, 16 were signed between 1975 and 1989; during this time 31% (5) of the peace processes did not have DDR provision and 19% (2) had a complete DDR provision. Between 1990 and 1999, 64 peace processes were signed; of these 19% (12) did not have DDR and 34% (22) incorporated the entire programme. Finally, from 2000 to 2012, 49 were signed; of these 18% (9) did not have DDR while 63% (33) did. In conclusion, the DDR process is a provision which was rarely implemented in the 70s and 80s, but since the 90s the DDR has become an important provision to achieve peace.

Figure 1: Number of peace processes by rebel groups and DDR provision



Source: DDR dataset.

This study tries to explain why not all agreements include disarmament, demobilisation and reintegration provision during peace negotiation, what determines this outcome, and whether the DDR can explain the resumption of war or the emergence of new types of violence in post-conflict societies (Berdal, 1996a; Muggah, 2013; Nussio & Oppenheim, 2013). DDR is considered a highly politicized process because it serves as a key element of bargaining power. I argue that DDR is a cost-increasing provision because DDR increases the cost of fighting and changes the incentives for fulfilling the deal. This provision not only contributes to the security of a state, but also builds confidence among warring parties (Berdal, 1996d; Fortna, 2004b; Spear, 2002; B. Walter, 2002). However, not all peace negotiation includes DDR provision: some may only incorporate certain stages of DDR or negotiate this provision many years later, because the security and trust were not initially strong enough to modify the complete cost-benefit structure. Consequently, DDR is considered a crucial aspect in any peace settlement because a fruitful disarmament, demobilisation and reintegration of a warring faction contributes not only to improving the security of both society and the rebels, but also to fostering trust between the negotiating parties for the implementation phase (Spear, 2002; UNDDR, 2014). The greatest challenge is to design a DDR provision that convinces both parties that they have guarantees for surrendering and disbanding and that their vulnerability and limits will be respected. When the parties obtain clear agreements about these preoccupations, they will negotiate and implement the settlement. When warring parties fail to obtain guarantees, they will eventually reject a negotiated settlement. Peace agreements normally have more provisions to solve the cause of

conflict and to avoid the commitment problem (Stedman, Rothchild, & Cousens, 2002; B. Walter, 2002).

In sum, this PhD dissertation is about DDR processes in the last 37 years and the link between DDR programmes and the end of armed conflict, peace duration and transformation of violence in the post-conflict stage. There are three basic questions that different studies⁴ have tried to answer: the first considers why DDR is successful or not; the second concerns the general lessons that can be learnt—positive and negative—from different DDR programmes, and the final question focuses on the role of the international community and the United Nations, especially in relation to peacekeeping missions. There is a lack of comparative research focusing on the general characteristics and conditions of conflicts and countries that include DDR provision in a peace agreement (Berdal, 1996a). We need to improve formal analysis, data, and evaluation in order to have better elements and information for public policies. Policy-makers should think about the scope of the negotiation and the implementation of DDR provision, so as not to generate an unrealistically high expectation that the government cannot achieve, which then reduces the benefits for ex-combatants entering into an integration process within the society. This PhD dissertation intends to provide the enhanced research needed by policy-makers, while also closing the gap in the literature and generating new questions for further research.

⁴ See, for example, Colletta, 1997; Giustozzi, 2012; W. A. Knight, 2008; Matveeva, 2012; Muggah & Baaré, 2009.

The main limitation of my proposal is the difficulties encountered when trying to gather data. Because of this, there is genuine space for debate about both baselines and the recording of key statistics after a peace treaty (Specker, 2008). There is a clear measurement deficit (Bush, 1998), both regarding the identification of what should be measured and the quality, reliability and validity of the available data (Duffield, 1997; UNDDR, 2014). In sum, this research contributes to both the debate regarding the failure of peace processes, and to existing literature about negotiations and the cessation of civil wars. Additionally, it introduces a new dataset about peace agreements and DDR.

Disarmament, demobilisation and reintegration (DDR): conceptualization

Table 1 shows the accepted definitions of DDR for each stage; these definitions were developed by the United Nations and they are accepted by consensus. DDR, at its origins, had only three stages: disarm, demobilize, reintegrate. However, stakeholders decided to create a new short phase between demobilisation and reintegration—reinsertion—which focusses special attention on primary needs and transitional assistance, as a condition to assist rebels on their way to social and economic integration into civil life.

Table 1: Definition of DDR – UN approach

Definition
<p>Disarmament</p> <p>This is the collection, documentation, control and disposal of small arms, ammunition, explosives and light and heavy weapons carried by both combatants and sometimes civilians. Disarmament may also include the development of responsible arms management programmes.</p> <p>Demobilisation</p> <p>Demobilisation is the formal and controlled discharge of active combatants from armed forces or other armed groups. The first stage of demobilisation may extend from the processing of individual combatants in temporary centres to the massing of troops in camps designated for this purpose (cantonment sites, encampments, assembly areas or barracks). The second stage of demobilisation encompasses the support package provided to the demobilized, which is called reinsertion.</p> <p>Reinsertion</p> <p>Reinsertion is the assistance offered to ex-combatants during demobilisation but prior to the longer-term process of reintegration. Reinsertion is a form of transitional assistance to help cover the basic needs of ex-combatants and their families and can include transitional safety allowances, food, clothes, shelter, medical services, short-term education, training, employment and tools. While reintegration is a long-term, continuous social and economic process of development, reinsertion is a short-term material and/or financial means of assistance to meet immediate needs, and can last up to one year.</p>

Reintegration

Reintegration is the process by which ex-combatants acquire civilian status and gain sustainable employment and income. Reintegration is essentially a social and economic process with an open time frame, primarily taking place in communities at the local level. It is part of the general development of a country, and a national responsibility, and often necessitates long-term external assistance.

Source: Operational Guide to the Integrated DDR Standards (IAWG - DDR, 2014)

Indeed, the DDR programme is a mechanism designed to disband or demilitarize armed groups which are official or non-state armies, and to control and reduce the use of arms. In addition, the DDR is a mechanism to placate former combatants by providing security and supporting them in the pursuit of legal incomes (Berdal, 1996c, 1996b; W. A. Knight, 2008). This mechanism is developed in different stages. It is important to clarify that DDR is not a linear process, as the phases can overlap; for example, disarmament can be considered as a first step in the short term. In some cases, the government and international supporters may develop different strategies for ensuring that this stage is circular. Meanwhile, reintegration is a long process with an important impact on the recovery of a war-torn country. A good example of the circular cycle of DDR is the Nepalese case, where the civil society held numerous weapons. As a consequence, the government created a long-term disarmament programme that developed certain incentives and strategies, such as a lottery, for collecting weapons on a constant and continual basis (Joshi & Quinn, 2012). Thus,

the DDR programme is part of the provisions which are negotiated during or after a peace process.

Additionally, the main objective of DDR processes is not only to contribute to the improvement of security and stability in post-conflict states, but also to establish an important connection between the military and civilian aspects of peace processes. For this reason, DDRs are multidimensional and complex processes involving “political, military, security, humanitarian and socio-economic dimensions” (IAWG - DDR, 2014, p. 24; Knight, 2008; Ministry for Foreign Affairs, 2006). Therefore, their success is vital for sustainable and lasting peace.

DDR can be regarded as a period of transition from war to peace in which the foundations of the new order are set in place. Given the high variation in the levels of success of DDR programmes implemented throughout the world, it is perhaps unsurprising that the literature on small-n cases tends to be highly polarized. Positive experiences like the ones in Mozambique and Burundi are often used by those extracting the positive lessons from DDR (Douma & Gasana, 2008; Striuli, 2012). On the other hand, studies centred on the Centro-American processes, for example, show that the consolidation of peace is a difficult aim, because in these cases the homicide and criminality rates have increased significantly; moreover, the reintegration programme, social, economic and psychological efforts have also failed (Chamorro, 2015; Moser & McIlwaine, 2001).

As Caramés, Fisas, and Sanz (2009) assert, there are no magic bullets for DDRs. Although at a certain level of abstraction, all DDRs can be seen as consisting of the same steps and component elements (Escola de Cultura de Pau, 2006, 2007a, 2008, 2009), each takes place in a different context, involves a different set of actors (national and international), is subject to different constraints, and counts on different types of resources and assets. Nonetheless they all remain arduous (UNDP, 2009). The relative success of DDR thus depends on achieving a lasting impact for the peace in ways that involve not only the monopoly of force, but also the provision of public goods that guarantee a significant improvement in the quality of life of the population (especially ex-combatants), and therefore serve to dissuade ex-combatants and civilians from resuming conflict.

In sum, DDR programmes have played a significant role in determining peace after an armed conflict, particularly in the last twenty years (Banholzer, 2013; Joshi & Quinn, 2012). Figure 2 shows the number of peace processes with DDR arrangements between 1975 and 2012. Of the 129 peace processes, 26 did not have DDR provision, 57 had the entire provision (D+D+R), and 28 had only two stages (10 had disarmament and demobilisation, nine had disarmament and reintegration, and nine had demobilisation and reintegration). Only 18 had one stage (nine had disarmament, four had demobilisation, and five had reintegration).⁵ In her dataset analysis, Banholzer⁶ highlights similar findings, stating that

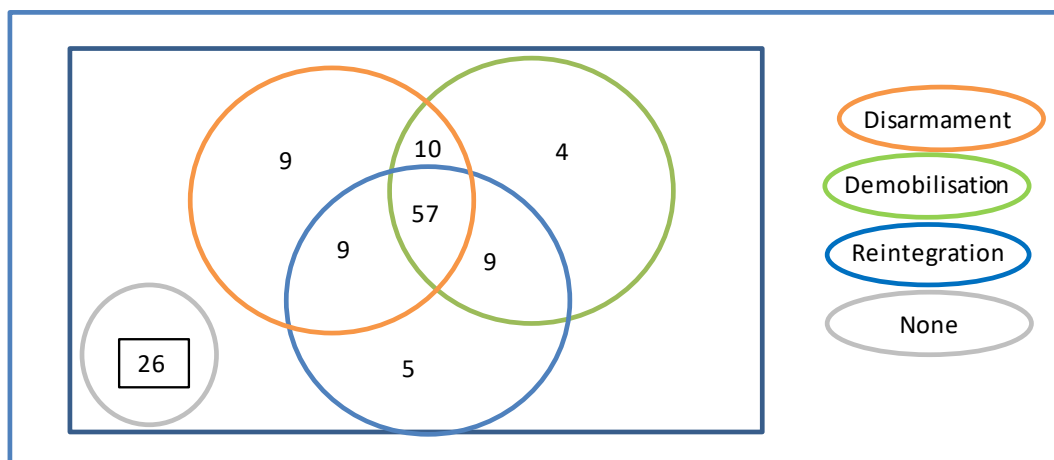
⁵ See Figure 2 and Appendix A for details of the cases.

⁶ It is important to bear in mind that while the Peace Agreement dataset reported DDR as a provision for disarmament (only), the researchers had coded other variables that we can interpret as part of the DDR process including, for example, Intarmy – Integration in army, and Intciv – Integration in Civil

according to the Uppsala Conflict Data Programme [...] DDR has been mentioned in only 63 of 148 peace agreements (43%) since the end of the Cold War. This of course means in turn that, in 85 cases (or 57%), the peace agreement did not contain DDR measures (2013, p. 34).

These last figures glaringly show that less than 50% of the cases have employed a complete DDR process. For this reason, it is relevant to understand the differences between cases if the DDR provision is considered to be a critical tool for achieving peace.

Figure 2: Venn diagram of DDR provision (1975 – 2012) – peace process by rebel groups



	DDR provision	Disarmament	Demobilization	Reintegration
No	26 (20%)	44 (34%)	49 (38%)	49 (38%)
Yes	103 (80%)	85 (66%)	80 (62%)	80 (62%)

Source: DDR dataset.

Service. It is not clear if the author had calculated the percentage based only on the DDR variable or if she considered the other variables.

Table 2 shows a summary of the percentage of peace processes with (column yes) or without (column no) at least one stage of DDR, taking into consideration some particularities. The first group is duration and intensity of conflict. I can conclude that there is a difference between long and short conflicts, but there is no difference between minor and major intensity. This means that duration could have a statistical impact, while intensity has no statistical significance; both characteristics are independent of DDR. The second group is the spoilers. Here I present two types of data, the first being multiparty conflicts⁷ and the second being the number of rebel groups in the country. Based on Pearson's chi-squared test⁸ and a basic rule of thumb,⁹ I suggest that there is a difference between conflicts which are multiparty and those which are not multiparty, when it comes to negotiating a peace agreement. This category group is not statistically independent.

The third group is about military and tactical capability, and the data suggests that there is an important difference between the categories of much weaker rebels and weaker rebels, and there is a divergence between weaker rebels and stronger rebels. It is important to clarify that most rebel groups are considered as much weaker than the government, and for that reason it is necessary to bear in mind other characteristics present within each group. For instance, a political wing is a proxy for "the ability to substitute nonviolent actions for violent activities" (Cunningham, Gleditsch, &

⁷ The multiparty and "maximum rebel group" data are different because "maximum rebels" represents the historical number of rebel groups during the entire conflict period, while multiparty is calculated year by year.

⁸ Pearson's chi-squared test checks the hypothesis that the rows and columns in a two-way table are independent.

⁹ The rule of thumb means that if the difference between the groups is more than 10%, then there is a difference existing between groups in the moment of negotiating a peace agreement.

Salehyan, 2009, p. 581) and if the political wing is legal the rebels will have “the opportunity to pursue their demands through legal political means” (Cunningham et al., 2009, p. 581). It is a dummy variable. Table 2 illustrates that there seems to be no differences between groups with or without a political wing. It is important to analyse the interaction of this variable with other rebel characteristics. In sum, many peace processes with at least one stage of DDR are negotiated with rebel groups that have a clear central command, a political wing, low capacity for fighting and who are considered as to be much weaker or weaker in tactical terms.

Research methods

Two different datasets were gathered to develop a quantitative analysis. Statistical analysis allows comparison of multiple cases at the same time and identifies common patterns between cases. The first dataset, which is called the DDR data, collects information for chapters 3 and 4. This dataset provides information on DDR provision, duration of peace, the peace agreement, internal armed conflicts, rebel characteristics, and the political and economic characteristics of the country. The description of the dataset is included in this document.

The second dataset presents information about the general characteristics of each municipality in Colombia (1,122 in total) from 2003 to 2014. The dataset is clustered into four groups: crime, DDR, the legacy of conflict and the municipality socio-

economic characteristics. The crime block reports the rates of homicide and robbery. The DDR block represents the information related to the demobilisation and reintegration programme. The legacy of conflict data group indicates the presence of armed conflict in the past and present. Finally, the characteristic of municipality category shows different information relating to social conditions, regional distributions and economic conditions, such as poverty, the culture of violence and illegal economy.

Using these datasets, I estimated different types of models and their statistical diagnostics. This type of analysis allows us to calculate the probability that some event will happen, or calculate the relationship between the control and dependent variable. However, this type of analysis has its limitations. First, we can identify some patterns, although important differences, such as beliefs, culture, and history, can cause governments and rebel factions to act in ways not predicted by the statistical model. Secondly, statistical analysis can reveal the correlation between each control variable and dependent variable, but it cannot reveal the causal mechanism. We need to develop case studies to identify certain particularities which are difficult to measure by number, but should help to reveal the limitations of the theory.

Table 2: Historical record of DDR based on characteristics of the conflict

DDR (at least one stage)			DDR (at least one stage)			
	No	Yes		No	Yes	
Characteristics of the Conflict			Rebels military and tactical capability			
1. Duration			4. Balance of power			
Longevity conflicts	22,39%	77,61%	Rebels strength_much weaker	26,92%	73,08%	
	15	52	Rebels strength_weaker	18,92%	81,08%	
Short conflicts (less 5 years)	17,74%	82,26%	Rebels strength_parity	14,29%	85,71%	
	11	51	Rebels strength_strong	25,00%	75,00%	
Pearson Chi2 (1): 0,43		Pr: 0,511		Pearson Chi2 (1): 2,41		
				Pr: 0,660		
2. Intensity			Political wing_No			
Minor_Intensity	19,13%	80,87%		21,59%	78,41%	
	22	93	Political wing_Yes	17,50%	82,50%	
War_Intensity	28,57%	71,43%		69	33	
	4	10	Pearson Chi2 (1): 0,2843		Pr: 0,594	
Pearson Chi2 (1): 0,69		Pr: 0,406		Legal political wing_No		
				20,59%		
3. Spoilers			Legal political wing_Yes			
Multiparty_No	26,32%	73,68%		19,05%	80,95%	
	10	16		4	17	
Multiparty_Yes	17,58%	82,42%	Pearson Chi2 (1): 0,025		Pr: 0,873	
	28	75	Fight_low		25,00%	
Pearson Chi2 (1): 1,27		Pr: 0,26				
Rebel groups_0	32,43%	67,57%		17	51	
	12	25	Fight_moderate		13,21%	
Rebel groups_1	5,71%	94,29%		7	46	
	2	33	Fight_high		40,00%	
Rebel groups_2	16,67%	83,33%		2	3	
	4	20	Pearson Chi2 (1): 3,721		Pr: 0,156	
Rebel groups_3	14,29%	85,71%				
	3	18				
Rebel groups_more than 4	41,67%	58,33%				
	5	7				
Pearson Chi2 (1): 21,92		Pr: 0,001				

Source: DDR Dataset.

How the thesis is organized

The following five chapters examine the relevance of the disarmament, demobilisation and reintegration provision and its relationship with peace and post-conflict violence. Chapter 2 introduces the new dataset “DDR Data”. This new dataset provides a quantitative picture of peace negotiation results worldwide from 1975 to 2012, and explains the advantages compared to previous sources of quantitative datasets on peace negotiation as well as its limitations.

Chapter 3, entitled “Determinants of disarmament, demobilisation and reintegration during peace negotiation”, focuses on analysing characteristics of conflicts, the rebels’ capabilities, and the economic and political factors of the states that have had peace negotiations with or without DDR provision. This study is the first to employ the rebel – government approach to examine why some peace processes have a DDR provision while others do not. I develop a Hawk-Dove game to explore the incentives and conditions of the adversaries for including a DDR provision in the agreement. The findings suggest that conflicts which are high cost, in terms of duration and death, are less likely to have a DDR in a peace negotiation. This highlights the fact that the weariness and state weakness have an important effect on the decision to negotiate a DDR. I also argue that rebel groups which are considered strong and have territorial control are not expected to negotiate a DDR. However, the rebel groups with a clear and identifiable political wing are more prone to negotiate a DDR provision, because they can use political means to advance their demands. When the

conflict does not have more than two rebel groups, the rebel groups are more likely to negotiate a DDR. Countries considered to be a stable regime and with a solid economy are less prone to have a DDR in a peace negotiation, because the society may assimilate former combatants without the need for a special programme.

Chapter 4 is titled “Failure of Peace and Disarmament, Demobilisation and Reintegration”. This chapter is primarily interested in the effect of the DDR provision on the likelihood of peace failure after parties have signed a peace agreement. This chapter argues that a DDR mechanism within a peace negotiation can make peace more durable because this provision has a high political and economic cost for both sides, should either party decide to renege on the commitment or to alter the agreement. This research finds something different, compared with previous work: the reintegration stage, especially military reintegration, has a positive impact on peace due to the long process involved, which develops different programmes focused upon generating new opportunities. In other words, the reintegration is going to change the individual incentives for preferring civil life over war. This result arises for two reasons. First, because the dataset uses the disaggregation of DDR, while others simply use one variable. Second, the research also shows that not all peace agreements have a complete DDR strategy: this dataset also provides for this distinction.

Chapter 5 is entitled “Reintegration programme, ex-combatants and post-conflict violence: the Colombian case”. This chapter considers why rates of violence typically

increase in post-conflict scenarios and what the relationship is between DDR processes and the new forms of violence in the post-conflict period. This chapter answers these questions by examining the dynamics of violent crime in the Colombian case, after the peace negotiations with the United Self-Defence Forces of Colombia (Autodefensas Unidad de Colombia – AUC), and the consolidation of the individual demobilisation of combatants as a counterinsurgency strategy, which is focused on guerrilla groups. This work intends to characterise the regional dynamics of the conflict and the post-conflict violence. The focus is on the presence of ex-combatants who participated in DDR programmes and patterns of different types of violence, such as homicide and robbery, at the municipal level. Do communities with more ex-combatants experience more crime? And do DDR programmes matter? We are going to determine the factors that might explain this violence in a spatial context, including regional, demographic and economic perspectives.

Chapter 6 reviews the findings presented in the thesis. It concludes by outlining the implications this study may have for scholars interested in questions of peacebuilding and post-conflict recovery.

Dataset for DDR analysis

Description – Version 1.2, October 2014 / January 2016

This dissertation seeks to explain why some peace processes have DDR and some do not. A necessary first step is to map out the different negotiations and to identify which has a DDR provision. After we comprehend the patterns of negotiation of DDR, we can turn our attention to explaining its determinants and its relationship with peace.

This chapter draws primarily on the disarmament, demobilisation and reintegration (DDR) peace process dataset. This new dataset provides a quantitative picture of the global peace negotiation results from 1975 to 2012. The dataset is comprised of information from individual peace negotiations and other sources. The DDR data provides information on the peace process, number of peace agreements, DDR provision, type of reintegration (military, civil, or both), duration of peace (number of years to resumption of conflict), if the peace agreement was implemented, conflict with other rebels and the characteristics of rebel groups.

This chapter serves to introduce the DDR dataset, explaining the advantages it offers compared to previous sources of quantitative datasets on peace negotiation, as well as outlining its limitations. This dataset only measures DDR at one point in time (the bargaining moment–inclusion in peace agreement). For this reason, it cannot properly address the longer processes. The long process (implementation) is therefore

misleading in the dataset. This is a limitation of the dataset which could underestimate the effect of DDR. For further research, I want to include the long path and extend the data to include the implementation phase.

A new dataset on DDR

This project builds a new dataset of DDR use in peace processes. There were three existing datasets with DDR information: the Uppsala Conflict Data Program (UCDP) Peace Agreements Dataset (PAD), the Banholzer dataset, and the Peace Accords Matrix database (PAM). These data resources collect important information, but are not adequate for this project. First, PAD (Harbom, Högbladh, & Wallensteen, 2006), version 2.0-2012, registers peace agreements signed in armed conflicts after 1975 and includes five main topics: military, political, territorial, justice and implementation. However, it uses a different definition of DDR, as although the dataset has a variable called “DDR”,¹⁰ this variable only represents disarmament. However, PAD has other variables which are closer to the wider dimensions of DDR, such as “Intarmy – Integration in army”, “Intgov – Integration in government/Civil Service”, and “Intciv – Integration in Civil Service”. This dataset reports 216 peace agreements. Second, Banholzer’s dataset collected information for 40 cases. Her material focuses on three questions: “1) What is the state of the conflict? 2) If the conflict has ended, how has it ended? 3) Are international actors involved and if so, in what way?” (Banholzer,

¹⁰ “DDR: 1) The agreement included provisions for the disarmament of the warring parties. Coded as yes even if the disarmament only concern one of the warring parties. 0) The agreement did not provide for any disarmament of the warring parties” (Högbladh, 2012, p. 6).

2013, p. 9). This dataset includes cases from 1989 to 2010 which represent different ways of ending conflicts; for example, there are six military victories, six low activity, three ceasefires, twenty peace agreements and five outcomes which are unclear. The issue in this case is that the information does not distinguish between the three stages of DDR, in spite of the author acknowledging in the text that “Although DDR programmes usually consist of three components, not all of them are implemented in all cases. Some programmes focus exclusively on disarmament and demobilization, while others skip the “DD” part to directly address the issue of reintegration” (Banholzer, 2013, p. 10). Third, the Peace Accord Matrix is an excellent resource of qualitative and quantitative data, covering 34 comprehensive peace agreements, including their provisions and implementation from 1989 to 2007. The matrix distinguishes between 51 different types of provisions and collects information about disarmament, demobilization and reintegration. These three sources of information are excellent, but they do not match the definitions employed within this study or the purpose of this thesis. These databases also do not provide disaggregated information about disarmament, demobilisation and reintegration. Therefore, I have used them as a verification tool and a secondary resource.

Definitions

The unit of analysis of this dataset is a peace process between government and rebel groups which are/were engaged in internal armed conflict. Consequently, this dataset uses the following definitions. First, conflict is defined according to the UCDP

description as “a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths” (UCDP, 2015). Moreover, UCDP classifies conflict into four types, which are extra-systemic armed conflict, internal armed conflict, internationalised internal armed conflict and interstate armed conflict. The UCDP dataset is based on the first three types of conflict.

Second, following the UCDP definition, a peace process is understood as a set of peace agreements which are compromises on how to solve the causes of conflict and to rebuild war-torn societies. The compromises are basically political issues, which use different mechanisms such as transitional justice, security reform, elections, political reform, land reform, and disarmament, demobilisation and reintegration (DDR), in order to give incentives to rebels for reaching peace and starting a political and civil transition. This dataset is based on peace negotiations signed after 1975, which could include one or more peace agreements.

Third, following the UN definition, disarmament is interpreted as the collection and control of weapons; demobilisation is the discharge of active combatants from armed groups and provision of basic assistance (medical, financial, material needs); reintegration is a long-term process where the former combatants obtain social skills and civilian status (IAWG – DDR, 2014). The information is collected from each peace agreement which is signed during a peace negotiation.

In sum, this database is limited to internal armed conflicts which have a peace negotiation between the government and rebel group(s) from 1975 to 2012. This data is focused on DDR provision, and whether or not it is included in the agreement as a guarantee of security and whether it serves as an important tool of credibility between parties.

Data collection

As explained above, there are three important data sources which were used to obtain complementary information. For gathering information about peace negotiations, peace agreements and its provisions, this dataset used the UCDP dyadic Conflict Termination Dataset (CTD), version 1-2010, which collects information on “at least one year of non-activity, or more specifically, when the conflict ceases to be registered in the UCDP/PRIO armed conflict dataset” (Kreutz, 2010, p. 2). I obtain the text of the agreements and code the information. For this purpose, I utilize the Transitional Justice Peace Agreements database (University of Ulster, Transitional Justice Institute, & Incore, 2006); the Peace Accords Matrix (Joshi & Darby, 2013); the Peace Agreements Database (UN, 2006); the Peace Agreements Digital Collection (USAIP, 2009); the IMPACT (Implementation of Pacts) dataset (Jarstad, Nilsson, & Sundberg, 2012); annualized implementation data on comprehensive intrastate peace accords (1989–2012) (Joshi, Quinn, & Regan, 2015); the Yearbooks

on Peace Processes and DDR programmes,¹¹ UCDP Conflict Encyclopedia (UCDP, 2015); *Civil Wars of the World: Major Conflicts since World War II* (DeRouen & Heo, 2007) and other research about specific cases.

I collect the information and identify the three components of DDR, if these are mentioned or the implementation is explained, the type of reintegration (military, civil, or both), the number of years to resumption of conflict, and the transformation of the rebel group. I also gather information about certain characteristics of the peace negotiation and rebel groups. Some variables are dichotomous and others are categorical. The information was collected until 2012. Table 3 shows the variables and definitions.

Table 3: Variables

Variable name	Description	Type
1. Disarmament_has_1 2. Demobilization_has_1 3. Reint_has_1 4. DDR_1 5. Army_reint 6. Civ_reint	1, if the peace negotiation has DDR (or disarmament, demobilisation, reintegration, military reintegration or social reintegration); 0, in other cases.	Dichotomous
7. Disarmament_has 8. Demobilization_has 9. Reint_has	2, if the peace negotiation has a road map (yes-implementation rules) of the DDR; 1, if the peace negotiation mentions the DDR (yes-mention); 0, in other cases.	Categorical
10. DDR_2	1, if the DDR only includes one stage; 2, if the DDR includes two stages; 3, if the DDR is completed; 0 in other cases.	Ordered

¹¹ (Escola de Cultura de Pau, 2006, 2007a, 2007b, 2008, 2009, 2016)

Table 3: Variables (continuation)

Variable name	Description	Type
11. Failure of peace	0, if the peace negotiation failed (civil war recurrence); 1, in other cases (Absence of war – peace). There are five dummy variables which measure if the conflict had ended after the first year (second, third, fourth, fifth and tenth) since the peace agreement was signed.	Dichotomous
12. Number of years to resumption (duration of peace)	Time (in years) between the cessation of conflict by peace negotiation and the start of another war between the same parties.	Continues
13. Conflict after peace negotiation	What happened to the conflict after the end of the peace negotiation. 1. Negotiation in process 2. Ongoing 2.1. Ongoing and negotiation in process 2.2. Ongoing and rebel splits 3. End 3.1. End and negotiation in process 4. Low activity 4.1. Low activity and rebel splits 4.2. There are no military actions 4.3. Frozen conflict 5. Resumption after some years 6. Resumption of conflict with an alliance of rebel groups	Categorical
14. Rebel group after peace negotiation	What happened to rebel groups after the end of the peace negotiation. 1. Active 1.1. Active and joint 1.2. Active / joint / political party 1.3. Active and low activity 1.4. Active and political party 1.5. Active and split 2. Split 2.1. Split and political party 2.2. Split and army 3. Political party 4. Army 4.1. Army and disbanded 4.2. Army and political party 4.3. Army and civil reintegration 4.4. Army and civil reintegration and political party 5. Disbanded or dissolved 5.1. Disbanded OR political party 5.2. Disbanded OR joint 6. Unclear	Categorical

Table 3: Variables (continuation)

Variable name	Description	Type
15. Type of rebel group	1. Ethnic 1.1. Ethnic / grievance 1.2. Ethnic / secessionist 2. Grievance 3. Ideological 4. Political 4.1. Political / religious 4.2. Political / grievance 4.3. Political / secessionist 5. Pro-independence 6. Religious 7. Secessionist 7.1. Secessionist/ethnic/ideological 8. Unclear	Categorical
16. Is there conflict with other rebel groups?	1, if there is a conflict with other rebel groups; 0, in other cases.	Dichotomous
17. Is there a previous peace failed negotiation by rebel group?	1, if the previous peace negotiation with the rebel group had failed; 0, in other cases.	Dichotomous
18. Is there a previous peace failed negotiation by conflict?	1, if the previous peace negotiation by conflict had failed; 0, in other cases.	Dichotomous

Structure of the data

The DDR dataset is a unique source of comparable data on the disarmament, demobilization and reintegration provisions signed between 1975 and 2012. The resulting dataset consists of 129 observations (dyads) regarding 102 peace negotiations with 260 peace agreements during 1975 to 2012. Figure 3 shows the logical structure of the dataset. Appendix A provides a summary of the cases and

outlines some of the criteria considered. These cases are included as peace negotiations because they meet the following three rules of decision:

1. The negotiation is for solving the same incompatibility.
2. It is negotiated by national government and at least one rebel group.
3. This study considers a peace process as new if:
 - During the negotiation, the main rebel group or government retires from the table.
 - OR
 - There are more than three years between signed agreements.

Negotiations that do not meet these operational criteria are not included in the database.

It is important to bear in mind that the unit of analysis in this research is peace negotiation by dyad. The observations increase as there are many cases that have more than one rebel group. I therefore duplicate the observation according to the following criteria. If the peace negotiation has more than one rebel group, the information is duplicated for each rebel group. For example, in 1991, Cambodia had a peace agreement with KR, KPNLF and FUNCINPEC. I process these as distinct observations and collect individual information for each rebel group.

Table 4 shows how many peace processes were negotiated by the number of participants (rebels).

Figure 3: Basic structure

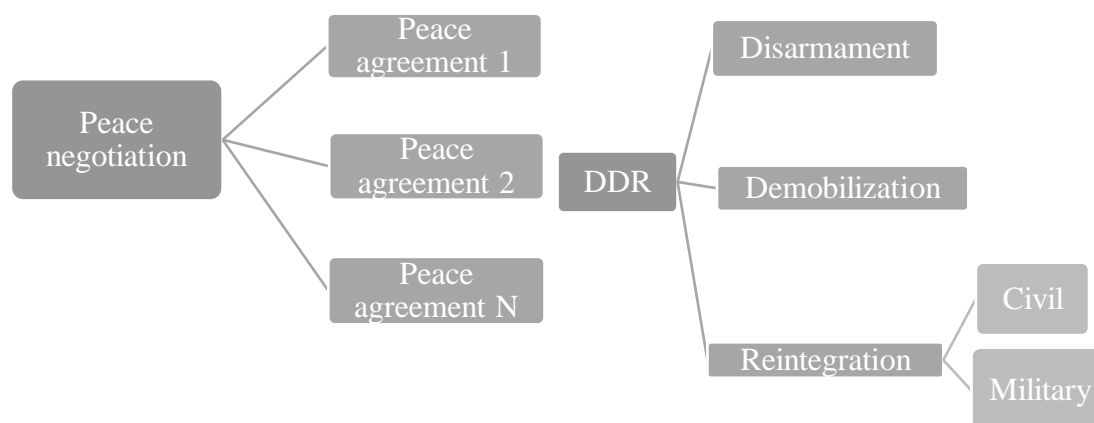


Table 4: Peace negotiation and number of rebel groups involved

Peace negotiation with one rebel group	84
Peace negotiation with two rebel groups	12
Peace negotiation with three rebel groups	3
Peace negotiation with four rebel groups	3
TOTAL	102

In summary, this dataset is used to provide a large-n statistical picture of peace deals, provisions and their results. The collected data allows quantitative analysis of various issues related to conflict and rebel characteristics, conflict resolution, effects of DDR provision, transformation of the rebel group and other outcomes. This database provides broad comparative quantitative data across 102 peace processes. The database could be used in combination with other important datasets, for example, the

Uppsala Conflict Data Program and the World Bank Database, Polity IV Project: this will allow exploration into different questions related to theory of conflict, conflict resolution and post-conflict outcomes. It will provide an evidentiary basis to rethink the gap relating to how peace negotiation and its settlements, such as DDR, are understood for peace-building.

Appendix A: Summary of the cases, including comments and notes.

1. Afghanistan

Conflict ID	Peace process	Peace agreements	Year	Rebels
137	First	2	1993	Hizb-i Islami-yi Afghanistan
		1		Hizb-i Wahdat
137	Second	1	1996	Hizb-i Islami-yi Afghanistan

2. Angola

Conflict ID	Peace process	Peace agreements	Year	Rebels
131	First	2	1991	The National Union for the Total Independence of Angola
131	Second	1	1994	The National Union for the Total Independence of Angola
131	Third	1	2002	The National Union for the Total Independence of Angola
192	Fourth	1	2006	Front for the Liberation of the Enclave of Cabinda

Number of rebel groups: seven. Number of conflicts: three. 1989, The Gbadolite Declaration which was a dead letter. 1991, The Bicesse Agreement was a cease-fire accord. The Lusaka Accord, 1994, was the implementation of the accords signed in Lisbon in May 1991. In 2002, the Luena Memorandum of Understanding was reached.

3. Bangladesh

Conflict ID	Peace process	Peace agreements	Year	Rebels
126	First	1	1997	Parbatya Chattagram Jana Samhati Samiti

4. Bosnia-Herzegovina

Conflict ID	Peace process	Peace agreements	Year	Rebels
203	First	1	1994	The Croatian Republic of Bosnia-Herzegovina Croatian irregulars
194	Second	1	1995	The Croatian Republic of Bosnia-Herzegovina Serbian irregulars

5. Burundi

Conflict ID	Peace process	Peace agreements	Year	Rebels
90	First	1	2000	Palipehutu The National Council for the Defence of Democracy Frolina
90	Second	4	2003	The National Council for the Defence of Democracy-Forces for the Defence of Democracy
90	Third	3	2008	Palipehutu-National Forces of Liberation

Palipehutu and The National Council for the Defense of Democracy split into two new factions. “Kabura thus founded the Palipehutu-FNL. The original group lost its military capacity and begun to focus solely on a political struggle, becoming inactive

as a warring party”(International Crisis Group, 2001). “The National Council for the Defence of Democracy-Forces for the Defence of Democracy was created in 1998 when the first National Council for the Defence of Democracy split in two as a consequence of a leadership struggle. [...] The first National Council for the Defense of Democracy entered into negotiations with the government, signing a peace agreement in the year 2000” (Nindorera, 2012).

I follow the rule of thumb, and for that reason I code as peace after a peace agreement is signed, although the conflict is ongoing with the new factions.

6. Cambodia

Conflict ID	Peace process	Peace agreements	Year	Rebels
103	First	1	1991	Khmer Rouge. Khmer People's National Liberation Front. National United Front for an Independent, Neutral, Peaceful, and Cooperative Cambodia.
103	Second	1	1998	National United Front for an Independent, Neutral, Peaceful, and Cooperative Cambodia

Khmer Rouge signed the peace agreement in 1991, but they continued fighting until 25/12/1998. In the termination dataset, this case is registered as a victory by government.

7. The Central African Republic

Conflict ID	Peace process	Peace agreements	Year	Rebels
222	First	2	2008	Union of Democratic Forces for Unity
222	Second	2	2012	The Convention of Patriots for Justice and Peace

“On 13 April 2007, negotiations between the government and Union of Democratic Forces for Unity resulted in the signing of a peace agreement in the city of Birao. [...] The ceasefire was respected, and no fighting has subsequently been reported between the government and Union of Democratic Forces for Unity. [...]. In December 2012, a new rebel group called Seleka started a rebellion in northern Central African Republic. Seleka was an alliance of the former The Convention of Patriots for Justice and Peace, Union of Democratic Forces for Unity, and CPSK groups. Seleka fought against President Bozize as he had dishonoured the-peace agreements of 2007 and 2011.”¹² In light of this, I code this event as peace having failed.

8. Chad

Conflict ID	Peace process	Peace agreements	Year	Rebels
91	First	3 1	1979	The Armed Forces of the North Popular Movement for the Liberation of Chad
91	Second	1	1993	National Council for Recovery
91	Third	1	1994	Committee of National Revival for Peace and Democracy
91	Fourth	1	1995	Movement for Development and Democracy
91	Fifth	3	1997	Chadian National Front
91	Sixth	1	1998	Armed Forces for a Federal Republic
91	Seventh	1	1999	Movement for Development and Democracy
91	Eight	1	2002	Movement for Democracy and Justice in Chad
91	Ninth	1	2005	Movement for Democracy and Justice in Chad
91	Tenth	1	2006	Front for Democratic Change
91	Eleventh	1	2007	Union of Forces for Democracy and Development Rally of Democratic Forces

¹² http://www.ucdp.uu.se/gpdata/gpcountry.php?id=31®ionSelect=2-Southern_Africa#

“The agreement lasted for 6 years, July-early August (probably 2 August) 2000. After the agreement was signed, Committee of National Revival for Peace and Democracy became a legal party and joined the government. In September 1994, the Higher Transitional Council adopted amnesties for the former fighters of Committee of National Revival for Peace and Democracy. The integration of former fighters into the army began in November 1994. Kette was sacked from the government in 1996, but soon re-joined the government where he was security advisor until March 2000 when he was again removed from his position. A local paper reported on 3 August 2000 that government forces clashed with Committee of National Revival for Peace and Democracy fighters, resulting in two deaths. Clashes against civilians were also reported. The government forces killed Kette in September 2000” (Högbladh, 2012).

“22 October 1993. It ended after government forces killed the leader of the National Council for Recovery, Col. Abbas Koty, on 22 October 1993” (Högbladh, 2012).

“In the end of October, a Libyan brokered peace agreement was signed between the Chadian government and four different rebel groups (including Union of Forces for Democracy and Development). However, after a month the rebels took arms again stating that the reason for this was the lack of implementation of the agreement” (‘Chad profile’, 2017).

National Council of Chadian Recovery: “the National Council of Chadian Recovery has not participated in armed conflict since 1997. In 2006 National Council of Chadian Recovery joined the Union of Forces for Democracy and Development alliance” (UCDP, 2015).

Rally of Democratic Forces and Union of Forces for Democracy and Development: “On 25 December 2006 the parties signed a peace agreement [...] After this agreement was signed Union of Forces for Democracy and Development and Rally of Democratic Forces decided to unite and continue fighting against president Déby. In 2007 the conflict in Chad continued in a similar way as the two earlier years” (UCDP, 2015).

“The Rally of Democratic Forces is allied with the Concord National Tchadien as the Rally of Democratic Forces - Concord National Tchadien [...] The Rally of Democratic Forces appeared to serve as a partial successor to the Rally of Democratic Forces in 2007. In January 2009 the Rally of Democratic Forces served as a core founder of the Union of resistance forces, an umbrella for some eight rebel groups dedicated to the overthrow of President Déby” (‘Alert 2010’, n.d.).

“The Union of Forces for Democracy and Development, Union of Forces for Democracy and Development Fundamental, Rally of Democratic Forces, and other small groups announced the formation of a National Alliance to continue the anti-Déby campaign” (Lansford, 2015).

9. Colombia

Conflict ID	Peace process	Peace agreements	Year	Rebels
92	First	1	1989	M-19
92	Second	1	1991	Popular Liberation Army
92	Third	3	2002	Revolutionary Armed Forces of Colombia
92	Fourth	1	2012	Revolutionary Armed Forces of Colombia

10. Comoros

Conflict ID	Peace process	Peace agreements	Year	Rebels
213	First	3	2003	MPA/Republic of Anjouan

11. Congo

Conflict ID	Peace process	Peace agreements	Year	Rebels
214	First	1	1999	Ninjas Cocoyes Ntsiloulous Cobras

12. Croatia

Conflict ID	Peace process	Peace agreements	Year	Rebels
195	First	1	1995	Serbian irregulars The Serbian Republic of Krajina

13. Djibouti

Conflict ID	Peace process	Peace agreements	Year	Rebels
184	First	1	1994	Front for Restoration of Unity and Democracy
184	Second	2	2001	Front for Restoration of Unity and Democracy - Ahmed Dini

“The fighting was on low-scale for the first years after the 1994 agreement but the situation intensified in the second half of 1998 following the Eritrea-Ethiopia border conflict” (UCDP, 2015).

14. DR Congo (Zaire)

Conflict ID	Peace process	Peace agreements	Year	Rebels
86	First	4	2003	Rally for Congolese Democracy Movement for the Liberation of the Congo
86	Second	1	2009	National Congress for the Defence of the People

15. El Salvador

Conflict ID	Peace process	Peace agreements	Year	Rebels
120	First	9	1992	Farabundo Marti National Liberation Front

16. Georgia

Conflict ID	Peace process	Peace agreements	Year	Rebels
197	First	1	1992	The Republic of South Ossetia
198	Second	3	1994	The Republic of Abkhazia

17. Guatemala

Conflict ID	Peace process	Peace agreements	Year	Rebels
36	First	16	1996	Guatemalan National Revolutionary Unity

18. Guinea – Bissau

Conflict ID	Peace process	Peace agreements	Year	Rebels
216	First	1	1998	Military Junta for the Consolidation of Democracy, Peace and Justice

“The peace agreement lasted for 6 months, i.e. from 1 November 1998 to 7 May 1999. In late January 1999, there was a brief period of fighting in the capital but talks resumed quickly and a new ceasefire was reached on 9 February. On 6 May, new fighting erupted and the President Vieira was overthrown on 7 May” (Högbladh, 2012).

19. Haiti

Conflict ID	Peace process	Peace agreements	Year	Rebels
186	First	1	1993	Military faction (forces of Raoul Cédras)

20. India

Conflict ID	Peace process	Peace agreements	Year	Rebels
139	First	1	1988	Tripura National Volunteers (TNV)
227	Second	1	1993	All Bodo Students Union
139	Third	1	1993	All Tripura Tiger Force

21. Indonesia

Conflict ID	Peace process	Peace agreements	Year	Rebels
134	First	1	1999	Fretilin
171	Second	2	2005	Free Aceh Movement

22. Israel

Conflict ID	Peace process	Peace agreements	Year	Rebels
37	First	7 2	1999	Fatah Palestinian National Authority
37	Second	1	2007	Fatah

On 19 June 1992 Israeli negotiators met with their Palestinian counterparts to discuss the possibility of having more informal talks between Israel and the Fatah/PLO. Some of the pre-negotiations were mediated by Terje Larsen, a Norwegian socialist, in preparation for the actual negotiations. The first substantive talks between Israeli and PLO teams were held on 20-22 January 1993 in Oslo. The negotiations resulted in The Declaration of Principles (Oslo Agreement), signed on 13 September 1993. Several peace agreements were signed between 1997 and 1999; however, these catered only to some minor issues (such as continued Israeli withdrawals) and did not address the core of the problem. All in all, these negotiations are commonly referred to as the 'Oslo Peace Process'.

23. Ivory Coast

Conflict ID	Peace process	Peace agreements	Year	Rebels
225	First	2	2003	Patriotic Movement of Côte d'Ivoire Ivorian Popular Movement of the Great West Movement for Justice and Peace
225	Second	7	2008	Armed Forces of the Republic of Ivory Coast

24. Lebanon

Conflict ID	Peace process	Peace agreements	Year	Rebels
63	First	1	1989	Lebanese Army (Aoun) Lebanese Forces Lebanese National Resistance Front Lebanese Forces - Hobeika faction

The Lebanese National Movement (LNM) dissolved after the Israeli invasion of 1982. It was replaced by the Lebanese National Resistance Front.

The Lebanese Forces (LF) merged with several minor groups, such as Al-Tanzim, Guardians of the Cedars, Lebanese Youth Movement, and Tyous Team of

Commandos. The LF split with the Tigers Militia in 1980. The Tigers Militia was the military wing of the National Liberal Party.

The war finally came to an end with a peace accord signed in October 1989. It is not clear how many rebel groups signed the agreement.

25. Liberia

Conflict ID	Peace process	Peace agreements	Year	Rebels
146	First	4 5	1991	National Patriotic Front of Liberia Independent National Patriotic Front of Liberia
146	Second	5	1996	National Patriotic Front of Liberia
146	Third	2	2003	Liberians United for Reconciliation and Democracy Movement for Democracy in Liberia

26. Macedonia

Conflict ID	Peace process	Peace agreements	Year	Rebels
223	First	1	2001	National Liberation Army

27. Mali

Conflict ID	Peace process	Peace agreements	Year	Rebels
177	First	2 1	1992 (1991)	Azawad People's Movement Arab Islamic Front of Azawad
177	Second	1	2012	National Movement for the Liberation of Azawad

28. Mauritania

Conflict ID	Peace process	Peace agreements	Year	Rebels
253	First	1	1979	POLISARIO

29. Mexico

Conflict ID	Peace process	Peace agreements	Year	Rebels
205	First	1	1996	Zapatista Army of National Liberation

30. Moldova

Conflict ID	Peace process	Peace agreements	Year	Rebels
199	First	1	1997	Pridnestrovian Moldavian Republic

31. Mozambique

Conflict ID	Peace process	Peace agreements	Year	Rebels
136	First	5	1992	Mozambican National Resistance

The conflict resumed in 2013 (after 21 years).

32. Myanmar

Conflict ID	Peace process	Peace agreements	Year	Rebels
34	First	1	1993	Kachin Independence Organisation
23-56-228-264	Second	1 1 2 1	2012	Karen National Union Karenni National Progressive Party United Wa State Army Myanmar National Democratic Alliance Army

33. Nepal

Conflict ID	Peace process	Peace agreements	Year	Rebels
72	First	4	2006	Communist Party of Nepal (Maoist Centre)

34. Nicaragua

Conflict ID	Peace process	Peace agreements	Year	Rebels
140	First	5	1990	Contras / Nicaraguan Democratic Force

35. Niger

Conflict ID	Peace process	Peace agreements	Year	Rebels
255	First	1	1993	Liberation Front of Air and Azawak
255 - 178	Second	2 1	1995	Coordination of the Armed Resistance Union of Forces of the Armed Resistance

The Liberation Front of Air and Azawak, and the Coordination of the Armed Resistance: “The first group to emerge was the Liberation Front of Air and Azawak that fought for a federal system in Niger. The conflict ended in 1993 when the Liberation Front of Air and Azawak signed a peace agreement, but the Tuareg rebels fractionalised with the result of a new umbrella rebel organisation, the Coordination of the Armed Resistance, instigating an armed conflict over territory in 1994 striving for autonomy for northern Niger” (UCDP, 2015).

36. Papua New Guinea

Conflict ID	Peace process	Peace agreements	Year	Rebels
174	First	1	1991	Bougainville Revolutionary Army
174	Second	1	1994	Bougainville Revolutionary Army
174	Third	1	2001	Bougainville Revolutionary Army

37. Rwanda

Conflict ID	Peace process	Peace agreements	Year	Rebels
179	First	6	1993	Democratic Forces for the Liberation of Rwanda

38. Philippines

Conflict ID	Peace process	Peace agreements	Year	Rebels
112	First	1	1976	Moro National Liberation Front
112	Second	1	1987	Moro National Liberation Front
10	Third	1	1995	Military Faction (forces of Honasan, Abenina & Zumel)
112	Fourth	1	1996	Moro National Liberation Front
112	Fifth	6	2002	Moro Islamic Liberation Front
112	Sixth	4	2012	Moro Islamic Liberation Front

39. Senegal

Conflict ID	Peace process	Peace agreements	Year	Rebels
180	First	1	2004	Movement of Democratic Forces in the Casamance

40. Serbia (Yugoslavia)

Conflict ID	Peace process	Peace agreements	Year	Rebels
189	First	1	1991	The Republic of Slovenia
218	Second	1	1999	Kosovo Liberation Army

41. Sierra Leone

Conflict ID	Peace process	Peace agreements	Year	Rebels
187	First	1	1996	Revolutionary United Front
187	Second	2	2000	Revolutionary United Front

“In May 2000, Revolutionary United Front began attacking United Nations mission troops in Sierra Leone, culminating in the kidnapping of several hundred UN troops in an ambush. Sankoh’s dash for control of the country was however foiled by large-scale civil society protests, and the arrival of battle-hardened and well-equipped British forces that aligned themselves with the remnants of the Sierra Leone army to battle the resurgent Revolutionary United Front. [...] The military action of British forces, Revolutionary United Front’s disastrous fighting with the government of Guinea in September 2000 to early 2001 and the strengthened presence of United Nations mission in Sierra Leone combined to finally break the back of Revolutionary United Front. The rebels began, under the leadership of Issa Sesay after Sankoh’s capture, to cooperate with the Lomé peace agreement and the Abuja agreement, which was signed in November to reaffirm the earlier accord that had been disrupted by the May 2000 disturbances. Consequently, the disarmament process began to gain pace and in January 2002, 72,490 combatants had been disarmed, marking the official end to the war. Conflict activity has at this time not been recorded since the year 2000” (Rashid, 2000, p. 26).

42. Somalia

Conflict ID	Peace process	Peace agreements	Year	Rebels
141	First	2	1994	United Somali Congress/Somali National Alliance
141	Second	1	1997	United Somali Congress/Somali National Alliance
141	Third	2	2008	Alliance for the Re-liberation of Somalia

43. South Africa

Conflict ID	Peace process	Peace agreements	Year	Rebels
101	First	1	1978	South West Africa People's Organisation
150	Second	5	1993	African National Congress

44. Sudan

Conflict ID	Peace process	Peace agreements	Year	Rebels
113	First	1	1988	South Sudan People's Liberation Movement in Opposition
113	Second	7	2005	South Sudan People's Liberation Movement in Opposition
113	Third	2	2005	National Democratic Alliance
113	Fourth	1	2006	Sudan Liberation Army-Minni Minawi
113	Fifth	1	2011	South Sudan People's Liberation Movement in Opposition - North
113	Sixth	3	2012	Justice and Equality Movement

“The duration of the DPA ended at the end of 2010. At that time, the government and Sudan Liberation Movement/Army (Sudan Liberation Army-Minni Minawi) clashed at three different times. In addition, Minni Minawi said that he was thinking of joining forces with Sudan Liberation Movement/Army led by Abdul Wahid. In addition, the government declared Minni Minawi and his forces to be a legal target” (BBC, 2010).

2010:

Most of the fighting took place between the Justice and Equality Movement and the government, but fighting between the government and the Sudan Liberation Movement/Army also caused many battle-related deaths.

2011:

Fighting continued, and in Darfur the Justice and Equality Movement and Sudan Liberation Movement/Army continued their struggle against the government, although at a lower level of intensity compared to previous years. Still, no durable solution for the continuing crisis in Darfur was within sight ('Sudan Tribune: Plural news and views on Sudan', n.d.).

45. Tajikistan

Conflict ID	Peace process	Peace agreements	Year	Rebels
200	First	5	1997	United Tajik Opposition

46. Uganda

Conflict ID	Peace process	Peace agreements	Year	Rebels
118	First	1	1985	National Resistance Army
118	Second	1	1988	Uganda People's Democratic Army
118	Third	1	2002	Uganda National Rescue Front II
118	Fourth	7	2008	The Lord's Resistance Army

Despite this, the parties for a long time refrained from fighting each other. However, when Kony missed a November 2008 deadline for signing the agreement, and The Lord's Resistance Army launched attacks on civilians in southern Sudan and also initiated attacks in eastern Democratic Republic of Congo (DRC), it seemed to confirm suspicions that the rebel group, while engaging in negotiations, had in fact been buying time and preparing for war. (Arieff et al, 2015)

47. Zimbabwe

Conflict ID	Peace process	Peace agreements	Year	Rebels
122	First	1	1979	Patriotic Front in Zimbabwe

48. United Kingdom

Conflict ID	Peace process	Peace agreements	Year	Rebels
119	First	1	1998	The Provisional Irish Republican Army

Determinants of disarmament, demobilisation and reintegration during peace negotiation

Abstract

The Disarmament, Demobilisation and Reintegration process (DDR) is often proposed as a mechanism to build trust and avoid defection or cheating between parties, during conflict negotiations and an implementation phase. Previous studies consider DDR as one of the most important stages for a lasting peace, and a necessary if not wholly sufficient condition for solving causes of conflict. Based on a newly created database of peace negotiations from 1975 to 2012, this paper considers how the characteristics of a conflict, the rebel capabilities, and the economic and political factors of the state affect the likelihood that peace negotiations may include a DDR agreement. The findings suggest that long-lived and multiparty conflicts, as well as conflicts where rebel groups have territorial control and high tactical and military capacity, are less likely to have a DDR provision in a peace negotiation. This paper further finds that DDR is less likely if a country has had a stable regime and a solid economy.

Keywords: disarmament, demobilisation, reintegration, peace agreements, logistic model.

Introduction

From 1975 until 2012, 102¹³ peace negotiations have been negotiated worldwide, of which 80 agreements have DDR provisions. Some agreements have a clear mandate about DDR, while some have only mentioned it without citing specific details. The remaining 22 agreements did not negotiate a DDR provision. This paper addresses the following questions: why do some agreements include disarmament, demobilisation and reintegration provisions during peace negotiations, while others do not? Moreover, what determines whether or not a peace negotiation has a DDR provision?

Following the UCDP definition, a peace process¹⁴ is a set of peace agreements, which are defined as arrangements to resolve the basic incompatibility. Numerous peace processes have different provisions for achieving more sustainable objectives and long-term stability as well as solving the causes of the conflict. Both the peace process and some of their provisions have been extensively studied to establish the incentives for negotiation, the duration of peace, and the causes of peace failure. For example, Mattes and Savun (2009) identify two types of “commitment-enhancing” conditions that have a significant effect on creating long-lasting peace and preventing

¹³ A closer look at the data indicates that a peace process is an important way to finish and solve an internal armed conflict. (Ballesteros et al., 2016; Escola de Cultura de Pau, 2016). The dataset reports 129 peace processes with rebel groups involving 260 individual peace agreements.

¹⁴ A peace process is a common practice for settling the causes of an armed conflict. UCDP has defined a peace process as a “formal process including more than one peace agreement, in which the warring parties have either decided to settle the incompatibility through a process where one issue at a time is regulated by an agreement, or settings where the peace agreements concluded explicitly build on previous peace agreements.” A peace agreement is defined by UCDP as “an agreement between two or more primary warring parties in a conflict, which addresses the disputed incompatibility either by settling all or part of it, or by clearly outlining a process for how the warring parties plan to regulate the incompatibility” (Högbladh, 2012).

the recurrence of war: fear-reducing provision and cost-increasing provision. The former condition aims to decrease the rebel insecurity and reduce the opportunity “[...] that one side behaves opportunistically by imposing internal or external constraints on the parties’ ability to renege on the peace agreement” (Mattes & Savun, 2009, p. 742), such as power-sharing and third-party guarantees. The latter provision, which could entail peacekeeping operations, withdrawal of foreign forces or the separation and dispersal of troops, is focused on increasing the cost of fighting or going back to war. This provision “make(s) it more attractive for the parties to stick to the deal in the short-run and allow the peace agreement to be fully implemented” (Mattes & Savun, 2009). The authors highlight that the cost-increasing condition has received little scholarly attention, except in relation to peacekeeping operations, while Berdal¹⁵ (1996) emphasises that there are few comparative studies, in relation to this provision, which identify common factors between cases.

This paper focuses on an important cost-increasing provision: disarmament, demobilisation and reintegration. It will argue that DDR is a cost-increasing provision because it increases the cost of going to war or reneging on the agreement. Additionally, DDR “contributes to the security necessary for the successful implementation of a civil war peace agreement” (Spear, 2002, p. 141). DDR is also considered a highly politicised process because it represents a fundamental element of bargaining power, where the rebel leaders can keep the majority of weapons, maintain control of their ex-combatants as a “secret rebel army” and preserve territorial control and use these strategies as a “reactive commitment” to force a result. This was

¹⁵ See Berdal, 1996a, 1996b, 1996c, 1996d, 1996e .

precisely the case in Angola after the peace agreement in 1994 (Berdal, 1996e, p. 22). Thus, DDR is considered a crucial aspect of any peace settlement, because a fruitful disarmament, demobilisation and reintegration of a warring faction contributes not only to improving the security of both society and the rebels, but also to fostering trust between the negotiating parties for the implementation phase.

The process of disarmament, demobilisation and reintegration (DDR) is by definition a multidimensional and complex mechanism involving political, military, security, humanitarian and socio-economic dimensions. DDR establishes an important connection between the military and civilian aspects of a peace process and it is a transitional link between rebel life and new civil life (W. A. Knight, 2008; UNDDR, 2014). DDR is considered the last stage of a peace process or any other consensus for reaching peace (B. Walter, 2002). To achieve peace, the main objectives of the DDR are to contribute to the improvement of security and political stability in post-conflict states, to prevent recidivism and a shift to other forms of violence and to preclude parties from renegeing on the commitment to the peace process. The parties decide to include DDR provision in peace agreements particularly when security is ensured for all sides. For example, in the South African case, the national peace accord was signed in September 1991 by the white majority government and the National Party on the one side, and the African National Congress and the Inkatha Freedom Party on the other side. The political violence increased during the period from 1991 to 1993 because the parties did not want to disengage their armies. However, after 18 months,

when the violence was under control, the DDR negotiations started¹⁶ and the official demobilisation process was initiated in April 1995 (Lamb, 2013). At this stage, there were 135,927 demobilised personnel (statutory and non-statutory forces); some of these were integrated into the new military force, and others were socially reintegrated.

In accordance with various DDR's aims, there are cases of peace processes with a DDR provision that could be considered successful, partially successful or unsuccessful. The positive results of DDR can be measured in terms of the levels of recidivism, improvement in the quality of life or the disappearance of other violence. For example, after two decades of civil war in Mozambique, in 1992 Frelimo and Renamo signed a peace agreement with DDR provision. The Mozambican process has been considered a successful case, because the conflict ended and the violence disappeared. Striuli (2012) has highlighted that the DDR provision has been particularly positive in terms of demobilisation and reintegration, but less so in relation to disarmament.¹⁷ Different reports indicated that DDR in Mozambique was a necessary but insufficient condition for reaching peace. Although it helped to build trust and stability, it failed because the rate of collection and destruction of weapons was diminutive (Berdal, 1996d; Striuli, 2012). Another example is Colombia, a country with an armed conflict since 1946, which has signed three peace

¹⁶ "In April 1993, formal military negotiations between the SADF and MK were initiated. The negotiation focused on the control of the defence force during the transition, the creation of a new defence force and the integration of the various armed forces into this new defence force (the South African National Defence Force - SANDF). APLA did not participate in the military negotiations and only formally suspended the armed struggle in 1994" (Lamb, 2013, p. 9).

¹⁷ The process demobilised around 110,000 rebels (supporters and combatants) and 30,000 core force personnel and developed a community approach for reintegration. See Striuli (2012).

agreements,¹⁸ each with a DDR provision. Nonetheless, the armed conflict is ongoing with other armed groups. DDR in Colombia could be considered partially successful because it disengaged the rebel group involved in the peace process, but the presence of other rebel groups supplanted the original combatants, and thus the conflict continued. Also, some ex-rebels had been recruiting again for these groups due to a poorly designed reintegration programme, which was bereft of economic opportunities for ex-combatants (Gutiérrez & González, 2012; Nussio & Howe, 2014).¹⁹

In this paper, I focus on analysing the characteristics of conflicts, the rebels' capabilities and the economic and political factors of the states that have had peace negotiations with or without DDR provision. There are two main motivations for developing this research. First, there is evidence, borne out by different reports and studies, that the DDR process has played a significant role in determining peace after an armed conflict. DDR is one of the instruments for reaching a lasting peace that could help to solve the commitment problem in a peace agreement. Additionally, the rebels could use DDR as a negotiating power strategy. For example, Muggah emphasises that while “there is a widespread consensus about the centrality of DDR in post-conflict settings, there is comparatively less awareness of the way in which disarmament and demobilisation, in particular, are negotiated and institutionalised”

¹⁸ The first peace agreement was reached in 1953 with “la guerrilla de los llanos”, the second was agreed in 1989 involving the 19th of April Movement (M-19), the People's Liberation Army (EPL) and some small groups, and the last was negotiated in 2003 with paramilitary forces – AUC.

¹⁹ Maedl et al. make clear that “the risk of re-recruitment is high when ex-combatants fail to reintegrate economically and socially into their civil host communities” (Maedl, Schauer, Odenwald, & Elbert, 2010, p.186), which may cause post-conflict violence or resumption of the conflict.

(Muggah, 2013, p. 21). Finally, the DDR provision needs to be studied in more detail, as currently most studies are based on evaluation and policy analysis or case studies. If we do not understand when DDR should be included, models that evaluate their success may suffer from selection bias. In sum, there is a lack of comparative research focusing on the general characteristics and conditions of conflicts and countries that include DDR provision in a peace agreement.

This research contributes to the debate regarding the failure of peace processes, and to existing literature about negotiations and the cessation of civil wars. I examine the relationship between the government, rebels, and conflict by focusing on the characteristics and the inducements that encourage both sides to negotiate a DDR provision. This study is the first rebel-government approach examining why some peace processes have a DDR provision while others do not. I develop a Hawk-Dove game to explore the incentives and conditions of the adversaries for including a DDR provision in the agreement. The findings suggest that conflicts which are high cost, in terms of duration and death, are less likely to have a DDR in a peace negotiation. This result highlights the fact that weariness and state weakness have a substantial effect on the decision to negotiate a DDR. I also find that rebel groups which are considered to be strong, and have territorial control, are not expected to negotiate a DDR. The rebel groups with a clear and identifiable political wing are more prone to negotiate a DDR provision because they can use political means to advance their demands. When the conflict does not have more than two rebel groups, the rebel groups are also more likely to negotiate a DDR. Countries considered to have a stable regime and robust

economy are less prone to have a DDR in a peace negotiation because the society has the potential to assimilate former combatants without a special programme.

The remainder of the paper is structured into three sections as follows. The first section considers the importance of this process and why and when DDR is included in peace agreements. This question is explained using a review of the DDR literature and a brief review of the existing literature on the resolution of conflict, negotiation and peace processes that support the paper's hypothesis. Second, I present the data collected, outline the methodology and analyse the empirical results. Third, there is a discussion of the main empirical findings and their implications for our understanding of the disarmament, demobilisation and reintegration mechanism.

Literature review: The concept of DDR and theory of conflict resolution

Different studies have investigated why some peace processes (or negotiations) have brought peace while others have not. This literature has shown that peace negotiations could fail for a variety of different reasons, such as the presence of spoilers, problems of distrust, secrecy between negotiating parties, and a lack of credible guarantees (B. Walter, 1997). The most popular cause is the commitment problem,²⁰ which can be understood as a lack of credibility between the government and rebel groups concerning their ability to fulfil expectations. On the one hand, the government does

²⁰ This paper does not focus on this issue. For further information, see Coyne & Mathers (2011) and Mattes & Savun (2009).

not believe that rebels will cease their military activities; on the other hand, rebels do not trust the government to follow and uphold the agreement. In addition, the rebels may feel vulnerable to any aggression or military attacks due to the shifting balance of power.

To solve the imminent distrust between parties, which dissuades agreements, the international community and mediators have designed different mechanisms; one of them is the disarmament, demobilisation and reintegration provision. DDR can be understood not only as a bargaining power tool to solve the mutual mistrust issue, but can also be a guarantee of security, especially when the security situation is fragile due to the presence of other armed groups or spoilers and weak institutions. For instance, during the ongoing Colombian peace talks (2012) the parties defined a common agenda that consisted of six points.²¹ The fifth point was the end of conflict, where both sides discussed the abandonment of arms by the FARC, reincorporation of the FARC into civil life, guarantees of security and a definitive ceasefire, and an end to hostilities. The negotiators agreed to discuss these conditions in the last stage of the process as a measure of credibility and power. However, there are other cases which do not invoke the whole DDR, as for example in Zimbabwe's peace negotiation (1979). In this instance, the rebels and government decided to actualise only a demobilisation stage, because the mistrust between warring parties was too severe to consider any further measures (Giustozzi, 2012). There are other cases which negotiated disarmament exclusively, such as Indonesia with Fretelin (1999), or

²¹ The six points were: rural reform, political participation, illicit drugs, victims, end of conflict, implementation.

negotiated only reintegration, such as India with the All Tripura Tiger Force (ATTF) (1993). In certain cases, DDR is subsequently negotiated a few years after the peace process, such as in South Africa.

These examples show us that we can find some peace agreements where the DDR provision is partially negotiated, not negotiated or negotiated after a prudential time. The reasons for this situation are twofold. First, the mutual mistrust can result in an aversion to implementing DDR because, as Glassmyer and Sambanis point out, “once the rebels demobilise, they lose bargaining power, and the government can renege on its promise” (Glassmyer & Sambanis, 2008, p. 365). Humphreys describes the second reason as a “security dilemma” (Humphreys & Weinstein, 2007), due to the presence of other armed groups or spoilers and weak institutions. In sum, DDR may be perceived as a provision for solving the commitment problems by increasing the cost of defection (Mattes & Savun, 2009), or by altering the incentives (cost and benefits) for combatants to maintain illegal activities (Humphreys & Weinstein, 2007).

In brief, this paper understands DDR as a mechanism for reaching peace, but not as a solution for the causes of conflict. Every stage in DDR is described according to the United Nations definition. I acknowledge that the DDR is an important stage because it is a bridge between the end of the military actions and a new civil life. The guarantees, tools and opportunities, which are developed during negotiations, serve as the bridge connecting the former combatant to a new path and a fresh start in a post-conflict life. The DDR contributes to the improvement of security and political

stability in post-conflict states, prevents the recurrence of violence, and builds long-term confidence between former adversaries.

A basic game for bargaining a DDR process²²

This paper studies the determinants of bargaining a peace process with or without DDR provision. These determinants are based on the conditions and reasons that different actors in an armed conflict have for negotiating peace. The literature review shows that DDR is a provision for solving the commitment problem, because it increases the cost of defection and alters the motivations for former combatants by influencing them to refrain from war or illegal activities. The literature also highlights the importance of a clear understanding of the context, the social, political and economic dynamics of each country, and the characteristics and incentives of the insurgent organization for fighting or not fighting. Additionally, it is important to analyse the security dilemma, the conflict's political economy, war incentives and commitment and credibility among actors in order to understand and analyse why a DDR process is negotiated. In other words, it is necessary to analyse the groups of incentives for negotiating DDR.

To facilitate a better understanding of the above ideas, this section develops a basic game-theoretic model. The model shows that decisions made at the bargaining stage of the peace process are based on the combatants' beliefs about fulfilment in relation

²² I would like to thank Camilo Argoty for his comments and help with this brief section.

to the agreed-upon DDR and the economic incentives. In other words, if the armed groups have a strong economic motivation for fighting, they should be less likely to start a “real” DDR process; instead, they will want a provision that enables their armed structures to become an army reserve, and preserve the established coordination networks which can be easily reactivated and maintain territorial control. I am going to develop the Hawk-Dove game because “it is a negotiation environment with a non-equitable distribution of payoff in equilibrium” (García, Aguilar, & Muñoz-Herrera, 2015, p. 289). The game has two strategies:

- Hawk: It denotes an aggressive behaviour. In this case it corresponds to readiness to fight or to stop the negotiation. (H)
- Dove: It represents a cooperative behaviour. In this case, it denotes willingness to come to a reasonable compromise about DDR. (D)

In this game there are two players, a rebel group (RG) and government (G) that are contesting for some plunder with value $V > 0$. The cost of the struggle for each player is $C > 0$, so if both players decide a Hawk strategy, each one will receive $\frac{V}{2} - C$. If one player decides to use the Dove strategy but the other does not, the aggressive player will take the plunder (V), while the steady one will receive nothing (0). If both players decide to adopt the Dove strategy, each one will receive $\frac{V}{2}$. The plunder represents the expectations for each agent and can be economical, political, social or a combination of these three. The payoffs are given in Table 5, where the first entry is the payoff of RG, and the second entry is the payoff of G.

The game has four possible outcomes:

1. Both players negotiate a DDR. This outcome entails a payoff of $(V/2)$ but it is never a Nash equilibrium.
2. Both players assume an aggressive strategy (Hawk – Hawk). They are going to fight or stop the negotiation. Each can win with a probability of 0.5 and each pays a cost (C). In other words, if $V > 2C$ there is a Nash equilibrium. This means that both players are likely to stop the negotiation, since the plunder is worth the struggle.
3. In the case of $V \leq 2C$, we have a pure strategy Nash equilibrium in Hawk-Dove and Dove-Hawk. In this equilibrium, one of the players will stop the bargaining process, since there is no reason for continuing the dialogue.
4. There is a fourth possibility and this is a mixed strategy Nash equilibrium in which both players will bargain with probability $\frac{V}{2C}$. This means that the “desire of bargaining” of each player, depends on the gap between $\frac{V}{2}$ and C.

It is important to highlight that an egalitarian bargaining process is not likely to happen and the closer the cost of stopping the negotiation is to the expectation of plunder, the stronger the willingness to solve the conflict. Because this game represents the cooperation and conflict environments, as both players are trying to avoid the outcome Hawk – Hawk, it is not clear who is going to be given the advantage.

The literature about conflict and negotiation shows that the commitment problems and the asymmetries of information make it difficult to reach an agreement through dialogue, as the resulting outcome or strategy can lead to the worst possible scenario. However, this disagreement could be used by one of the players to influence the strategy of another player: in other words, one of the players is going to send a message with his strategy. In this case, it is important to send a “reactive commitment”,²³—a threat, a promise or both—which can only be effective if it is credible. As Schelling argues, “In bargaining, the commitment is a device to leave the last clear chance to decide the outcome with the other party, in a manner that he fully appreciates; it is to relinquish further initiatives, having riffed the incentives so that other party must choose in one’s favour” (Schelling, 1980, p. 37). In sum, player 2, in this case the government, can send a warning showing its power (military or political) or its compromise with the implementation of the agreement; in other words, the government can increase the cost of defection (C) or alter the rebel’s incentives (V) for participating in legal activities.

Following Hirshleifer (2000), the game with reactive commitment has the following protocol:

- First comes the commitment (threat – promise – both)
- Then the target player (RG) makes his movement
- Then the committing player (G) makes his reactive movement

²³ “Reactive commitment occurs when the decision-maker who will be acting last pledges to respond, in a specified contingent way, to the opponent’s earlier choice.” According to Hirshleifer, this can be regarded as a pre-play move (Hirshleifer, 2000, p. 2).

This game has the same payoff structure as shown in Table 5, with the first row and column representing the more cooperative actions and the second row and column displaying the less cooperative strategies. The second-mover is the one who makes the warning (or pre-play move). The important point here is that the threat or promise must be credible. Let us suppose that player 1²⁴ (rebel group) assigns the likelihood P_p to the promise or the likelihood P_t to the threat being fulfilled.

If the government uses a threat, then the rebel group will rationally accede to it, rather than defy it, if its level of credibility is $P_t > (V/2C)$.

Similarly, if the government uses a promise and a threat, the expected utilities and payoff will be:

- If the rebel group chooses to be cooperative (H), the government will carry out its promise and the payoff for the rebel will be:

$$E(U_1)(cooperative) = \left(\frac{V}{2} - C\right)P_p + V(1 - P_p)$$

- If the rebel group chooses to be less cooperative (D), the government will carry out its threat and the payoff for the rebel will be

$$E(U_1)(lesscooperative) = \left(\frac{V}{2}\right)P_t + 0(1 - P_t)$$

It follows that the rebel will rationally choose his cooperative strategy if and only if:

$$\left(\frac{V+2C}{V}\right)P_p + P_t \geq 2.$$

²⁴ It is also possible to play the game with the warning being sent by the rebel group. The rebel group would show its military power, its territorial control and its capacity to control the rebels.

Table 5: The Hawk-Dove game: Payoffs

		Government	
		Hawk	Dove
Rebel group	Hawk	$\left(\frac{V}{2}\right) - C, \left(\frac{V}{2}\right) - C$	$V, 0$
	Dove	$0, V$	$\frac{V}{2}, \frac{V}{2}$

In conclusion, this game suggests that the bargaining of a DDR programme between a rebel group and government depends on the size of plunder, or the expected utilities each of them obtains from war, and the credibility of the threat or promise in terms of influencing the decision of another player. The conditions and incentives of each player are likely to be different and can determine whether the parties negotiate a complete DDR, partial DDR or no DDR. The next section presents the possible determinants of these conditions.

Determinants for DDR

As mentioned previously, DDR is the bridge for a peacebuilding process. It can help to create a transition from military life to civil life, build confidence, improve security and start the recovery of a war-torn society. Berdal highlights the importance of identifying the factors in play, but taking into account the “uniqueness of individual conflicts and the variety of local actors and cultural settings” (1996e, p. 9). Glassmyer

and Sambanis (2008) point out the determinants of rebel-military reintegration. They conclude that “Postwar hostility measures are not significant determinants of MI [...] we find that MI is more likely to be implemented if income growth is high, and it is less likely to be implemented if resource-dependence is high [...] High hostility does not prevent the implementation of MI” (2008, p. 376). Banholzer (2013) argues that conflicts which end with a peace agreement are more likely to develop a DDR programme. However, few studies identify common factors²⁵ between cases. To fill this gap, this paper identifies the common characteristics of countries and conflicts, in term of rebels’ characteristics as well as economic and political factors. My purpose is to contribute to the discussion about the DDR process as a negotiation tool, giving a clearer appreciation of the context and features of the DDR by determining those characteristics which increase the likelihood of DDR being included in a peace process.

My core hypotheses are consistent with the literature on conflict resolution. Five underlying conditions can be identified to make war less desirable and motivate warring parties to pursue peace negotiations with a DDR provision: the cost of war, the presence of spoilers, the balance of military power and the strength of economic and political institutions. The following sections develop the main ideas about these conditions and their relationship with DDR.

²⁵ Berdal emphasises there are “[...] *common* features both directly and indirectly relevant to considerations of disarmament, demobilisation and reintegration. These features - whose intensity and importance vary greatly from case to case - derive from the intra-state character of conflict, the socio-economic legacy of protracted war, and the proliferation of arms in the countries and regions where disarmament and demobilisation have been attempted” (Berdal, 1996d, p.7).

Characteristics of conflict: duration,²⁶ war-related deaths and spoilers

The economic theory of civil war suggests that wars will be longer when there is positive utility from warfare (Collier, 2004). The Lebanese civil wars are a clear example of this theory. The first Lebanese civil war started in 1975 and lasted 15 years. During these 15 years of war, the parties adjusted to a low-intensity conflict and created an economy of war, which generated positive benefit for both sides. During the conflict, the rebels were able to accumulate different kinds of assets,²⁷ which were of higher value than the cost of war. However, a new cycle of violence emerged from 1989 to 2003 which increased the cost of war significantly, resulting in an economy of war that became impossible to sustain (Richani, 2002). This situation facilitated a negotiated peace process with a DDR process based on economic dynamics and legal profit maximising. One of the objectives was to prevent the “greed” factor of civil war and generate legal earning based on employment and formal training (Munive & Jakobsen, 2012).

In sum, the economic theory of civil war argues that armed groups are more likely to fight when it is less costly for them to reach their objectives. Following this argument, the decision to fight or negotiate is determined by the utility (benefits) of a military victory or a peace negotiation (settlement)²⁸ (Mason & Fett, 1996). Walter

²⁶ “The costs of war tend to be directly related to its duration. Data on battle deaths in civil war reveal that internal conflicts that are two years or shorter generate an average of 3,000 deaths while civil wars that are longer than two years result in an average of 44,000 deaths” (Cunningham, 2006, p. 875).

²⁷ Richani reported that the economy of war was equivalent to around 25% of GDP.

²⁸ It is important to highlight that this paper is not focused on when parties start to negotiate, but concentrates on the stage when the negotiations include DDR arrangements.

highlights that “settlement occurs when combatants believe they can do no better by continuing to fight than by bargaining” (B. Walter, 2002, p.8). This theoretical logic suggests that DDR arrangements are a key element to be included in a peace agreement when assuming “greed” to be the main factor for fighting; consequently, it is important to define what is the desired utility of ex-combatants. Munive et al. point out that “ex-combatants’ reintegration is linked to successfully eliminating greed through the provision of a new economic livelihood [...] if you have a job, you do not go fighting” (2012, p. 375).

The theory concerning the duration of war has concluded that prolonged conflicts have negative consequences for countries. For instance, they create state weakness in terms of re-establishing a legitimate state monopoly on violence, have an impact upon the recovery of the economy and the welfare of its inhabitants, generate vendettas, and divide societies. These consequences could have potentially “negative” implications for developing DDR arrangements during a peace process. First, the prolonged conflict and the weakened state of the government contribute to the inability of the post-conflict government to follow through with the proposed settlements derived through negotiations; second, the negative consequences mentioned above result in reintegration aims that cannot be achieved due to the lack of economic support. The case of the Democratic Republic of the Congo (DRC) is pertinent as the demobilised rebels were attacked and robbed by other rebel groups, such as the CNDP (Richards, 2013). The case of Liberia is another relevant instance, where the former combatants were reintegrated into standards of poverty. Finally, the

case of the Central African Republic demonstrates how the weakness of the state and the presence of other armed groups led to accords that were not implemented and the war resumed (Caramés & Sanz, 2009).

Other significant factors which are emphasised by Berdal (1996c) are the intensity and type of the violence, which

have a direct bearing on disarmament and demobilisation efforts [...] First, and most obviously, confidence and mutual trust between parties are necessarily more difficult to generate and far more susceptible to reversal and rapid erosion when violence has been acute, indiscriminate and widespread. Second, more often than not the armed forces to be “reformed” as part of a settlement have, in the past, been the instrument of state repression and violence. (p. 6)

When wars are extreme and one side commits different violations against civil society and its enemy, the parties are more prone to include a partial DDR or to negotiate it after some years, because the credibility of the adversary is low, and in these circumstances it is difficult to believe that the adversary is going to fulfil the deal. The case studies of South Africa, El Salvador and Guatemala illustrate this point. The combined estimated death toll in these conflicts was nearly 700,000, and the majority of violations were committed by the state army.

Alternatively, some authors have considered that, after a long and high intensity war, parties could have a “positive” stance towards DDR, because in this scenario participants can experience weariness and discouragement and therefore want to sign a peace agreement. For the rebels, DDR represents a new opportunity for achieving their goals by using “legal” tools. On the other hand, for the government, it is the chance to solve a conflict in situations where they were unable to obtain a military victory (Cunningham et al., 2009). Thus, the fatigue and discouragement produced by a long drawn out and intensive conflict should induce a DDR inclusion, because it increases the rebel’s incentives to be in the legal arena: this would mean that the cost of war is bigger than its utility, and in terms of the game $V \leq 2C$. A notable example is the negotiation between Burundi and the Palipehutu-National Forces of Liberation (FNL). In July 2007, the leadership of the rebel group decided to abandon the demobilisation process, which resulted in a split within Palipehutu-FNL and an inevitable clash between the factions. One faction (Lovers of Peace) “said they were tired of war and wished to be demobilised”²⁹, while the other faction wanted to fight because the leader (Palipehutu-FNL) considered that the government had been cheating. Other samples of weariness can be traced in the Angolan and Mozambican cases.

An important element of the longevity of conflict is the number of parties involved in the war. For example, Christia (2012) points out that multiparty civil wars³⁰ are longer in duration and higher in intensity because “an increase in the number of actors

²⁹ http://www.ucdp.uu.se/gpdatabase/gpcountry.php?id=26®ionSelect=2-Southern_Africa#

³⁰ Multiparty civil war is defined as a conflict with three or more armed groups.

leads to heightened informational asymmetries and shrinks the range of acceptable negotiations for the multiple parties involved” (p. 12). Nevertheless, Cunningham (2011) argues that multiparty conflicts could end “when all parties see a greater benefit from signing and implementing a negotiated agreement than from continuing fighting” (p. 58). The presence of other rebel groups can be seen as a negative element for the DDR provision because they constitute a threat (Doyle & Sambanis, 2006) to security for negotiating parties, in particular on the rebel side, due to revenge issues.

For this reason, I consider other rebel groups as outside spoilers, taking into account the concept developed by Stedman (1997), who defines spoilers as “leaders and parties who believe that peace emerging from negotiations threatens their power, world view, and interests, and use violence to undermine attempts to achieve it.” (p. 5). The spoiler theory proposes threats to peace processes on two levels, indicated by the position of spoilers as either inside or outside the conflict. The former “signals a willingness to implement a settlement, and yet fails to fulfil key obligations to the agreement” (Stedman, 1997, p. 8), while the latter “are parties who are excluded from a peace process or who exclude themselves, and use violence to attack the peace process” (Stedman, 1997, p. 8). In conclusion, the presence of spoilers, who are other rebel groups, implies that the rebels do not feel secure and that they do not want to lay down their arms. This was the case in South Africa, where the DDR provision was negotiated after the negotiation of a peace accord because the members of the African National Congress (ANC) did not feel secure, due to the political violence that they

suffered at the hands of their enemies—the Inkatha Freedom Party. However, if the negotiation includes more rebel groups, the fear of a security dilemma is going to diminish and the incentive for including a DDR will increase.

Balance of power: Tactical and military

My study examines which characteristics of the rebel groups are more important to facilitate discussion of a DDR provision during peace negotiation. I follow the logic developed by Hultquist (2013), Cunningham et al. (2009), Walter (2002), Weinstein (2002) and Organski (1968) about the importance of the relative military capabilities of both parties in the resolution of conflict, because the end of war depends on the rebels' disposition to stop fighting or lay down arms. Cunningham et al. (2009) argue that we should analyse the civil war duration and outcome by considering the state and rebel characteristics, focusing on strength and the ability to obtain their goals (repression and nonviolent strategies). The power of the rebels is a mix between tactical and military capacities, which is analysed as two components; first, “offensive strength, or the ability to inflict costs on a government in the centre, and the ability to resist or evade government repression in the insurgent’s “home” territory in the periphery and the underground” (Cunningham et al., 2009, p. 575). In the same logical vein, McQuinn (2006) argues that the internal organisation of armed groups, such as their command profile and financing architecture, affects the post-conflict DDR strategy. He concludes that “armed groups which exercise highly

regimented, role-based control over their rank-file fighters are more likely to sustain this type of control during a DDR transition”³¹ (McQuinn, 2016, p. 5).

There is an academic consensus that if the rebels are considered weak by the government, the likelihood of a peaceful resolution of conflict is slim. This is demonstrated by Hultquist, who concludes first, if the rebels are weak the government has few incentives to negotiate because this negotiation can legitimise the rebel group (extreme asymmetry). Second, power parity increases the likelihood of negotiation because their costs (for fighting) are high. Third, rebel superiority, negotiations are less likely in this case of asymmetry (Hultquist, 2013). Similarly, B. Walter (2002) argues that in the resolution of civil war the:

combatants who are fairly equal on the civil war battlefield should be more likely to negotiate a settlement [...] military stalemates [...] indicate a determined opponent who promises a costly war of attrition [...] military stalemates produce uncertainty as to eventual winner, making each side less willing to risk a decisive loss. (p. 9)

Accordingly, rebel strength is an important characteristic for starting a negotiation. For example, the rebels who are considered weak or much weaker have the capacity to attack, to hide and avoid confrontation which means that the conflict could be perpetual (Cunningham et al., 2009). Bearing in mind that both sides are negotiating,

³¹ For research on the importance of command structure, ideology, cohesion and financing architecture in the DDR phase, see Beardsley & McQuinn (2009); de Vries & Wiegink (2011); Munive (2013); Munive & Jakobsen (2012); Staniland (2012, 2014) and Torjesen (2013).

which means that the government has decided to offer some concessions and the rebels have considered laying down arms, we can ask the question: Which attributes of the rebel group could impact the willingness to include DDR during peace negotiations? What is the impact of rebel strength, in tactical and military terms, on DDR bargaining? One potential impact is that when the rebels are considered as “much weaker” and they have a political wing, they are more prone to negotiate a DDR provision because it could be an excellent way to achieve their objective by legal means and to start a new life. From the government’s point of view, if the rebels are much weaker, the government has incentives for including DDR, because a military victory could be more expensive financially and politically than a peaceful transition. To clarify this point, a clearing up exercise to get rid of the last rebels in a conflict is relatively costly compared to the (small) concessions that would be required to settle with them politically. Additionally, the government can use this weakness as a “reactive commitment” to force the rebels into the cooperative strategy. As Weinstein (2002) highlights, it is important to ask with “[...] whom are we dealing?” When the government is designing the DDR programmes, therefore, it needs to keep in mind the structure of the rebel group, “its command and control, and the capacity of its leadership to influence the behaviour of its dispersed and armed membership” (Weinstein, 2002, p. 3), in order to prevent high political costs such as criminality or post-conflict violence.

Economic and political factors

Studies³² relating to the onset and duration of civil war, the implementation of agreements and the duration of peace have discussed the influence of different economic and political factors. Economic factors include low income, low development, lack of state capacity, poverty and inequality. Political factors comprise regime type, human rights, transparency, corruption and fair elections. Doyle and Sambanis (2006) have highlighted how weak states, in terms of economic development and local capacities, are more prone to violence because the cost of war is low. Additionally, “Increased hostility due to the experience of war makes reconciliation more difficult” (Doyle & Sambanis, 2006, p. 30). Following the same logic, Fearon and Laitin (2003) have emphasised that violence becomes more probable when the state is unable to deter or repress challengers because of its weakness or lack of capability. Collier, Bank and Group (2003) have developed the concept of the conflict trap, which basically states that

the risk of civil war is much higher in low-income countries than in middle-income countries [...] Once a country has had a conflict it is in far greater danger of further conflict: commonly, the chief legacy of a civil war is another war. (p. 11)

This conflict trap is illustrated by the case of the Central African Republic (CAR). This country has launched peace processes, but they have not been fully implemented due to the unstable security situation, poor governance, poor leadership, dysfunctional

³² For instance, see Collier (2004); Collier, Bank, & Group (2003); Dixon (1994); Doyle & Sambanis (2006); Kinsella & Rousseau (2009) and Leatherman (1999).

institutions, and dependence on multilateral foreign aid, poor infrastructure, limited taxation and scarce private investment. Therefore, the conflict resumes because of the on-going structural problems.

With respect to political factors, Hegre et al. (2001) have noted that democratic or autocratic countries have a low risk of war, while anocracies³³ are more likely to experience conflict; thus the statistical association between peace (war) and the type of regime is quadratic (it is U-shaped³⁴) (Doyle & Sambanis, 2006; Hegre, Ellingsen, Gates, & Gleditsch, 2001; Kinsella & Rousseau, 2009). Collier and Rohner (2008) have shown that democracy is peace-promoting and it is related to high income because of “the inability of democratic governments to use techniques of repression that autocracies find effective” (p. 538). In sum, different studies have argued that democracies³⁵ are less likely to experience a conflict because democracy forces the society to solve their conflicts through negotiation. There are no incentives to fight as a democracy normally has a powerful economy, and there is a political responsibility to maintain the electoral system and the essential checks and balances system. In short, the influence of democracy on an armed conflict is that a democratic government will be less liable to restrict individual liberties, rights and freedoms, and therefore the openness of the democratic political system allows group discontent to be expressed non-violently (Hegre, 2014).

³³ Anocracies are mixed forms of government, which combine democratic with autocratic features.

³⁴ “The most democratic societies face few rebellions because the level of grievance is generally lower; group conflict is more often resolved non-violently, even if sometimes contentiously. But the most authoritarian societies may also face few rebellions, despite a higher level of grievance, because group conflict tends to be suppressed by the state” (Kinsella & Rousseau, 2009, p. 485).

³⁵ Hegre (2014) gives us a good summary and analysis of the different theories which study the relationship between conflict and democracy.

There is some research showing the relationship between the implementation of DDR, state capacity and political regime but, to my knowledge, there are no studies exploring the relationship between the negotiation of DDR and those factors. Kingma and Gebrewold (1998) highlight that a significant factor for implementing a DDR programme is the state's capacity,³⁶ because it permits governments to both fulfil their commitments and to provide security. A lack of state capacity may cause ex-combatants to regress into poverty (M. Knight & Ozerdem, 2004), or to relapse into criminal activities or illegal armed groups (Collier, 1994). Banholzer (2013) argues that "if income-generating opportunities even for skilled individuals are simply lacking, the vocational training offered by DDR initiatives will not produce the desired effect of giving former combatants an alternative to employment in armed groups" (p. 17). Subsequently, the DDR provision will be harder to implement if the "national" economy is devastated, and ex-combatants are not integrated into the labour market. For example, Richards (2013) reports that the DDR process in the Democratic Republic of Congo was affected by the absence of security:

the interviewees also highlighted that demobilised former members of RCD-Goma had been targeted by active members of the CNDP. An ex-combatant who quit RCD-Goma stated: "From CONADER I received USD 400 the same day CNDP came to my place. They took the USD 400 and burned my eyes. Then they took me to Kitshanga, where I stayed for five months. (p. 9)

In a study of 7,000 Somali combatants, Kingma and Gebrewold (1998) found that the combatants are more likely to participate in a DDR programme if there is a possibility

³⁶ The state capacity could be measured by terrain, mountains, gross domestic product (GDP), natural resources or infant mortality, among other factors. See Collier (2004); Doyle & Sambanis (2006) and Fearon & Laitin (2003).

of returning to an economically stable zone. We need to bear in mind that the DDR provision is designed to develop different strategies such as vocational training or loans to start businesses, in order to make it more attractive for combatants to transition to civilian work rather than to continue fighting (Kingma, 1997; Kingma & Gebrewold, 1998).

The stability of the political regime and some elements of democracy should have an interesting link with the DDR programme. However, at the moment, there are no systematic studies concerning this relationship. Democracy is “more than an occasional cast of a ballot, and democracy-building efforts by outsiders must be much more attuned to local dynamics and much more focused on principles of inclusion and actual participation of civil society and informal authorities in decision making. [...] democracy is about the accountability of the state to its people.” (Sisk, 2013, p.129). It is important for implementation of the DDR phase (and any other peace agreement provision) to have democratic institutions where the population (inhabitants and former combatants) can solve their concerns and problems using legal tools. For instance, Dixon (1994) has explained how democracies have efficient tools for resolving conflict and are more prone to achieving a peaceful solution. Banholzer (2013) states that participation in a democracy is necessary for the success of the DDR because “combatants feel that they can voice their concerns and contribute to political decisions” (p. 26). Following the same logic, Kingman and Gebrewold (1998) emphasised that the absence of a legal system as a tool for peaceful conflict-solving mechanisms could lead to the failure of DDR initiatives and

the resumption of armed conflict. However, the DDR programme in Tajikistan was developed by an authoritarian regime which was characterised by the absence of transparency and accountability (Matveeva, 2012).

It can be seen from the above analysis that both the economic and political conditions are inextricably linked to peace settlements and stability in post-conflict situations, especially in terms of the DDR implementation. These studies have demonstrated the importance of the state's capacity and political regime for establishing peace or creating war, because the reconstruction of the country needs a consolidated and legitimate central government, and sufficient economic resources must be gathered to support the process (Zartman, 1995). However, how do those factors affect the negotiation of DDR provision during peace discussions? The relation could be spurious because different research shows us that "bad or low" economic and political factors induce conflict and decrease the probability of a positive post-conflict outcome. At this point, political and economic background are important in terms of bargaining DDR, because the stability of the political regime and the economy should be used as a reactive commitment, by the government, to induce the rebel's group to include DDR in the peace agreement. Based on the game outcome, the government would promise to ensure the availability of financial resources and to maintain the stable and strong institutions necessary for guaranteeing the implementation phase.

In sum, a background of a badly performing economy and unstable political regime will impede a DDR negotiation, because the former rebels would not feel that the

government has the capacity to guarantee the agreements in economic, political and security terms. At the same time, if combatants have power, money and the respect of others,³⁷ then they will need substantial incentives to remain in the legal arena. Thus, it is important that the government is presenting a stable economy and strong political regime: then rebels may believe that it has the resources to include DDR in a peace agreement.

Based on the theoretical review, I can derive some implications which highlight the relationship between rebels, conflict, country characteristics, peace processes and the DDR provision. In my general statement, I focus on three factors that affect whether or not a DDR provision is included in the negotiation process. These factors are the intensity, duration and multiparty aspects of the conflict, the rebel's military and tactical capability, and the government capability.

Hypothesis 1a: a conflict which has a long duration increases the probability of DDR provision.

Hypothesis 1b: a conflict which has a high intensity is more likely to have a DDR provision.

³⁷ This circumstance is called the "Thucydidean and Hobbesian triangle of motives". (Doyle & Sambanis, 2006).

If the rebels survive the initial period of war, when they are most vulnerable, the possibility for the government to achieve a military victory is low and, for this reason, the government should give them an enticing set of concessions.

Hypothesis 1c: The presence of multiple armed groups in a conflict decreases the probability of DDR.

If there are more rebel groups, it is difficult for individual rebel groups to surrender their weapons and disband their armed structures, as they feel vulnerable to a military attack by other factions (i.e. by other rebel groups).

Hypothesis 2a: a DDR condition is more likely to be negotiated when rebels are considered much weaker (tactical) by the government or do not have territorial control.

Hypothesis 2b: a DDR condition is more likely to be negotiated when rebels have a political wing.

In many cases, the rebels have less military capability than the government and, for this reason, I expect very weak groups to be more likely to negotiate with a DDR provision.

Hypothesis 3a: a DDR condition is more likely to be negotiated when the state has a history of high capacity.

Hypothesis 3b: a DDR condition is more likely to be negotiated when the state has a democratic background. In other words, it is more likely when the country has a political regime which is considered a democracy.

Hypothesis 3c: a DDR condition is more likely to be negotiated when the country has a stable political regime.

Research Design

To address the hypotheses concerning the likelihood for peace negotiations to include a DDR, this study employs logistic regression models which are clustered by conflict (Agresti, 2013; Agresti & Finlay, 2014; Long & Freese, 2014). The unit of analysis for all models is the peace negotiation-dyad. Every line in the dataset represents a peace process between a government and rebel group involved in a peace negotiation from 1975 to 2012. The criteria for including a specific peace negotiation are as follows:

- The negotiation is for solving the same incompatibility
- It is negotiated by national government and at least one rebel group
- The negotiation is a new peace process

This study considers a peace process as *new* if:

- During the negotiation, the main rebel group or government has previously retired from the table, or,
- There are more than three years between signed agreements.

The resulting dataset consists of 129 observations (dyad) regarding 102 peace processes. The cases for this study are limited to extra systemic armed conflict, internal armed conflict and internationalised internal armed conflict. Missing data across my variables subsequently reduced the number of observations included in each model.

Dependent variable

The hypotheses concern DDR negotiation during a peace process. I used five dichotomous variables in the DDR dataset. The core models were estimated with at least one stage of DDR variable. The other models are presented in Appendix D. Table 6 shows the descriptive statistics:

- Variable DISARMAMENT: It identifies if the negotiation has a disarmament or not.
- Variable DEMOBILISATION: It identifies if the negotiation has a demobilisation or not.

- Variable REINTEGRATION: It identifies if the negotiation has a reintegration or not.
- Variable DDR_1: It registers if the agreement included provisions for at least one stage of the disarmament, demobilisation or reintegration mechanism.
- Variable DDR_2: It registers if the agreement included a complete DDR provision, partial DDR (only two stages) or one stage. In other words, the peace agreement has one or more stages of disarmament, demobilisation and reintegration.

Table 6: Descriptive Statistics – Dependent Variable

VARIABLES	N	% Yes	% No	Min	max
Disarmament	129	65.89	34.11	0	1
Demobilisation	129	62.02	37.98	0	1
Reintegration	129	62.02	37.98	0	1
DDR provision	129	44.19 ³⁸	20.16	0	3
At least one stage of DDR	129	79.84	20.16	0	1

³⁸ The dataset reports that 13.95% cases have one stage and 21.71% have two stages.

Key independent variables³⁹

I am primarily interested in the effect of the characteristics of the conflict, rebel's military and tactical capability, and government capability on the likelihood of negotiating DDR provision during a peace process. Table 7 shows the descriptive statistics of independent variables. Characteristics of the conflict are measured by the cost of civil war: duration and fatalities, and spoilers. This study measures the cost of civil war by counting the number of conflict years in which the rebel group is active, and the battle-death figures derived from the Battle Deaths Dataset 1946–2008 (version 3.0) (Uppsala Conflict Data Program, 2015). The duration reflects the longevity of the armed conflict. The number of deaths reveals the intensity of the armed conflict. High values for both variables indicate a costly armed conflict.

The presence of spoilers⁴⁰ is defined as the presence of other rebel groups. I record the maximum number of rebel groups by conflict and the number of rebel groups by conflict-year. The multiparty⁴¹ variable is based on a definition developed by Christia, as “civil wars in which there are three or more major domestic combatant groups” (Christia, 2012, p. 11).

³⁹ Due to the study being cross-sectional I created new variables, which use the last information registered in the original dataset, to reduce missing values.

⁴⁰ A spoiler can be defined as “one (as a political candidate) having little or no chance of winning but capable of depriving a rival of success.” (Mish, 2004, p.1,206; Stedman, 1997).

⁴¹ Cunningham observes that “[...] the multy-party conflicts are dynamic. The number of actors can change dramatically across the course of these wars” (Cunningham, 2011, p. 81). In this paper I have not taken into account the dynamic variation. I have taken a static account of the number of rebel groups. This is an interesting point for further research.

The following variables will measure the second group of hypotheses: rebel strength (tactical) which is measured in terms of “its ability to target government forces, the ability of rebel groups to resist repression and the availability of nonviolent alternatives” (Cunningham et al., 2009, p. 580). This variable is composed of six proxies with different characteristics, for example, whether the group has a clear central command, strong central leadership, mobilisation capacity, access to arms, the fighting capacity⁴² and political wing. Low values indicate weaker rebel groups. I use the compound variable and single variables.

For the economic and political factors, I use the following variables. The total real GDP per capita (2005 prices) is drawn from the data collected and expanded by Gleditsch (2014, v. 6.0). The democracy duration is from Boix, Miller and Rosato (2014) and represents the number of consecutive years the country has had the same regime (Boix, Miller, & Rosato, 2014; Przeworski, 2004). Polity is “...computed by subtracting the AUTO⁴³ score from the DEMOC⁴⁴ score; the resulting unified polity scale ranges from +10 (strongly democratic) to -10 (strongly autocratic)” (Marshall, Jagers, & Gurr, 2014, p. 16). Polity’s correction, by Vreeland (2008), removes the

⁴² The fighting capacity is “the ability of the rebels to effectively engage the army military and win major battles” (Cunningham, Gleditsch, & Salehyan, 2009, p. 580); high values show that rebels have high capacity.

⁴³ Autocracies are defined in terms of the presence of a distinctive set of political characteristics: “...autocracies sharply restrict or suppress competitive political participation. Their chief executives are chosen in a regularized process of selection within the political elite, and once in office they exercise power with few institutional constraints” (Marshall, Jagers, & Gurr, 2014, p.15).

⁴⁴ “Democracy is conceived as three essential, interdependent elements. One is the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders. Second is the existence of institutionalized constraints on the exercise of power by the executive. Third is the guarantee of civil liberties to all ... We do not include coded data on civil liberties” (Marshall et al., 2014, p.14).

components of Polity that are defined by civil conflict, which are repressed to competitive (PARCOM) and political participation (PARREF).

Table 7: Descriptive Statistics – Independent Variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Years in conflict	129	9.806	11.39	0	55
Annual battle fatalities	129	7.030	1.436	3.912	10.68
Spoilers	129	5.946	4.086	1	17
Maximum rebels (accumulated)	129	1.620	1.597	0	7
Political wing	129	0.473	0.761	0	2
Territorial control	129	0.442	0.499	0	1
Rebel strength (much weaker)	129	0.202	0.403	0	1
Rebel strength (stronger)	129	0.225	0.419	0	1
GDP per capita (real) ¹	128	0.278	0.350	0.0221	2.190
Years of current regime ²	128	33.68	43.29	0	187
Polity minus parreflag & parcomplag (V)	93	1.097	4.051	-6	7
Regime (V)	93	0.871	0.797	0	2
Polity_Adj Square (V)	93	17.44	16.82	0	49
Polity IV, 2 years before PA	102	0.765	4.089	-6	7
Polity IV, 3 years before PA	102	0.961	4.124	-6	7
Regime, 2 years before PA	102	0.941	0.830	0	2
Regime, 3 years before PA	102	0.873	0.829	0	2
Incompatibility	129	0.682	0.467	0	1
Civil war	129	0.620	0.487	0	1

¹ A year before war.

² Five years before war (average).

Empirical findings

I estimate several models with different combinations of variables. The models displayed in Table 8 and Table 9 present only one combination of variables out of the various specifications. The models include the variables which were explained in

detail above. I make the following logistic regression diagnostics:⁴⁵ specification error, the goodness of fit, multicollinearity, influential observations and coefficient sensitivity. I conclude that the models do not have specification error or collinearity problems and the models fit the data well but could present selection bias⁴⁶ (see Appendix B).

The model captures the basic logic of previous theoretical discussion. In summary, the DDR process is expected to be less likely if the conflict is long, intense and has more than one rebel group. The longevity is statistically significant in all models. As Regime is based on Vreeland variable.

Figure 4 demonstrates, the probability⁴⁷ of a DDR decreases by 21 percentage points (average) if the duration of the conflict is increased from 0⁴⁸ years (min) to 56 years (max). The longest conflicts in the world are Myanmar, at 56 years (different rebel groups), and Colombia, at 48 years: both are carrying on with negotiations. The next longest conflicts include Myanmar against the Kachin independence army (1991), at 31 years without DDR; Cambodia against Khmer Rouge (1992), at 31 years with a

⁴⁵ I used Stata ® and estimated the following tests: linktest, lfit, collin, estat classification, graph analysis (standard residual, deviance, leverage) and ldfbeta.

⁴⁶ One of the concerns of the previous models is called “sample selection bias”, which is a systematic error due to a non-random sample of the data. This means that the selection process influences the data availability and it is related to dependent and independent variables (Stock & Watson, 2015; Wooldridge, 2010). This study is based on conflicts which have negotiated an agreement: some of them have DDR and others do not. However, not all wars end with a deal; some may end because of a military victory or they may peter out. One of the weaknesses of my data is that I did not collect information on the presence of a DDR process in the case of military victory or low activity. For further research, it is important to extend the data collection to different types of conflict end.

⁴⁷ In Appendix C, I show the predicted probability for each variable and their confidence intervals.

⁴⁸ Zero means less than one year.

complete DDR; and the United Kingdom versus the Provisional Irish Republican Army (1998), at 28 years but only with a disarmament process. Conversely, conflicts with less than one year of longevity have a complete DDR provision, such as Chad (2007) against the Rally of Democratic Forces (RAFD), Liberia (2003) versus the Movement for Democracy and Lebanon (1989) against the Hobeika faction.

The proxy of intensity is not statistically significant. The proxy of intensity has a negative relationship with the probability of negotiating a DDR, and it is ONLY statistically significant in model 2B. The models are based on a high estimation of fatalities. However, I ran the same models with a low estimation of battle death. The results, regarding relation and significance, are similar. Regime is based on Vreeland variable.

Figure 4 displays how the probability of a DDR decreases by 12 percentage points (average) if the intensity is increased from min (3.9) to max (10.68). The theoretical review shows two possibilities: first, if the conflict is high intensity, the confidence between parties is difficult to generate and thus DDR provision has a low probability of being negotiated. Second, if the conflict is long and high intensity, the fatigue of both parties could induce a DDR addition. The model supports the first possibility. This result means that mistrust, state weakness and the breach of the peace accord is more powerful than the idea of fatigue in combatants. However, it is important to understand what the relationship is between types of violence and DDR, because there are cases with a high intensity and state repression which have DDR as part of

the negotiation, such as Guatemala and Salvador. In contrast, South Africa negotiated DDR after a peace agreement due to the political violence that rebels had suffered.

Additionally, I estimate the models using the previous number of warring groups. I also use two different variables as a proxy of spoilers: maximum rebels and multiparty civil war. The results are constant and persistent in all models. The models reinforce the hypothesis that the presence of other rebels reduces the likelihood of negotiating a DDR. The probability of a DDR decreases by 22% (average) when the presence of rebel groups is increased; however, this result is not significant when I estimate the model using the correction by type of regime. For example, the United Kingdom and El Salvador were not multiparty conflicts and these conflicts negotiated a DDR provision. In contrast, Colombia is considered to be a multiparty conflict where nevertheless the parties had negotiated a DDR.

The theoretical assumptions concerning rebel groups are divided into the political wing and tactical and military abilities. I estimate the models with three proxies for the political wing; the relation is positive, but it is only slightly statistically significant. The rebel abilities are measured by rebel strength and its components (clear central command, territorial control and fight capacity). If the rebels are strong or have territorial control, it is less likely there will be a DDR addition. The coefficient is negative and significant throughout the models. The first difference suggests that the probability of a DDR is about one percentage point lower with rebels that are considered as stronger than much weaker, which constitutes my

baseline. Territorial control is the unique variable, which is negative and statistically significant; this factor should decrease the expectation of DDR process.

In sum, rebel organisations with a political wing, limited tactical and military ability and a lack of territorial control have more interest in obtaining a DDR provision by negotiation, because it is the best way to achieve their goals without losing their credibility. A good example of this is the peace negotiation between the Burundian government and Frolina, Palipehutu⁴⁹ and CNDD⁵⁰ rebels in 2000. The rebels were considered weak, without territorial control, but they did have a political wing. The agreement provided for DDR with army reform and democratic transition. The agreement was not signed by CNDD and Palipehutu, which are considered to be stronger than Frolina.⁵¹ In 2002, two smaller factions of the CNDD and Palipehutu groups signed a deal, but the majority of these groups continued to fight. In 2003, the CNDD-FDD signed and agreed to the implementation of the Arusha Accords. In 2006, Palipehutu-FNL signed a peace agreement but the conflict was not terminated until 2008 when a final agreement was reached.⁵²

When considering economic and political factors, it becomes clear that a DDR programme needs a specific environment that includes economic and political stability. The theoretical review shows that if the country had a stable economy

⁴⁹ Party for the Liberation of the Hutu People.

⁵⁰ National Council for the Defense of Democracy.

⁵¹ In the dataset, CNDD and Palipehutu are classified as weaker groups while Frolina is coded as much weaker.

⁵² For a further explanation of the situation in Burundi, see Douma & Gasana (2008) and Gilligan, Mvukiyehe, & Samii (2013).

before the war started, they are more prone to negotiate a DDR. I use GDP as a proxy of state capacity. The relation is negative and statistically significant. The dataset shows us that only 11% of countries with high GDP had developed a complete DDR provision, while 47% of the countries with low GDP did. Regime is based on Vreeland variable.

Figure 4 shows the probability of a DDR decrease by 48 or 82 percentage points if GDP is increased from min (0.0221) to max (2.190). The model supported the notion that developing countries are more prone to develop a complete DDR strategy than rich countries. One explanation is that rich countries have a more innate capacity for absorbing former rebels into the society, while developing countries need to create economic strategies for including ex-combatants into a productive life.

Many of the conflicts occur in countries that are considered as anocracies.⁵³ The DDR dataset shows us that 16% (13/81) of anocracies, and 25% (13/52) of the countries which are not an anocracy, had not developed a DDR provision. Meanwhile 46% (37/81) of the anocracies, and 38% (20/52) of non-anocracies, had negotiated a complete DDR. The theoretical analysis shows that if the country has a democratic background and stable political regime they are more disposed to negotiate a DDR. I estimate the same models using different polity variables. The results are non-significant but differ between the polity variables. In Table 8, we can see that the type of regime (where democracy constitutes the baseline) has a negative but non-

⁵³ These are states at the mid-range in the polity IV.

significant relationship with DDR negotiation. Table 9 uses the correction by Vreeland (2008), and in this case the results show that autocracies have a positive but non-significant relationship and anocracies are negatively related. In terms of political factors, the models are not conclusive and, as Vreeland (2008) suggests, “we should employ more sharply defined variables to capture the effects of political institutions” (p. 420) for further research.

To summarise, I may conclude that the peace processes with armed groups that have a clear political interest, but are without territorial control, are more likely to negotiate a DDR provision. However, this likelihood is affected by the conditions of the conflict, especially the presence of other rebels that threaten the security of these fighters and challenge the state's capacity. Additionally, the dynamics of long and intense conflicts make the settlement of the conflict (understood as the rebuilding of society and issues of trust between citizens and institutions) more difficult. The correct economic and political conditions within the country are essential factors. This first exercise showed that gross domestic product has a negative and significant effect on DDR. The relation of the regime stability and type of regime and the probability of DDR is negative but statistically non-significant.

In conclusion, the parties should negotiate a DDR provision either during the peace negotiation or after the signing of certain agreements, such as political participation or ethnic recognition. The literature has shown that DDR provision is a necessary condition of trust and stability. However, not all peace processes, given the specific

characteristics of the conflict, the rebels and the country, need to develop this provision. This research can be interpreted as an invitation to the policymaker to design programmes considering those differences by not following a general recipe. This is the interesting characteristic in the Colombian programme, which has developed its policy bearing in mind the basic guidelines of the United Nations but with a national and differential emphasis.

Table 8: Determinants of at least one stage of DDR during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0474* (0.029)	-0.0467 (0.030)	-0.0541** (0.026)
Annual battle fatalities	-0.166 (0.296)	-0.148 (0.256)	-0.0538 (0.332)
Spoilers	-0.298*** (0.102)	-0.223** (0.091)	-0.311*** (0.088)
Political wing = 1, Political wing	1.252 (1.520)	0.995 (1.066)	
Political wing = 2, Legal political wing	-0.146 (0.650)	0.393 (0.663)	
Territorial control	-1.754** (0.735)		
GDP per capita (real)	-2.991*** (0.892)	-2.056** (1.048)	-3.160*** (1.044)
Years of current regime	-0.0129* (0.008)	-0.00848 (0.008)	-0.00997 (0.008)
Regime, year before PA = 1, Anocracy	-0.615 (0.956)	-0.821 (0.950)	-0.859 (1.082)
Regime, year before PA = 2, Autocracy	-2.206 (1.503)	-2.543* (1.322)	-2.328 (1.443)
Civil war	3.501*** (0.923)		3.113*** (0.757)
Incompatibility		2.534*** (0.718)	
Rebel strength (much weaker)			1.007 (0.913)
Rebel strength (stronger)			-0.256 (0.689)
Constant	6.170*** (1.658)	4.571*** (1.491)	4.883*** (1.687)
Observations	128	128	128
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.400	0.295	0.337
Chi-squared	32.16	21.25	36.24
Significance	0.000720	0.0194	7.66e-05

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

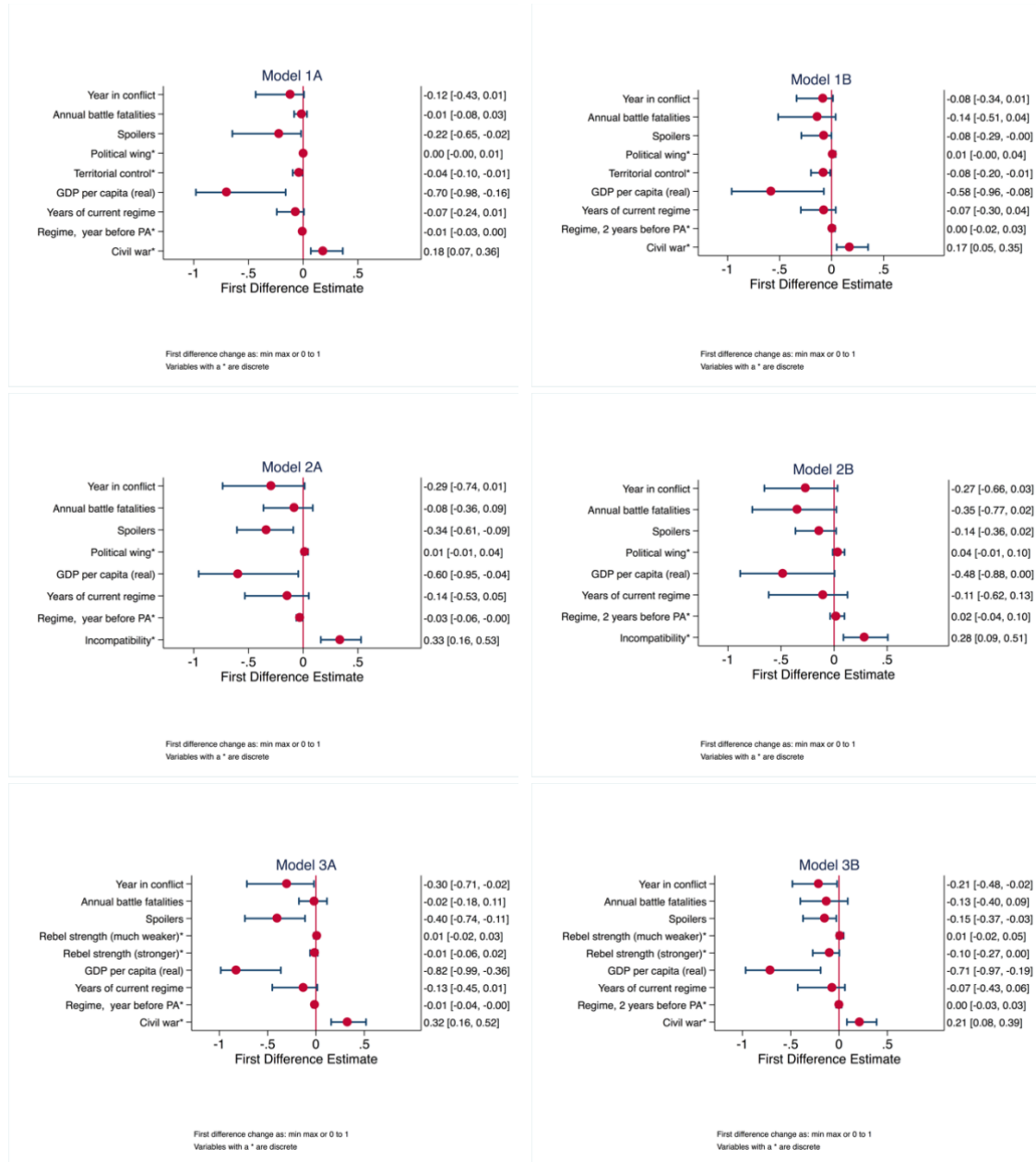
Regime is based on Polity IV variable.

Table 9: Determinants of at least one stage of DDR during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0620** (0.028)	-0.0505** (0.024)	-0.0508** (0.026)
Annual battle fatalities	-0.587 (0.454)	-0.527* (0.281)	-0.444 (0.356)
Spoilers	-0.150 (0.094)	-0.0932 (0.090)	-0.248*** (0.083)
Political wing = 1, Political wing	3.502** (1.524)	1.992** (0.917)	
Political wing = 2, Legal political wing	0.196 (0.967)	0.782 (0.742)	
Territorial control	-1.921** (0.797)		
GDP per capita (real)	-2.757** (1.165)	-1.458 (0.986)	-2.903*** (1.074)
Years of current regime	-0.0114 (0.010)	-0.00274 (0.009)	-0.00168 (0.009)
Regime, 2 years before PA = 1, Anocracy	-1.334 (1.253)	-0.644 (1.005)	-0.736 (0.971)
Regime, 2 years before PA = 2, Autocracy	0.320 (1.183)	0.188 (0.884)	0.372 (0.851)
Civil war	3.702** (1.498)		2.509*** (0.877)
Incompatibility		2.091*** (0.766)	
Rebel strength (much weaker)			0.639 (0.709)
Rebel strength (stronger)			-1.868* (1.002)
Constant	7.420** (2.935)	5.303*** (1.745)	6.614*** (2.517)
Observations	97	97	97
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.405	0.263	0.308
Chi-squared	21.43	18.94	26.87
Significance	0.0292	0.0410	0.00273

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Regime is based on Vreeland variable.

Figure 4: First difference estimates



To illustrate the previous results, I will now consider two important peace negotiations in more detail: the Myanmar case and the Colombian case.

Myanmar case

The Union of Myanmar (formerly known as Burma) received its independence from Britain in 1948. It is ethnically diverse with more than 100 ethnic groups; the Bamar is the majority ethnic group (representing around 68% of the population). During the periods between 1958 to 1960 and 1962 to 2011, the country was under a military regime. In 2011, the government became civilian with a robust military influence. Since its independence from Britain, Burma has been involved in internal conflict.⁵⁴ From 1989 to 2010, several ceasefire agreements were signed⁵⁵ between the government and at least 40 ethnic rebel groups. Fifteen rebel groups signed and joined the new army or militia. Twenty groups agreed to maintain the ceasefire, and five⁵⁶ rebel groups did not sign. Those agreements were more akin to “gentleman’s agreements” without political settlements, which permitted the rebels to retain weapons, territorial control, and business privileges such as natural resource extraction. This process was stable in terms of limiting clashes or fighting incidents and was characterised by the constant mistrust between parties and the lack of clear codes of operationalisation. The government was accused of using “divide and rule tactics”, by not permitting the coalition rebel groups to negotiate a general agreement

⁵⁴ “The most protracted conflict is the Karen struggle, but there have also been long-running insurgencies in the Mon, Kachin, Karenni, and Shan-dominated regions. Briefer fighting spells have occurred in the conflicts over Lahu, Wa and Kokang rights, but there has been little progress to find a long-term solution to the conflict issues.”

See http://www.ucdp.uu.se/gpdata/gpcountry.php?id=112®ionSelect=7-Eastern_Asia

⁵⁵ There were two stages to the ceasefire process: 1989 to 1995 and 1998 to 2010.

⁵⁶ The five rebel groups who did not sign were the Kachin Independent Organization (KIO), the New Mon State Party (NMSP), the United Wa State Army (UWSA), the Karen Peace Council (KPC), and the National Democratic Alliance Army. See <http://www.mmpeacemonitor.org/peace-process/negotiation-timeline>

and by not creating the new army⁵⁷ that was supposed to be integrated with non-state armed groups. In summary, these cycles of agreements were not completely successful because the process was not a political solution to solve the cause of conflict. Indeed, in terms of the rebel groups, “Some of them regret being disarmed. In some cases, new armed groups emerged to replace disarmed groups” (Zaw Oo, 2014, p.13).

A new peace process started in 2011 with a new democratic regime which “made its first reconciliatory announcement on the peace process on 18 August 2011 inviting ethnic armed groups “to secure lasting peace” in the country” (Zaw Oo, 2014, p.16). This new process is advancing well, and it has been characterised in the following terms:

- Uncertainty about how the process would end ethnic conflict and carry out political and economic reforms;
- Being more of a political than military solution, the rebels were very clear in their negotiation strategy; they wanted to achieve a political settlement and a collective negotiation before the disarmament;
- Accountability;

⁵⁷ “The government at this time considered that non-state armed groups should be transformed into the Border Guard Force (BGF) to become a part of Tatmadaw. By extension, these groups would be constitutionally legal. The BGF was a form of an armed unit that was neither militia nor part of the regular army. Some ethnic armed groups criticized that the government’s plan to form the BGF was intended for undermining the command and control of existing commanders of ethnic armed groups” (Zaw Oo, 2014, p.11).

- Problems with the implementation because it is not clear how it would be executed;
- The presence of intra group violence⁵⁸ and the geographic dispersion of rebel units;
- Lack of economic resources and the presence of the war economy.

Table 10 summarises the statistical results for the Myanmar case. I suggest that the probability of having a DDR with The Karen National Union (KNU) is 80% and with The United Wa State Army (UWSA) the probability is around 37%. The likelihood of DDR with the Karenni National Progressive Party (KNPP) is around 97%. The probability of DDR with the Myanmar National Democratic Alliance Army (MNDAA) is 95%. This negotiation process demonstrates the challenges that the parties face. They have learnt that the political settlement is more important than the military one; they need to solve different kinds of problems such as the presence of weapons, lack of opportunities, dismantling the war economy and maintaining credibility if they do not want to repeat the legacy of previous negotiations.

⁵⁸ “Intra-minority conflict is another concern that may potentially undermine the ceasefire process, especially in Shan State where multiple armed groups operate. These groups in conflict are concerned not only with the government, but also with other armed groups who might take advantage of ceasefires to undermine their interest. Multiple armed groups in one geographical location intensify overlapped territorial claims that are often linked to the war economy” (Zaw Oo, 2014, p.33)

Table 10: Probability of Myanmar DDR.

Variable	Myanmar /KNU	Myanmar /KNPP	Myanmar /UWSA	Myanmar /MNDAA
Years in conflict	46	55	1	1
Annual battle fatalities	1351	35	135	270
Political wing	Yes	Yes	No	No
Legal political wing	No	No	No	Yes
Territorial control	Yes	Yes	Yes	Yes
Previous number of warring groups	10	10	10	10
Years of current regime	51	51	51	51
Autocracy	Yes	Yes	Yes	Yes
Anocracy	No	No	No	No
Civil war	No	No	No	Yes
GDP per capita (previous negotiation)	5733,37	5733,37	5733,37	5733,37
Constant				
PROBABILITY (%) (Model 1B)	0,80	0,97	0,37	0,95

Colombian case

The Republic of Colombia attained its independence from Spain in 1819. It is not ethnically diverse, as 86% of the population are “mestizos”. Colombia has been immersed in an internal armed conflict since the late 1940s (1948 – 1958: the violence; 1953 – 1964: political party violence; since 1964: low-intensity conflict, guerrilla activity, drug trafficking, paramilitary involvement) (González, 2014).

The first period, “La Violencia” (1948 – 1958), was the historical age in Colombia when the liberal party and conservative party were fighting. During this period, different kinds of armed groups were created. These were called “Chulavitas” and “Pájaros” (liberal guerrillas). On 13 September 1953, during Rojas Pinilla’s

dictatorship, the liberal guerrillas of “los Llanos” decided to demobilize around 3,540 combatants for two reasons. First, the guerrilla group was divided, demoralised and weakened militarily. Second, the national government gave an amnesty and offered different economic benefits. However, the Colombian government could not fulfil its promises: the guerrilla leaders were murdered and rebels who came back to their lands were displaced by people who were militants in the conservative party. In other words, the demobilised rebels could not benefit from the peace, and many of them decided to take up arms. Consequently, the seeds of new violence were sown.

In 1964 a new cycle of violence started; new rebel groups appeared, including the Revolutionary Armed Forces of Colombia – FARC, The National Liberation Army – ELN, The Popular Liberation Army (1967) – EPL; The 19th of April Movement (1970) – M-19 and other smaller guerrilla groups. In 1984, the government began peace talks with each rebel group. However only the M-19, EPL and some minor groups or factions signed a peace agreement. Nevertheless, this process was considered a successful pact because the political reintegration had been positive; however, the rate of political homicide has witnessed an upwards trend, and the social and economic reintegration of former combatants was poorly designed and improvised (Villarraga, 2008, 2015).

During this negotiation period, a new armed group began to fight against guerrilla groups and attack their social support; this group has been referred to as a paramilitary organisation. In 2003, the Colombian government started a peace process

with these paramilitary forces. The process has triggered multiple controversies and has been considered unsuccessful because of the problems with the process of reincorporating the former combatants,⁵⁹ the lack of public policy that seeks out a solution for the real reasons of the Colombian conflict, the lack of reparation and justice, and the re-emergence of new groups called criminal bands that are linked to drug trafficking and criminality (Gutiérrez & González, 2012).

Colombia has had many peace talks and three peace agreements with disarmament, demobilisation and reintegration provisions. Currently, there is a peace implementation in progress with FARC, but the challenge for the Colombian government and civil society is enormous because the government will need to implement a DDR programme for roughly 10,000 rebels. This programme will need to improve the institutions, to develop some mechanism for reparation, truth and justice and to solve the real causes of the conflict, for instance, the grievances relating to land issues, poverty and inequality.

Table 11 summarises the statistical results for the Colombian case. I can suggest that the probability of having a DDR with “Fuerzas Revolucionarias de Colombia” (FARC - EP) is between 86% and 92%. The likelihood of DDR with “Ejército de Liberación Nacional” (ELN) is more than 90%.

⁵⁹ There are around 31,617 former combatants.

Table 11: Probability of Colombia DDR.

Variable	Colombia /FARC	Colombia /ELN
Years in conflict	48	45
Annual battle fatalities	310	27
Political wing	No	No
Legal political wing	Legal	No
Territorial control	Yes	Yes
Previous number of warring groups	6	6
Years of current regime	53	53
Autocracy	No	No
Anocracy	No	No
Civil war	Yes	Yes
GDP per capita (previous negotiation)	7,728.66	7,728.66
Constant		
PROBABILITY (%) (Model 1B)	0,90	0,97

Conclusion - Discussion

This paper seeks to explain why some peace negotiations have DDR provision while others do not. The dataset shows that there are 80 peace negotiations which include DDR provision and 22 without this provision. The theoretical framework in this discussion views DDR provision as an important mechanism to not only build trust and avoid defection and cheating between parties during a peace negotiation, but also to serve as the bridge in connecting the former combatants to a new post-conflict life. DDR is an instrument for reaching peace but it is not a solution for the root causes of conflict.

The theoretical argument developed eight empirical predictions for three general factors, with the main objective being to answer the following question: what are the determining characteristics as to whether a peace process includes a DDR provision or not? The three factors explored are the features of the conflict (duration, intensity and spoilers), the characteristics of the rebels (tactical and military capacity and political interest), and the attributes of the country (capacity state, type and stability of political regime). The quantitative analysis of 102 peace agreements, dating from 1975 onwards, has supported some predictions and this result invites deeper exploration into other variables that may influence DDR negotiations.

The answer to the question is that the peace processes with armed groups who have a clear political interest, but who are without territorial control, are more likely to negotiate a DDR provision. However, this likelihood is affected by the conditions of the conflict, especially the presence of other rebels which threatens the security of these fighters and challenges the state's capacity; additionally, the dynamics of long and intense conflicts make the settlement of the conflict (understood as rebuilding the society and the tissues of trust between citizens and institutions) more difficult. The economic and political conditions of the country are essential factors. Countries with a democratic regime and a low economic capacity have a greater propensity to negotiate a DDR.

Finally, the analysis of peace agreements with DDR provisions provides a vital contribution to policymakers, by showing the importance of the characteristics of

conflict, country, and rebels in the negotiation, development and implementation of a DDR solution. However, unlike the statistical analyses, they are not analyses designed for testing theories. This research demonstrates an area where further theoretical work and further empirical work are needed. We need to understand why the characteristics of conflict, country, and rebels are necessary to negotiate a DDR. It is also important to understand the incentives of parties to achieve peace if we want to solve the underlying conflict.

To illustrate the general patterns, I have considered two important peace negotiations in more detail: Colombia and Myanmar. Both have similarities and dissimilarities: for example, they are both long and multiparty conflicts with a clear and strong war economy. However, Myanmar has an ethnic conflict with a transitional regime, which is considered to be anocratic in nature. Colombia is a democratic republic with a civil war. Analysing these cases I conclude that government, policymakers and stakeholders are faced with a significant challenge, as both countries have a historical context of failed negotiations. Each needs to design a DDR provision considering the necessities of the host community and former combatant, and also develop a strategy of reconciliation and reparation between populations.

Appendix A: Dataset for DDR analysis – Co-variables

Description of co-variables

1. DURATION: Time elapsed in years of conflict. It is based on start date and EpEnd. Source, UCDP dyadic dataset and UCDP dyadic conflict termination dataset. Transformation: $\ln_duration_1: \ln(\text{Duration}_1 + 1)$
2. INTENSITY: Source, UCDP dyadic dataset. “The intensity variable is coded into two categories:
 0. (Minor): Between 25 and 999 battle-related deaths in a given year.
 1. (War): 1000 or more battle-related deaths in a given year.”
3. DEATH-BATTLE: Source, Battle Deaths Dataset 1946–2008 (version 3.0). Transformation: I calculate the log, max and mean for death-battle low, high and estimate.
4. REBEL STRENGTH: Source, Non-State Actor Data. “This field provides a coding of the strength of the rebel forces relative to the government forces.” Transformation 1: I recoded the variable original: 0. Much weaker; 1. Weaker; 2. Parity; 3. Stronger; 4. Much stronger. Transformation 2: I reclassified the original variable: 0. Much weaker; 1. Weaker; 2. Stronger.
5. FIGHTING CAPACITY: Source, Non-State Actor Data. “The ability of the rebels to effectively engage the army military and win major battles, posing a credible challenge to the state.” Coding: 0. No; 1. Low; 2. Moderate; 3. High.

6. CENTRAL CONTROL: Source, Non-State Actor Data. “The rebels have a clear central command.” Coding: 0. No; 1. Yes.
7. POLITICAL WING: Source, Non-State Actor Data. Coding: 0. No; 1. Explicit link; 2. Alleged link; 3. Acknowledged link. I recoded the original information by whether the rebel group has a political wing or not: 0. No; 1. Yes.
8. LEGAL POLITICAL WING: Source Non-State Actor Data. Coding: 0. No; 1. Yes.
9. MAX OF REBEL FORCES: The maximum number of rebel groups in every conflict. Source, UCDP dyadic dataset. I also created the variable SUM_ SB which is the number of rebel groups by conflict-year.
10. MULTIPARTY CIVIL WAR: Source, Christia. “Civil wars in which there are three or more major domestic combatant groups.” (p. 11)
11. NWG_P: Source, Christia. Previous number of warring groups-Maximum number of warring groups.
12. INCOMPATIBILITY: Source, UCDP dyadic dataset. Coding: 0. Territory; 1 Government. Incomp_1: the last incompatibility registered for the conflict dyad. Max_incomp: the maximum incompatibility registered for the conflict dyad.
13. DEMOCRACY, AUTOCRACY AND ANOCRACY: Source, Polity IV. “The POLITY score is computed by subtracting the AUTOC score from the

DEMOC score; the resulting unified polity scale ranges from +10 (strong democratic) to -10 (strongly autocratic) [...] POLITY2 is a modified version of the POLITY variable added in order to facilitate the use [...] in time-series analyses. It modifies the combined annual POLITY score (-66, -77, -88) to conventional polity scores.” I generate a dummy variable for each type of regime and a categorical variable (Polity_ADA)

- 0. Democracy if (polity2 >= 6)
- 1. Anocracy if (polity2 < 6) and (polity2 > -6)
- 2. Autocracy if (polity2 <= -6)

14. REGIME VREELAND: Recombines the Polity components “leaving out the variables ‘contaminated’ with reference to political violence and civil war.” (Vreeland, 2008, p. 402)

- 0. Democracy if (xpollag >= 4)
- 1. Anocracy if (xpollag < 4) and (xpollag > -3)
- 2. Autocracy if (xpollag <= -3)

15. DEMOCRACY DURATION: Source, Boix, Miller, and Rosato. “The number of consecutive years the country has had the same regime type.”

16. TYPE OF CONFLICT: Source, Non-State Actor Data. I generate a dummy variable for each conflict. Coding: 1. Anti-colonial; 2. Autonomy conflict; 3. Civil war; 4. Communist rebellion; 5. Coup d’etat; 6. Ethnic conflict; 7. Islamist; 8. Secessionist conflict; 9. Terrorist.

17. GDP: Source, Gleditsch. Version 6.0 BETA (9 September 2014).

Transformation: natural logarithm and division by thousand.

Appendix B: Statistical Test – main models

Specification error

I use the command linktest to detect a specification error. “The idea behind linktest is that if the model is properly specified, one should not be able to find any additional predictors that are statistically significant except by chance” (IDRE Stats, 2014).

Table 12 shows the different results of this test; I argue that the models do not have specification error, because Hat is statistically significant at 5% and Hatsq is not.

Table 12: Specification error

Model	Hat	Hatsq
Model 1A	Coef: 1.1037 P-value: 0.000	Coef: -.04842 P-value: 0.561
Model 2A	Coef: 1.3370 P-value: 0.001	Coef: -0.1329 P-value: 0.221
Model 3A	Coef: 1.02526 P-value: 0.000	Coef: -0.014397 P-value: 0.886
Model 1B	Coef: 1.249518 P-value: 0.000	Coef: -0.09257 P-value: 0.145
Model 2B	Coef: 1.3482 P-value: 0.002	Coef: -0.142032 P-value: 0.237
Model 3B	Coef: 1.496787 P-value: 0.002	Coef: -0.178239 P-value: 0.129

Multicollinearity

Table 13 summarises the variance inflation factors (VIFs) of the control variables.

Note that the variables have a VIF under 5, indicating that these variables do not present multicollinearity problems.

Table 13: The variance inflation factors

Variables	Model 1A	Model 2A	Model 3A	Model 1B	Model 2B	Model 3B
Years in conflict	1.17	1.17	1.18	1.20	1.19	1.16
Annual battle fatalities	1.36	1.40	1.43	1.32	1.38	1.37
Spoilers	1.30	1.23	1.39	1.18	1.13	1.35
Political wing = 1, Political wing	1.03	1.03		1.05	1.04	
Political wing = 2, Legal political wing	1.03	1.03		1.05	1.04	
Territorial control	1.03			1.05		
Rebel strength: much weaker			1.24			1.25
Rebel strength: stronger			1.19			1.25
GDP per capita (real)	1.14	1.22	1.15	1.15	1.21	1.18
Years of current regime	1.12	1.10	1.15	1.14	1.10	1.21
Regime (Polity IV)	1.35		1.36		1.25	
Regime (V)				1.24		
Civil War	1.30		1.33	1.27		1.32
Incompatibility		1.45			1.44	

Influential observations

I calculate predictions, residuals, standardised residuals, and studentized (jackknifed) residuals; the standard error of the forecast, prediction, and residuals; the influence measures Cook's distance, DFBETAs, DFITS, and leverage. The graphs generated as part of the exploratory analysis, which are not included within this thesis, identify some influential cases. I estimate new models without these cases, but the result is similar.

Classification statistics

We use the command estat to estimate the correct classification of the model. Table 14 shows the overall rate of correct classification for each model is estimated to be around 85, with 51.34% (approximately) of the normal weight group correctly classified (specificity) and 95.80% (approximately) of the low weight group correctly classified (sensitivity).

Table 14: Classification statistics

Model	Classification
Model 1A	Correctly classified 88.28%
Model 2A	Correctly classified 85.16%
Model 3A	Correctly classified 85.94%
Model 1B	Correctly classified 89.69%
Model 2B	Correctly classified 86.60%
Model 3B	Correctly classified 86.60%

Goodness of fit

We use the command `lfit` to estimate the goodness of fit:

The idea behind the Hosmer and Lemeshow's goodness-of-fit test is that the predicted frequency and observed frequency should match closely and that the more closely they match, the better the fit. The Hosmer-Lemeshow goodness-of-fit statistic is computed as the Pearson chi-square from the contingency table of observed frequencies and expected frequencies (IDRE Stats, 2014).

Table 15 show the results: with a p-value of above 5%, we can say that Hosmer and Lemeshow's goodness-of-fit test indicates that our model fits the data well.

Table 15: Goodness of fit

Model	Hosmer-Lemeshow
Model 1A	H-L chi2(8) = 8.41 Prob > chi2 = 0.3948
Model 2A	H-L chi2(8) = 12.10 Prob > chi2 = 0.1469
Model 3A	H-L chi2(8) = 5.58 Prob > chi2 = 0.694
Model 1B	H-L chi2(8) = 10.29 Prob > chi2 = 0.2450
Model 2B	H-L chi2(8) = 7.26 Prob > chi2 = 0.5083
Model 3B	H-L chi2(8) = 22.36 Prob > chi2 = 0.0043

Residual plots

Figure 5: Residuals - Models Table 8

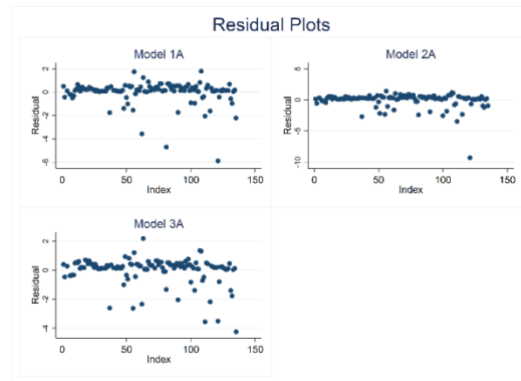


Figure 6: Residuals – Models Table 9

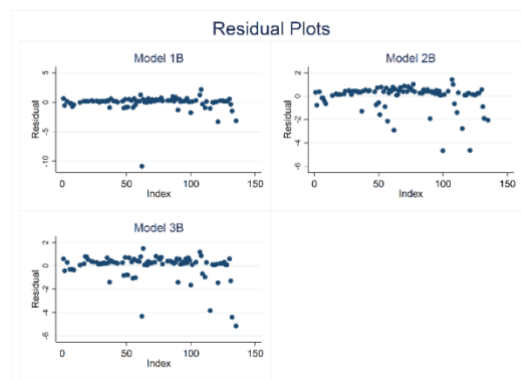


Figure 7: Residual and predict values – Models Table 8

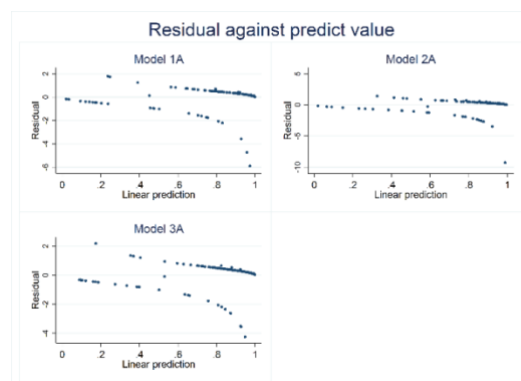
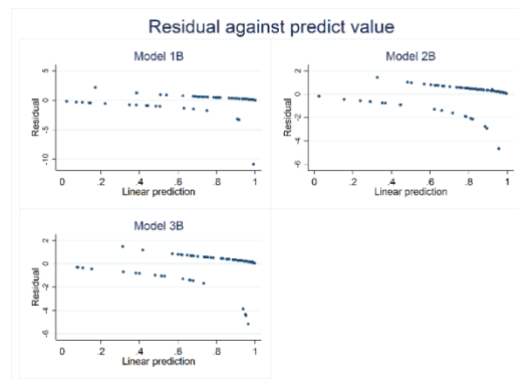


Figure 8: Residual and predict values – Models Table 9



Selection models

One of the concerns in all fields of empirical political science is “sample selection bias”, in which non-random samples affect the properties of conventional estimators. There are different methodological approaches to solve this type of bias, such as seemingly unrelated regression (SUR), or the Heckman model which “...is composed of two equations. The first is the selection equation that determines whether the variable of interest is observed...The second equation is the linear model of interest...” (Adkins & Hill, 2011, p. 533). The problem surfaces when we consider that the selection equation determines that the dependent variable is observed.

In the model of the determinants of DDR, observations regarding the effect of duration, intensity, GDP, regime and rebel characteristics have been conveniently selected, based on whether the conflicts had negotiated a peace agreement. The implication is that the disturbances are not truly random, because I do not collect data

on the presence of a DDR process in the case of a military victory or low activity, or in the case of hidden agreements or for DDR provisions created without negotiation.

It is important to consider whether the effect of any of the independent variables on DDR could be conditional on having an agreement. I consider that the relationship is not likely to be different in other cases where there is not a peace agreement because, in this research, I analysed influential cases and I estimated models in cases without a peace agreement and the results (relationship) were robust. However, for further research and to prove my initial findings, I need to extend the dataset to include those cases and to check if there are conditional effects because, clearly, DDR is less likely when a conflict ends without some type of negotiation.

Appendix C: Predict probabilities by control variables

I use the command “prgen” to calculate the predict probabilities and to plot the confidence intervals. The probabilities are calculated from the min to max ranges of the key variable and the mean of other variables. The results are shown in Figure 9.

For example, the predict probability of DDR when the duration of conflict changes from 0 years to 30 years shows a clear negative effect by the increasingly small probabilities. I can see that the probabilities decrease as duration increases. The graph (duration) shows that the confidence interval is smaller at the beginning and increases

as the conflict ages. We can observe a similar performance in the intensity and spoiler variables.

The graph displaying the political factor was based on the duration of the regime (from 0 to 50 years). It shows that the confidence interval is broad, and the probability decreases mildly. It is important to bear in mind that the political factor is not statistically significant in the models. The graph of the economic factor shows the clear negative effect of real GDP per capita (based on 2005 prices); the confidence interval is smaller at between 0.0221 to 0.8 and increases as I move to a higher GDP figure.

Figure 9: Predicted probabilities of DDR by control variables

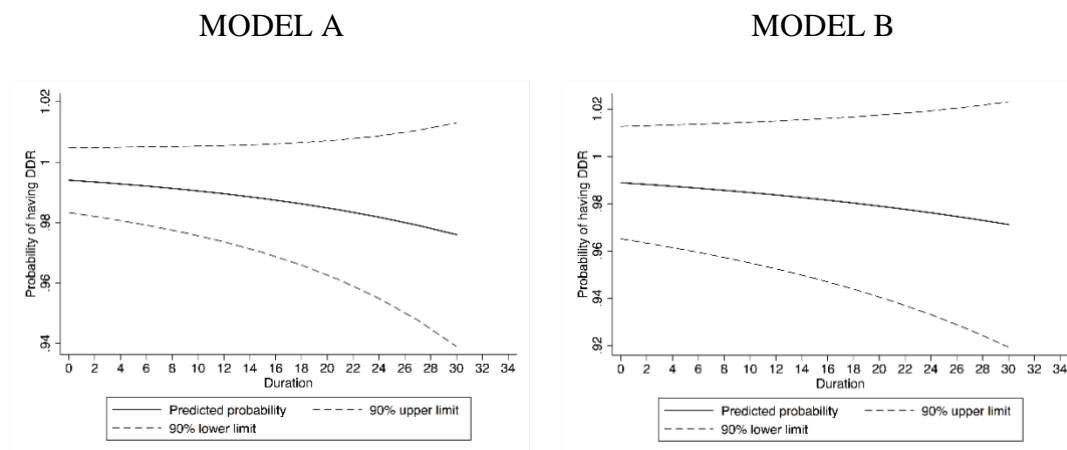


Figure 9: Predicted probabilities of DDR by control variables (continuation)

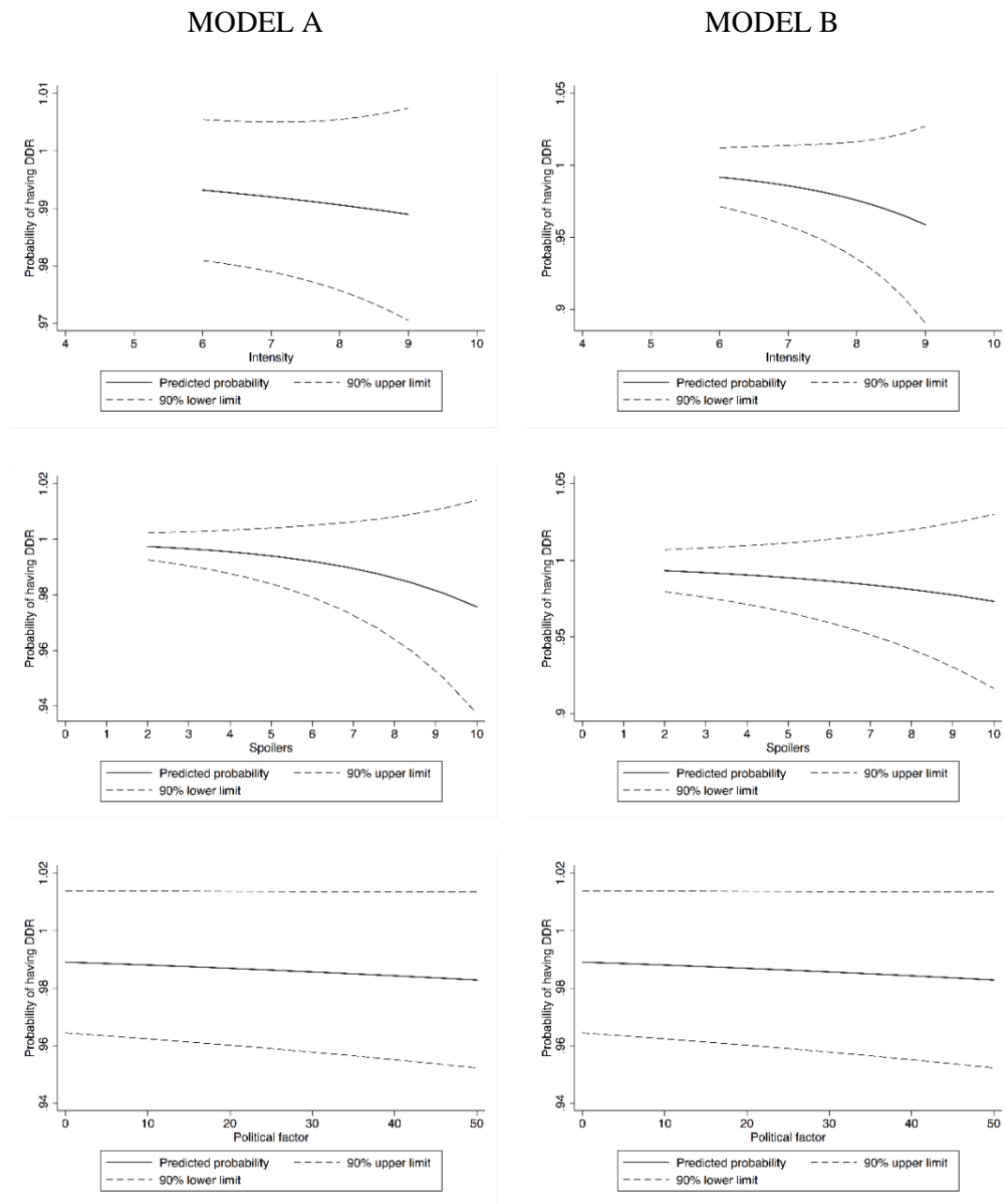
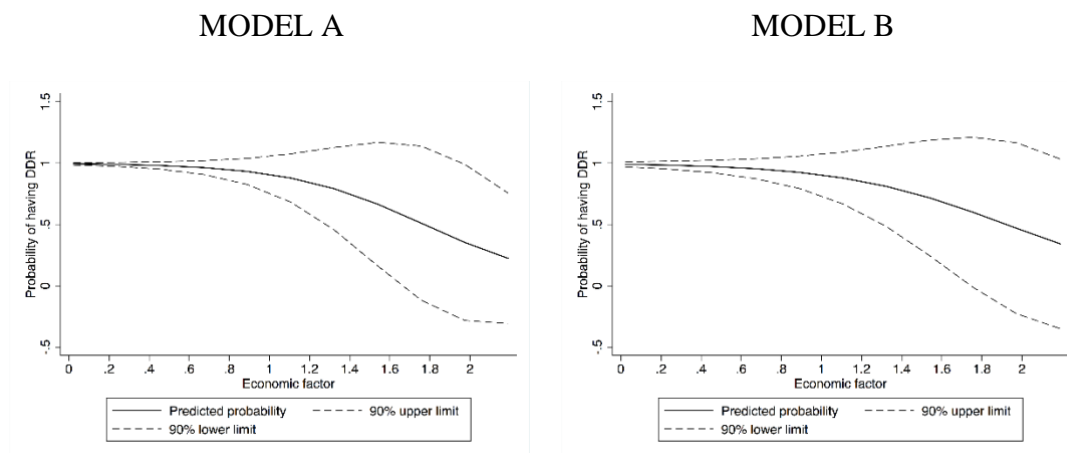


Figure 9: Predicted probabilities of DDR by control variables (continuation)



Appendix D: Other models

This appendix presents the results of other models containing each path of DDR or a combination of paths. Table 16 to Table 23 present the results for disarmament, demobilization, reintegration and the stages of DDR; these models have the same structure as the core models (Table 8 and Table 9).

In the case of the determinants of disarmament, the presence of spoilers and the rebel strength have a negative and statistically significant effect. In the case of demobilization, spoilers, GDP and regime stability, these variables are statistically significant with a negative relationship with the dependent variable. When the model is controlled by the type of political regime, following the argument of Vreeland, the results are quite similar to the core model in Table 9. The determinants of reintegration model show that territorial control by rebels, GDP and the duration of regime are negative and significant. The last tables present the ordered logistic model,

where the dependent variable has the following information: 0, no DDR; 1, one stage of DDR; 2, two stages of DDR and 3, DDR. The likelihood ratio chi-square of 52.68, with a p-value of 0.0000, tells us that the model as a whole is statistically significant. These models show that spoilers, GDP and the type of conflict are statistically significant.

These models may highlight the importance of the presence of other rebel groups for bargaining a DDR. The spoilers have a direct link with the security dilemma, because the implementation of DDR is difficult and unrealistic where the security is problematic and also because those groups provide potential options for recidivism if the ex-combatants do not have economic and social opportunities.

Table 16: Determinants of disarmament bargaining during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0253 (0.019)	-0.0217 (0.019)	-0.0231 (0.020)
Annual battle fatalities	0.0446 (0.213)	0.00350 (0.211)	0.00648 (0.182)
Spoilers	-0.208*** (0.060)	-0.194*** (0.059)	-0.191*** (0.059)
Political wing = 1, Political wing	0.631 (0.621)	0.471 (0.558)	
Political wing = 2, Legal political wing	0.142 (0.636)	0.222 (0.620)	
Territorial control	-0.278 (0.450)		
Rebel strength (much weaker)			-0.743 (0.829)
Rebel strength (stronger)			0.00953 (0.517)
GDP per capita (real)	-1.420* (0.733)	-0.921 (0.723)	-1.395* (0.807)
Years of current regime	-0.00486 (0.007)	-0.00467 (0.007)	-0.00469 (0.006)
Regime, year before PA = 1	-0.544 (0.641)	-0.484 (0.645)	-0.644 (0.763)
Regime, year before PA = 2	-1.098 (0.894)	-1.176 (0.856)	-1.255 (0.919)
Civil war	1.239 (0.831)		1.097 (0.750)
Incompatibility		1.370** (0.687)	
Constant	2.289* (1.384)	2.006* (1.217)	2.726*** (0.963)
Observations	128	128	128
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.136	0.136	0.138
Chi-squared	21.54	22.68	23.47
Significance	0.0282	0.0120	0.00912

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Polity IV variable

Table 17: Determinants of disarmament bargaining during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0234 (0.022)	-0.0225 (0.018)	-0.020 (0.018)
Annual battle fatalities	-0.232 (0.281)	-0.263 (0.257)	-0.195 (0.208)
Spoilers	-0.144** (0.068)	-0.134* (0.072)	-0.183*** (0.065)
Political wing = 1, Political wing	1.680 (1.159)	1.356* (0.795)	
Political wing = 2, Legal political wing	0.329 (0.712)	0.426 (0.649)	
Territorial control	-0.733 (0.485)		
Rebel strength (much weaker)			-0.581 (0.808)
Rebel strength (stronger)			-1.391* (0.744)
GDP per capita (real)	-1.363* (0.746)	-0.926 (0.732)	-1.534** (0.780)
Years of current regime	0.00164 (0.009)	0.00248 (0.008)	0.00496 (0.009)
Regime, year before PA = 1	-0.986 (0.801)	-0.748 (0.713)	-0.710 (0.798)
Regime, year before PA = 2	0.567 (0.734)	0.524 (0.712)	0.498 (0.716)
Civil war	1.037 (0.995)		0.526 (0.828)
Incompatibility		0.976 (0.661)	
Constant	3.277* (1.762)	2.868** (1.419)	3.724*** (1.307)
Observations	97	97	97
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.175	0.159	0.157
Chi-squared	17.45	17.21	16.62
Significance	0.0952	0.0698	0.0833

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Vreeland variable

Table 18: Determinants of demobilization deal during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0253 (0.024)	-0.0103 (0.023)	-0.0241 (0.022)
Annual battle fatalities	-0.369 (0.248)	-0.359* (0.207)	-0.272 (0.235)
Spoilers	-0.185** (0.079)	-0.130* (0.068)	-0.191*** (0.070)
Political wing = 1, Political wing	1.272 (0.824)	0.756 (0.761)	
Political wing = 2, Legal political wing	0.351 (0.769)	0.537 (0.672)	
Territorial control	-0.148 (0.557)		
Rebel strength (much weaker)			-0.0224 (0.696)
Rebel strength (stronger)			-0.807 (0.573)
GDP per capita (real)	-6.392*** (2.081)	-4.646*** (1.644)	-6.023*** (1.611)
Years of current regime	-0.0142** (0.007)	-0.0106 (0.007)	-0.0137** (0.007)
Regime, year before PA = 1	-0.216 (0.844)	0.426 (0.769)	0.248 (0.753)
Regime, year before PA = 2	-0.787 (1.153)	-0.605 (0.979)	-0.572 (1.057)
Civil war	3.533*** (0.896)		3.204*** (0.853)
Incompatibility		2.728*** (0.754)	
Constant	4.591** (2.000)	3.258* (1.695)	4.122** (1.821)
Observations	128	128	128
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.378	0.311	0.371
Chi-squared	31.70	25.04	31.07
Significance	0.000851	0.00526	0.000570

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Polity IV variable

Table 19: Determinants of demobilization deal during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0629** (0.026)	-0.0369 (0.024)	-0.0392* (0.022)
Annual battle fatalities	-0.777* (0.403)	-0.618*** (0.238)	-0.520 (0.333)
Spoilers	-0.0893 (0.097)	-0.0339 (0.081)	-0.132* (0.079)
Political wing = 1, Political wing	3.816*** (1.217)	2.490** (1.151)	
Political wing = 2, Legal political wing	0.0286 (1.012)	0.410 (0.847)	
Territorial control	-0.269 (0.692)		
Rebel strength (much weaker)			-0.270 (0.691)
Rebel strength (stronger)			-0.593 (0.859)
GDP per capita (real)	-5.773*** (1.807)	-3.384** (1.335)	-5.496*** (1.584)
Years of current regime	-0.0139** (0.007)	-0.00787 (0.007)	-0.0129* (0.007)
Regime, 2 years before PA = 1	-1.003 (1.080)	-0.0978 (0.888)	0.374 (0.994)
Regime, 2 years before PA = 2	-0.396 (1.069)	-0.289 (0.840)	-0.193 (0.921)
Civil war	4.823*** (1.140)		3.537*** (0.954)
Incompatibility		3.142*** (0.878)	
Constant	6.682*** (2.565)	4.344*** (1.630)	5.500** (2.258)
Observations	97	97	97
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.465	0.344	0.393
Chi-squared	36.95	24.30	27.04
Significance	0.000117	0.00684	0.00256

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Vreeland variable

Table 20: Determinants of reintegration bargaining during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0124 (0.024)	-0.00905 (0.028)	-0.0258 (0.020)
Annual battle fatalities	-0.141 (0.207)	-0.250 (0.201)	-0.0369 (0.211)
Spoilers	-0.0812 (0.072)	-0.0890 (0.068)	-0.100 (0.069)
Political wing = 1, Political wing	0.0557 (0.804)	-0.123 (0.599)	
Political wing = 2, Legal political wing	0.767 (0.586)	0.705 (0.656)	
Territorial control	-1.559*** (0.488)		
Rebel strength (much weaker)			-0.0203 (0.543)
Rebel strength (stronger)			-0.994 (0.606)
GDP per capita (real)	-3.376*** (1.219)	-2.427** (1.155)	-3.086*** (1.145)
Years of current regime	-0.0119** (0.005)	-0.0118*** (0.004)	-0.0101** (0.005)
Regime, year before PA = 1	-0.622 (0.690)	-0.816 (0.816)	-0.647 (0.661)
Regime, year before PA = 2	-0.525 (0.910)	-1.185 (0.962)	-0.817 (0.858)
Civil war	1.996*** (0.722)		1.778*** (0.654)
Incompatibility		2.772*** (0.732)	
Constant	3.307** (1.507)	2.733* (1.633)	2.562* (1.476)
Observations	128	128	128
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.258	0.254	0.204
Chi-squared	25.15	37.30	18.41
Significance	0.00868	5.01e-05	0.0485

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Polity IV variable

Table 21: Determinants of reintegration bargaining during peace negotiations

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.00320 (0.024)	-0.00641 (0.025)	-0.0327* (0.019)
Annual battle fatalities	-0.569 (0.352)	-0.573** (0.291)	-0.414 (0.328)
Spoilers	-0.141 (0.098)	-0.119 (0.096)	-0.172* (0.096)
Political wing = 1, Political wing	-0.581 (1.169)	-0.583 (0.794)	
Political wing = 2, Legal political wing	0.243 (0.718)	0.640 (0.887)	
Territorial control	-1.906** (0.785)		
GDP per capita (real)	-5.738*** (2.194)	-3.828** (1.577)	-4.981*** (1.608)
Rebel strength (much weaker)			-0.233 (0.708)
Rebel strength (stronger)			-2.349** (0.942)
Years of current regime	-0.0164*** (0.006)	-0.0137** (0.006)	-0.0112* (0.006)
Regime, 2 years before PA = 1	1.286 (0.982)	1.056 (0.799)	0.454 (0.835)
Regime, 2 years before PA = 2	-0.518 (0.856)	-0.636 (0.790)	-0.471 (0.848)
Civil war	2.844*** (0.992)		1.999** (0.804)
Incompatibility		2.631*** (0.799)	
Constant	6.568*** (2.381)	4.904** (2.292)	5.817*** (2.193)
Observations	97	97	97
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.371	0.315	0.356
Chi-squared	19.15	26.64	22.52
Significance	0.0584	0.00297	0.0127

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Vreeland variable

Table 22: Determinants of DDR during peace negotiations (1975 – 2012)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0172 (0.020)	-0.00792 (0.021)	-0.0258 (0.020)
Annual battle fatalities	-0.0934 (0.201)	-0.147 (0.174)	-0.0369 (0.211)
Spoilers	-0.158** (0.066)	-0.170*** (0.064)	-0.100 (0.069)
Political wing = 1, Political wing	0.429 (0.660)	0.223 (0.480)	
Political wing = 2, Legal political wing	0.465 (0.551)	0.497 (0.604)	
Territorial control	-0.621* (0.353)		
GDP per capita (real)	-2.593*** (0.621)	-1.970*** (0.689)	-3.086*** (1.145)
Years of current regime	-0.00896* (0.005)	-0.00950** (0.005)	-0.0101** (0.005)
Regime, year before PA = 1	-0.531 (0.662)	-0.483 (0.727)	-0.647 (0.661)
Regime, year before PA = 2	-0.806 (0.970)	-1.149 (1.001)	-0.817 (0.858)
Civil war	1.936*** (0.591)		1.778*** (0.654)
Incompatibility		2.474*** (0.509)	
Constant cut2	-2.937*** (1.073)	-2.543** (1.111)	
Constant cut3	-1.767 (1.151)	-1.307 (1.126)	
Rebel strength (much weaker)			-0.0203 (0.543)
Rebel strength (stronger)			-0.994 (0.606)
Constant cut1	-3.916*** (1.128)	-3.498*** (1.148)	-2.562* (1.476)
Observations	128	128	128
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.140	0.157	0.204
Chi-squared	52.68	42.67	18.41
Significance	2.05e-07	5.70e-06	0.0485

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Polity IV variable

Table 23: Determinants of DDR during peace negotiations (1975 – 2012)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Years in conflict	-0.0281 (0.020)	-0.0183 (0.019)	-0.0279 (0.018)
Annual battle fatalities	-0.355 (0.253)	-0.369* (0.216)	-0.308 (0.227)
Spoilers	-0.105 (0.066)	-0.109 (0.070)	-0.129** (0.050)
Political wing = 1, Political wing	0.993 (0.835)	0.659 (0.616)	
Political wing = 2, Legal political wing	0.344 (0.638)	0.495 (0.692)	
Territorial control	-0.775 (0.485)		
Rebel strength (much weaker)			-0.691 (0.617)
Rebel strength (stronger)			-1.506** (0.703)
GDP per capita (real)	-2.194*** (0.587)	-1.499** (0.687)	-2.393*** (0.749)
Years of current regime	-0.00683 (0.005)	-0.00446 (0.005)	-0.00215 (0.006)
Regime, 2 years before PA = 1	-0.123 (0.754)	-0.0140 (0.663)	-0.0648 (0.701)
Regime, 2 years before PA = 2	0.101 (0.681)	-0.0261 (0.648)	0.00325 (0.680)
Civil war	1.859*** (0.664)		1.517** (0.696)
Incompatibility		1.953*** (0.552)	
Constant cut1	-4.913*** (1.466)	-4.146*** (1.357)	-5.174*** (1.326)
Constant cut2	-3.858*** (1.388)	-3.162** (1.306)	-4.157*** (1.231)
Constant cut3	-2.850* (1.482)	-2.153 (1.358)	-3.118** (1.273)
Observations	97	97	97
Cluster	Conflict	Conflict	Conflict
Pseudo R-squared	0.147	0.139	0.151
Chi-squared	42.62	44.51	44.69
Significance	1.26e-05	2.66e-06	2.48e-06

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Regime is based on Vreeland variable

Failure of Peace and Disarmament, Demobilisation and Reintegration (DDR)

Abstract

Existing studies suggest that DDR programmes do not strengthen peace after negotiations or treaties. This research argues that the various components of DDR can have different impacts on the failure of peace. This paper examines the implications of the DDR provision in internal armed conflict negotiation for preventing the recurrence of war. This research addresses the following question: Does a DDR provision, in internal armed conflict settlements, prevent the recurrence of war in the post-conflict scenario? Using an original database that registers 102 peace negotiation processes during the period 1975 to 2012, I demonstrate that peace is more likely to be achieved when the peace agreement includes a DDR provision, especially the reintegration process.

Keywords: disarmament, demobilisation, reintegration, peace, conflict resolution, war recurrence

Introduction

There have been 117 conflicts during the period from 1980 to 2015; of these conflicts, 47 have ended with a peace agreement, and 14 have ended with a military victory (Escola de Cultura de Pau, 2016). The literature on the failure of peace argues that the probability of recurrence of conflict is likely in around 60% of the cases (Collier et al., 2003; Collier & Sambanis, 2002; B. Walter, 2010). The Colombian case is a good example in this respect. Colombia has had nine peace talks⁶⁰ and three peace agreements since 1953.⁶¹ These agreements could be considered as only partially successful because the armed conflict is ongoing. Many former combatants have subsequently relapsed into different militant groups, including guerrilla groups, criminal bands and drug cartels. Thus, the criminal and homicide rates are still very high. Currently, there is an implementation of a peace process with FARC and a peace negotiation with ELN. If the peace is achieved, the challenge for the Colombian government and civil society is enormous, because the warring parties need to uphold the compromises and maintain trust in one another. However, Colombian history has demonstrated the challenges and difficulties for lasting and fruitful peace.

The Colombian example raises the important question, why does peace sometimes last and sometimes fail? Countries in conflict have formulated different provisions to try to achieve and (or) maintain peace. These mechanisms are often implemented as

⁶⁰ For details, see Villarraga (2015).

⁶¹ These peace agreements include different provisions such as political participation and DDR.

part of peace negotiations. Warring parties (rebels and government) negotiate different provisions such as power sharing, cease-fire conditions, amnesties, political participation, third-party verification and DDR. Do these measures work? This paper will answer the following question: Does a DDR provision, in internal armed conflict settlements, prevent the recurrence of war in the post-conflict scenario?

The existing scholarly work on peace failure⁶² mainly focuses on the determinants of peace building after the civil war, the impact of the provision which is negotiated and its implementation. These works focus on the relationship between the failure of peace and hostility, local capacities, international support, power-sharing, military sharing, cease-fire agreements or mediation. There are hundreds of works⁶³ on disarmament, demobilisation and reintegration that focus on case studies, evaluation of results and lessons learnt. However, only a few studies adopt a macro vision of the relationship between DDR⁶⁴ provision and the durability of peace or failure of peace. This deficiency seems somewhat surprising since international organisations, like the World Bank, United Nations, national governments and NGOs, emphasise the positive effect of developing this type of programme to achieve peace and stability in post-conflict. In addition, these organisations invest not only financial capital but also

⁶² This paper adopts as synonymous the concepts of war recurrence, resumption of conflict, conflict relapse, peace duration, durability of peace and durable peace. For excellent discussions of these topics see Balcells & Kalyvas (2014); DeRouen, Lea, & Wallensteen (2009); Gurses, Rost, & McLeod (2008); Sambanis (2007); Doyle & Sambanis (2006); Fortna (2004a, 2004b); B. Walter (2002); Stedman, Rothchild, & Cousens (2002); B. Walter (1997); Rudloff & Findley (2016); Kreutz (2014) and Doyle & Sambanis (2006).

⁶³ For example, see Ansorge (n.d.); Barbero-Baconnier (1993); Bauer, Fiala, & Lively (2014); Berdal & Ucko (2009); Boas & Bjørkhaug (2010); Douma & Gasana (2008); Matveeva (2012); Munive & Jakobsen (2012) and Striuli (2012).

⁶⁴ For example, see Krebs & Licklider (2016); Haer & Bohmelt (2015); Banholzer (2013); DeRouen et al. (2009); Glassmyer & Sambanis (2008); Hartzell & Hoddie (2003) and Hoddie & Hartzell (2003).

technical and human capital in DDR programmes. However, a systematic analysis of this relationship is missing, and the academic works on the failure of peace do not study the role of the DDR programme.⁶⁵ This paper seeks to contribute to this debate by explaining the importance and the impact of DDR on the longevity of peace, taking into consideration a complete process, individual paths and different types of reintegration. Previous studies have produced inconclusive or contradictory findings, but these works do not identify the different phases of DDR, as they only focus on one stage. This current study divides the DDR into its components in order to understand if there is a differential impact. I found that reintegration (military and social) has a positive and statistical impact on preventing conflict recurrence. It is important to highlight that the information collected is focused on whether or not the peace agreement has this provision.

This chapter argues that a DDR mechanism within a peace negotiation can make peace more durable, because this provision has a high political and economic cost for both sides in the event that either of them should decide to renege on the commitment or to alter the agreement. In the Nicaraguan case, rebel leaders agreed that they would not disband until the political system changed (Chamorro, 2015; CIDOB, 2000; Fauné, 2014). In the Salvadorian case, the FMLN maintained a significant stock of weapons in secret places because they did not trust in the government's political will and the government was also reluctant to demobilise military forces, "citing the need to combat the country's rising tide of crime" (Hill, 2004, p. 162). Another example is Angola, which signed three peace agreements (1991, 1994 and 2002) with not only

⁶⁵ Some studies are focused on military reintegration, military power sharing or disarmament.

power-sharing clauses but also DDR provision and military reform. The first two agreements failed due to the lack of credibility of the parties, and the lack of resources, planning and security. Other reasons for failure were that many of the aspects of military provision were only discussed after the peace agreement was signed, and the rebels experienced election defeat (Hill, 2004). It is worth noting that both sides have the possibility to keep weapons, maintain control of their former soldiers and preserve territorial control, meaning that they could cheat. Therefore, DDR is a fundamental element of bargaining power. This provision reduces the uncertainty of actions and intentions during the implementation phase and prevents recidivism because the re-organisation of armies would be costly (B. Walter, 2002, p. 21). As Hartzell (2013) highlights,

power-sharing provisions such as those that mandate the integration of rivals' troops into the state's military make it more difficult for adversaries to return to armed conflict, opposing factions that implement these measures should be more likely to abide by the terms of the bargain they agree to at the war's end. (p. 243)

If the previous argument is upheld, then the inclusion and contents of a DDR provision should affect the duration and success of peace.

This paper relies on an original DDR database compiled for this dissertation, that registers 102 peace negotiation processes during the period from 1975 to 2012 and identifies the three components of DDR and the type of reintegration (military, civil or both). The dependent variable is a dichotomous variable, which registers if the

peace is achieved after 2 or 5 years from the date of signature of a peace agreement between the government and the same rebel group. The key independent variables are the DDR provision, using different combinations of each stage of this provision and the type of reintegration process, which could be civil, military, or both. These variables are dichotomous: 1, if the peace agreement has the DDR (or disarmament, demobilisation, reintegration, military reintegration, social reintegration or both), or 0, in other cases.

A peace negotiation is considered as a set of peace accords which are negotiated between representatives of the government and the rebel group that resulted in compromises involving how to solve the conflict causes, how to manage the consequences of conflict and how to rebuild war-torn societies. Hoddie and Hartzell (2003) identify four different power-sharing provisions in a negotiation settlement: political, territorial, military and economic. The military power sharing is defined as the integration of armed forces into a new common security force. It includes a proportion of each group's former combatants into the new army and the inclusion of rebel leaders into equivalent ranks in the new army (DeRouen, Lea, & Wallensteen, 2009; Hoddie & Hartzell, 2003). In this paper, DDR provision is defined as much broader than military power sharing. Military provision is a process related to security sector reform and military institutions, and DDR is a social, political and economic process based on individuals. This paper therefore defines DDR from the United Nations point of view. It is understood as a path between the end of military life and the journey towards a new start, within a new civil life.

The rest of the paper proceeds as follows. The first section develops a brief overview of why DDR is necessary for durable peace. Opening with a literature review, it lays out five causal mechanisms between the DDR process and the recurrence of war. The second section describes the research design and the dataset. The findings and conclusions are presented in the third and fourth sections.

Literature review: Why does DDR contribute to a lasting peace?

We can theorise that peace in armed conflict is the result of interchange and mutual dissuasion, in which both parties cease fighting while the government gives the rebels some concessions and the rebels must disband (Fortna, 2004b; B. Walter, 2002). However, this definition cannot be totally accepted, because there are cases where DDR is not negotiated or it is negotiated some years later, after the original signing, due to the lack of credibility or security between sides. We need to be mindful that peace negotiations and their agreements operate as a mechanism to solve the roots of conflict, to stop fighting and to maximise the expectations of both parties, in terms of military-political and economic power. For the government, authority and security can be interpreted as necessary to increase its credibility, to achieve the state monopoly of violence and to strengthen its institutions. From the rebel side, power and safety can be understood as political participation,⁶⁶ access to public resources,

⁶⁶ Of the 129 peace agreements by rebel groups analysed in this sample, the groups only transformed into a political party in 50 cases (37%). Source: Dataset.

access to government agencies and security guarantees for its members. Most theories about conflict resolution emphasise that the main difficulty in achieving peace relates to whether the parties can rely on the commitment of the other side. This difficulty is because “The government cannot trust the rebels to end their military campaign once they have been granted concessions [...] Similarly, the rebels cannot trust the government to honour its side of the deal.” (Mattes & Savun, 2009, p. 739). Muggah (2013) has highlighted how

disarmament is an intensely political issue and linked to a widely recognised security dilemma for parties involved in or emerging from armed conflict [...] Without transparent and credible guarantees that the terms of a peace agreement will be enforced, and the security of disarmed parties will be ensured, the rational response is to decline the handing over of armaments or the demobilisation of one’s forces. (p. 34)

In sum, DDR is “a politically driven process, and its success depends on the will of the parties in the conflict to demilitarise after conflict.” (UNDDR, 2014, p. 25) Moreover, it is created as a cost provision which helps to recover the monopoly of violence by the state and to generate and demonstrate trust between parties.

B. Walter (2002) points out that the implementation phase is when many peace processes fail and cooperation between parties collapses, because the accord “creates potentially devastating opportunities⁶⁷ for post-treaty exploitation” (p. 20), and “after the signing of a peace agreement, both sides have incentives to try to renegotiate its

⁶⁷ The possibilities include the occurrence of a surprise attack or being excluded from power after the rebels surrender arms and cede territorial control.

terms [...] changes in the distribution of power between belligerents can provide incentives to return to armed strife” (Kreutz, 2014, p. 355). This means that the possibility of commitment problems appears during the implementation⁶⁸ phase of DDR, because parties are more vulnerable to be annihilated or captured at this time. For example, if the peace agreement only calls for rebels to disband, they are susceptible to attack if the government decides to defect on the deal, because the process implies that they are going to be identified and put into special camps. However, there is the possibility that rebels could hide the best weapons and combatants for reassembly of the rebel group and resume the war, in cases where they think that the government can renege on the deal, or should they not obtain the results and benefits that they want. To avoid this scenario, it is important that the design of the implementation of DDR should be planned and coordinated during the peace talks and its enforcement should start after the signing of the peace agreement. As UNDDR highlights, “DDR programmes are more likely to be successful when planning is integrated and starts early, preferably during peace negotiations” (UNDDR, 2014, p. 57). Also, it is important to secure the involvement of the international community, because its support is essential in financial, logistical and military terms, since the state capacity is too weak at the early stage of post-conflict when both parties need to build trust (Doyle & Sambanis, 2006; Fortna, 2004b; B. Walter, 2002).

⁶⁸ This paper is not focused on implementation, but I used the information collected by Joshi, Regan and Quinn (2015), Jarstad and Nilsson (2008) and Escola de Cultura de Pau for checking how many DDR programmes have been implemented. Of a total of 99 cases, 37 of them had not been implemented, 26 had been partially implemented, 28 had been fully implemented and eight cases were without information (Escola de Cultura de Pau, 2006, 2007a, 2008, 2009; Jarstad & Nilsson, 2008; Joshi, Quinn, & Regan, 2015).

The main objective of this paper is to identify the effect of the inclusion of DDR provision on the subsequent peace stability when the parties have negotiated a peace settlement. There are five existing studies which are focused on the relationship between peace and this “military provision”. First, is the study conducted by Hoddie and Hartzell (2003) which explored the impact of negotiating and implementing military power-sharing⁶⁹ arrangements on peace duration. They used the comparative method with a sample of 16 peace processes from 1980 to 1996. They found “a strong relationship between successful efforts at implementation of military power-sharing and the maintenance of peace” (Hoddie & Hartzell, 2003, p. 313). Following the same logic, DeRouen et al. (2009) studied the relation between costly power-sharing provision to government and the lifespan of the peace agreements. They analysed territorial autonomy and military power-sharing with a stratified Cox duration model and Weibull model and concluded that these provisions have a positive and significant effect on the duration of peace (DeRouen et al., 2009).

In contrast, Sambanis and Glassmyer (2008) estimated logistic and Weibull models for determining the impact of rebel and military integration on peace. They built a dataset featuring 138 peace processes from 1945 to 1999. They conclude that military integration “fails to provide credible security guarantees and that it serves mostly as an economic strategy” Also, military integration does not have a significant effect on peace duration (Glassmyer & Sambanis, 2008, p. 3). Likewise, Haer and Bohmelt (2015) and Krebs and Licklider (2016), using different approaches and perspectives,

⁶⁹ Power-sharing is understood as “rules regarding the distribution of the state’s coercive power among the warring parties” (Hartzell & Hoddie, 2003, p. 320).

have analysed whether military reintegration⁷⁰ or DDR reduces the risk of society's relapse into civil war; both articles conclude that military integration or DDR has no impact on the durability of post-war peace.

In conclusion, the scholarly studies of military power sharing have produced inconclusive or contradictory findings. As mentioned above, military power sharing is the configuration of a new army with the view to integrate entirely or partially the former combatants and legal forces. It is part of the reform of military institutions and security structures designed for consolidation of a post-conflict peacebuilding strategy. In contrast, DDR is a social and civil strategy, which involves transitioning former combatants (rebels and soldiers) from military to civil life or into a new army. This paper is focused on the DDR provision as a social, civil and military strategy for achieving peace; for that reason, I collect the information about what type of reintegration is mentioned in the peace agreement.

The impact of DDR on peace

Undoubtedly, the disarmament, demobilisation and reintegration (DDR) process is a multidimensional and complex mechanism involving political, military, security, humanitarian and socio-economic dimensions which help (re-)build national, regional and local capacities, create a political identity and generate reconciliation and

⁷⁰ Military reintegration “means that combatants from the formerly warring parties – of which there are often more than two – and/or the populations they represent are all included in the state's new national military” (Krebs & Licklider, 2016, p. 99).

reconstruction (W. A. Knight, 2008; UNDDR, 2014). This could be developed for rebels or all parties (rebels and military forces) involved in the conflict. It is considered a key component of the general recovery programme which is linked with security, humanitarian and peacebuilding programmes, such as landmine recovery, small arms control, security sector reform, poverty reduction, economic recoupage and political participation. Its implementation is the responsibility of central government with the involvement of non-state actors (NGOs), civil society organisations, the private sector and the support of the international community.

Maintaining peace after war requires strong cooperation between parties because it is likely that they will have strong incentives to take advantage of each other and many reasons to fear each other. DDR operates on the basis of reciprocity in terms of security and confidence. But for this reciprocity to work, the expected utility of peace and the fulfilment of the agreements must be greater than the cost of war or a breach of the agreements. I argue that there are five mechanisms through which DDR provision might significantly help to increase the expected utility of peace: by preventing the parties from renegeing on the commitment because of the high political cost; by improving the security; by building local capacities and generating community reconciliation through the creation of economic recovery programmes, and by inhibiting recidivism through the generation of employment and income and the development of professional and/or technical skills. These mechanisms suggest that when the peace negotiation proposes to establish the three stages of DDR provision, the greater its impact will be on the peace outcome.

Hypothesis 1: Peace is more likely if the peace agreement includes all three stages of DDR provision.

Every stage of DDR has different challenges and mechanisms, but the effect on durable peace is positive because the entire strategy is focused on improving the quality of life of ex-combatants and their communities using human, social and economic incentives. Özerdem (2002) emphasises that

a DDR programme means investment in the capacity building of human resources and the revitalisation of livelihoods. The time-line for such programmes should be envisaged as much longer than a couple of years [...] every effort should be made to ensure that a closely interwoven relationship exists between DDR strategies and the overall reconstruction process. (p. 972)

Furthermore, a comprehensive DDR strategy seeks to divert military expenditure in war-torn countries which would otherwise expend a high percentage of income on war. Subsequent expenditures can be diverted toward other social sectors, such as education or health, and the recovery of infrastructure.

It is important to highlight, regarding public policy, that disarmament and demobilisation are considered as short-term phases, but disarmament could be long-term if it is expanded to the community level. However, the reintegration phase is a

long-term strategy. This stage means the end of criminal life for rebel combatants and the beginning of civil life.

The first component of a DDR strategy is the disarmament phase. The main objective of this phase is the removal of weapons, ammunition and explosives. This step is highly symbolic for combatants for two reasons: it is the end of their military role, and it is the sign of their willingness for peace. Regarding the peace process and recovery, disarmament suggests there is a level of confidence between parties and communities. Additionally, this phase reduces the capacity of the parties to reassemble the armies and resume armed conflict. The UN suggests that its duration should last no more than 30 days per group (UNDDR, 2014). However, this step could be part of a long-term national strategy for arms reduction and control.

The disarmament can fail as a result of three security risks: operational risk, time delay and technical risk. The disarmament has three operational phases: first, weapons collection; second, storage and management of weapons; ultimately, weapons destruction. The operational decision about how disarmament is going to be implemented could have an impact on the process and the duration of peace, because the illegal armed group could stockpile their best weapons because of their fears concerning the government's inability to fulfil the agreement. This was the situation in Colombia during the disarmament of AUC. OAS, which was the international guarantor, reported the rebirth of a new wave of paramilitaries in Colombia at this time (OAS, 2007).

Hypothesis 2: Including disarmament provisions in a peace negotiation increases the likelihood of peace two (five) years after the peace accord.

The second component is demobilisation. The main objective in this phase is the physical separation of combatants from their armed group; they are cutting formal military relations with their rebel group. Demobilisation is a multifaceted and short-term phase (no more than two months per unit) which includes activities such as registration and documentation of combatants (a census), health screening, counselling and awareness of the challenges of transitioning from military to civil life. The process is completed when the combatants receive documentation that confirms their new social status. It is coordinated by civilians or peacekeepers who give guarantees of equality, security and protection from discrimination. It is a symbolic phase in the peace recovery because it is the end of the rebel structure as an army but the beginning of a new civil and (or) political structure.

The demobilisation phase needs to consider the areas where the former rebels are going to be quartered. There are two types of quartering, static or mobile. Static quarters mean that ex-rebels are held in one place, and they are not allowed to leave. In contrast, those who are mobile have free movement and are able to live on their own. Both options pose critical security challenges; for instance, static quarters can become a focal point for crime (UNDDR, 2014, p. 145) and an easy target for spoilers. Mobile quartering is difficult with regard to control of participants and

security, because ex-combatants are more vulnerable to vendettas. The design of the demobilisation phase needs to consider the minimum standards of living, the supplies and the special needs of ex-combatants, because the lack of appropriate conditions could induce internal security problems such as protests. These security vulnerabilities require attention not only in terms of the management of personal ex-combatant information, but also highlight the need to avoid internal riots and to protect the ex-combatants from external military attacks. The phase between demobilisation and reintegration is called reinsertion, which helps with the immediate and basic needs of the former combatants and their dependents. It is focused on short-term financial allowances but not on (long-term) sustainable income.

Hypothesis 3: Including a demobilisation provision in a peace negotiation increases the likelihood of peace two (five) years after the peace accord.

Hypothesis 4: Including disarmament and demobilisation (DD) provisions in a peace negotiation increases the likelihood that internal armed conflict will not resume in the early phase.

The last phase of the process is called reintegration. The reintegration should be military and/or civil. Military reintegration means that both armed forces could be merged into a new single entity (Glassmyer & Sambanis, 2008; Hoddie & Hartzell, 2003; Krebs & Licklider, 2016). Civil reintegration is the inclusion of former

combatants in communities (Kaplan & Nussio, 2015). Some peace processes decide to develop both types of reinstatement, others incorporate only one type. Of the 81 peace agreements observed with reintegration, 79% have military reintegration, 73% have civil reintegration, and 52% have both options (see Table 24). The challenge, in this phase, is to generate a sustainable reintegration of former rebels into the communities' social life and a new army. This reintegration should be implemented in economic, political and social terms and should include a mix of different programmes, such as psycho-social therapies, vocational programmes and land access. The UN highlights that “failure to produce sustainable reintegration will increase the security risk posed by ex-combatants and the potential for relapse into conflict” (UNDDR, 2014, p. 157).

Table 24: Type of reintegration

	Yes	No
Military Reintegration ⁷¹	62 (78%)	17 (22%)
Civil reintegration	59 (73%)	22 (27%)
Military and civil reintegration	41 (51%)	39 (49%)

Military reintegration can be designed “varying along three dimensions: the magnitude of the integration, the horizontal integration of units, and the vertical integration of the officer corps” (Krebs & Licklider, 2016, p. 99). Civil reintegration can be planned with two approaches: individual and community-based. Both approaches require an understanding of the general context, psycho-social needs,

⁷¹ There is a missing value in this data sample.

capacities and necessities of former combatants and communities. Both have benefits and drawbacks. For example, the community-based reintegration creates a win-win situation, thus avoiding feelings of unfairness, and generates different economic opportunities which could have a positive impact on the development of the host community (Kaplan & Nussio, 2015).

The reintegration phase has two important risks: first, the national economy is devastated, and there is limited access to employment, assets, investment and markets, which can make it too difficult to generate a successful economic reintegration. For that reason, the former combatants are more prone to participate in illicit activities such as drug trafficking, crime and illegal exploitation of natural resources for income.⁷² The second risk concerns the acceptance of former combatants within communities. The presence of ex-combatants could generate vendettas, isolation and rejection by inhabitants. Additionally, the ex-combatants are very vulnerable because they have lost their social support from the rebel organisation. Furthermore, they could suffer mental illness, and these situations tend to generate anti-social behaviours and violence (especially intra-family violence). The socio-economic reintegration of ex-combatants and their families is a long-term process, but if the process is well-designed and implemented, it has a positive impact on peace.

⁷² I estimated four statistical models with interactions between reintegration, military reintegration, civil reintegration and GDP. The results are not statistically significant but in the model with dependent variable, 2 years, the effect is positive. In the model of 5 years, the interaction between military reintegration and GDP is positive but social interaction is negative. These results are relevant to further research on DDR and conflict resolution because they show the relevance of the first two years in a war-torn society.

Hypothesis 5: Including reintegration provisions in a peace negotiation increases the likelihood that the conflict does not resume.

Hypothesis 5a: Including military reintegration provision in a peace negotiation increases the chances that the conflict does not resume.

Hypothesis 5b: Including civil reintegration provision in a peace negotiation increases the likelihood that the conflict does not resume.

Hypothesis 5c: Including both military and civil reintegration provisions in a peace negotiation increases the chances that the conflict does not resume.

In conclusion, the DDR process has distinct perspectives, which are focused on the economic, social, political and security development of former combatants and their host communities. This process and their programmes have become a major part of the reconstruction strategy because it is a way to build confidence between parties, to recover the state monopoly of force and to provide economic and political guarantees. The state and private sector are important actors. The private sector is the main employer, while the state must re-configure its institutions and create legal and physical security. However, one of the challenges for the success of the programme is the implementation phase, because many post-conflict countries are considered as failed states where the central authority is too weak to implement the recovery and the private sector is very hesitant to hire former combatants.

Research design

The main hypothesis is that DDR provision should contribute positively to peace, controlling for other relevant factors such as conflict duration, the presence of other rebels, GDP and political stability. This study employs a logistic regression for the analysis of the impact of DDR in the discrete times (two and five years).

To find out how well DDR works, the dataset uses information on internal armed conflicts, the peace agreement, whether DDR was negotiated and how long peace lasted, and it uses specific control variables. Peace is defined as the absence of war.⁷³ The data was built using three distinct datasets: peace processes with DDR provision, dyadic conflict termination and internal armed conflict. The former was developed as part of this thesis for a study of the determinants of DDR during peace negotiations. This dataset covers peace agreements between 1975 and 2012. The latter two are adapted from UCDP datasets: the UCDP Dyadic dataset (DD), version 1-2015, which is based on the UCDP/PRIO Armed Conflict dataset, but is a disaggregated version by rebel groups, and the UCDP dyadic Conflict Termination Dataset (CTD), version 1-2010.

The dataset includes peace processes by rebel groups that were signed from 1975 to 2012. Each signed peace agreement by rebel group is an observation for the statistical

⁷³ The absence of war is defined as negative peace. The discussion is developed by different authors. See for example Doyle & Sambanis (2006); Richmond (2010, p. 15); Sambanis (2007) and Zartman & Kremeníuk (2005, p. 5).

analysis. The statistical results are performed on cross-sectional data. The dataset excludes wars that were not considered as internal armed conflicts and cases where there was not a peace process. If a peace process started and failed immediately, then it is coded as a peace failure in the first year. Three cases have failed immediately and 30 have failed in less than one year.

For independent variables, this study uses the following datasets: the Peace Agreement Dataset (PAD), version 2-2012; the UCDP dyadic dataset (DD), version 1-2015; the UCDP dyadic Conflict Termination Dataset (CTD), version 1-2010; the Battle Deaths Dataset 1946–2008 (version 3.0); the GDP dataset by Gleditsch (2014, v.6.0); the number of rebel groups by Christia; the democracy duration by Boix, Miller and Rosato (2014) and Polity IV. The subsequent section describes the dependent and independent variables.

Dependent variable

This paper examines the durability of peace and evaluates the effect of the DDR provision on the eventual absence of war after the peace agreement is signed. Some studies of durability or civil war recurrence adjudicated the success or failure of peace by whether the conflict resumed within a certain period. In quantitative research, a common cut-off point is typically one five-year period (Archer and Gartner, 1976) or two five-year periods (Collier and Hoeffler, 2004). For the discrete time route, the cut-off point is two and five years, because the term of two years is average for the

DD phase and the five-year measure is average for a typical DDR process. In many cases, the duration of disarmament and demobilisation is two years, and the reintegration is five years.

The dependent variable is a dichotomous variable, which measures if the conflict ended. Two dichotomous variables were created to measure this fact: one after two years and another five years from the time the peace agreement was signed. The absence of war (peace) was coded as one (1) if the dyad (rebel and government) is not registered in the UCDP/PRIO Armed Conflict dataset. If the war resumes after the peace process, it is coded as zero (0) which indicates peace failure or civil war recurrence. A peace treaty is assumed to mark the beginning of the post-conflict phase. Peace treaty information was determined from two sources: first, the Peace Agreement Dataset (PAD) (Harbom, Högbladh, & Wallensteen, 2006), which registered the date when peace fails. Second, the UCDP Dyadic dataset (DD) (Harbom, Melander, & Wallensteen, 2008), which registered rebel group military activity. These two sources highlight discrepancies because some rebel groups, which had signed the peace agreement, are still active in the conflict, but do not meet the minimal requirement for being considered part of an armed conflict. For that reason, these groups are not in the DD dataset. In those cases, the general principle applied is that if the rebel groups are not in the UCDP/PRIO Armed Conflict (DD dataset), I assume that peace has been achieved. Table 25 demonstrates how the peace fails after

two years in 21% of the cases;⁷⁴ after five years, the peace fails in 17% of cases. See Appendix B – Table 29 for descriptive statistics of the dependent variables.

Table 25: Failure of peace cases

	Failure	Peace
Peace 2 years	26 (21%)	96 (79%)
Peace 5 years	20 (17%)	99 (83%)

Key independent variable

This paper is primarily interested in the effect of the DDR provision on the likelihood of peace failure after parties have signed a peace agreement. Appendix B – Table 30 shows the descriptive statistics of the main independent variables. These variables are binaries and identify if the peace process has a disarmament, demobilisation and reintegration provision. Other variables identify if the peace agreement only mentions or includes the implementation of this provision. The information also includes the type of reintegration negotiated by the parties. The reintegration may be military, civil or both.

⁷⁴ The number of cases that are included in the dataset are as follows: If I use the two years' variable, the dataset has 122 cases for the statistical analysis. If I use the five years' variable, the dataset has 119 cases. There are seven cases which are not included in this analysis because they are signed after 2012.

The DDR process could be considered circuitous, and every stage is connected; therefore, I use the tetrachoric⁷⁵ and Pearson measures to estimate the correlations between the dependent and key independent variables. The results show us that only disarmament has a statistically significant correlation with the two-year variable. Demobilisation has a negative relationship with the two-year variable but a positive correlation with the five-year variable. This result is very logical considering the security situation, since demobilisation requires that the rebels reside in a special place (a military area – cantonment) for a short period (following UNDRR, at no more than three months per group) before they start their reintegration process. Reintegration has a positive relationship with both variables. In conclusion, these figures suggest that the models should omit one of the three key variables due to the high correlation between them. (See Appendix B – Table 31).

Table 26 indicates that 80 cases have demobilisation, 67 have disarmament, and 80 cases have reintegration. Of the total cases, 57 have all three stages. In sum, 28 cases have two stages (disarmament – demobilisation; disarmament – reintegration; demobilisation – reintegration). Additionally, 18 cases have only one stage, and 26 cases do not have DDR provision. Of the cases with three stages of DDR, 82% achieve peace whereas 18% do not. Of the 28 peace agreements with two DDR stages, 85% have reached peace (such as Papua New Guinea – The Bougainville Revolutionary Army (BRA), which has two previous peace accords), and 15% have

⁷⁵ Tetrachoric correlation is “the correlation between two variables that originally arise from a bivariate normal distribution but are only observed as variables that have been dichotomized at some thresholds value, leading to a data set that is simply a 2x2 table of counts” (Everitt & Skrondal, 2010, pp. 427–428)

not (for example, the peace settlement signed between the Chad government and different rebel groups). Finally, of the 18 peace accords with only one DDR stage, 82% have achieved peace (for example, the United Kingdom and The Provisional Irish Republican Army (IRA)), and 18% have not (such as Lebanon and Forces of Michel Aoun; Mali and Arab Islamic Front of Azawad (FIAA)). To conclude, of the 101 cases with a DDR provision, 66.33% reached peace, but 33.66% did not; in contrast, 54% of the cases without DDR achieved peace although 46% did not.

Table 26: Contingency table

		Disarmament			
		Yes		No	
		Demobilisation			
		Yes	No	Yes	No
Reintegration	Yes	57 (44,18%)	9 (6,97%)	9 (6,97%)	5 (3,87%)
	No	10 (7.75%)	9 (6,97%)	4 (3,10%)	26 (20,15%)

Control variable

DDR provisions are clearly not the unique, influential factor in determining peace failure. I also need to control for other factors that are likely to affect the failure of peace. Different research has determined those control variables and the study by Doyle and Sambanis (2006) produced one of the most interesting results. The authors developed a model of peacebuilding, which has been used and modified by later

research. This model proposed that three dimensions determine the post-conflict circumstances: hostility, local capacity and international capacity. They used different proxies for each dimension and concluded that higher income, lower dependence on natural resources and less fractionalization of society reduce the risk of a new war. Ethnic wars are much more likely to have peacebuilding failure due to persisting claims over sovereignty. Economic growth and development are the critical determinants of a low risk to return to civil war (Doyle & Sambanis, 2006). Another example is the work developed by Hartzell, Hoddie and Rothchild (2001). They demonstrated that the duration of peace is longer when a peace agreement includes the national autonomy provision and the support of third parties, because these provisions not only suggest a compromise but also offer security assurances among parties⁷⁶ (Hartzell, Hoddie, & Rothchild, 2001, p. 187).

In summary, the factors identified by this literature can be classified into four sets: characteristics of the conflict, local capabilities, third-party mediation and power-sharing agreements. Therefore, this study⁷⁷ measures the intensity⁷⁸ of conflict by using two variables. First is the number of years that the conflict by rebel group is active. This duration reflects the longevity of armed conflict. The second variable is the number of deaths, which reveals the intensity of the armed conflict. In both

⁷⁶ See also Cochrane (2008); Doyle & Sambanis (2006); Fortna (2004a, 2004b); Gurses et al. (2008); Hartzell (1999, 2014, 2014); Hartzell & Hoddie (2003); Kreutz (2010, 2014); Sambanis (2007); Stedman et al. (2002); Svensson (2014) and B. Walter (1997, 2002, 2009).

⁷⁷ Since the study is cross-sectional I created new variables which use the last information registered in the original dataset to reduce missing values.

⁷⁸ I estimated the same models using the battle-deaths (from the Battle Deaths Dataset 1946–2008 (version 3.0)), but the variables were not statistically significant and due to my sample size being small I decided to remove this variable in the final models. For further research, it is important to include this variable as well as displacement.

variables, high values indicate that the armed conflict is costly, and this should make peace less probable. However, Glassmyer and Sambanis (2008) highlight that “war duration [...] has an ambiguous effect: long wars can make signing a peace agreement more likely as victory seems unlikely, but they can also make peace-building harder if longer wars also result in greater hostility and more damage” (p. 368).

The presence of spoilers⁷⁹ is defined as the presence of other rebel groups. It is a binary variable, which registers if the conflict is on-going with another group. For robustness, I estimate some models using the multiparty definition developed by Christia: “civil wars in which there are three or more major domestic combatant groups” (Christia, 2012, p.11). I also utilised information about the maximum number of rebel groups by conflict and the number of rebel groups by conflict-year. The presence of a greater number of spoilers should make peace less probable, but if the negotiation includes other groups the probability of peace is more probable. I measure local capacities with the most acceptable socio-economic indicator: gross domestic product (GDP). I use total real GDP per capita (2005 prices), which is collected and expanded by Gleditsch (2014, v.6.0). A high socio-economic indicator should increase the likelihood of peace. The democratic institutions are also measured by the duration of the regime and the type of regime. Appendix B – Table 30 displays the descriptive statistics of those variables.

⁷⁹ Spoilers are defined as “one (as a political candidate) having little or no chance of winning but capable of depriving a rival of success” (Mish, 2004, p.1,206; Stedman, 1997).

Empirical findings⁸⁰

For these models, the dependent variable is peace (0: the war resumes; 1: the war does not resume). I calculate the models with disarmament, demobilisation and reintegration as a key independent variable. I also estimate models with other variables, such as civil or military reintegration, a variable that registers if the peace process utilised both civil and military reintegration simultaneously. Other variables include at least one stage of DDR, or only disarmament and demobilisation. In Appendix D, I present other models which include certain provisions such as peacekeeping, sharing government and the creation of a political party. I also control by the presence of mediators, previous peace agreements and other forms of interactions.

The logistic regressions of peace on the main variables without other co-variables (model 1, model 2 and model 3: two years and five years) reveal the following results. On disarmament, a non-significant positive relationship: peace is more likely to be achieved when the peace agreement includes this provision. On demobilisation, a non-significant positive correlation: peace is more likely to be achieved when demobilisation has been negotiated. On reintegration (model 4 is estimated with civil

⁸⁰ One of the concerns in all fields of empirical political science is “sample selection bias” This means a non-random sample affected the properties of conventional estimators. This study is based on a dataset which is a convenience sampling; in other words, this dataset is non-probability sampling and this type of sample is useful for pilot testing. The DDR dataset does not collect data on the presence of a DDR process in the cases of a military victory or low activity, or in the case of hidden agreements or DDR provision without negotiation. In the future, the dataset should be extended to different types of conflict resolutions (Adkins & Hill, 2011; Stock & Watson, 2015; Wooldridge, 2010).

and military reintegration), a significant positive relationship. These results are displayed in Table 27 and Table 28.

According to these results, I could accept hypothesis 1, 2, 5a, 5c and reject hypothesis 3 and 5b (because the results are not statistically significant). However, to evaluate the real effect of DDR, we also need to control for other factors that are likely to influence the chance of conflict recurrence. Model 5 and Model 6 show the results: on disarmament, the relationship is negative and non-significant. On demobilisation, the relationship is also negative and non-significant. On the reintegration, military reintegration and simultaneous reintegration, the models show us a positive and statistically significant relation; however, civil reintegration presents a negative and non-significant relation. The other factors, such as the duration of the conflict, conflict with other rebels, GDP per capita, and length of political regime, are statistically significant, and several kinds of literature corroborate these relationships. In sum, in the presence of other factors, the most important variable for achieving peace (in a statistical sense) is the reintegration phase and this result is stable when I control by other provisions (see models in Appendix D). Figure 10 shows that the probability of peace is increased by 37 percentage points in the two-years model (or 35 percentage points in the five-years model) if the process included reintegration or military reintegration but decreased by three percentage points if civil reintegration is included. Additionally, if the peace agreement includes civil and military reintegration, the likelihood of peace increases by 17 percentage points.

I also calculate the predicted probability for model 5 and model 6 (see Appendix C). Figure 11 and Figure 12 in Appendix C show the predicted probabilities of peace when disarmament and demobilisation take values from 0 to 1. The negative effect of these variables is shown by the increasingly small probabilities. I can see that the probabilities decrease if the process has or does not have disarmament (or demobilisation). The graph (disarmament and demobilisation) shows that the confidence interval is wide in the possible scenarios. Bear in mind that these variables are not statistically significant in the models.

The graph of reintegration (military and civil) (from 0 to 1) shows that the confidence interval is narrow, and the probability increases slightly. Analysing these results, we can see that military reintegration has an important role in the reintegration of former combatants. The variables are statistically significant in the models.

In conclusion, the statistical models demonstrate that DDR is an important provision to achieve peace. When the process is divided into stages, I can see that the reintegration, especially military reintegration, has a positive impact due to the long process involved, which develops different programmes focusing on generating new opportunities. In other words, the reintegration is going to change the individual incentives for preferring a civil life over war. This research presents new findings, compared with previous work, because it is based on the disaggregation of DDR, while other studies simply use one variable. I show that not all peace agreements have a complete DDR strategy, which is another distinctive quality of this research.

Table 27: Effects of DDR on Peace (dependent variable: Peace after two years of PA)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6	(7) Model 7	(8) Model 8	(9) Model 9
Disarmament	0.300 (0.504)				-0.353 (0.480)	0.0890 (0.463)	-0.0704 (0.475)		
Demobilization		0.531 (0.590)			-0.488 (0.687)	-0.0961 (0.826)	0.0950 (0.641)		
Reintegration			1.547*** (0.550)		1.984*** (0.529)				
Military reintegration				2.111*** (0.602)		2.123*** (0.594)			
Civil reintegration				-0.291 (0.653)		-0.286 (0.715)			
Military and Civil reintegration							0.989* (0.568)		
Disarmament and Demobilization								0.458 (0.553)	
At least one stage of DDR									1.150* (0.600)
Real GDP per capita	0.0408** (0.019)	0.0473** (0.024)	0.0548** (0.024)	0.0851** (0.041)	0.0488** (0.023)	0.0847** (0.042)	0.0631* (0.034)	0.0432** (0.020)	0.0480** (0.022)
Duration of conflict (ln)	-1.137*** (0.268)	-1.139*** (0.277)	-1.224*** (0.349)	-1.335*** (0.341)	-1.279*** (0.338)	-1.337*** (0.344)	-1.299*** (0.316)	-1.156*** (0.290)	-1.091*** (0.289)
Conflict with other rebels	-0.920* (0.533)	-0.964** (0.490)	-1.362*** (0.424)	-1.501*** (0.507)	-1.564*** (0.462)	-1.485*** (0.524)	-1.085** (0.491)	-0.902* (0.530)	-0.942* (0.490)
Ln year of current regime	-0.386* (0.200)	-0.399* (0.206)	-0.397** (0.189)	-0.438* (0.227)	-0.366** (0.184)	-0.439* (0.229)	-0.374* (0.214)	-0.385* (0.203)	-0.447** (0.208)
Constant	4.983*** (0.988)	4.866*** (0.974)	4.686*** (0.988)	5.100*** (1.094)	5.174*** (1.108)	5.098*** (1.235)	5.138*** (1.075)	4.941*** (0.946)	4.350*** (1.078)
Observations	122	122	122	122	122	122	122	122	122
Cluster	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel
Pseudo R-squared	0.195	0.200	0.257	0.294	0.266	0.294	0.218	0.199	0.219
Wald chi2	31.10	27.87	26.54	30.13	38.70	30.55	25.52	29.87	25.90
Prob > chi2	8.94e-06	3.86e-05	7.01e-05	3.71e-05	2.23e-06	0.000169	0.000614	1.57e-05	9.33e-05

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.

Table 28: Effects of DDR on Peace (dependent variable: Peace after five years of PA)

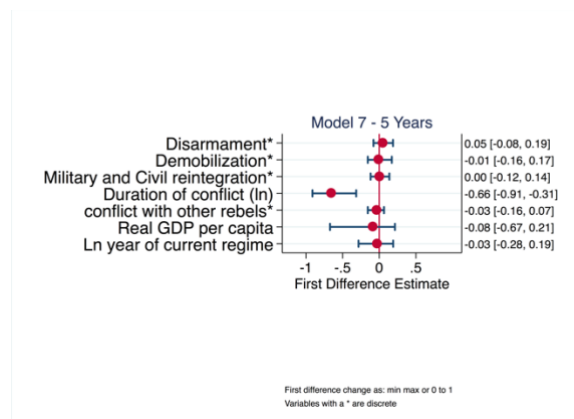
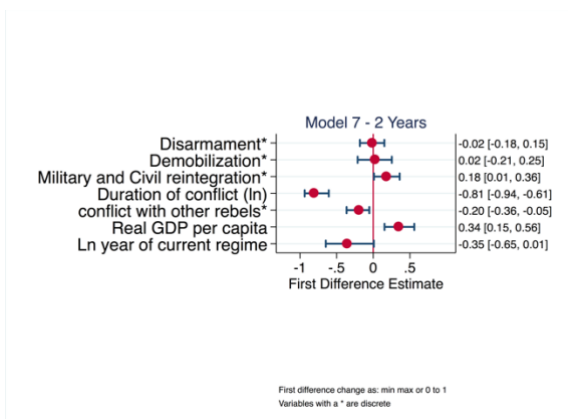
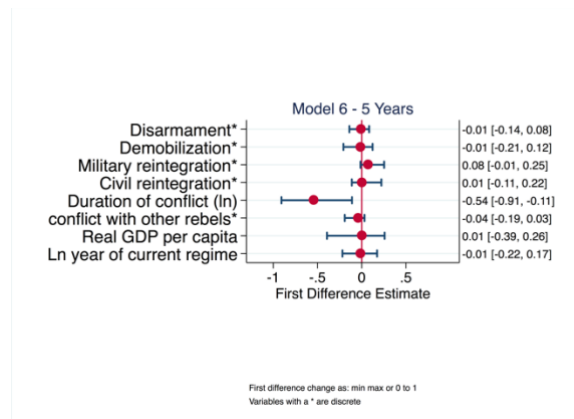
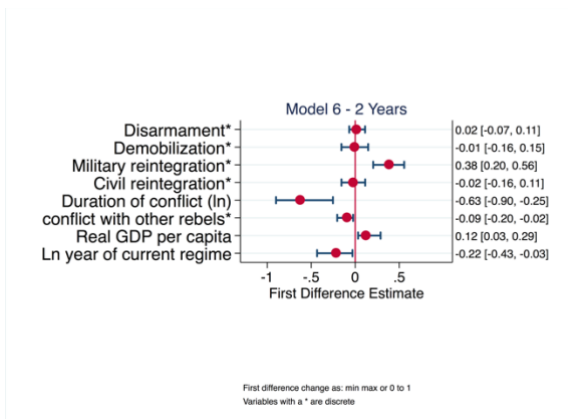
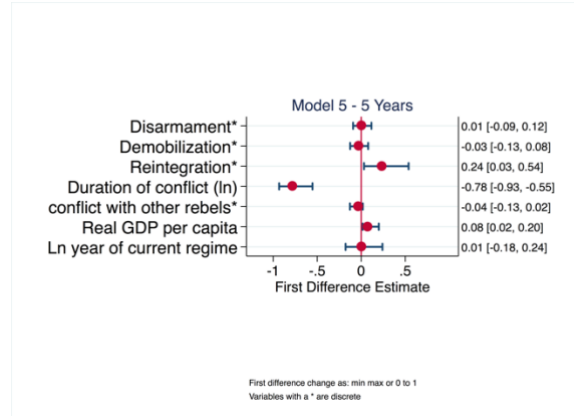
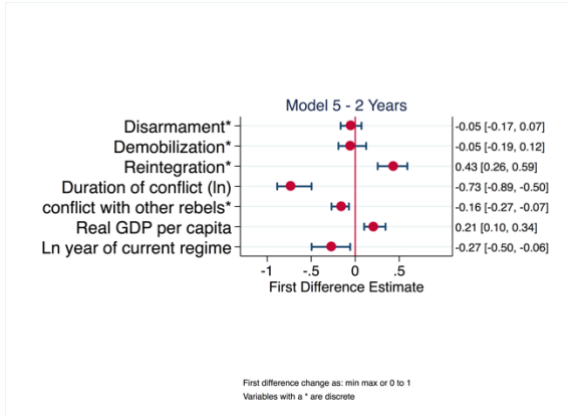
VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6	(7) Model 7	(8) Model 8	(9) Model 9
Disarmament	0.323 (0.559)				0.0323 (0.781)	0.149 (0.727)	0.443 (0.625)		
Demobilization		0.0745 (0.687)			-0.887 (1.079)	0.126 (1.056)	-0.171 (0.864)		
Reintegration			0.720 (0.602)		1.716** (0.737)				
Military reintegration				0.496 (0.593)		0.772 (0.584)			
Civil reintegration				0.0446 (0.611)		-0.396 (1.072)			
Military and Civil reintegration							-0.0484 (0.714)		
Disarmament and Demobilization								-0.0211 (0.686)	
At least one stage of DDR									0.602 (0.618)
Real GDP per capita	0.00474 (0.014)	0.00516 (0.015)	0.00655 (0.016)	0.00774 (0.015)	0.0480* (0.027)	0.00837 (0.016)	0.00341 (0.016)	0.00458 (0.015)	0.00417 (0.014)
Duration of conflict (ln)	-1.433*** (0.390)	-1.444*** (0.382)	-1.436*** (0.400)	-1.442*** (0.406)	-1.900*** (0.539)	-1.479*** (0.447)	-1.442*** (0.397)	-1.450*** (0.388)	-1.382*** (0.382)
Conflict with other rebels	-0.356 (0.629)	-0.438 (0.632)	-0.549 (0.530)	-0.495 (0.550)	-0.615 (0.625)	-0.370 (0.679)	-0.349 (0.633)	-0.456 (0.666)	-0.353 (0.594)
Ln year of current regime	-0.0643 (0.220)	-0.0574 (0.222)	-0.0619 (0.219)	-0.0628 (0.219)	-0.00389 (0.260)	-0.0497 (0.223)	-0.0604 (0.220)	-0.0542 (0.219)	-0.0732 (0.224)
Constant	4.922*** (1.237)	5.133*** (1.325)	4.791*** (1.190)	4.939*** (1.215)	5.655*** (1.609)	4.910*** (1.454)	4.990*** (1.381)	5.213*** (1.244)	4.566*** (1.300)
Observations	119	119	119	119	117	118	119	119	119
Cluster	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel
Pseudo R-squared	0.221	0.218	0.232	0.225	0.315	0.242	0.221	0.218	0.225
Wald chi2	16.25	16.86	18.54	17.21	19.14	15.43	16.20	17.05	16.64
Prob > chi2	0.00617	0.00478	0.00234	0.00856	0.00776	0.0513	0.0234	0.00440	0.00524

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 10: First difference estimates

Two years after PA was signed

Five years after PA was signed



Discussion and conclusion

This paper seeks to answer if the negotiation of a DDR provision, in internal armed conflict settlements, prevents the recurrence of war in the post-conflict scenario. The literature review helps us to identify different ways through which this provision might achieve peace, because DDR is not only a political process but it also a socio-economic process. The process is one of the requirements for consolidation of peace⁸¹ because it is considered as a bridge between the military and/or illegal status and civil life. I found that not all peace agreements have this type of provision; sometimes the DDR is partially negotiated, which means that the agreement only includes one or two steps, or it remains unclear how the government will implement it. I also found that reintegration (military and civil) has a positive relationship with peace. This is a logical result bearing in mind that the reintegration phase is the stage which includes professional training and psychological treatments for adapting the former combatants to life within civil society.

I also highlight the fact that the literature concerning this topic has produced contradictory findings. The most important reason for this outcome is the different approaches to defining and measuring DDR. For this research, I only use an identification variable based on whether the peace agreement contains the provision or

⁸¹ “DDR is meant to address [...]: ensuring that armed groups that have prospered during the active phase of hostilities do not return to the battlefield or find other ways of undermining local and international efforts to build lasting peace, and to do so by finding ways of integrating ex-combatants into the social, economic, and political life of post-war society” (Berdal & Ucko, 2009, p. 2).

not and if so, which stage(s); in other words, I determine if the peace agreement has a completed or partial DDR. Further research needs to analyse the level of implementation of the accords, because literature argues that it is during this phase when many peace agreements have failed. There have been remarkable advances in this area of study; for example, see the investigations by Joshi, Regan and Quinn (2015), Jarstad and Nilsson (2008) and Escola de Cultura de Pau.

The review of the impact of DDR helps us to identify the vulnerabilities and challenges present within each stage. Demobilisation is a critical phase because the rebels are very vulnerable if this phase fails; at this time, the possibility of different conflicts, such as riots or protests, or even the resumption of conflict is high. This was the case in Mozambique, where a register recorded 317 incidents arising for various different reasons (Striuli, 2012). The statistical models suggest a negative but not statistically relevant relationship with peace. However, disarmament is a fundamental element for the stability of peace. This stage is important because it reduces the stock of weapons in the society. However, it is a very vulnerable phase because in many cases there is evidence that the amount of weaponry collected, and its serviceability, is very low and the “best arms” are kept for commanders or combatants, as in the Mozambique, Nicaragua and El Salvador cases. The models may conclude that disarmament has a positive but not statistically significant relationship. These results, from my point of view, are entirely reasonable because disarmament and demobilisation are, in many cases, the short-term stages.

The reintegration phase is a long-term programme, but it is important to bear in mind that in some cases the disarmament process could also be long-term. The statistical models in this paper help us to conclude that disarmament and reintegration (civil and military) have a positive and statistical relationship with peace. I also estimated the effect by controlling for other factors. These models conclude that reintegration is the most important stage to achieve peace. If the peace negotiation has a clear mandate about how the process is going to develop, the rebels are going to be more confident about the guarantees and their future. The reintegration strategy develops different programmes to improve not only the quality of life of the ex-combatants, but also the quality of life of the hosting communities. However, when I disentangle the programme of civil and military reintegration, the statistical models suggest that when the parties develop a military reintegration peace is more achievable, because this type of reintegration could give the rebels more confidence about the process than social reintegration, where they would need to find not only economic stability (a job) but also social acceptance.

This paper has sought to expand our understanding of the relationship between DDR provision and peace. The findings suggest that including DDR in a peace agreement, especially the reintegration programme, has a significant positive impact on the peace and shows evidence of the importance of military reintegration in the process of peace consolidation. Therefore, this research implies that the policy community, at the international and national level, should think carefully about the scope of negotiation and implementation of this provision so as not to generate a high expectation that cannot be

achieved. This paper serves as an invitation for researching this topic and its different interrelationships in more detail. For further research, many other important questions remain to be solved.

Appendix A: Dataset for DDR analysis

Dependent variable

1. Failure of peace variable:

It is a dummy variable. The dependent variable measures if the conflict was ended after the peace agreement was signed. Source: UCDP dyadic dataset and UCDP dyadic Conflict Termination Dataset.

0. No

1. Yes

- Peace 2 year: The peace was achieved after two years.
- Peace 5 year: The peace was achieved after five years.

2. Duration of Peace:

It is the time (in years) between the termination of conflict and the start of another war between the same parties.

Description of co-variables

1. DURATION: Time elapsed in years of conflict. It is based on Startdate and EpEnd. Source, UCDP dyadic dataset and UCDP dyadic conflict termination dataset. Transformation: $\ln_duration_1: \ln(\text{Duration}_1 + 1)$
2. MAX OF REBEL FORCES: It is the maximum number of rebel groups in every conflict. Source, UCDP dyadic dataset. I also create the variable SUM_SB which is the number of rebel groups by conflict-year.
3. MULTIPARTY CIVIL WAR: Source, Christia. “Civil wars in which there are three or more major domestic combatant groups.”
4. NWG_P: Previous number of warring groups – Maximum number of Warring groups by Christia.
5. DEMOCRACY DURATION: Source, Boix, Miller, and Rosato. “The number of consecutive years the country has had the same regime type.”
6. GDP: Source, Gleditsch. Version 6.0 BETA (9 September 2014). Transformation: natural logarithm and division by thousand.

Appendix B: Statistical Test – main models

Descriptive statistics

Table 29 and Table 30 show the descriptive statistics of the independent and control variables.

Table 29: Descriptive Statistics – Dependent Variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) Min	(5) max
Peace 2 year	122	0.786	0.411	0	1
Peace 5 year	119	0.832	0.375	0	1

Table 30: Descriptive Statistics – Key Independent Variable and co-variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Disarmament	129	0.659	0.476	0	1
Demobilization	129	0.620	0.487	0	1
Reintegration	129	0.620	0.487	0	1
Military reintegration	128	0.500	0.502	0	1
Civil reintegration	129	0.457	0.500	0	1
Military and Civil reintegration	129	0.318	0.467	0	1
At least one stage of DDR	129	0.791	0.408	0	1
Disarmament and Demobilization	129	0.519	0.502	0	1
DDR stages	129	1.891	1.187	0	3
Real GDP per capita	129	10.07	23.62	0.0300	150.6
Duration of conflict (ln)	129	1.805	1.092	0	4.025
Conflict with other rebels	129	0.682	0.467	0	1
Ln year of current regime	129	2.966	1.262	0	5.283
Peacekeeping operation	114	0.351	0.479	0	1
Regime, 2 years before PA	102	0.941	0.830	0	2
Third party	115	0.765	0.426	0	1
Sharing Government	115	0.252	0.436	0	1
Political Party	129	0.388	0.489	0	1
Previous PA failure by conflict	129	0.457	0.500	0	1

Correlation

Table 31 displays the correlation between the key variables. I calculate two types of correlation. The first is called a tetrachoric correlation. It is used to measure rater agreement for binary data. The results show us that there is only a weak association between peace after two years of signature and each stage of DDR. The association between the variable after five (5) years is still weak. The Pearson correlation corroborates these results.

Table 31: Pearson and Tetrachoric correlation

	2 years peace		5 years peace		Disarmament		Demobilization		Reintegration		Military reintegration	
	Pearson	Tetrachoric	Pearson	Tetrachoric	Pearson	Tetrachoric	Pearson	Tetrachoric	Pearson	Tetrachoric	Pearson	Tetrachoric
Disarmament	0.1945*	0.3125*	0.0938	0.1567	1	1						
Demobilization	-0.0005	-0.0009	0.0364	0.0612	0.5344*	0.7461*	1	1				
Reintegration	0.1024	0.1674	0.0727	0.1217	0.5033*	0.7126*	0.5370*	0.7479*	1	1		
Military reintegration	0.0945	0.1538	0.1197	0.1994	0.2826*	0.4379*	0.4321*	0.6391*	0.7365*	0.9437*	1	1
Civil reintegration	0.0991	0.1632	0.0403	0.0679	0.5440*	0.7936*	0.5975*	0.8459*	0.7194*	1.0000*	0.3877*	0.5748*

Multicollinearity

Table 32 summarises the variation inflation factors (VIFs) of the control variables. Note that none of the variables have a VIF above 5, indicating that the controls do not present multicollinearity problems.

Table 32: Multicollinearity

	Model G1	Model G2
	VIF	VIF
Disarmament	1,41	1,51
Demobilisation	1,59	1,94
Reintegration	1,60	
Military Reintegration		1,43
Civil reintegration		1,85
Real GDP per capita	1,16	1,24
Conflict duration	1,07	1,11
Spoilers	1,32	1,25
Regime duration	1,22	1,24

Diagnostics test

Table 33 summarises the specification test, goodness of fit, classification, influential observation and coefficient sensitivity. Those tests reveal some influential cases; I estimate the models without these cases. The results do not present important changes.

Table 33: Other statistical tests

	Model 1 (2 years)	Model 1 (5 years)	Model 2 (2 years)	Model 2 (5 years)
Specification	Hat: significant	Hat: significant	Hat: significant	Hat: significant
Error: link test	Hat^2: no significant	Hat^2: no significant	Hat^2: no significant	Hat^2: no significant
Goodness of fit: Hosmer and Lemeshow's test	The test indicates that the model does not fit the data well	The test shows that the model fits the data well	The test indicates that the model fits the data well	The test indicates that the model fits the data well
Estat classification	81,97%	88,24%	78,69%	85,71%
Influential observations	The graph identifies Ivory Coast as an influential case; I estimate a new model without this case, but the result is similar.	The graph analysis identifies 7 cases. I estimate a new model without those cases, but the result is similar. The final model is estimated without INDIA – ATTF (1993) and SOMALIA – USC (1994).	The graph analysis identifies 6 cases. I estimate a new model without these cases, but the result is similar.	The graph analysis identifies 11 cases. I estimate a new model without those cases, but the result is similar. The final model is estimated without CHAD – MDJT (2002).
Coefficient sensitivity	No cases	The graph analysis identifies 3 cases.	The graph analysis identifies 3 cases.	The graph analysis identifies 4 cases.

Appendix C: Predict probabilities by control variables

I use the command 'prgen' to generate the predict probabilities and to plot the confidence intervals. The probabilities are calculated from min to max ranges of the key variable and the mean of other variables. The results are shown in Figure 11 and Figure 12.

Figure 11: Predicted probabilities of Peace by key variables. (2 years peace)

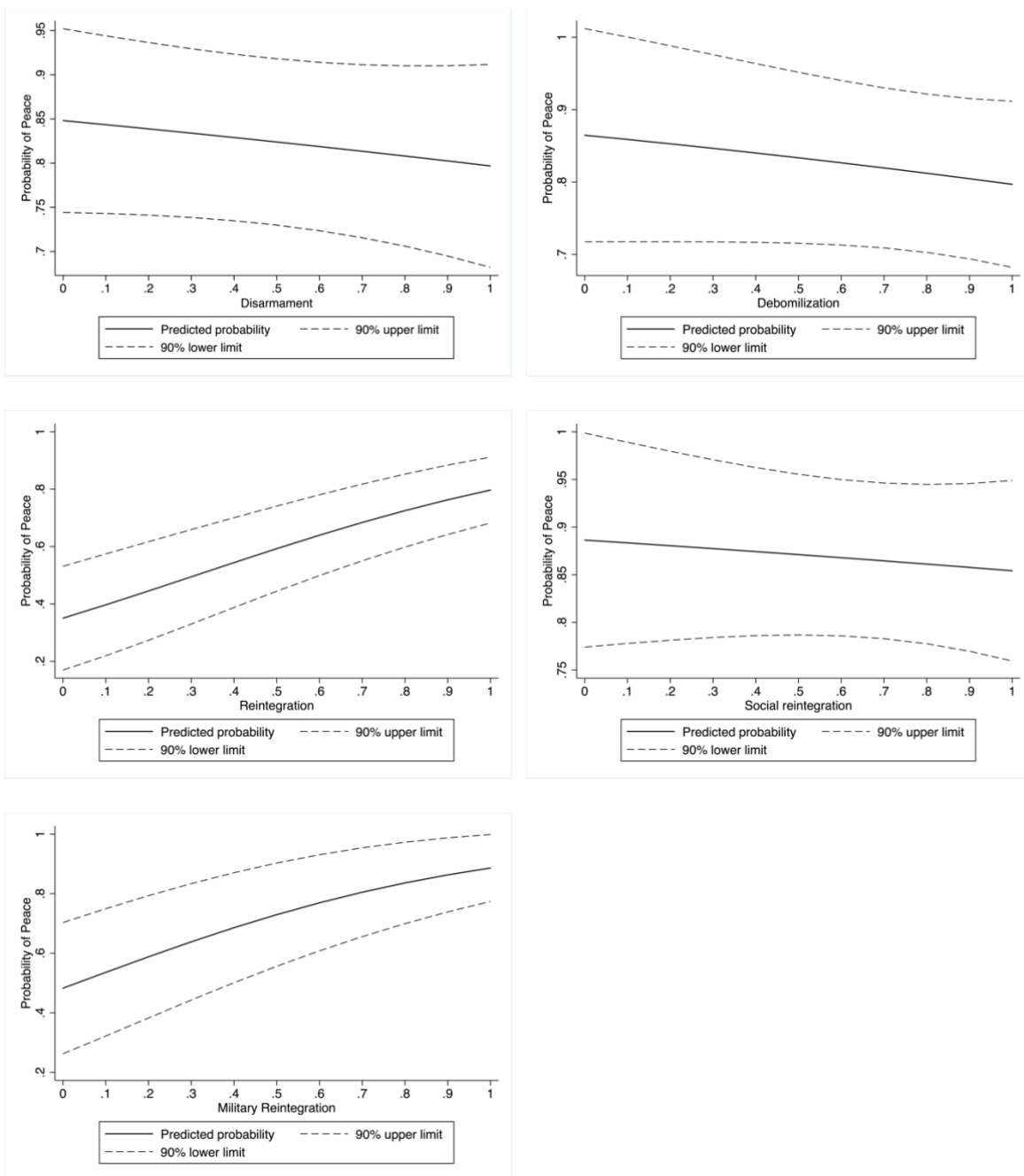
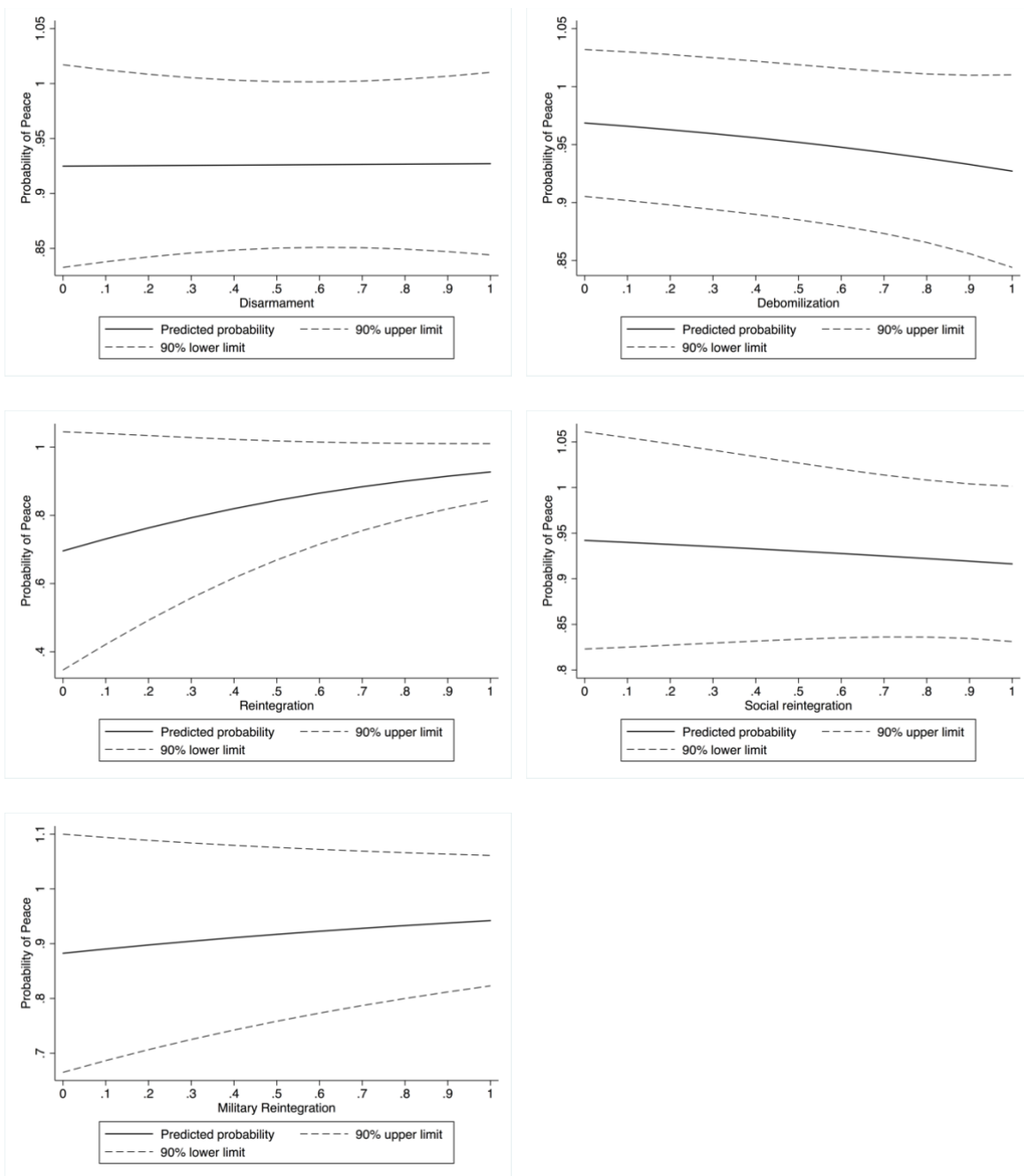


Figure 12: Predicted probabilities of Peace by key variables. (5 years peace)



Appendix D: Other models

Table 34: Effects of DDR on Peace (dependent variable: Peace after two years of PA)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Disarmament = 1, Yes	0.820 (0.775)	0.662 (0.687)	0.799 (0.691)	0.306 (0.645)	0.614 (0.732)	0.189 (0.579)
Demobilization = 1, Yes	0.271 (1.069)	-0.452 (0.955)	-0.777 (1.094)	-0.817 (0.759)	-0.574 (0.916)	-0.669 (0.714)
Reintegration = 1, Yes	1.829 (1.137)	1.796** (0.751)	2.403** (0.934)	1.432** (0.688)	2.024*** (0.757)	1.830*** (0.571)
Real GDP per capita	0.116 (0.077)	0.0425** (0.021)	0.0442** (0.019)	0.0505** (0.023)	0.0548** (0.026)	0.0488** (0.022)
Duration of conflict (ln)	-2.433*** (0.913)	-1.765*** (0.449)	-1.714*** (0.466)	-1.421*** (0.384)	-1.787*** (0.447)	-1.442*** (0.372)
Conflict with other rebels = 1, Yes	-3.186** (1.354)	-1.891*** (0.557)	-1.882*** (0.639)	-1.636*** (0.503)	-1.945*** (0.564)	-1.740*** (0.532)
Ln year of current regime	-1.222** (0.519)	-0.622*** (0.233)	-0.654*** (0.238)	-0.564** (0.256)	-0.599** (0.244)	-0.548** (0.257)
Previous PA failure by conflict = 1, Yes	1.566* (0.851)	1.869*** (0.573)	1.888*** (0.586)	0.791 (0.714)	1.870*** (0.590)	1.367** (0.644)
PeaceKeeping	-0.143 (1.060)	-0.370 (0.564)	0.496 (1.096)		-0.494 (0.562)	
Regime, 2 years before PA = 1	1.612 (1.586)					
Regime, 2 years before PA = 2	1.747 (1.236)					

Table 34: Effects of DDR on Peace (dependent variable: Peace after two years of PA) (continuation)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Third party = 1, Yes	-0.887 (1.499)	-0.961 (1.054)	-0.795 (1.020)			
Sharing Government = 1, Yes	-2.459** (1.078)					
Political Party = 1, Yes	3.516*** (1.201)					
Reintegration # PeaceKeeping			-1.298 (1.369)			
Reintegration # Previous PA failure				0.982 (1.006)		
Constant	8.408** (3.307)	6.869*** (1.650)	6.467*** (1.749)	5.640*** (1.356)	6.036*** (1.241)	5.463*** (1.258)
Observations	89	114	114	122	114	122
Cluster	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel
Pseudo R-squared	0.547	0.370	0.378	0.310	0.361	0.304
Wald chi2	31.79	42.44	44.54	33.76	36.41	37.06
Prob > chi2	0.00428	6.26e-06	5.86e-06	9.86e-05	3.35e-05	1.12e-05

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 35: Effects of DDR on Peace (dependent variable: Peace after two years of PA)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Disarmament = 1, Yes	0.840 (0.945)	1.229 (0.817)	0.753 (0.826)	0.824 (0.704)	1.184 (0.831)	0.886 (0.576)
Demobilization = 1, Yes	0.754 (1.250)	0.0895 (1.251)	-0.354 (1.168)	-0.377 (0.949)	0.0292 (1.292)	-0.323 (0.953)
Military reintegration = 1, Yes	2.031 (1.293)	2.198*** (0.754)	0.816 (0.908)	2.177** (0.881)	2.341*** (0.766)	2.111*** (0.686)
Civil reintegration = 1, Yes	0.0630 (1.813)	-0.533 (0.958)	1.424 (1.322)	-0.853 (0.894)	-0.453 (0.967)	-0.354 (0.843)
Real GDP per capita	0.127* (0.070)	0.0667* (0.040)	0.0689 (0.059)	0.0776** (0.039)	0.0876* (0.046)	0.0838* (0.046)
Duration of conflict (ln)	-2.570*** (0.931)	-1.979*** (0.490)	-2.593*** (0.733)	-1.727*** (0.452)	-2.002*** (0.490)	-1.721*** (0.420)
Conflict with other rebels = 1, Yes	-2.928** (1.274)	-1.850*** (0.602)	-2.175*** (0.650)	-1.601** (0.666)	-1.902*** (0.625)	-1.633*** (0.626)
Ln year of current regime	-1.232** (0.604)	-0.779** (0.350)	-0.652* (0.360)	-0.810** (0.370)	-0.733** (0.352)	-0.796** (0.360)
Previous PA failure by conflict = 1, Yes	1.382 (1.033)	1.736*** (0.626)	1.767** (0.705)	1.117 (0.751)	1.754*** (0.653)	1.630** (0.664)
PKO_1 = 1	-0.476 (1.051)	-0.926 (0.677)	-0.680 (0.823)		-1.010 (0.662)	
Third party = 1, Yes	-0.514 (1.594)	-0.969 (1.167)	-2.027 (1.824)			

Table 35: Effects of DDR on Peace (dependent variable: Peace after two years of PA) (continuation)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Regime, 2 years before PA = 1	0.722 (1.763)					
Regime, 2 years before PA = 2	1.158 (1.175)					
Sharing Government = 1, Yes	-2.095* (1.180)					
Political Party = 1, Yes	3.446*** (1.098)					
Militar R # PeaceKeeping			5.047*** (1.929)			
Civil R # PeaceKeeping			-4.364** (1.896)			
Militar R # Previous PA failure				-0.526 (1.536)		
Civil R # Previous PA failure				1.667 (1.486)		
Constant	8.506** (3.617)	7.627*** (2.377)	9.957*** (3.623)	6.603*** (1.899)	6.645*** (1.652)	6.224*** (1.654)
Observations	88	113	113	119	113	119
Cluster	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel
Pseudo R-squared	0.554	0.402	0.479	0.384	0.393	0.371
Wald chi2	41.33	25.85	32.70	26.47	22.27	27.70
Prob > chi2	0.000285	0.00684	0.00189	0.00552	0.0138	0.00107

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 36: Effects of DDR on Peace (dependent variable: Peace after five years of PA)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Disarmament = 1, Yes	-2.617* (1.358)	0.673 (0.744)	0.616 (0.807)	0.618 (0.712)	0.722 (0.742)	0.576 (0.683)
Demobilization = 1, Yes	4.889** (1.921)	-0.240 (0.962)	-0.142 (0.967)	-0.946 (0.922)	-0.711 (0.921)	-0.869 (0.889)
Reintegration = 1, Yes	4.036*** (1.431)	0.529 (0.960)	0.349 (0.978)	0.598 (0.852)	0.899 (0.803)	0.931 (0.742)
Real GDP per capita	-0.101*** (0.030)	0.000897 (0.019)	0.00124 (0.019)	0.00274 (0.018)	0.00426 (0.018)	0.00365 (0.017)
Duration of conflict (ln)	-5.148*** (1.682)	-1.648*** (0.508)	-1.682*** (0.487)	-1.546*** (0.435)	-1.630*** (0.465)	-1.581*** (0.429)
Conflict with other rebels = 1, Yes	-4.207** (1.644)	-0.845 (0.643)	-0.881 (0.664)	-0.590 (0.654)	-0.760 (0.670)	-0.661 (0.676)
Ln year of current regime	-0.892 (0.991)	-0.0175 (0.258)	-0.0257 (0.265)	-0.124 (0.225)	-0.0326 (0.261)	-0.112 (0.231)
Previous PA failure by conflict = 1, Yes	3.611* (2.040)	0.695 (0.531)	0.699 (0.540)	0.0782 (0.673)	0.681 (0.532)	0.596 (0.521)
PeaceKeeping = 1	-1.648 (1.301)	-0.0667 (0.756)	-0.373 (0.969)		-0.240 (0.732)	
Regime, 2 years before PA = 1	-9.071** (3.840)					
Regime, 2 years before PA = 2	0.672 (1.340)					
Third party = 1, Yes	-8.094*** (2.400)	-1.589** (0.784)	-1.672* (0.867)			

Table 36: Effects of DDR on Peace (dependent variable: Peace after five years of PA) (continuation)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Sharing Government = 1, Yes	5.076*** (1.865)					
Reintegration # PeaceKeeping			0.472 (1.323)			
Reintegration # Previous PA failure				0.851 (0.889)		
Constant	21.21*** (4.955)	6.194*** (1.628)	6.471*** (1.767)	5.301*** (1.466)	4.939*** (1.547)	5.179*** (1.424)
Observations	54	113	113	119	113	119
Cluster	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel
Pseudo R-squared	0.620	0.286	0.288	0.252	0.252	0.247
Wald chi2	27.33	20.73	22.47	18.18	19.54	18.74
Prob > chi2	0.0112	0.0231	0.0210	0.0332	0.0210	0.0163

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 37: Effects of DDR on Peace (dependent variable: Peace after five years of PA)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Disarmament = 1, Yes	-1.387 (1.147)	0.806 (0.819)	0.743 (0.938)	0.835 (0.753)	0.927 (0.769)	0.753 (0.709)
Demobilization = 1, Yes	3.133** (1.531)	0.0351 (1.056)	0.108 (1.161)	-0.716 (1.064)	-0.380 (1.066)	-0.546 (1.031)
Military reintegration = 1, Yes	0.966 (1.671)	0.215 (0.740)	0.0563 (0.950)	-0.202 (0.793)	0.470 (0.660)	0.435 (0.608)
Civil reintegration = 1, Yes	1.209 (1.284)	-0.0561 (1.251)	-0.0892 (1.536)	-0.0684 (0.866)	-0.0180 (1.054)	0.0115 (1.017)
Real GDP per capita	-0.0737*** (0.027)	0.00142 (0.018)	0.00135 (0.018)	0.00460 (0.015)	0.00626 (0.017)	0.00567 (0.016)
Duration of conflict (ln)	-3.944*** (1.330)	-1.640*** (0.527)	-1.682*** (0.519)	-1.504*** (0.448)	-1.611*** (0.470)	-1.548*** (0.441)
Conflict with other rebels = 1, Yes	-2.434** (1.127)	-0.751 (0.594)	-0.797 (0.628)	-0.319 (0.665)	-0.585 (0.634)	-0.487 (0.684)
Ln year of current regime	-0.577 (0.779)	-0.0389 (0.263)	-0.0411 (0.266)	-0.148 (0.218)	-0.0501 (0.268)	-0.125 (0.226)
Previous PA failure by conflict = 1, Yes	3.159* (1.704)	0.715 (0.527)	0.733 (0.548)	-0.199 (0.697)	0.706 (0.532)	0.648 (0.539)
PeaceKeeping	-1.779 (1.336)	-0.161 (0.800)	-0.406 (0.995)		-0.392 (0.751)	
Third party = 1, Yes	-5.368*** (1.770)	-1.688** (0.823)	-1.778* (0.971)			
Regime, 2 years before PA = 1	-6.387*					

Table 37: Effects of DDR on Peace (dependent variable: Peace after five years of PA) (continuation)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Regime, 2 years before PA = 2	(3.485) 0.696 (1.049)					
Sharing Government = 1, Yes	3.335** (1.463)					
Militar R # PeaceKeeping			0.562 (1.587)			
Civil R # PeaceKeeping			-0.116 (1.406)			
Militar R # Previous PA failure				1.493 (1.314)		
Civil R # Previous PA failure				0.258 (1.296)		
Constant	15.35*** (3.363)	6.267*** (1.741)	6.547*** (1.956)	5.228*** (1.549)	4.843*** (1.609)	5.022*** (1.511)
Observations	54	113	113	119	113	119
Cluster	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel	Country-rebel
Pseudo R-squared	0.582	0.284	0.285	0.255	0.244	0.238
Wald chi2	38.65	19.73	22.64	19.85	17.60	17.12
Prob > chi2	0.000414	0.0491	0.0462	0.0475	0.0622	0.0469

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Reintegration programme, Ex-combatants and Post-Conflict Violence: The Colombian case ⁸²

Abstract

The implementation of different provisions for achieving peace does not necessarily accomplish a reduction in the rates of criminal violence. Various theories explain the cause of post-conflict violence, but few demonstrate the relation between the post-conflict violence, internal armed conflict, and peace agreement provisions, such as the disarmament, demobilisation and reintegration process (DDR). DDR provision incorporates different objectives, not only creating stability in terms of developing economic, social and political programmes for former combatants, but also preventing new types of violence and crime by ex-combatants. This paper analyses the dynamics of violent crime in Colombia after the peace negotiations between the Colombian government and the paramilitary forces (AUC) (2003 – 2006), and the consolidation of the individual demobilisation of combatants as a counterinsurgency strategy (2002 – 2014). The main objective is to contribute to explanations for patterns of violence post-conflict and determine whether there is a relationship between this violence and the reintegration process. The Colombian case allows us to identify trends related to violence and DDR processes at a sub-national level of analysis. For this purpose, we have built a yearly-municipal panel database for the period from 2003 to 2014. The database registers violent events, municipality characteristics, the presence of former combatants, the

⁸² A later version of this paper was submitted to *Conflict Management and Peace Studies* on 7 May 2018. Authors: Andrea González and Han Dorussen.

presence of rebel groups, birthplace and recruitment place. The findings suggest that the presence of former combatants has no statistical effect on the rate of homicide. However, this variable has a positive and statistical effect on the rate of robbery. This research has important implications for the study of post-conflict violence and stability.

Introduction

El Salvador, Guatemala, South Africa and Afghanistan, among others, have demonstrated that the rates of violence inside a society do not necessarily decrease, despite the signing of peace agreements and the employment of different strategies (programmes and policies) of peacebuilding. In fact, these case studies reveal two issues. The first issue is the co-existence of different types of violence (non-organized and organized or non-collective and collective) in these societies—such as homicide, robbery, sexual violence, violence against woman and trafficking—which may persist after the end of civil war.⁸³ Second, there is a positive correlation between conflict violence and post-conflict violence (violent crime). The literature suggests that after a peace agreement, in many cases, the structural problems of a country are not solved; for example, the presence of an illegal economy, property disputes, the new balance of power (political and economic) and the weakness of peace deal provisions are all

⁸³ See Berdal & Suhrke (2012); Collier & Hoeffler (2004); Deglow (2016); Dercon & Ayalew (1998); Geneva Declaration & Secretariat (2008); Kaplan & Nussio (2016); Martí Puig (2002); Rivera (2016) and Schuld (2013).

elements of vulnerability. In sum, these cases show an increase and diversification of the violence.

The case studies mentioned above show that the relationship between conflict, conflict resolution and criminal violence is not straightforward. For these reasons, it is important to ask, why do rates of violence “typically” increase in post-conflict scenarios? What is the relation between DDR processes and the new forms of violence in post-conflict scenarios? When a country starts its post-conflict process or the peace consolidation, it also initiates a transformation of culture, of development, of the security concept and the violence. All those transformations oblige the state to create public policies that strengthen the state institutions, give guarantees of compliance and help to consolidate the peaceful coexistence of the population. The DDR process is a tool of peace consolidation that enables the state to obtain the monopoly of force and to give security guarantees to the rebels. From the viewpoint of the development theory, DDR stimulates and strengthens the socio-economic development of a country (Correia, 2009; Giustozzi, 2012), because the programme should incentivise the desire to create an internal market and encourage the participation of the private sector, which in turn creates opportunities for the legal market. It should also develop strategies to address the traumas of the civil war and to generate reconciliation between inhabitants.

This paper investigates the question regarding the relation between DDR processes and the new forms of violence by examining the dynamics of violent crime in the Colombian case, after the peace negotiations with the United Self-Defence Forces of Colombia (Autodefensas Unidad de Colombia – AUC) and the consolidation of the individual demobilisation of combatants as a counterinsurgency strategy,⁸⁴ which is focused on guerrilla groups. This work intends to characterise the regional dynamics of the conflict and the post-conflict violence. The focus is on the presence of ex-combatants who participated in DDR programmes and patterns of different types of violence,⁸⁵ specifically homicide and robbery,⁸⁶ at the municipality level. In other words, do communities with more ex-combatants experience more crime? Do DDR programmes matter? We are going to determine the factors that might explain this violence in a spatial context, including regional, demographic and economic perspectives.

We contribute to advancing knowledge on the study of post-conflict violence by exploring how the presence of former combatants at a local level affects rates of post-conflict violence (violent crime). Based on previous research, we argue that the presence of ex-combatants, who are part of a reintegration programme, leads to lower levels of

⁸⁴ In Colombia, the individual demobilisation policy has been implemented since 1984. However, from 2002 it became part of the war strategy. The main objective of the programme was to weaken the armed groups, by obtaining war material or strategic information from the deserters. “[...] the guerrilla fighters have often been lured away from their groups with the promise of reintegration benefits” (Kaplan & Nussio, 2015, p. 12).

⁸⁵ This paper is based on these two types of violence due to the lack of municipality data regarding other crimes such as intra-family violence, rape, etc.

⁸⁶ We use the term robbery to represent a set of different concepts, such as theft, burglary, mugging, raid and larceny.

violent crime. However, there is a different behaviour observed in former combatants from guerrilla or paramilitary groups. This paper contributes to understanding violence on the micro-level, based on distinguishable factors from district to district, and participates in the discussion about security and reintegration policy by comprehending the spatial and temporal variance. This work could be significant for the development of public policies to promote general stability during the post-conflict stage. The Colombian case could highlight elements that help to elaborate the public policy of social, economic and political reintegration after the peace agreement with the FARC and ELN.⁸⁷

To evaluate our question on crime levels, we employ statistics in a sub-national dataset, covering homicide, robbery and the presence of ex-combatants, for the period from 2003 to 2014 in Colombia on the municipal level. We focus on the municipality level due to data availability and to account for micro-level or regional variability. Because of its important statistical services and the well-developed monitoring of participants in demobilisation programmes, Colombia is unique among post-conflict countries and a relevant case for studying any effect of the presence of ex-combatants on crime. Previous studies have concluded that DDR programmes can reduce the rate of homicide and forced displacement, while other research does not present conclusive results because of

⁸⁷ The FARC agreement was finally signed on 24 November 2016. The peace talks with ELN have been in the exploratory phase since January 2014.

the temporality or the lack of data.⁸⁸ Our study highlights the difference between the presence of ex-guerrilla or ex-paramilitary soldiers, provides controls by endogeneity bearing in mind recruitment and birthplaces and employs a random effect model with additional time-invariant variables (A. Bell & Jones, 2015), and instrumental variables (Baltagi, 2005; Cameron & Trivedi, 2010) to solve heterogeneity, autocorrelation and endogeneity problems.

We found that the ex-combatants involved in the reintegration programme are important in terms of explaining the difference in the municipality homicide rate, but if the number of former combatants in the programme increases over time, they do not have a statistical effect. There is a different story when we examine the rate of robbery, when the presence of ex-combatants has a positive and significant effect; this result suggests that the number of ex-combatants is an important factor for explaining the difference in the municipality robbery rate.

In the next section, we briefly review the existing literature on the violence during post-conflict and its relationship with disarmament, demobilisation and reintegration (DDR) programmes. It also presents a theory and hypotheses about the relationship between the presence of former rebels and violence. Next we provide a brief context of the Colombian case. Then, we describe the research design and data, and subsequently,

⁸⁸ To our knowledge, there have been fourteen studies which have analysed, using different approaches, the effects of the DDR programme on homicide or displacement in Colombia.

present the empirical results of our statistical analysis and robustness checks. Finally, the summary of the main findings and other important implications are discussed.

Theoretical and Conceptual Framework: violence in the post-conflict stage

This paper defines violence broadly as the intentional causation of bodily harm and psychological injury to the person and damage to goods. Violence has various forms such as homicide, body injury, vandalism, displacement, kidnapping, torture, rape and robbery, among others (Eisner, 2009, 2013; Kalyvas, 2006; Tilly, 2003). Different authors distinguish violence according to its impetus, its effects, its dimensions and its genesis. For instance, the violence during war⁸⁹ is seen as distinct from the violence in peacetime. Both states of violence share some mechanisms but differ in contexts, aims, techniques and modes (Kalyvas, 2006).

When a civil war ends, we can expect a cessation of “war violence”. However, different forms of deadly violence continue and may even increase in the following years. Some studies have demonstrated this behaviour, for instance, the Global Burden of Armed Violence report (2008) or the work developed by Berdal and Suhrke (2012). The majority of research on violence has used homicide as the best indicator of violence

⁸⁹ Kalyvas (2006) highlights that violence and war must be analysed separately because “areas consumed by the same conflict can exhibit substantial variation in violence. Hence, violence should be analytically decoupled from war, echoing the well-established distinction between *jus ad bellum* (lawful initiation of war) and *jus in bello* (lawful conduct of war)” (p. 20).

because it is the absolute violence (Kalyvas, 2006; Tilly, 2003) and data collection and coverage are broad and seem relatively reliable (Eisner, 2009, 2013). For example, Collier and Hoeffler (2004) show that homicide rates increase after the end of an internal armed conflict. Additionally, Archer and Gartner (1976) have stated that most warring nations

[...] in the study experienced substantial postwar increases in their rates of homicide [...]. The increases were pervasive and occurred after large and small wars, with several types of homicide indicators, in victorious as well as defeated nations, in nations with improved post-war economies and nations with worsened economies. (p. 961)

Rivera (2016) also shows that post-conflict states in Latin America have a positive relationship with high homicide rates. In sum, post-war societies might be considered more violent than they were before the conflict and present new forms of violence. These new types of violence include domestic violence, riots, violent crime, sexual abuse, violent gangs and revenge assassinations (Aguirre, 2012; Barron, 2014; Berdal & Suhrke, 2012; Geneva Declaration & Secretariat, 2008).

There is a consensus that the post-conflict phase is a transitory period between war and peace. For example, Berdal and Suhrke (2012) define post-conflict as “a transition from war to more “normal conditions” (p.50). Licklider (1995) suggests that this conversion process is around five years (one five-year period), while Collier and Hoeffler (2004)

propose the time limit for studying post-war violence is two five-year terms. Reychler and Langer (2006) describe it as “multiple transition processes: [...] Transforming conflict-torn, politically unstable, and socially and economically disintegrated countries into more politically and economically stable, equal and prosperous ones” (p. 4). The transitional stage is the period when cessation of warfare begins. Lambach (2007) defines post-conflict as the period in which the “violence perpetrated by actors in the conflict is no longer employed about the central narratives of the previous conflict” (p. 11). Schuld (2013) points out that “violence in post-conflict configurations (as far as it is considered illegitimate) is regarded as a violation of the re-established legal system, and usually referred to as crime, assumed to be driven by personal, emotional or economic motivations” (p. 62). Here, we define the post-conflict stage as a period after a conflict has ended with victory or a peace agreement. We can also define post-war violence as all acts of violence produced at the end of the civil war or internal armed conflict, and without (necessarily) political motivations (Geneva Declaration & Secretariat, 2008).

Explanations for post-war violence

Research on the different reasons for the variance in violence during the post-conflict stage is growing. Most studies of post-war violence are based on macro-analysis and

similar methodologies,⁹⁰ but there are a few⁹¹ studies working on the micro-analysis of the type of violence within the post-conflict country. The macro-analysis, which is focused on a national level rather than a regional level, analyses the relation between war and levels of post-conflict violence. These studies commonly rely on the so-called legacy of conflict, the culture of violence and peace agreement conditions hypothesis, to explain some of their findings, stipulating that war societies have more violent behaviour during peace stages. The Global Burden of Armed Violence reports state that “[w]here wars are especially long and severe, post-conflict mortality and morbidity can escalate further still” (Geneva Declaration & Secretariat, 2008, p. 50), as the institutional framework has collapsed or is too weak to achieve the minimum requirements required by its inhabitants. Berdal and Sunrke highlight that the post-conflict violence emerges for two reasons: legacy of war and conditions of the peace (Berdal & Suhrke, 2012). Accordingly, some vulnerabilities increase the probability of post-conflict violence, such as a failed DDR provision, the illegal economy⁹² and its networks,⁹³ property disputes (land problems), a weak justice sector (the creation of informal security and justice), a

⁹⁰ See, for example, Berdal & Suhrke (2012); Dudouet, Giessmann, & Planta (2012); Dzinesa (2007); Giustozzi (2012); Leatherman (1999); Moser & McIlwaine (2001); Pearce (2016) and Rivera (2016).

⁹¹ See Aguirre (2014); Barron (2014); Collier (1994); Deglow (2016) and Samset (2013).

⁹² From the greed perspective, illegal economy means illegal opportunities for obtaining financial viability, such as drug trafficking or smuggling.

⁹³ These are “Armed groups that have not been effectively disarmed and demobilized may morph into organized criminal networks”(Geneva Declaration & Secretariat, 2008, p. 55).

culture of revenge, the new balance of power between parties⁹⁴ and the presence of peacekeeping missions.⁹⁵

The legacy of conflict is also identified as relevant in micro-level studies of post-conflict violence. In Northern Ireland, Deglow (2016) shows that the legacy of the conflict has had a positive effect on post-conflict violent crime. His conclusion is that “the more an area has been exposed to violence, and the larger the proportion of this violence committed by anti-government groups, the more violent crime on the local level” emerges (Deglow, 2016, p. 1). Schuld (2013) analyses the South African case and argues that the primary cause of post-conflict violence is a culture of violence inherited from the apartheid system. This violence is expressed by xenophobia, political assassinations, mob violence and protest violence (Schuld, 2013).

The second explanation of post-conflict violence focuses on the structural problems of a country. A micro-study developed in Indonesia by Barron (2014) establishes that the cause of post-conflict violence is based on the reality of a country which employs its economic power and the political clout of its elites and their incentives to use violence and take advantage of calm (peaceable) conditions and opportunities. In sum, he shows

⁹⁴ “As noted by Chaudhary and Shre (2008) if one party wins and controls security apparatus this can lead to violent purges to eliminate remnants of the enemy and its affiliates” (Geneva Declaration & Secretariat, 2008, p. 53).

⁹⁵ Di Salvatore shows that peacekeeping helps to reduce political violence but could increase the criminal violence: “In the case of criminal violence, while political violence is reduced the collateral effect is the creation of favourable conditions for criminal activities” (Di Salvatore, 2017, p.11).

that four related issues explain the post-conflict violence:⁹⁶ first, the political economy⁹⁷ of violence; second, the power of elite bargaining; third, the impact of the previous conflict, and fourth the state capacity to lead and maintain the order (Barron, 2014).

The third explanation concerns the peace agreement conditions. If the end of the conflict was achieved through negotiation, there are different provisions which can be negotiated such as amnesty, DDR, election, power-sharing, security sector reforms, third party participation, victims (refugees and internally displaced persons), and a truth commission. If the results of these provisions are not as expected, they could be considered “destabilising”. For example, Samset (2013) highlights the fact that, depending on the objective of the amnesty,⁹⁸ it can contribute to reduce or increase postwar violence:

Amnesties help build peace if they are limited, that is, if they do not cover the most serious crimes committed during the conflict [...] Amnesties help build peace if they are unlimited, that is, if they cover all the crimes ... This is because an unlimited amnesty enables society to leave the divisive past behind. (p. 77)

⁹⁶ “Where violence proves to be an effective strategy for capturing resources or power, and where higher level authorities tolerate or support its use, future violence is more likely” (Barron, 2014, p. 59).

⁹⁷ “Examining the political economy of violence– the reasons why violence is profitable in some places at some times, and not in others–illuminates why post-conflict violence occurs or does not. Differing incentives for different sets of actors explains why post-conflict violence takes varying forms across areas for combinations of support for violence from different groups determines the forms post-conflict violence will take” (Barron, 2014, p. 320).

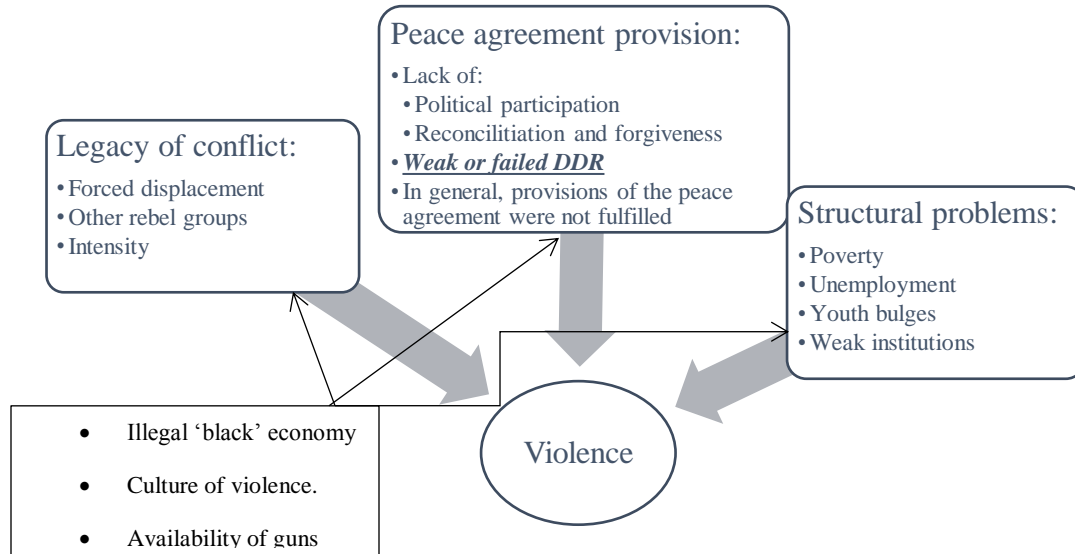
⁹⁸ In the case of amnesty, Samset presents a double argument. First, amnesty is described as an accountable mechanism. Second, amnesty is described as an opportunity to leave the past behind (peaceful coexistence). Each argument has a different effect on post-war violence.

Post-war elections are another feature of negotiated conflict termination. The literature on this subject reveals ambiguous conclusions: elections can contribute to reduce or increase postwar violence depending on the results and their acceptance. For instance, Samset (2013) points out that

elections are particularly prone, moreover, to be dominated by ex-combatants-turned-politicians and armed-groups-turned-parties; actors who will see the polls as just another battle. If they lose they may return to violence; if they win, they can easily use the power they get to oppress their (former) enemies. (p. 86)

There are other mechanisms, such as DDR or peacekeeping or third parties, which reduce the ability of opposition groups to use violence. It is important to highlight that this paper is focused on only DDR programmes as a peace agreement provision and the effect on some indicators of criminality and violence of the presence of former combatants who are part of the reintegration programme. We are going to control our statistical models by considering some of the reasons outlined above. In the next section, we explain the relationship between DDR programmes and post-conflict violence.

Figure 13: Reasons for the variance in violence during the post-conflict stage



Source: Literature review – Authors.

In conclusion, the literature provides three sets of explanations for the increase of violence in a post-conflict phase: the legacy of conflict, structural problems of the country (state) and peace agreement conditions. At the same time, these explanations have various subcategories such as socio-cultural factors (culture of violence), institutional problems (weak state, faltering justice and institutions) and the political economy of violence. Figure 13 shows the classifications and demonstrates that if we analyse each category, we can find some interrelation and “simultaneous causality” (Stock & Watson, 2015). It is normal that most post-war countries exhibit multiple types of explanation. Nicaragua illustrates this point, as the country signed a peace agreement in 1987, but it was not fully implemented due to the unstable security situation, poor

governance, lack of basic planning during the recovery phase and lack of financial sources. Its post-conflict stage was characterised by armament, disarmament and rearmament cycles, high rates of violence and criminality among urban cities,⁹⁹ high unemployment rates (particularly among youth), low levels of social capital and the presence of drug trafficking routes (Brune & Bossert, 2009; Chamorro, 2015; Martí Puig, 2002; Rodgers, 2002, 2013; Rodgers & Jensen, 2015).

DDR process and post-conflict violence

El Salvador has demonstrated a growing tendency to delinquency and violence following the peace agreement of 1992. However, it is not clear if there is a direct connection between the violence and a “failed” DDR process or if it is, alternatively, simply a continuation (or mutation) of a historical process in which violence is an intrinsic part of the culture (Cruz, González, & Romano, 1998; Sida, 2003; K. Walter & Williams, 1993). Nicaragua has been characterized by high rates of violence and criminality, and Rodgers (2013) finds that the first wave of gang violence was largely related to practices of the Sandinista popular army and that the reasons for being part of the gang were “a natural

⁹⁹ “Rather than leading to peace, post-conflict regime change marked a shift in Nicaragua’s geography of violence, the logic of which was well summarized by Galeano (1998: 322–24), who remarked that “while the streets of Nicaragua’s cities were peaceful during the years of formal conflict, once peace was declared, the country’s streets became scenes of war” as a result of a dramatic explosion in urban crime and delinquency. According to official Nicaraguan National Police statistics, crime levels rose steadily by an annual average of more than 10 per cent during the 1990s, compared to less than 2 per cent during the 1980s, with the absolute number of crimes almost quadrupling between 1990 and 2000. Crimes against persons – including homicides, rapes, and assaults – increased especially significantly (Cajina, 2000: 185–87)” (Rodgers, 2013, p. 9).

continuation of their previous role as a soldier” (p. 21). We can observe similar tendencies for Colombia, even though the case might be considered atypical¹⁰⁰ because the DDR strategy had been developed in the middle of the conflict.¹⁰¹

Betancourt (2010) has analysed the demobilisation of the AUC in Medellin (Colombia). She concluded that there was a positive impact because of the demobilisation process in the short term, as the homicide rates decreased dramatically. However, in the long run, the homicide rates increased. This was also shown by Howe (2012), who concluded that “[...] the more combatants who demobilised to an area, the higher the homicide rate in the post-demobilisation period, holding other causes of homicide constant” (p. 5). The explanations of this tendency are a “weak reintegration programme”, the inefficacy of the state to fulfil the arrangements and the continuity of the conflict. For example, there are some complaints from former AUC combatants who, after ten years of their demobilisation, have received prison sentences and economic sanctions, which will ultimately cost them their jobs and their new life (El Tiempo, 2015).

The last three examples are not unique and demonstrate that post-conflict countries face two potential risks: the regression to violence and the appearance of new types of violence (Ministry for Foreign Affairs, 2006). The DDR is one of the mechanisms to

¹⁰⁰ Afghanistan has a similar DDR strategy to Colombia.

¹⁰¹ See Betancourt (2010); Gutiérrez & González (2012); Howe (2012); Howe, Sánchez, & Contreras (2010); Muggah & Restrepo (2008); Nussio (2012); Nussio, Massé, Negrete, & Ugarriza (2011) and Palou (2009).

contribute to the security and the stability of the country in these situations. For instance, Dzinesa (2007) developed a comparative examination of DDR programmes in Southern Africa. He concluded that

DDR processes stood a better chance where the principle of a comprehensive, coordinated, and sustainable approach was encompassed. In the absence of this, DDR floundered resulting in reigniting of fighting as Angola demonstrated. Also, in the absence of re-emergence of outright war ineffectively reintegrated ex-combatants only went so far; there came a time when disillusioned and enflamed ex-combatants shifted from an acquiescent mood to a confrontational one against the state. The stability threat they posed aggravated when weapons were easily accessible-even though the more empirical evidence is required in this realm. (p. 87)

The relation between the DDR process and post-conflict violence must be studied to understand the real dynamics and factors that foster the transition from conflict violence to higher rates of violence, especially criminal violence, in post-conflict countries. Different macro-studies are analysing the many reasons for this type of behaviour and whether DDR is useful or not. For instance, Özerdem (2012) points out that the insecurity can increase¹⁰² if the former combatants do not have legal work opportunities

¹⁰² Insecurity may increase “if the demobilised combatants are not placed in employment as lack of skills, except in the use of weapons, is considered a potential risk for leading them to criminal activities, or they might be tempted to return to arms if their grievances and frustration continues to be neglected in peace-building processes” (Özerdem, 2012, p.58).

or if the illegal market is more attractive. Different research has demonstrated that economic reintegration, as an employee or entrepreneur, is a good way to prevent recidivism or criminal activities. However, the problem is that in many countries the economy has been destroyed, resulting in high unemployment rates, high inflation and high poverty rates. Some of the challenges for the reintegration programme are to create legal and economic opportunities and develop job skills for demobilised combatants (Colletta, 1997). Dercon et al. (1998, 2003) analysed the demobilisation and reintegration processes in Ethiopia. This research concluded that the lack of a private sector economy and the traumas of civil war were the core difficulties in reintegrating the ex-combatants, primarily because “young people, with little hope of future work, may well engage in the opportunistic behaviour, and perhaps remain as an army in waiting” (2003, p.93). The former combatants were also sharing the low standards of living of the civil population. The authors also suggest that “facilitating the return to rural areas is crucial to avoiding pressure on the urban labour market and related problems such as housing shortage and crime” (Ayalew, Dercon, & Krishnan, 2003, p. 103; Dercon & Ayalew, 1998). Aguirre (2012) examined the factors linking conflict and post-conflict violence, using the case study of Guatemala. She suggested that urban violence and organised crime are the most important types of post-conflict violence in Guatemala. Focusing on DDR, she concluded that

The direct legacies of the war on contemporary violence in Guatemala cannot be dismissed, including the incomplete implementation of a DDR programme, involvement of former combatants in contemporary criminal activities, latent

availability of firearms, effects of displacement, increasing fear and paranoia, and a routinization of violence, among others. (Aguirre, 2012, p. 98)

Nevertheless, few studies are presenting the relation between demobilised personnel and the generation of violence in a post-conflict situation systematically. For example, Collier investigated the effect of demobilisation on crime in Uganda. He concludes that “in the short term demobilisation significantly increased crime if soldiers lacked access to land, but significantly reduced it if they had access” (Collier, 1994, p. 8). The reason could be as simple as fostering pride of ownership by giving an ex-combatant land. This pride of possession extends not only to the land but to the community. Nussio and Howe (2014) argue that the breakdown of the illegal protection system established by paramilitary groups increases the post-conflict¹⁰³ violence for three reasons: it reduced the cost of crime, opportunities for revenge and new competition. Their study on Córdoba (a Colombian department) supports these arguments (Nussio & Howe, 2014).

In sum, the causal mechanism for post-conflict violence can be understood in two related ways, at an individual level or as a failure of the process. The former is related to ex-combatants who could present problems such as drug addiction, post-war trauma or mental illness. Also, the former combatants are attracted to the illegal market due to their homicidal and war skills. If they do not receive the adequate attention, medical treatment

¹⁰³ The authors use the term “post-demobilisation”.

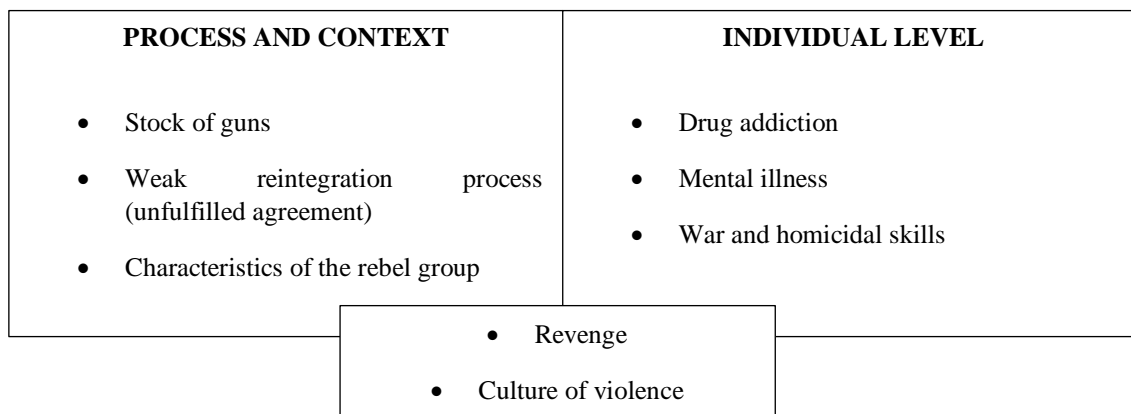
and income opportunities the potential to return to criminality is high. The latter issue relates to a bad disarmament programme which increases gun supply in the civil population or enables the maintenance of hidden weapon reserves in the case of unfulfilment. The lack of justice and proper forgiveness mechanisms could generate retaliation events between victims and victimizers. If the national economy and infrastructure suffer a general devastation, the possibility to develop and implement the proper reintegration process is limited and weak. Bauer et al. (2014) highlight

The importance of reintegrating former soldiers back into communities. The common view is that reintegration is complicated by the negative effect of trauma and the normative environment of rebel groups on cooperative tendencies of ex-soldiers and by anger and lack of acceptance by receiving communities. (p. 9)

However, when the government develops a community reintegration process the combatants are going to build infrastructure. This is one of the ways to gain acceptance from the community, and it is also a means to develop transferable skills for ex-combatants. The likelihood of returning to criminality is lessened by fostering community acceptance (Kaplan & Nussio, 2015). Figure 14 summaries the causal mechanisms described above.

In line with the theoretical expectations and existing studies, we hypothesise that the rate of post-conflict violent crime rate will increase, marginally, in municipalities with a large number of former combatants who are part of reintegration programmes.

Figure 14: Mechanisms to explain the relationship between DDR and post-conflict violence.



Source: Literature review – Authors.

Colombia's DDR programme

Since 2002 Colombia's DDR programme has been developed¹⁰⁴ in two ways; first, it functioned as a war strategy for combating illegal armed groups, inducing the renunciation and surrender of these members and offering social and economic reintegration for those who voluntarily participated in the programme. Secondly, the DDR was part of the peace agreement signed by the administration of President Álvaro Uribe and the paramilitary groups (AUC) from 2003 to 2006. Currently, the individual and collective programmes are run by the Ministry of Defence, Office of the High

¹⁰⁴ The Colombian government has developed a legal framework since 1997 with Law 418 which gives to the state special faculties for developing peace negotiation with rebel groups. This law has been modified three times (Law 548, 1999; Law 782, 2002 and Law 1106, 2006). Thanks to that normativity, the Colombian state has put into practice two types of DDR: a DDR based on peace agreements and individual DDR. Under this normativity, in 1990 the first collective DDR of 5,700 ex-combatants took place (CONPES, 2008; Verdad Abierta, 2008).

Commissioner for Peace (OACP)¹⁰⁵ and Colombian Agency for Reintegration (ACR), in collaboration with many governmental institutions.

As part of the accords signed during the peace process with the Paramilitary (United Self-Defence Forces of Colombia – Autodefensas Unidad de Colombia, AUC), according to the Colombian Agency for Reintegration (ACR),¹⁰⁶ 31,698 combatants have participated in the DDR programme. There were two more collective demobilisations with the Guevarista Revolutionary Army (Ejército Revolucionario Guevarista, ERG) and the Cacica Gaitana (FARC) with, respectively, 38 and 190 demobilised combatants. The individually disbanded soldiers are ex-members of FARC, ELN and small guerrilla groups and, according to the ACR, 24,757 have taken part in the individual demobilisation programme.

The Colombian government has been able to develop a legal framework for DDR due to the normativity which gave the State special faculties. The public policy of DDR started with “Conpes 3554 de 2008”, which established the National Program for Social and Economic Reintegration for Persons and Illegal Armed Groups (PRSE). Other documents have modified this policy, such as the Conpes 3607 de 2009 and Conpes 3673 de 2010. These modifications gave the programme a long-term vision and developed a path to reintegration (Ruta de Reintegración) which is an integral programme with eight

¹⁰⁵ The full title of the OACP is the Oficina del Alto Comisionado para la Paz.

¹⁰⁶ The information relates to the period up to March 2014.

dimensions:¹⁰⁷ personal, educational, productive, family, habitable, health, citizen and security. This process can last around seven years.

The Agency for Reintegration (ACR) provided access to its information system for the purposes of this research. The system holds data about the ex-armed group, demobilisation, age, gender, education level, family, recruitment place, crimes after demobilisation and status in the programme. We are not working on an individual level. However, we consider it important to provide some statistical summaries about the programme.

ACR's information system reports a total of 56,358 former combatants, of which 83.73% have participated in the programme, and 16.27% have not been involved. Broken down by rebel group, the majority of the population comes from "paramilitary groups" (62.66%), followed by FARC (30.40%), ELN (6.08%) and other rebels (0.85%).¹⁰⁸ Other interesting information provided by ACR is on recidivism. The data suggests that 19.45% of the ex-rebels involved in the reintegration programme have "possibly" committed a crime and 8.71% have committed a crime. The data also shows that ex-AUC fighters are more recidivist than guerrillas. See Table 38.

¹⁰⁷ "The agreement of a work plan with the person undergoing a Reintegration Process requests comprise both the integrality of the person as well as the different barriers for the autonomous exercise of his/her citizenship. For this purpose, certain heuristic categories that reflect the different variables that have an impact on the development and/or enhancement of the capabilities of the individual and family are required. This means that a set of certain dimensions for operating the Reintegration Route is required that, in the end, is the entrance door for understanding the individual" ('The Reintegration Route', n.d.).

¹⁰⁸ These percentages are based on 47,189 ex-combatants involved in the reintegration programme.

We also use the information from the Colombian national police system and Colombian Agency for Reintegration (ACR) to disentangle violence committed by former combatants. There are 16,999 reports of crime, including ex-combatants who have committed more than one crime. Based on the Colombian penal code, there are 181 types of offence committed by former combatants. Crimes are grouped into two categories: public crimes (crimes against the state), of which there are 9,254 reports (54.43%), and private crimes (crimes against persons), of which there are 7,743 reports (45.55%). The main crimes against the state are: “Production, trading, purchasing, accepting or carrying addictive or recreation drugs for use” (34.91%), “weapons trafficking” (32.06%) and “conspiracy”¹⁰⁹ (18.76%). The main crimes against persons are: homicide (27.61%), theft/larceny (24.63%), Mayhem/battery (11.11%), extortion (8.19%), domestic violence (6.15%), kidnapping (3.76%), sexual assault/rape (3.52%) and forced disappearance (0.67%).

Table 38: Recidivism by rebel group

	Possibly	Proven
AUC	23.81%	10.91%
FARC	12.16%	4.87%
ELN	11.24%	5.67%
OTHERS	15.32%	4.34%

Source: Colombian Agency for Reintegration (ACR)

¹⁰⁹ The term is “concierto para delinquir”.

Research design

To address our hypotheses, we employ short panel data with numerous individuals (municipalities) ($N=1122$) and a few time periods ($T=12$). These models allow us to control for immeasurable variables or variables that change over time but not across municipalities. Some drawbacks include data collection issues such as sampling design, coverage and missing values (Baltagi, 2005; Wooldridge, 2010). Therefore, the panel data models allow us to assess the effect of our variables of interest on crime considering the regional and time differences. Furthermore, we rely on fixed effect, linear regression with panel-corrected standard errors and a random-effects linear model with an AR (1) disturbance,¹¹⁰ which distinguish not only the effect over time (within) but also the effect by municipalities (between); we used the within-between formulation because it is an effective solution to the correlation between control variables and residual. Additionally, as Bell et al. (2015) highlight, this separation has three advantages. First, temporal data are more comprehensible; second the estimations are more precise and stable, and third, “if the multicollinearity exists between j and other time-invariant variables, j can be removed without the risk of heterogeneity bias” (A. Bell & Jones, 2015, p. 142). Since crime rates can affect the presence of ex-combatants (because they may be attracted to or attempt to avoid lawless places), we also estimate an instrumental variable model to account for possible endogeneity.

¹¹⁰ We pursue Bell and Jones’ solution. The solution estimates for each municipality the within and between effects. The former is the difference between each observation and the panel mean. The latter is the panel mean (A. Bell & Jones, 2015).

The unit of analysis for all models is the Colombian municipality–year. Our study spans the period from 2003 to 2014 and includes 1,122 municipalities. The panel is unbalanced because of the creation of new municipalities over time. We applied the Amelia II programme to deal with missing data (see Appendix A).

Dependent variable

Our hypothesis concerns the determinants of post-conflict crimes against persons. Our main source of information is the Crime Observatory and we use its statistical data system (SIEDCO).¹¹¹ We are going to base our analysis on homicide and robbery, for two reasons; first, both are good proxies to criminal violence and second, because of the quality of information available. The models are based on a rate per 1000 people. See Appendix A, Table 44, for the descriptive statistics.

Key independent variable

We are primarily interested in the impact of the presence of former combatants who are part of a disarmament, demobilisation and reintegration programme on local crime rates. The number of ex-combatants is the count of individuals who have decided to leave a

¹¹¹ Observatorio del delito - Sistema de Información Estadística, Delincuencial, Contravencional y Operativo (SIEDCO). Policía Nacional de Colombia.

rebel group. There are two kinds of disarmament and demobilisation (DD) process: “individual”, meaning that a former combatant left the organisation willingly and “collective”, which means that the ex-rebel’s reintegration is part of the peace agreement between the government and their rebel group. After a DD process, each former combatant begins his or her reintegration process. Some ex-rebels start their programme immediately, some commence their programme after several years and others could not or did not want to be involved in the reintegration path. In sum, it is a discrete variable, which is counting the number of former rebels who are engaged in the Colombian reintegration programme. We also identify their location and the year that he/she is demobilised or participating in the programme. At the same time, we correct the information for participants that have deceased or returned to crime. Our main source of information was the statistical information system of the Colombian Agency for Reintegration (ACR). See Appendix A - Table 48, for descriptive statistics, and Appendix B for statistical tests. Note that the key variables have a VIF¹¹² under 5, indicating that the variables do not suffer from multicollinearity problems.

Control variables

We include some control variables to account for other factors thought to determine crime: population and youth population, municipality capacity, the presence of illicit

¹¹² VIF: the variance inflation factor measures the speed with which variances and co-variances increase because of the presence of multicollinearity (Gujarati & Porter, 2009, p. 352).

crops, the legacy of the conflict, socio-economic factors, and ex-combatants who are not part of the reintegration programme. Appendix A - Table 49 and Appendix B summarise the descriptive statistics and statistical test (VIF) for each of the control variables. It should be noted that none of the controls have a VIF above 5.

The selection of these variables is based on previous work on the determinants of violence and post-conflict violence. We principally consider variables that may influence the behaviour of violence. We grouped the control into groups, the legacy of conflict, characteristic of the municipality and structural problems of municipalities. The legacy of conflict indicates the presence of armed conflict in the past and present. Characteristic and structural problems of municipalities show different information relating to social conditions, poverty, regional distributions and economic conditions, such as population, the culture of violence and the illegal economy. We also control by the number of ex-combatants who are not part of reintegration.

Empirical Results

We consider the impact of the presence of ex-combatants on homicides first and then review separately the effect on robberies. Figure 15 provides a visual impression of the relationship between homicide, robbery/larceny and the former combatants. Each point on Figure 15 represents a municipality-year pair. The solid line is fitted by an OLS of the

rate of homicide/robbery on a quadratic for total ex-combatants, and the dashed line is fitted by nonparametric regression (Cameron & Trivedi, 2010). The rate of homicide does not show a particular behaviour. On the other hand, the rate of robbery increases after 60 former combatants. In Appendix B, Figure 23 presents the relationship between these variables based on different variations. The graphs do not suggest any non-linear relationship between these variables.

Figure 15: Relationship between core variables and former combatants

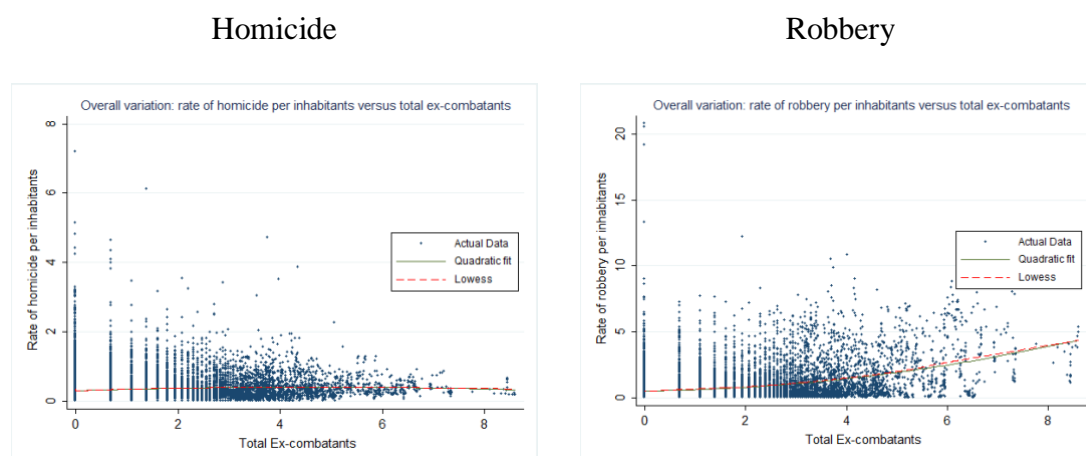


Table 39, Table 40, Figure 16 and Figure 18 summarise our findings from the random-effects linear model with an AR (1)¹¹³ (models 1 and 3) and linear regression with panel-corrected standard errors (models 2 and 4). Our results are robust across several

¹¹³ The fixed effect models are presented in Appendix C - Table 61 and Table 63. Based on these models, we perform different statistical tests. The different tests confirm the need to control for cross-sectional dependence, heteroscedasticity and autocorrelation. See Appendix B. In Appendix C we present the control variables of the main models. First difference models are presented in Table 62 and Table 64. These models show different results than the core models. However, the results are still marginally significant.

specifications. These models consider the core explanatory variable, the covariates and temporal correction. Our core variable is calculated in two different ways, counting the accumulative number of ex-combatants by total and by rebel group. The first group of models is focused on homicide. The second group is based on robbery/larceny. We present the short and marginal effect of our core variables by models in Figure 16, Figure 17, Figure 18 and Figure 19. The marginal effects show the change in the rate of homicide/robbery when moving the key explanatory variable from the minimum to the maximum while holding all other variables at their mean. It is important to highlight that results present on models AR (1) are based on the over-time effect variable.

Models based on homicide rate

In the homicide model (Table 39), the presence of ex-combatants involved in the reintegration programme is at a 5% significance level. The result for former combatants involved in reintegration suggests that the within (over-time) effect of ex-combatants is positive but not significant, while the between (across municipality) effect is negative and significant. These findings suggest that the number of former combatants is important to explain the difference in the municipality homicide rate (see Figure 16). Figure 17 – panel A presents the marginal effects of the models, which show that the instantaneous rate of change of homicide (rate by 1000) would decrease if the number of ex-combatants in the plan increased by five people over time. However, this effect does

not have a statistical effect after 25 former combatants are included in the programme. We also split the core variable by rebel group. Former guerrilla members who are in reintegration have a negative effect (over time and across municipalities). The result for former AUC members suggests that the between effect is negative and significant, but the within effect is positive and not significant. A possible explanation is that people involved in the programme are linked to legal activities, or they do not want to return to the criminal world. Figure 17 – panel B presents the marginal effects of the models by rebel group. In the case of the presence of former AUC members, it shows a slight decrease over time in the dependent variable when the number of ex-AUC in reintegration increases by five. In the case of guerrilla groups, the marginal effects are contradictory between models. The marginal effect in the AR(1) model are not significant and the marginal effect in PSCE presents a moderately significant decrease when the number of ex-Guerrillas in the plan increases by five. The other control variables have the expected sign.

Models based on robbery rate

The robbery model 1 suggests that the within (over-time) and between (across municipality) effect of former combatants is positive and statistically significant (Table 40). This result suggests that the number of ex-combatants is important in explaining the difference in the municipality robbery rate. This result is supported by the findings in

model 2 (see Figure 18). Figure 19 – panel A presents the marginal effects of the models, which show that the rate of change of robbery would increase if the number of ex-combatants in the plan increased by five over-time. In the PCSE model this effect is significant, but in the AR(1) model it is only slightly significant after 30 former combatants are in the programme. We also estimate the model with the core variable by rebel group. Model 3 shows that the key variables are statistically significant. If the number of former AUC and ex-guerrilla members in the programme increase over time, municipalities become more prone to presenting a rising robbery rate per 1000 people. Model 4 supports these findings but show us that the variable ex-guerrilla is statistically significant, while ex-AUC is not significant. A possible explanation for this result is that ex-combatants can commit robbery as a means of economic survival. It is important to highlight that ex-combatants lose the benefits of the programme only if the crime is proven. The Colombian justice system leniently punishes this type of offence and they are very difficult to prove, which could be an incentive for becoming involved in this illegal activity without any risk. The marginal effects (Figure 17) of both models show that the rate of change of homicide (rate by 1000) would increase slowly if the number of ex-combatants increased by five. However, these results are moderately significant.

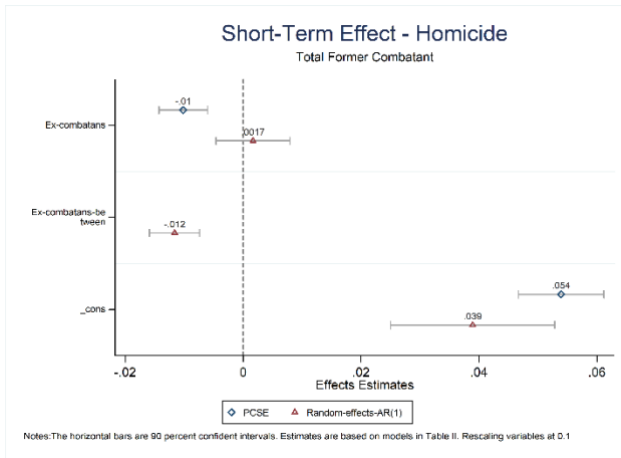
Table 39: Homicide and former rebels (2003 – 2014)

VARIABLES	Model (1) Total Combatant	Model (2) Total Combatant	Model (3) Combatant by rebel group	Model (4) Combatant by rebel group
Ex-combatants involved		-0.0099*** (0.002)		
Ex-combatants involved (within)	0.0017 (0.004)			
Ex-combatants involved (between)	-0.1161*** (0.026)			
Ex-AUC involved				-0.0102** (0.005)
Ex-AUC involved (within)			0.0089 (0.007)	
Ex-AUC involved (between)			-0.1270*** (0.031)	
Ex-guerrilla involved				-0.0091** (0.004)
Ex-guerrilla involved (within)			-0.0068 (0.009)	
Ex-guerrilla involved (between)			-0.2174*** (0.073)	
Constant	0.3894*** (0.085)	0.5968*** (0.048)	0.3903*** (0.085)	0.5972*** (0.048)
Observations	10,911	11,996	10,911	11,996
Number of ID_Muni	1,093	1,093	1,093	1,093
Method	Xtregar	xtpcse	xtregar	xtpcse
N	10911	11996	10911	11996
Sigma_u	0.200		0.200	
Sigma_e	0.273		0.273	
R-squared (Overall)	0.189	0.234	0.191	0.234
R-squared_W	0.0433		0.0434	
R-squared_B	0.331		0.333	
Chi-squared	931.8	4265	937.9	4625
Autocorrelation	0.0783		0.0781	
Cluster Variance		municipality AR1		municipality AR1

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Figure 16: Short effects – Homicide

A: Total former combatant



B: Former combatant by rebel group

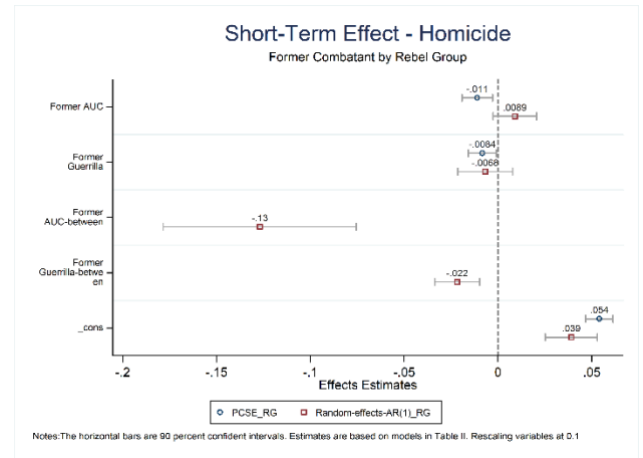
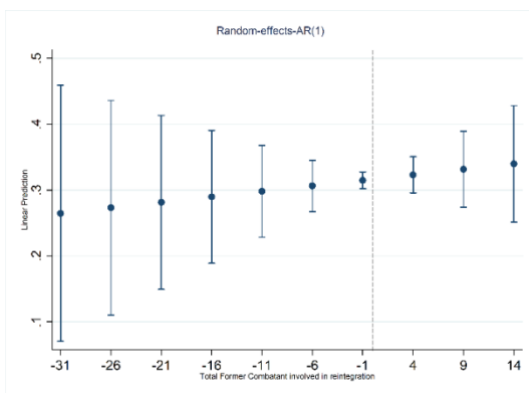


Figure 17: Marginal effects – Homicide

PANEL A

Model AR (1) total ex-combatants



Model PCSE total ex-combatants

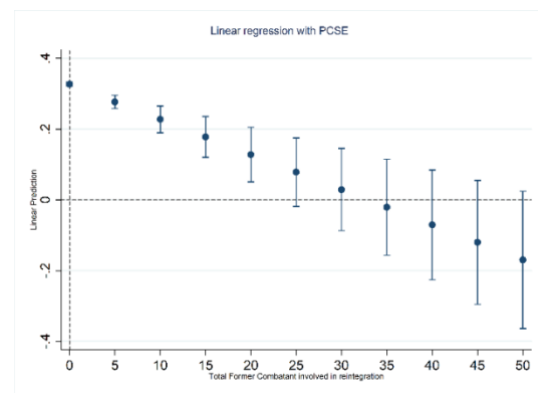
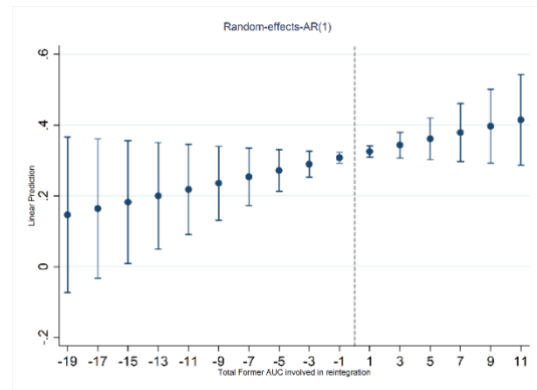
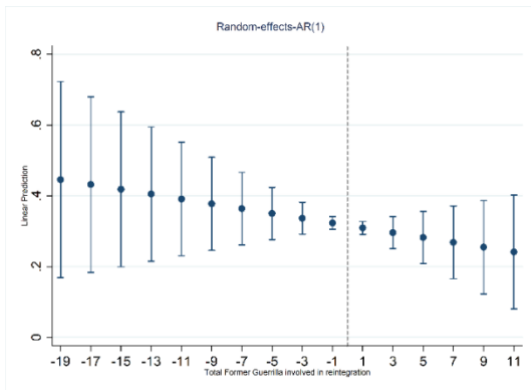


Figure 17: Marginal effects – Homicide (continuation)

PANEL B

Marginal effect – model AR (1) by rebel group



Marginal effect – model PCSE by rebel group

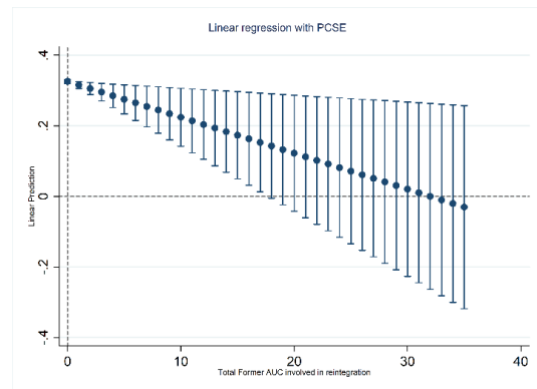
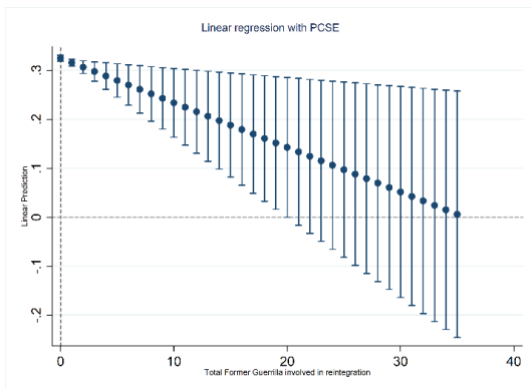


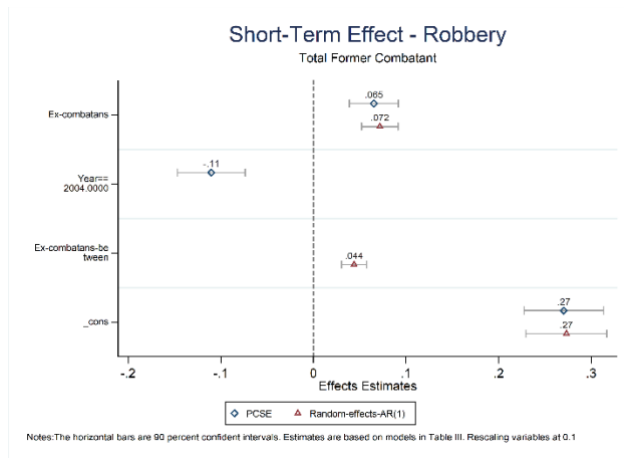
Table 40: Robbery and former rebels (2003 – 2014)

VARIABLES	Model (1) Total Combatant	Model (2) Total Combatant	Model (3) Combatant by rebel group	Model (4) Combatant by rebel group
Ex-combatants involved		0.0660*** (0.016)		
Ex-combatants involved in reintegration (within)	0.0717*** (0.012)			
Ex-combatants involved in reintegration (between)	0.4389*** (0.081)			
Ex-AUC involved				0.0313 (0.025)
Ex-AUC involved (within)			0.0570*** (0.022)	
Ex-AUC involved (between)			0.1764* (0.094)	
Ex-guerrilla involved				0.2365*** (0.057)
Ex-guerrilla involved in reintegration (within)			0.1458*** (0.028)	
Ex-guerrilla involved in reintegration (between)			2.6284*** (0.218)	
Constant	2.7318*** (0.266)	2.6253*** (0.253)	2.6852*** (0.253)	2.6118*** (0.254)
Observations	12,059	13,149	12,059	13,149
Number of ID_Muni	1,098	1,098	1,098	1,098
Method	Xtregar	xtpcse	xtregar	xtpcse
N	12059	13149	12059	13149
Sigma_u	0.619		0.579	
Sigma_e	0.733		0.733	
R-squared (Overall)	0.297	0.195	0.330	0.193
R-squared_W	0.0398		0.0422	
R-squared_B	0.461		0.515	
Chi-squared	1233	1163	1480	993.4
Autocorrelation	0.342		0.341	
Cluster		municipality		municipality
Variance		AR1		AR1

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 18: Short effects – Robbery

A: Total former combatant



B: Former combatant by rebel group

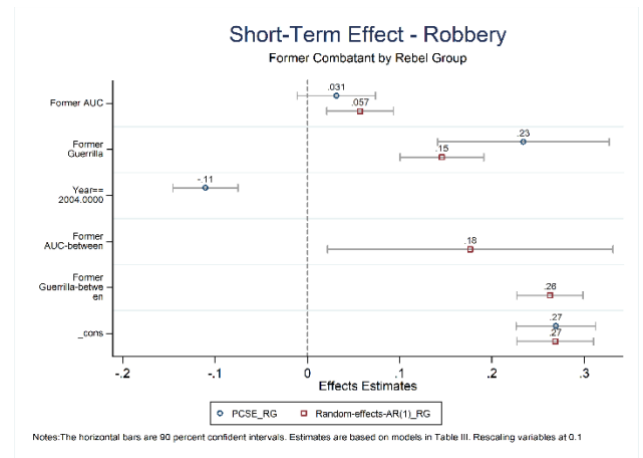
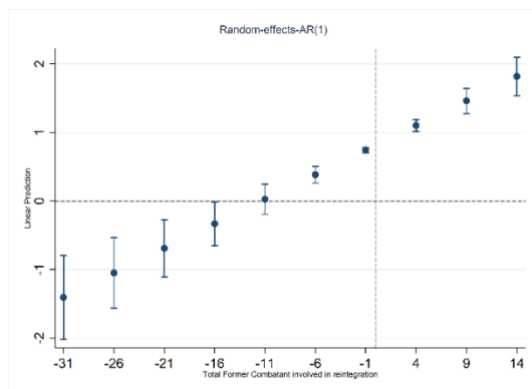


Figure 19: Marginal effects – Robbery

PANEL A

Model AR (1) total ex-combatants



Model PCSE total ex-combatants

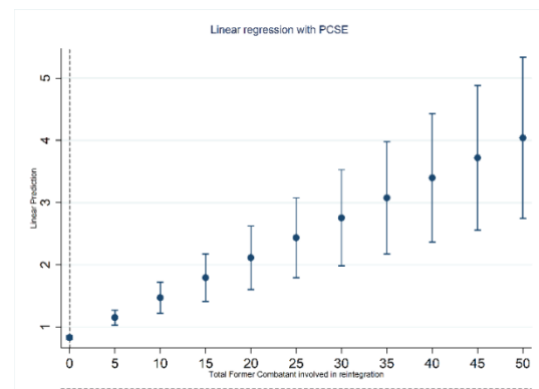
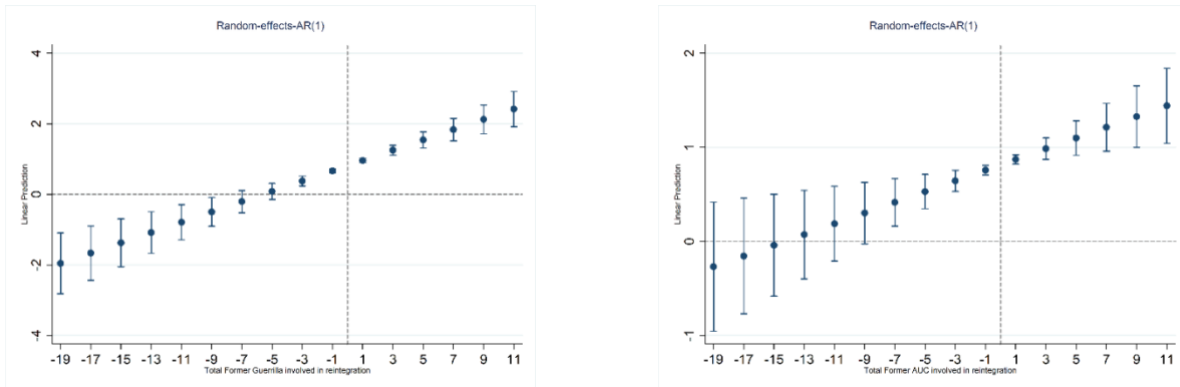


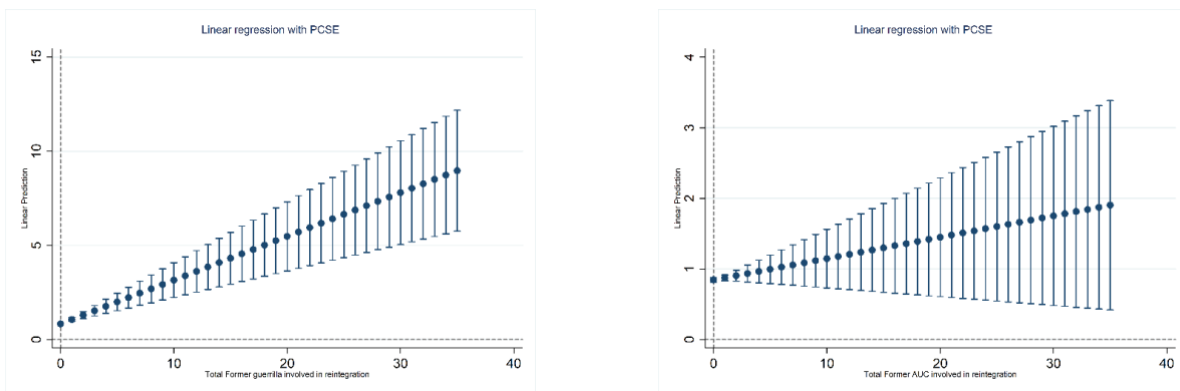
Figure 19: Marginal effects – Robbery (continuation)

PANEL B

Marginal effect – model AR (1) by rebel group



Marginal effect – model PCSE by rebel group



Instrumental Variable Analysis

The basic relationship that we are studying can be written as:

$$\text{Homicide/Robbery rate}_{it} = \alpha + \beta_1 \text{Former combatants}_{it-1} + \beta_i X_{it-1} + \varepsilon_i,$$

Where α is a fixed-effect reflecting the unobservable difference between municipalities, X_{it} is the control variable, and ε_i is an error term. This equation was estimated based on the previous section data using different methods. However, the relationship between the presence of ex-combatants and crime may, however, suffer from endogeneity. Reverse causality may be taking place: criminal rates may be affecting the decision of where ex-combatants prefer to live. Using the previous statistical methods to estimate the relationship would, therefore, lead to biased results. To address this issue, we use fixed effect panel data with instrumental variables.

The challenge here is to find suitable instrument variables. We propose data¹¹⁴ of birth and recruitment for the presence of ex-combatants as instruments, since it is unlikely that current crime rates will affect the probability of ex-combatants being born or recruited in a community. The geography of return and recruitment of former combatants and how they make their relocation decision have not been studied due to the lack of microdata. However, some studies have highlighted the importance of identifying these geographic patterns with the objective to improve the reintegration process and to prevent future violence. For example, Podder (2012) argues that the relationship between geographical

¹¹⁴ We collect the information where the rebels were born and recruited, then we collapse the information to generate variables that count the number of ex-combatants by municipality and year of reintegration (or year of beginning the programme).

recruitment and reintegration areas suggests a fundamental element for explaining the post-conflict tensions between communities and former combatants. Another example is the research of Daly (2016), which is focused on the remilitarization of rebel groups in Colombia. Her work is rich in sources of information. She concludes that “there exists a great deal of path dependence, with relocation determined by recruitment rather than by individual agency or post-war considerations. In particular, individuals should tend to return to where they were recruited, underscoring the importance of the geography of recruitment” (Daly, 2016, p. 86).

With the previous findings in mind, and for solving the endogeneity problem, we gather information about the areas where former combatants were born, where they were recruited and where they are living. We create different variables to identify if the former combatants are residing in the same place that they were born or were recruited. From this information, we identify the rebel group (guerrilla and paramilitary) recruitment pattern from 888 of 1,122 Colombian municipalities. In the paramilitary case, eight percent (8%) of the 32,508 individual combatants registered as a paramilitary member report the same birth, recruitment and living place; 31 percent report the same location of residence and birth, and 15 percent are living in the area of recruitment. In the guerrilla scenario, two percent of the 17,174 individual combatants registered as a guerrilla report the same birth, recruitment and living place; 11 percent report the same location of residence and birth, and four percent are living in the recruitment area. In sum, this information shows that 51.46% of the 49,682 ex-combatants do not return either to their

birth or recruitment place. However, the ex-paramilitaries present a high rate of returning to those locations. Meanwhile, the ex-guerrillas prefer new areas. Map 1 and Map 2 chart this information. For more details about this information see Appendix A.

Table 41 and Table 42 present the instrumental variable results, but only include the birthplace instrument. We also estimate models with recruitment place and both (birth and recruit); these results are shown in Appendix C. The first section (instrument) of both Table 41 and Table 42 present the first-stage result for the instrumented variable. These models are fixed effect estimates without any type of correction, such as robust option. The second section (IV estimation) of both tables present the second-stage IV results, and the models are robust fixed effect.

Table 41 presents the instrumental model with homicide rate as a dependent variable. In the first section, model (1), the instrumental variable is significant, and the p-values for the F-statistic of the excluded instrument are less than 1%, and the F-statistics are over 28. These results suggest instrument relevance.¹¹⁵ In model (2) the instrumented variable is former AUC, and we use as an instrument the birthplace of ex-AUC. The instrumental variable is significant and relevant. In model (3) the instrumented variable is ex-guerrilla, and the instrument is the birthplace of ex-guerrilla. The instrument is

¹¹⁵ “Stock and Watson (2003) suggest a simple rule of thumb to check for weak instruments [...] This first-stage F-statistic should be larger than 10. Stock and Watson (2003) suggest that a first-stage F-statistic less than 10 indicates weak instruments which casts doubt on the validity of 2SLS, since with weak instrument, 2SLS will be biased even in a large samples and the corresponding t-statistics and confidence intervals will be unreliable” (Baltagi, 2005, p. 263).

statistically significant, and the F-statistic suggests instrument relevance. The second section of Table 41 column 1 shows results for the total former combatants; the key finding is that this variable has no statistical effect on the rate of homicide by municipality. Column 2 results suggest that former AUC does have a positive statistical effect, while former guerrilla has a negative statistical effect; both are significant at 5%. Column 3 results propose a different scenerio from column 2, however, as these results are not statistically significant. Possible explanations for these results could be, firstly, that the instrument variables are different in both models, and these instruments show different behaviour depending on the type of group. Second, the number of former combatants does not have a statistical effect on the homicide rate because they do not commit this kind of crime, since they could lose benefits if the offender is proven guilty.

Table 42 presents the instrumental model with robbery rate as a dependent variable. The logic in these models is the same as Table 41. We use as an instrument the birthplace of former combatants. In model (1), model (2) and model (3), the instrument is statistically significant, and the F-statistic suggests instrument relevance.

The second section of Table 42, column 1, shows results for total former combatants; the key finding is that this variable has a positive but no statistical effect on the rate of robbery by municipality. Column 2 results suggest that former guerrillas have a positive statistical effect, meanwhile former AUC has a positive but no statistical effect. Column

3 results propose a different story from previous results; here, former AUC is positive and significant at 10% on the rate of robbery. However, ex-guerrillas have a negative but no statistical effect. This result confirms the conclusion presented in the previous section: ex-combatants can commit robbery as a means of economic survival because this type of crime does not present any risk.

Figure 20: Short effects – Instrumental variable model

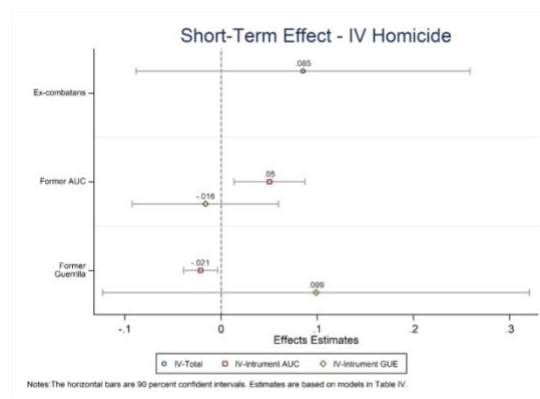


Figure 21: Short effects – Instrumental variable model – robbery

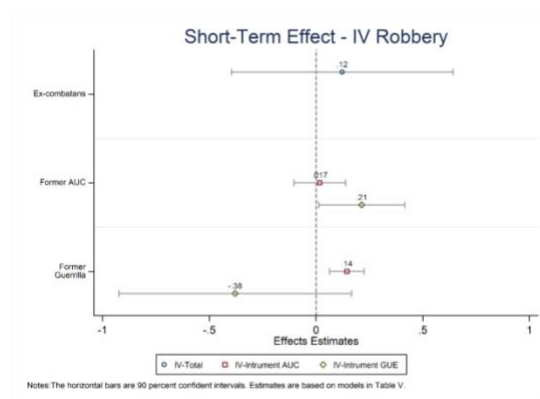


Table 41: Instrumental Variable: homicide and former rebels (2003 – 2014)

VARIABLES	Model (1) Total Combatant	Model (2) Combatant rebel group	Model (3) by Combatant by rebel group
Instrument			
Birthplace	-0.0044* (0.00047)	-0.0077* (0.00025)	-0.0125* (0.0015)
N	10909	10909	10909
Centered R-Square	0.0789	0.4026	0.3804
F-statistic excluded instrument	89.23	914.88	67.90
P-Value	0.000	0.000	0.000
Anderson LR-statistic (relevant test)	88.60	838.596	67.588
P-Value for Anderson LR-statistic	0.000	0.000	0.000
Cragg-Donald Wald F-statistic	89.22	914.876	67.905
Stock-Yogo (critical values) 10%	16.38	16.38	16.38
IV estimation			
Ex-combatants involved in reintegration	0.0852 (0.105)		
Ex-AUC involved in reintegration		0.0502** (0.022)	-0.0163 (0.046)
Ex-guerrilla involved in reintegration		-0.0214** (0.011)	0.0987 (0.135)
Observations	10,909	10,909	10,909
Centered R-squared	0.0130	0.0552	0.043
Number of ID_Muni	1,093	1,093	1,093
N	10909	10909	10909
F-statistic	28.34	17.83	26.71
Sigma	0.278	0.272	0.274
Instrumented		AUC	Guerrilla

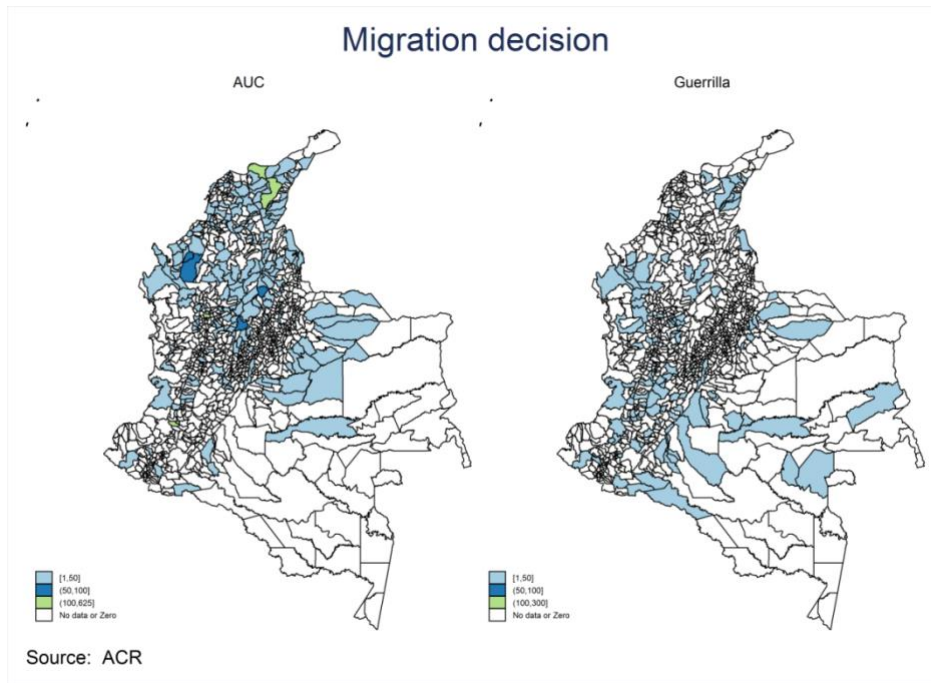
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 42: Instrumental Variable: robbery and former rebels (2003 – 2014)

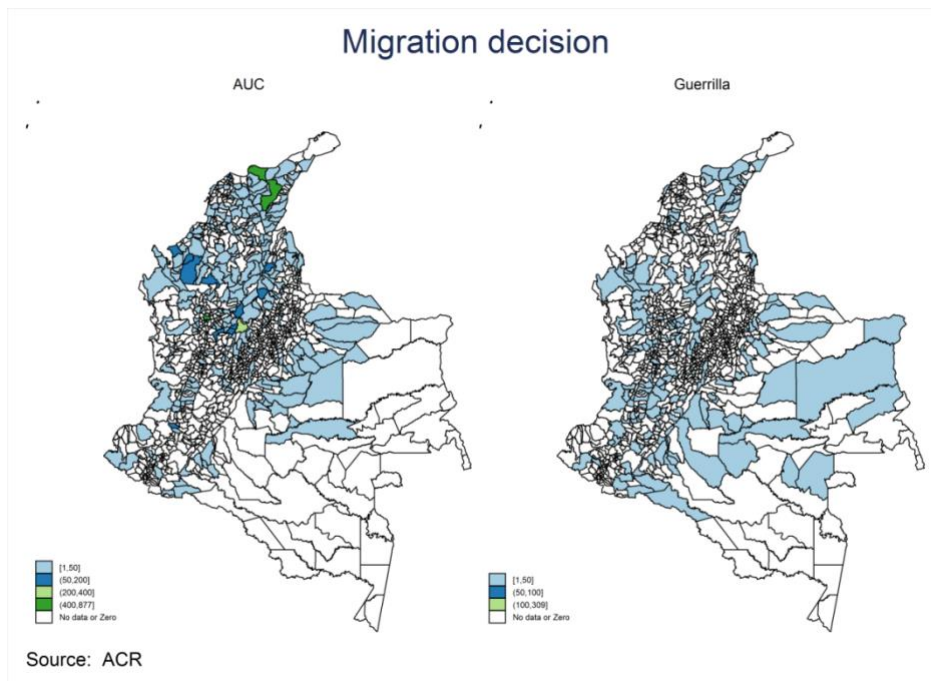
VARIABLES	(1) Total Combatant	(2) Combatant by rebel group	(3) Combatant by rebel group
Instrument			
Birthplace	-0.0029* (0.0005)	-0.0077* (0.0002)	-0.0145* (0.0015)
N	12.057	12.057	12057
Centered R-Square	0.0778	0.3742	0.4245
F-statistic excluded instrument	39.58	954.73	97.87
P-Value	0.000	0.000	0.000
Anderson LR-statistic (relevant test)	39.513	879.8	97.2
P-Value for Anderson LR-statistic	0.000	0.000	0.000
Cragg-Donald Wald F-statistic	39.58	954.72	97.873
Stock-Yogo (critical values) 10%	16.38	16.38	16.38
IV estimation			
Ex-combatants involved in reintegration	0.1191 (0.307)		
Ex-AUC involved in reintegration		0.0180 (0.074)	0.2392* (0.135)
Ex-guerrilla involved in reintegration		0.1529*** (0.051)	-0.4266 (0.360)
Observations	12,057	12,057	12,057
Centered R-squared	0.061	0.066	0.015
Number of ID_Muni	1,098	1,098	1,098
N	12057	12057	12057
F-stat	31.98	29.62	27.40
Sigma	0.782	0.780	0.801
Instrumented		AUC	Guerrilla

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Map 1: Same residence, birthplace and recruitment



Map 2: Same residence and recruitment



Conclusions

The existing literature on post-conflict violence identifies different reasons and types of violence appearing in post-conflict societies and explores the relationship between DDR processes and the new violence. Despite the valuable insights provided by this literature, there has been no systematic research directed towards studying the effect of former combatants who are involved in reintegration programmes in the post-conflict violence. An explanation for this absence could be the difficulty and the cost of gathering data.

We have contributed in this area by examining the dynamics of violent crime in Colombia and characterising the regional dynamics of the conflict and the post-conflict violence, focusing on the presence of ex-combatants who participate in the DDR programme; in other words, we have analysed if communities with more ex-combatants have experienced more crime, and if DDR programmes matter in this situation. The empirical findings are based on two types of crime—homicide and robbery—and consider data since 2003. The findings confirm our expectation: the presence of former combatants who are part of the reintegration programme influence the trend of the rate of homicide and robbery, and there is a regional differentiation in this tendency.

We only examined the presence of former combatants in each municipality in the Colombian case. The Colombian case has been previously studied because it has a good

information system, but this research marks a difference because we gather information on where the former combatants were born and were recruited to control for endogeneity. However, we did not obtain authorisation for conducting the study at the individual level. An extension of the data could entail, for example, gathering information about another type of low-intensity violence, including the individual level information and building other indicators about recruitment, birthplace and recidivism; these research avenues may merit further exploration.

The literature on post-conflict violence still has a lot to uncover and several options have been identified for further research. Throughout this paper, we have identified and referred to several causal mechanisms associating a DDR programme and ex-combatants with post-war violence. We focused on a regional level in our analysis and, consequently, we are not able to evaluate these mechanisms at the individual level. For this reason, for future research, it is important, initially, to develop a theory about the logic of violence in post-conflict societies. Second, it is necessary to understand the micromotives and macrobehaviours at the individual level. This would allow researchers and policymakers to assess the causes, reasons and preferences which determine why societies continue on a path of violence.

Our argument on the presence of former combatants suggests that this population has no effect on homicide but increases the risk of robbery. For future studies, we need to

analyse other forms of violence, such as intra-familial, gangs, revenge, sexual violence, smuggling, etc. These low-intensity forms of violence need to be studied because, first and foremost, we need to understand the legacy of the conflict, its ties with this type of violence and its motivations. Second, the government needs to create programmes and policies to solve the growing trend towards new forms of violence.

The main contributions of our research include the disaggregation of types of crime, identifying the numbers of former guerrilla or paramilitaries engaged in reintegration or not, and the inclusion of the geography of recruitment as an instrument. Moreover, the analysis at the municipality level allows us to abstract from highly individual factors and consider municipality level effects that are more policy relevant. With regard to the policy implications of our study, we believe that this research could influence the study of peacebuilding and post-conflict violence. For the policy community, it is important not only to consider the legacy of the conflict but also figure out how we can deal with the presence of ex-soldiers in a post-conflict society. Our results show that the presence of this population is likely to impact the rates of robbery but not the rates of homicide. We do not know whether reintegration matters for homicide/robbery because former combatants are less likely to commit a violent crime, or whether the communities themselves become less violent. However, reintegration programmes should perhaps be less centralized, be focused on individual expectations, and bear in mind the geography of recruitment in order to develop a policy of prevention which focuses on reducing recidivism and new types of violence.

Appendix A: Dataset

A design utilising a quantitative method was used to solve the research questions. We collected six official data sources and the municipality panel of The Centre for Economic Development Studies (CEDE¹¹⁶) and created an unbalanced panel data containing information for every municipality in Colombia (1,122 in total) for each year between 2003¹¹⁷ and 2014. In this Appendix, we introduce the dataset and explain certain technical decisions.

Missing data

We use the Amelia II programme for solving the missing data issue. Amelia II is an R package that performs multiple imputations to deal with missing data, running an Expectation Maximisation Bootstrap Algorithm. It was developed by Honaker, King and Blackwell (2011).

The following variables were imputed: Total income, revenue from total taxes, revenue from property tax (predial), index of unsatisfied basic needs (2005), public health system,

¹¹⁶ For further information, see <https://datoscede.uniandes.edu.co/contenido.php/1/about-cede-data-center/>

¹¹⁷ We have some variables with information since 1993 or 2000. We used this information for estimating missing data.

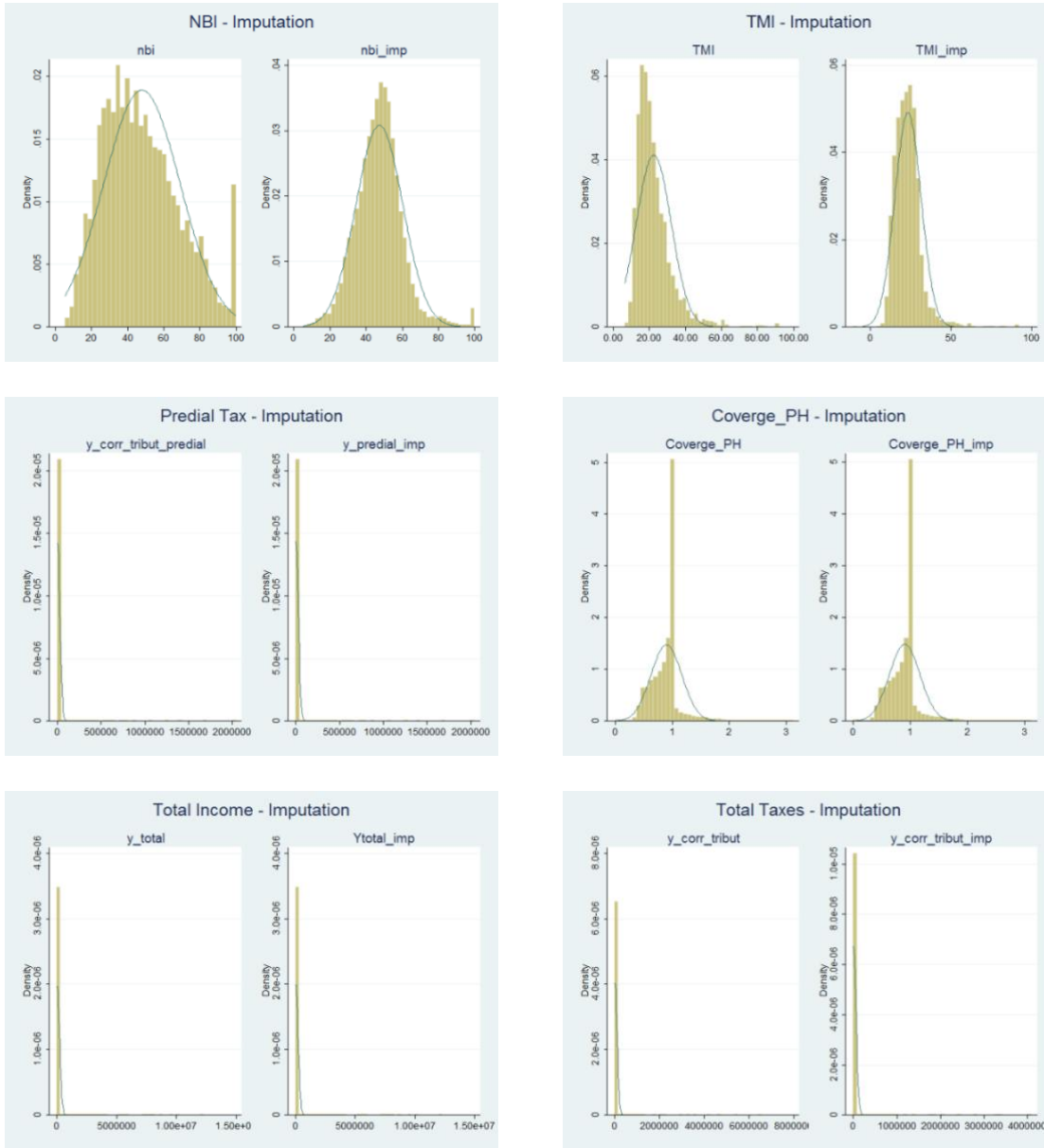
coverage of public health system and infant mortality. Table 43 shows the amount of missing data.

Table 43: Missing data

Variable	Missing	Observation	Min	Max
Index of unsatisfied basic needs	13,495	3,293	5,36	100
Index of unsatisfied basic needs _imp		16,788	5,36	100
Total income	332	16,456	0	10.187.876
Total income _imp		16,788	0	10.187.876
Income from taxes	330	16,458	0	6571326
Revenue from taxes _imp		16,788	0	4101949
Income property tax	332	16,456	0	2044135
Income property tax _imp		16,788	0	2044135
Infant mortality	6,701	10,087	7	91,97
Infant mortality _imp		16,788	0	91,97
Public_health	289	16,499	0	1681822
Public_health_imp		16,788	-19098	1681822
Coverage_public health	289	16,499	0	3
Coverage_public health		16,788	0	3

The following graphs (Figure 22) display the histograms for original and new variables.

Figure 22: Missing data - Histograms



Updated information

The municipality panel of CEDE¹¹⁸ presents information about general characteristics of each town in Colombia from 1993 to 2012. We updated some variables with information from the original or primary sources, such as DNP, DANE or the Ministries.

Dependent variables

The statistical exercises have two dependent variables. We used two different types of offences. We analyse private crime with information about robbery and homicide. This information was gathered from 2003 to 2014. See Table 44.

Table 44: Descriptive Statistics – dependent variables

VARIABLES	(1) N	(2) Mean	(3) Sd	(4) min	(5) max
Homicide – PN	12,004	15.19	82.77	0	2,138
Homicide – CEDE	13,375	15.49	83.57	0	2,678
Rate of homicide per 1th inhabitants	12,004	0.337	0.418	0	7.186
Total of theft	13,157	96.18	995.7	0	41,565
Theft or larceny	13,025	55.13	586.9	0	28,118
Rate of robbery per 1th inhabitants	13,157	0.805	1.221	0	20.81

¹¹⁸ We had access to the dataset in April 2015.

Independent variables

Following the literature review, we clustered the variables into three groups: DDR, the legacy of conflict and municipality characteristics. The DDR block represents the information related to the demobilisation and reintegration programme. The legacy of conflict indicates the presence of armed conflict in the past and present. Characteristic of municipality shows different information about social conditions, poverty, regional distributions and economic conditions, such as poverty, the culture of violence and the illegal economy.

Key independent variable: Number of ex-combatants

Our core variable is the number of former fighters. We distinguish between the rebel groups, ex-combatants involved in the ACR reintegration programme, recidivist and dead ex-combatants. Table 45, Table 46 and Table 47, show the total number of ex-combatants. Table 48 displays the descriptive statistics.

Table 45: Total former combatants demobilised (2002 – 2014)

	Frequency	Percentage
Paramilitary	35317	62.67
Guerrilla	21041	37.33
Total	56358	100.00
Paramilitary	32508	65.43
Guerrilla	17174	34.57
Total	49683	100.00

Source: Colombian Agency for Reintegration (ACR); Colombian National Police. Note ¹ Population 56,358 former combatants; sample 49,683 former combatants. 6,675 former combatants do not register municipality. They have been dropped from the dataset.

Table 46: Total former combatants involved in reintegration programme (2002 – 2014)

	Frequency	Percentage
Paramilitary	29110	63.48
Guerrilla	16750	36.52
Total ¹	45860	100.00

Source: Colombian Agency for Reintegration (ACR); Colombian National Police. Note ¹ 3823 former combatants do not involve in the reintegration programme

Table 47: Former fighters participating in a reintegration programme but recidivist (2002 – 2014)

	Frequency	Percentage
Paramilitary	9969	78.16
Guerrilla	2786	21.84
Total	12755	100.00

Source: Colombian Agency for Reintegration (ACR); Colombian National Police

Table 48: Descriptive Statistics – Key Independent Variable

VARIABLES	(1) N	(2) mean	(3) Sd	(4) min	(5) max
Ex-combatants involved in reintegration	13,445	0.253	1.643	0	46.39
Ex-AUC involved in reintegration	13,445	0.178	1.124	0	33.77
Ex-guerrilla involved in reintegration	13,445	0.0745	0.738	0	30.57

Table 49: Descriptive Statistics – Control Variables and instruments

VARIABLES	(1) N	(2) mean	(3) Sd	(4) Min	(5) max
Ex-combatants uninvolved in reintegration	13,445	0.574	5.026	0	178
Ex-Guerrilla uninvolved in reintegration	13,445	0.649	10.07	0	419
Ex-AUC uninvolved in a reintegration	13,445	3.817	26.80	0	962
Presence of ELN (lag)	13,440	0.179	0.383	0	1
Presence of FARC (lag)	13,440	0.395	0.489	0	1
Presence of AUC (lag)	13,440	0.138	0.344	0	1
Total forced displacement (arrival)	13,445	317.8	1,600	0	52,260
Natural logarithm of total forced displacement	13,445	3.609	2.120	0	10.86
Ratio: rural population/total population	13,445	0.579	0.243	0.0010	1
% youth population	13,445	0.186	0.0190	0.107	0.442
Natural logarithm of coca crops	13,445	0.771	1.858	0	9.589
Taxes Per capita	13,445	0.0585	0.0864	0	2.236
Infant mortality rate	10,087	22.47	9.677	6.507	91.97
Infant mortality rate (imp)	13,440	22.76	9.219	2.720	91.97
Presence of illegal mining	13,445	0.175	0.380	0	1
Altitude	13,445	1,153	1,158	1	25,221
Distance from municipality to Bogota	13,445	321.4	194.6	0	1,271
Total recruitment	13,445	2.389	18.35	0	930
AUC recruitment	13,445	1.455	17.82	0	930
Guerrilla recruitment	13,445	0.934	3.645	0	90
Total birthplace	13,445	3.081	20.93	0	1,350
AUC birthplace	13,445	2.032	20.23	0	1,337
Guerrilla birthplace	13,445	1.049	3.459	0	120

Instrumental Variables

We calculate total recruitment and identify if the ex-combatants return to their places of residence, recruitment and/or birth. These variables aim to control the endogeneity.

1. Total recruitment by municipality

We gather the information about the place where former combatants were recruited. This data was collapsed by municipality, year of demobilisation and rebel group. We create three different variables: first, a general index of recruitment by the municipality; second, an index by district and year; lastly, a dummy as an identification variable. 888 out of 1122 Colombian cities register recruitment. The following Map 3 and Table 50 show the districts with rebel recruitment by rebel groups.

Map 3: Place of recruitment

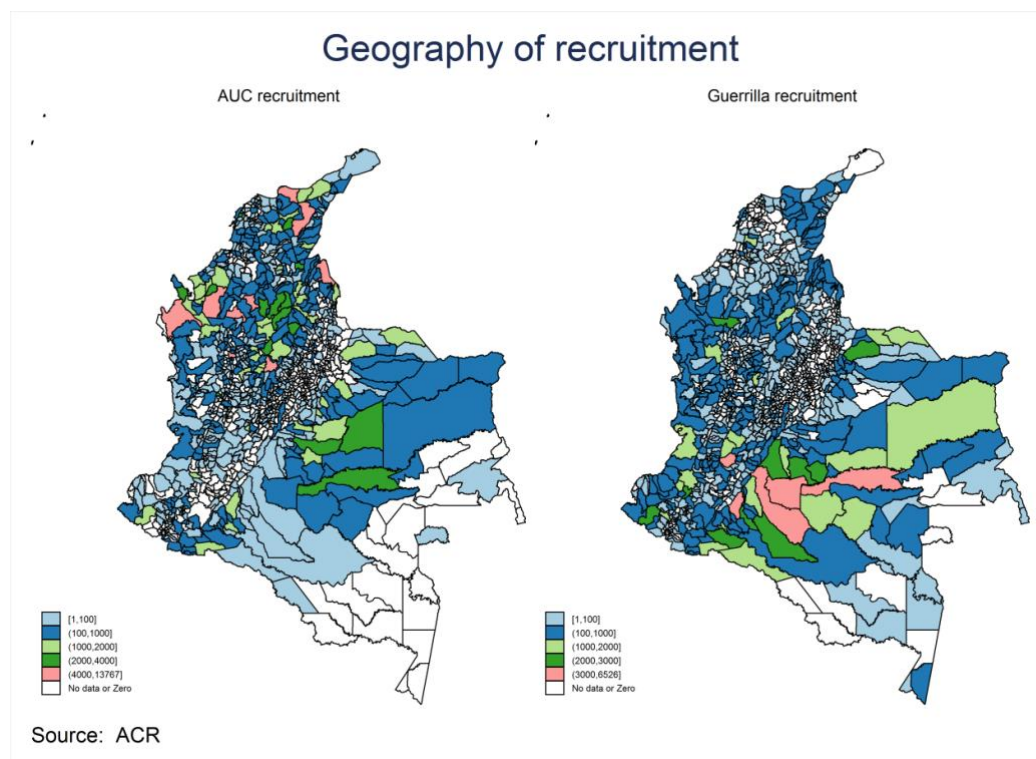


Table 50: Ranking of municipalities: recruitment by armed group

Position	Municipality	AUC	Position	Municipality	Guerrilla
1	Medellín	1,059	1	San Vicente del Caguán	502
2	Tarazá	1,014	2	San José del Guaviare	302
3	Valledupar	922	3	La Macarena	266
4	Santa Marta	794	4	Planadas	260
5	Tibú	487	5	Florencia	251
6	Tierralta	393	6	Uribe	229
7	Caucasia	389	7	Puerto Guzmán	217
8	Riosucio	336	8	Barbacoas	211
9	Puerto Boyacá	335	9	Vistahermosa	209
10	San Martín	282	10	Cartagena del Chairá	198
TOTAL					

2. Place of residence, place of recruitment and place of birth

We collect the information where the rebels are living, where they were born and where they were recruited. We use this information to generate different variables that count the number of ex-combatants residing in the same place that they were born or were recruited. We calculate¹¹⁹ the variables using the year when they started the reintegration process. We also differentiate by rebel group (paramilitary and guerrilla). We create the following variables:

1. Former combatant was born and resides in the same municipality:

This variable counts the number of ex-combatants who returned to their birthplace. We have 39,616 responses and 10,066 not available (NA). 24% of the former combatants have returned to their place of origin, and 56% have not returned.

Table 51: Resident = Born

	TOTAL	AUC	GUERRILLA
Return	11,994 (24%)	10,182 (31%)	1,812 (11%)
No return	27,622 (56%)	16,257 (50%)	11,365 (66%)
No information	10,066 (20%)	6,069 (19%)	3,997 (23%)
Total	49,682	32,508	17,174

¹¹⁹ We collapse the variables by year of reintegration (i.e. when they start the programme); for that reason, the sample is 45,860 former combatants.

2. Former combatant was recruited and resides in the same municipality:

This variable counts the number of ex-combatants who returned to where they were recruited. We have 31,936 responses and 17,746 were not available (NA). 11% of the former combatants have returned to their place of recruitment, and 53% have not returned.

Table 52: Resident = Recruited

	TOTAL	AUC	GUERRILLA
Return	5,691 (11%)	5,010 (15%)	681 (4%)
No return	26,245 (53%)	14,533(45%)	11,712 (68%)
No information	17,746 (36%)	12,965(40%)	4,781 (28%)
Total	49,682	32,508	17,174

3. Former combatant was born and recruited in the same municipality:

This variable counts the number of ex-combatants who were recruited in their birthplace. We have 28,007 responses and 13,423 were not available (NA). 16% of the former combatants were recruited in their place of birth, and 52% were not.

Table 53: Birthplace = Recruited

	TOTAL	AUC	GUERRILLA
Return	6,587 (16%)	3,859 (14%)	2,728 (19%)
No return	21,420 (52%)	13,993 (51%)	7,427 (53%)
No information	13,423 (32%)	9,468 (35%)	3,955 (28%)
Total	41,430	27,320	14,110

4. Former combatant was born, recruited and resides in the same municipality:

This variable counts the number of ex-combatants who were born, recruited and live in the same place. We have 28,007 responses and 21,835 were not available (NA). 6% of the former combatants have returned to their place of birth and recruitment, 50% have not returned.

Table 54: Birthplace = Recruited = Resident

	TOTAL	AUC	GUERRILLA
Return	2,991 (6%)	2,631 (8%)	360 (2%)
No return	24,856 (50%)	15,206 (47%)	9,650 (56%)
No information	21,835 (44%)	14,671 (45%)	7,164 (42%)
Total	49,682	32,508	17,174

Appendix B: Statistical Test – Fixed effect model

Multicollinearity

Table 55 summarises the variation inflation factors (VIFs) of the control variables. Note that the total ex-combatant involved and uninvolved variables have a VIF under 5; other variables have a VIF above 5, indicating that the controls present slight multicollinearity problems.

Table 55: The variation inflation factors

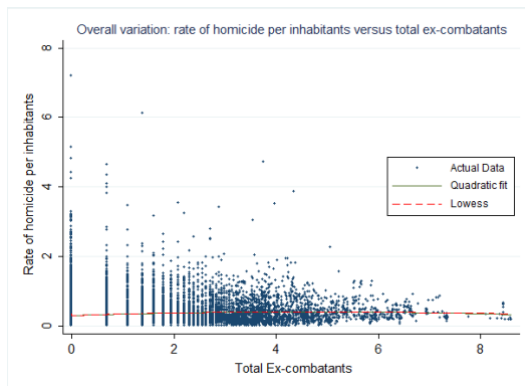
Variable	VIF	TOLERANCE
Ex-combatants involved in reintegration	1.66	0.60
Ex-AUC involved in reintegration	7.58	0.13
Ex-guerrilla involved in reintegration	11.14	0.08
Ex-combatants uninvolved in reintegration	1.60	0.62
Ex-guerrilla uninvolved in reintegration	9.64	0.10
Ex-AUC uninvolved in a reintegration	8.32	0.12
Presence of ELN (lag)	1.27	0.79
Presence of FARC (lag)	1.46	0.69
Presence of AUC (lag)	1.22	0.82
Natural logarithm of total forced displacement	2.02	0.49
Ratio: rural population/total population	1.76	0.57
% youth population	1.23	0.81
Natural logarithm of coca crops	1.38	0.73
Taxes Per capita	1.20	0.83
Infant mortality rate (imp)	1.68	0.59
Presence of illegal mining	1.04	0.96
Altitude	1.41	0.71
Distance from municipality to Bogota	1.49	0.67
Total recruitment	2.04	0.49
AUC recruitment	2.03	0.49
Guerrilla recruitment	2.12	0.47
Total birthplace	2.79	0.36
AUC birthplace	2.39	0.42
Guerrilla birthplace	2.35	0.43

Scatterplot for variation

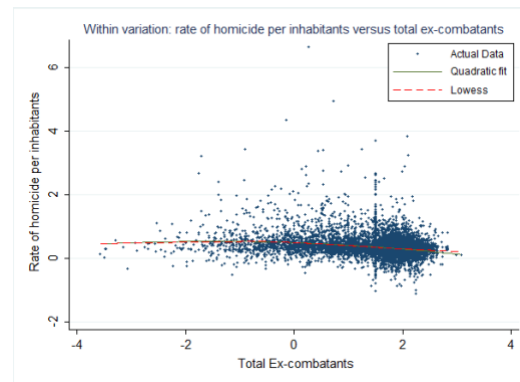
Figure 23: Relationship between core variables and former combatants

Homicide

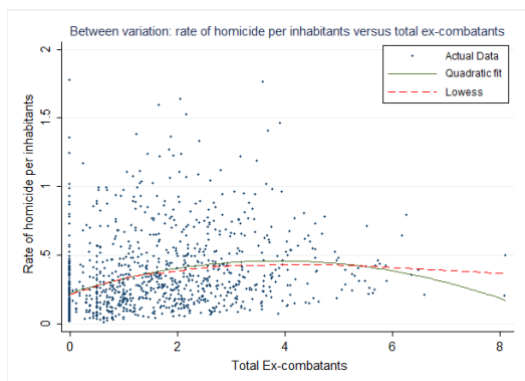
Overall



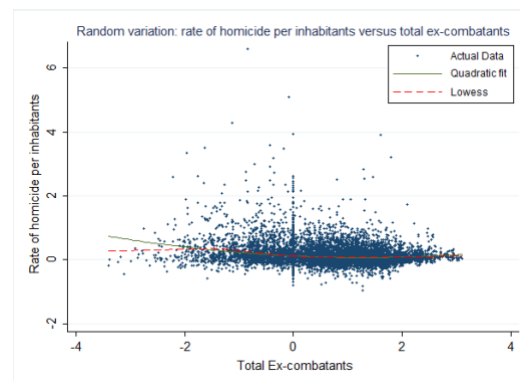
Within¹²⁰



Between¹²¹



Random¹²²



¹²⁰ The information is the deviation from individual means. Over-time effect.

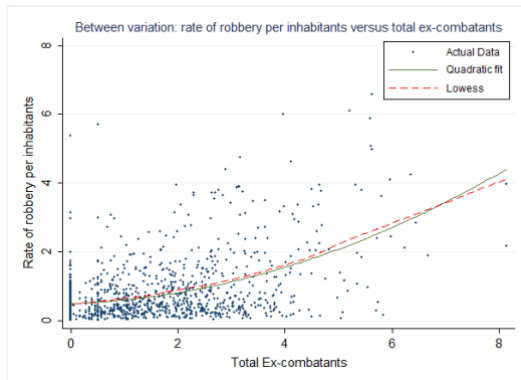
¹²¹ The information is the cross-section in the data (\bar{y}_i on \bar{x}_i). Across municipality effect.

¹²² Random estimator uses both between and within variation in the data.

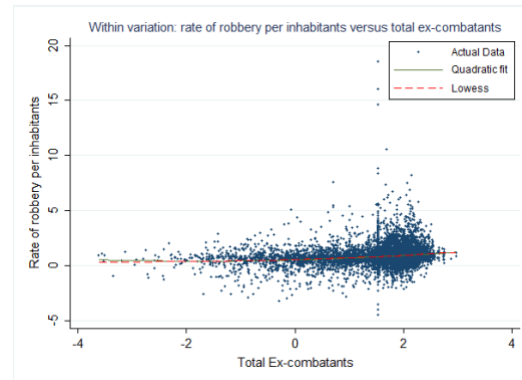
Figure 23: Relationship between core variables and former combatants (continuation)

Robbery

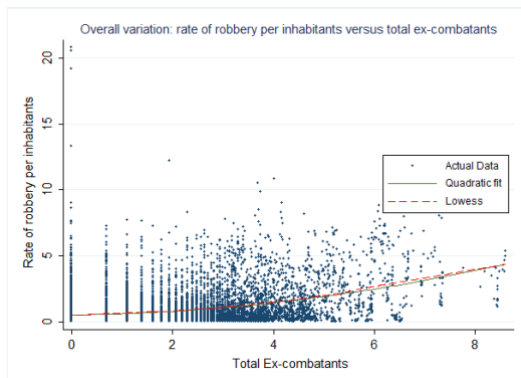
Between



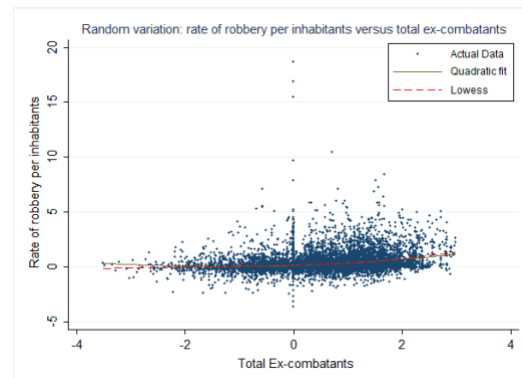
Within



Overall



Random



Time-series autocorrelations

Following Cameron and Trivedi (2010), we calculate autocorrelations at all lags and their average. Table 56 displays the average of lag-1 autocorrelation for individual-year, suggesting that the dependent variables have no autocorrelation at level one; in other words, AR(1) (Cameron & Trivedi, 2010, p. 245).

Table 56: Time-series autocorrelation

	Average of autocorrelation	
	Total ex-combatants	Ex-combatants by rebel group
Model 1: Homicide	0.2948	0.2956
Model 2: Robbery (total)	0.3482	0.317

Wooldridge test for autocorrelation in panel data

The Wooldridge test for autocorrelation confirms the need to control for autocorrelation.

Table 57: The Wooldridge test

	Wooldridge test for autocorrelation in panel data	
	Total ex-combatants	Ex-combatants by rebel group
Model 1: Homicide	41.058 (0.00)	41.059 (0.00)
Model 2: Robbery (total)	37.313 (0.00)	37.241 (0.00)

Unit root

We use the Fisher-type test, which has as the null hypothesis that all the panels contain a unit root. Table 58 shows the test results, indicating that the models do not present unit root problems.

Table 58: The Fisher-type test

	Inverse chi-squared
Model 1: Homicide	7393.0134 (0.0000)
Model 2: Robbery (total)	4990.6393 (0.0000)

Heteroscedasticity

Modified Wald test for wise group heteroscedasticity confirms that the models present heteroscedasticity problems.

Table 59: The Wald test for heteroscedasticity

	Wald test for groups' heteroscedasticity	
	Total ex-combatants	Ex-combatants by rebel group
Model 1: Homicide	520000 (0.00)	510000 (0.00)
Model 2: Robbery (total)	1200000 (0.00)	1300000 (0.00)

Cross-sectional dependence

The Pesaran's test of cross-sectional independence indicates that the models present a cross-sectional dependence problem.

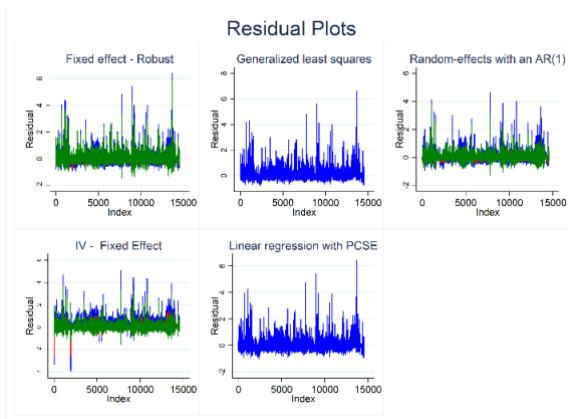
Table 60: The Pesaran's test of cross-sectional independence

		Total ex-combatants	Ex-combatants by rebel group
Model 1:	Homicide	57.316 (0.00)	57.887 (0.00)
Model 2:	Robbery (total)	71.987 (0.00)	72.617 (0.00)

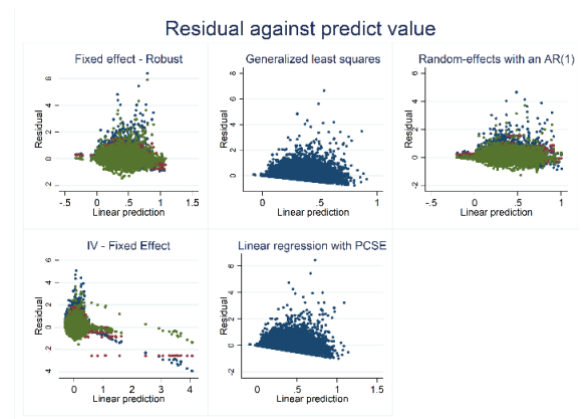
Residuals plots

Figure 24: Homicide: Residuals plots

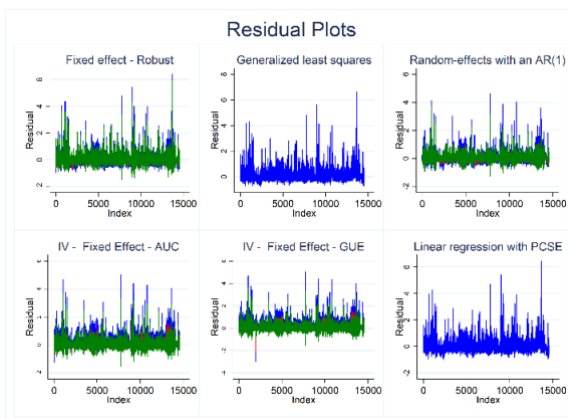
Residuals plots: total ex-combatants



Residual against predict value



Residuals plots: rebel groups



Residual against predict value: rebel groups

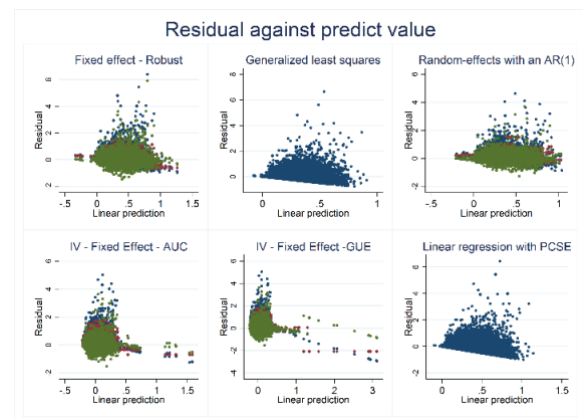
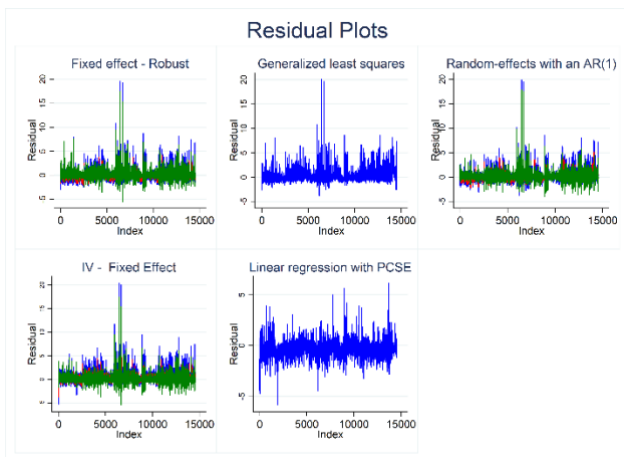
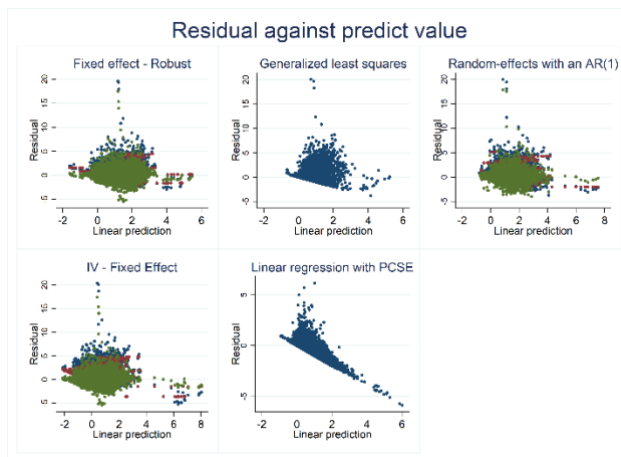


Figure 25: Robbery (total): Residual plots

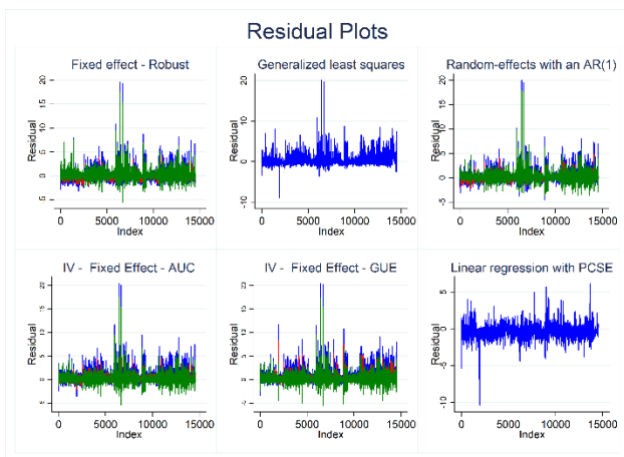
Residual plots: total ex-combatants



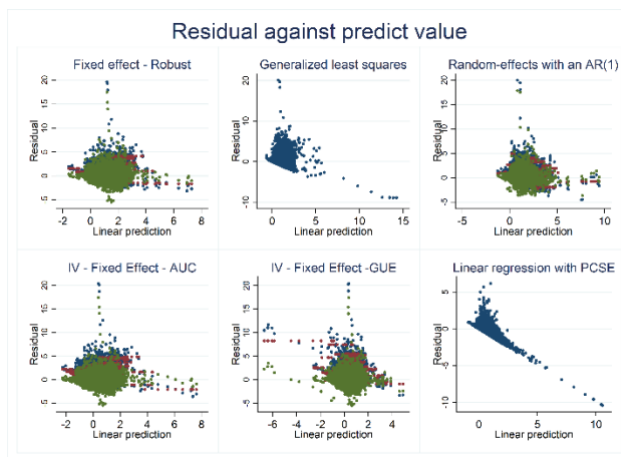
Residual against predict value



Residual plots: rebel groups



Residual against predict value: rebel groups



Appendix C: Other models

Homicide

Table 39: Homicide and former rebels (2003 – 2014)

VARIABLES	Model (1) Total Combatant	Model (2) Total Combatant	Model (3) Combatant by rebel group	Model (4) Combatant by rebel group
Presence of ELN (lag)	0.0336*** (0.009)		0.0335*** (0.009)	
Between ELN1	0.0746*** (0.024)		0.0774*** (0.024)	
Presence of FARC (lag)	0.0300*** (0.008)		0.0301*** (0.008)	
Between FARC_1	0.0540*** (0.018)		0.0552*** (0.018)	
Presence of AUC (lag)	0.0640*** (0.009)		0.0647*** (0.009)	
Between AUC_1	0.0565 (0.040)		0.0694* (0.041)	
Ratio: rural population/total population	0.8941*** (0.265)		0.9015*** (0.265)	
Between ind_rural	-0.0244 (0.040)		-0.0281 (0.040)	
% Youth population	-2.2425*** (0.436)		-2.2512*** (0.436)	
Between ind_youth	-0.7556 (0.465)		-0.7591 (0.464)	
Between TMI_imp	-0.0024* (0.001)		-0.0023* (0.001)	
Between Taxes_percapita	0.0025 (0.120)		-0.0022 (0.120)	
Altitude (Between)	-0.0000 (0.000)		-0.0000 (0.000)	
Distance to Bogota (Between)	-0.0003*** (0.000)		-0.0003*** (0.000)	

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 39: Homicide and former rebels (2003 – 2014) (continuation)

VARIABLES	Model (1) Total Combatant	Model (2) Total Combatant	Model (3) Combatant by rebel group	Model (4) Combatant by rebel group
Presence of illegal mining (Between)	-0.0156 (0.018)		-0.0157 (0.018)	
Ln-Total forced displacement (arrival)	0.0217*** (0.003)		0.0217*** (0.003)	
Between ln_DP	0.0490*** (0.006)		0.0501*** (0.006)	
Ln coca crop = L,	0.0065 (0.005)		0.0067 (0.005)	
Between ln_CC	0.0389*** (0.005)		0.0381*** (0.005)	
Taxes Per capita = L,	-0.0848 (0.084)		-0.0831 (0.084)	
Infant mortality rate = L,	0.0023*** (0.001)		0.0023*** (0.001)	
LN of total forced displacement (arrival)		0.0365*** (0.002)		0.0365*** (0.002)
Ratio: rural population/total population		-0.0355 (0.022)		-0.0359 (0.022)
% youth population = L,		-1.1283*** (0.234)		-1.1311*** (0.236)
Natural logarithm of coca crops		0.0393*** (0.003)		0.0393*** (0.003)
Taxes Per capita = L,		0.1993** (0.088)		0.1990** (0.088)
Infant mortality rate (imp) =,		-0.0020*** (0.000)		-0.0020*** (0.000)
Presence of ELN (lag)		0.0534*** (0.007)		0.0539*** (0.007)
Presence of FARC (lag)		0.0591*** (0.007)		0.0591*** (0.007)
Presence of AUC (lag)		0.0574*** (0.012)		0.0569*** (0.012)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 61: Homicide – Fixed effect and GLS models

VARIABLES	(1)	(2)	(1)	(2)
	Total Combatant	Total Combatant	Combatant by rebel group	Combatant by rebel group
Ex-combatants involved in reintegration	0.0059*	-0.0064**		
	(0.003)	(0.002)		
Ex-combatants uninvolved	0.0004	0.0001		
	(0.001)	(0.000)		
Ex-AUC involved in reintegration			0.0173*	-0.00656
			(0.0084)	(0.004)
Ex-AUC uninvolved			-0.00061	0.00039
			(0.0004)	(0.000)
Ex-guerrilla involved in reintegration			-0.0088	-0.0064
			(0.0057)	(0.005)
Ex-guerrilla uninvolved			0.00118	-0.0032*
			(0.0009)	(0.002)
LN of total forced displacement (arrival)	0.0328***	0.0319***	0.0330***	0.0320***
	(0.005)	(0.001)	(0.005)	(0.001)
Ratio: rural population/total population	-0.3444	-0.0274**	-0.3398	-0.0280**
	(0.504)	(0.013)	(0.504)	(0.013)
% youth population = L,	-1.8116***	-0.9917***	-1.8225***	-0.9928***
	(0.642)	(0.135)	(0.642)	(0.136)
Natural logarithm of coca crops	0.0200**	0.0355***	0.0203**	0.0354***
	(0.009)	(0.002)	(0.009)	(0.002)
Taxes Per capita = L,	-0.0222	0.1567***	-0.0186	0.1584***
	(0.114)	(0.044)	(0.114)	(0.044)
Infant mortality rate (imp) = L,	0.0025*	-0.0020***	0.0025*	-0.0020***
	(0.001)	(0.000)	(0.001)	(0.000)
Constant	0.8154***	0.4791***	0.8132***	0.4790***
	(0.311)	(0.027)	(0.311)	(0.027)
Observations	11,996	11,996	11,996	11,996
R-squared	0.097		0.097	
R-squared	0.0968		0.0971	
Number of ID_Muni	1,093	1,093	1,093	1,093
Cluster	municipality	municipality	Municipality	municipality
Method	Fixed effect	GLS	Fixed effect	GLS
Variance	Robust	AR1	Robust	AR1
N	11996	11996	11996	11996

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 62: Homicide and former rebels 2003 – 2012 – First Difference model

VARIABLES	(1) Total Combatant	(2) Total Combatant	(3) Combatant by group	(4) Combatant by group
Ex-combatants involved in reintegration	0.0161*** (0.006)	-0.0028 (0.004)		
Ex-combatants uninvolved	-0.0006 (0.001)	0.0000 (0.001)		
Ex-AUC involved in reintegration			0.0135 (0.009)	-0.0023 (0.006)
Ex-AUC uninvolved			-0.0006 (0.001)	-0.0000 (0.001)
Ex-guerrilla involved in reintegration			0.0386** (0.016)	0.0084 (0.013)
Ex-guerrilla uninvolved			0.0025* (0.001)	0.0012 (0.001)
LN of total forced displacement	0.0185*** (0.004)	0.0172*** (0.004)	0.0185*** (0.004)	0.0172*** (0.004)
Ratio: rural population/total population	-0.2804 (0.621)	-2.3989** (1.056)	-0.3079 (0.620)	-2.4017** (1.057)
% youth population	-1.6842* (0.939)	1.0398 (1.468)	-1.5980* (0.937)	1.0634 (1.470)
LN of coca crops	0.0004 (0.009)	-0.0009 (0.009)	0.0004 (0.009)	-0.0009 (0.009)
Taxes Per capita	0.0939 (0.107)	0.1413 (0.122)	0.0923 (0.107)	0.1419 (0.122)
Infant mortality rate (imp)	0.0012 (0.002)	0.0003 (0.002)	0.0012 (0.002)	0.0003 (0.002)
Presence of ELN (lag) = 1, Yes	-0.0475*** (0.011)		-0.0477*** (0.011)	
Presence of FARC (lag) = 1, Yes	-0.0289*** (0.007)		-0.0292*** (0.007)	
Presence of AUC (lag) = 1, Yes	-0.0725*** (0.014)		-0.0730*** (0.014)	
Constant		-0.1146*** (0.016)		-0.1147*** (0.016)
Observations	10,909	10,904	10,909	10,904
R-squared	0.0240	0.013	0.024	0.0134
R-squared	0.024	0.0134	0.0242	0.013
Cluster	Municipality	Municipality	Municipality	Municipality
Method	OLS	Fixed effect	OLS	Fixed effect
Variance	Robust	Robust	Robust	Robust
N	10909	10904	10909	10904

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Robbery

Table 40: Robbery and former rebels (2003 – 2014)

VARIABLES	Model (1) Total Combatant	Model (2) Total Combatant	Model (3) Combatant by rebel group	Model (4) Combatant by rebel group
Presence of ELN (lag)	-0.0020 (0.022)		-0.0020 (0.022)	
Between ELN1	0.0332 (0.075)		-0.0475 (0.071)	
Presence of FARC (lag)	-0.0304 (0.019)		-0.0314 (0.019)	
Between FARC_1	0.1957*** (0.057)		0.1718*** (0.055)	
Presence of AUC (lag)	-0.0860*** (0.025)		-0.0765*** (0.025)	
Between AUC_1	0.2377* (0.127)		0.0271 (0.123)	
Ratio: rural population/total population	-5.1625*** (0.775)		-5.1457*** (0.774)	
Between ind_rural	-1.5146*** (0.125)		-1.3927*** (0.119)	
% Youth population	-2.3887* (1.338)		-2.1409 (1.336)	
Between Ind_Youth	-5.9289*** (1.461)		-5.8547*** (1.387)	
Between TMI_imp	-0.0065 (0.004)		-0.0089** (0.004)	
Between Taxes_percapita	3.0506*** (0.366)		3.1723*** (0.348)	
Altitude (Between)	-0.0000 (0.000)		-0.0000 (0.000)	
Distance to Bogota (Between)	-0.0009*** (0.000)		-0.0007*** (0.000)	
Presence of illegal mining (Between)	-0.0201 (0.057)		-0.0292 (0.054)	

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 40: Robbery and former rebels (2003 – 2014) (continuation)

VARIABLES	Model (1) Total Combatant	Model (2) Total Combatant	Model (3) Combatant by rebel group	Model (4) Combatant by rebel group
Presence of illegal mining (Between)	-0.0201 (0.057)		-0.0292 (0.054)	
Ln-Total forced displacement	0.0139 (0.009)		0.0142 (0.009)	
Between ln_DP	0.0615*** (0.018)		0.0414** (0.017)	
Ln coca crop = L,	0.0052 (0.013)		0.0050 (0.013)	
Between ln_CC	-0.0485*** (0.015)		-0.0354** (0.014)	
Taxes Per capita = L,	0.9720*** (0.200)		0.9510*** (0.200)	
Infant mortality rate = L,	-0.0118*** (0.002)		-0.0115*** (0.002)	
LN of total forced displacement		0.0248*** (0.008)		0.0240** (0.008)
Ratio: rural population/total population		-1.5909*** (0.181)		-1.5875*** (0.184)
% youth population = L,		-5.6561*** (1.202)		-5.5829*** (1.192)
Natural logarithm of coca crops		-0.0137*** (0.004)		-0.014145*** (0.0036)
Taxes Per capita = L,		2.6076*** (0.245)		2.559393*** (0.244)
Infant mortality rate (imp) = L,		-0.0098*** (0.002)		-0.009727*** (.0022)
Presence of ELN (lag)		-0.0072 (0.018)		-0.008456 (.0181)
Presence of FARC (lag)		0.0176 (0.022)		0.017125 (0.022)
Presence of AUC (lag)		-0.0265 (0.025)		-0.023362 (.0243)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 63: Robbery – Fixed effect and GLS models

VARIABLES	(1) Total Combatant	(2) Total Combatant	(1) Combatant by rebel group	(2) Combatant by rebel group
Ex-combatants involved in reintegration	0.0547 (0.034)	0.0591*** (0.012)		
Ex-combatants uninvolved	-0.0033 (0.004)	-0.0031*** (0.001)		
Ex-AUC involved in reintegration			0.0327 (0.048)	0.0004 (0.015)
Ex-guerrilla involved in reintegration			0.1106 (0.072)	0.3842*** (0.056)
Ex-AUC uninvolved			-0.0051* (0.003)	-0.0020 (0.001)
Ex-guerrilla uninvolved			0.0327** (0.014)	0.0097 (0.007)
LN of total forced displacement)	0.0234*** (0.009)	0.0129*** (0.002)	0.0231** (0.009)	0.0122*** (0.002)
Ratio: rural population/total population	-2.5764*** (0.949)	-1.2478*** (0.034)	-2.6475*** (0.949)	-1.2370*** (0.035)
% youth population	-6.8522*** (1.884)	-4.3515*** (0.307)	-6.6104*** (1.881)	-4.2733*** (0.306)
Natural logarithm of coca crops	-0.0003 (0.011)	-0.0116*** (0.002)	-0.0011 (0.011)	-0.0115*** (0.002)
Taxes Per capita	0.6935 (0.694)	2.2826*** (0.123)	0.6754 (0.693)	2.2347*** (0.123)
Infant mortality rate (imp)	-0.0028 (0.003)	-0.0076*** (0.001)	-0.0028 (0.003)	-0.0075*** (0.001)
Presence of ELN (lag) = 1, Yes	-0.0104 (0.024)	-0.0091 (0.007)	-0.0128 (0.024)	-0.0097 (0.007)
Presence of FARC (lag) = 1, Yes	-0.0308 (0.031)	0.0309*** (0.006)	-0.0306 (0.031)	0.0294*** (0.006)
Presence of AUC (lag) = 1, Yes	-0.1754*** (0.034)	-0.0107 (0.009)	-0.1681*** (0.034)	-0.0093 (0.009)
Constant	3.4320*** (0.685)	2.1375*** (0.060)	3.4326*** (0.685)	2.1160*** (0.060)
Observations	13,149	13,149	13,149	13,149
Cluster	municipality	municipality	municipality	municipality
Method	Fixed effect	GLS	Fixed effect	GLS
Variance	Robust	AR1	Robust	AR1
N	13149	13149	13149	13149

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 64: Robbery and former rebels 2003 – 2012 – First Difference model

VARIABLES	(1) Total Combatant	(2) Total Combatant	(3) Combatant by group	(4) Combatant by group
Ex-combatants involved in reintegration	0.0244 (0.025)	-0.0266 (0.017)		
Ex-combatants uninvolved	-0.0003 (0.001)	-0.0009 (0.002)		
Ex-AUC involved in reintegration			0.0038 (0.034)	-0.0354 (0.023)
Ex-AUC uninvolved in reintegration			0.0010 (0.002)	-0.0003 (0.002)
Ex-guerrilla involved in reintegration			0.0462 (0.042)	-0.0557 (0.044)
Ex-guerrilla uninvolved in reintegration			-0.0087 (0.006)	-0.0087 (0.006)
LN of total forced displacement (arrival)	0.0147* (0.008)	0.0074 (0.008)	0.0148* (0.008)	0.0074 (0.008)
Ratio: rural population/total population,	-1.2485 (0.796)	0.5144 (1.119)	-1.2465 (0.796)	0.5312 (1.120)
% youth population	-2.3917 (1.670)	-5.1046 (3.276)	-2.3301 (1.671)	-5.1891 (3.287)
Natural logarithm of coca crops	0.0033 (0.011)	0.0054 (0.011)	0.0031 (0.011)	0.0053 (0.011)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 64: Robbery and former rebels 2003 – 2012 – First Difference model (continuation)

VARIABLES	(1)	(2)	(3)	(4)
	Total Combatant	Total Combatant	Combatant by group	Combatant by group
Natural logarithm of coca crops	0.0033 (0.011)	0.0054 (0.011)	0.0031 (0.011)	0.0053 (0.011)
Taxes Per capita	0.3531 (0.386)	0.5634 (0.390)	0.3485 (0.386)	0.5600 (0.391)
Infant mortality rate (imp)	-0.0016 (0.002)	-0.0009 (0.002)	-0.0016 (0.002)	-0.0009 (0.002)
Presence of ELN (lag) = 1, Yes	0.0242 (0.018)		0.0238 (0.018)	
Presence of FARC (lag) = 1, Yes	0.0412*** (0.012)		0.0411*** (0.012)	
Presence of AUC (lag) = 1, Yes	0.0215 (0.021)		0.0231 (0.021)	
Constant		-0.1042*** (0.024)		-0.1038*** (0.024)
Observations	12,054	12,049	12,054	12,049
R-squared	0.00301	0.040	0.003	0.040
R-squared	0.003	0.0400	0.00311	0.0401
Cluster	municipality	municipality	municipality	municipality
Method	Regress	Fixed effect	Regress	Fixed effect
Variance	Robust	Robust	Robust	Robust
N	12054	12049	12054	12049

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Conclusion

The central conclusion of this research is that DDR provision is a key aspect in any peace settlement because a fruitful disarmament, demobilisation and reintegration of a warring faction contributes not only to improving the security of both society and the rebels, but also to fostering trust between the negotiating parties. The purpose of this dissertation was to examine the determinants and effects of disarmament, demobilisation and reintegration processes on peace. This dissertation presents some general and broad questions, and raises some specific issues, which were answered in this research. In chapter 3, I address the following question: what determines whether or not a peace negotiation has a DDR provision? In chapter 4, I examine the question of whether a DDR provision, in internal armed conflict settlements, prevents the recurrence of war in the post-conflict scenario. In chapter 5, I analyse whether communities with more ex-combatants experience more crime, and ask the question: do DDR programmes matter? Together these three chapters contribute toward a broader understanding of how provisions, such as DDR, are determined by specific characteristics of the rebel group, country and conflict and its relationship with peace. The dissertation contributes to the debate regarding the failure of peace processes, and to existing literature about negotiations, the cessation of civil wars and peacebuilding.

Chapter 3 analyses the characteristics of conflicts, the rebels' capabilities and the economic and political factors of the states that have had peace negotiations with or

without a DDR provision. This chapter presents a Hawk – Dove game to illustrate how the incentives and conditions influence the bargaining of DDR and uses a statistical model for determining the factors of DDR negotiation. It argues that DDR is a cost-increasing provision and a highly politicized process, as it is a key element of bargaining power, and that it is a crucial aspect of any peace settlement. The findings suggest that conflicts which are high cost, in terms of duration and death, are less likely to have a DDR in a peace negotiation. This highlights the fact that weariness and state weakness have a substantial effect on the decision to negotiate a DDR. Rebel groups which are considered strong and have territorial control are not expected to negotiate a DDR. The rebel groups with a clear and identifiable political wing are more prone to negotiate a DDR provision, because they can use political means to advance their demands. When the conflict does not have more than two rebel groups, the rebel groups are more likely to negotiate a DDR. Countries considered as a stable regime and which have a robust economy are less prone to have a DDR in a peace negotiation, because society has the potential to assimilate former combatants without a special programme.

Chapter 4 examines the implications of the DDR provision in internal armed conflict settlements for preventing the recurrence of war. This chapter points out that countries in conflict have formulated different provisions in order to try to achieve and (or) maintain peace. These mechanisms are often implemented as part of peace negotiations. Warring parties (rebels and governments) negotiate different provisions such as power sharing, cease-fire conditions, amnesties, political participation, third-party verification and DDR.

I argue that the various components of DDR can have different impacts on the failure of peace. The review of the impact of DDR helps us to identify the vulnerabilities and challenges in each stage of the process. However, for further research, I need to improve the information about DDR; for example, I should investigate specific programmes, budgets and community participation, among other factors, to determine the real impact (policy evaluation) of each stage. At the moment, I only have dummy variables that identify whether the agreement includes this provision or not. The findings suggest that including DDR in a peace agreement, especially the reintegration programme, has a significantly positive impact on peace and shows evidence of the importance of military reintegration in the process of peace consolidation. For further research, I also need to develop cases studies to verify if the conclusions are in accordance with reality.

Chapter 4 describes how post-war societies might be considered more violent than they were before the conflict and present new forms of violence. The relation between the DDR process and post-conflict violence must be studied to understand the real dynamics and factors that foster the transition from conflict violence to higher rates of violence. This chapter identifies the causal mechanism for post-conflict violence in two related ways: at an individual level or as a failure of the peace process. The former is related to ex-combatants and could present different types of problems. The latter is related to a haphazard disarmament programme which increases the gun supply in the civil population or the maintenance of hidden weapon reserves in case of unfulfilment or lack of justice and proper forgiveness mechanisms. This chapter examines the dynamics of

violent crime in the Colombian case during the period 2003 to 2014. The focus is on the presence of ex-combatants who participated in DDR programmes and the patterns of different types of violence, such as homicide and robbery, at the municipal level. Our findings on the presence of former combatants suggest that this population has no effect on homicide but increases the incidence of robbery. For future studies, we need to analyse other forms of violence.

In general, this research contributes to filling the gap in comparative research focusing on the general characteristics and conditions of conflicts and countries that include DDR provision in a peace agreement. This study is the first rebel – government approach examining the determinants and the effect of DDR provision. This research implies that the policy community should think carefully about the scope of negotiation and implementation of each stage of this provision so as not to generate high expectations that cannot be achieved.

The research on DDR provision and its determinants and impact on peace highlights that there are few studies which consider a macro vision of the relationship between DDR provision, durability of peace and post-conflict violence. This deficiency seems somewhat surprising, since international organisations emphasise the positive effect of this type of programme. Additionally, the scholarly studies of military power-sharing have produced inconclusive or contradictory findings. Further research needs to analyse

the level of implementation of the accords. We also need to collect more information about the type of DDR which was negotiated; we should gather information about other kinds of low-intensity violence, to include the individual level information and to build other indicators about recruitment, birthplace and recidivism and extend the dataset to incorporate other types of conflict end, such as military victory or the petering out of hostilities. This dissertation extends an invitation for researching this topic and its different interrelationships. For further research, many other important questions remain to be solved.

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