THE
ECONOMICS AND DYNAMICS
OF
RESOURCE WARS

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Octubre, 2015

A mi madre.

AGRADECIMIENTOS:

Me gustaría comenzar agradeciendo a mis supervisores Doctor Nikolaos Georgantzis y Doctora Ainhoa Jaramillo Gutiérrez su apoyo, dedicación y en especial, su paciencia. Gracias por vuestras lecciones y por compartir vuestro tiempo y experiencia conmigo. Vosotros habéis hecho realidad que hoy sepa más que ayer y me habéis encaminado a aprender para mañana.

Gracias también a los doctores Aurora García y Miguel Ginés por sus comentarios a aquel primer paper que presenté como DEA y que ha sido la base de la tesis que aquí presento.

En especial, gracias a mi madre por ser mi continua motivación, a mi padre y hermano por ofrecerme siempre una palabra cálida de aliento y una mano que me sujeta and to my beloved husband for his love and support.

Y finalmente gracias a mis amigos y todos y cada uno de los miembros de las familias González-Zapata, Serrano-Sanchez, Tassell y Debens por estar a mi lado.

Sin todos vosotros, hoy no estaría aquí.

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PRÓLOGO

Tras un acto de reflexión histórica y social observamos que tras tantos años de evolución y progreso, aún hoy día la sociedad no ha logrado solventar la mayor fuente de mortalidad y pobreza, las guerras.

Desde los países desarrollados observamos con consternación a millones de individuos que desde los países en vía de desarrollo luchan desesperadamente por sobrevivir, por progresar.

La sociedad civil aún cuando en ciertas ocasiones emprende alternativas con la voluntad de la cooperación social internacional, delega la responsabilidad final a Gobiernos e Instituciones Internacionales, confiando que la intervención de estos organismos establezca soluciones de corto y largo plazo, restableciendo la paz y creando fuentes de crecimiento económico.

El objetivo de este trabajo es ayudar a entender en mayor medida el gran efecto que las decisiones que se toman en el mundo desarrollado, tienen en los países en desarrollo. Presentamos un análisis objetivo de las fuentes de conflicto y del progreso y transformación que ha sufrido la economía bélica, que tras el fin de la Guerra Fría, ha pasado de guerras financiadas por el Estado a conflictos financiados y guiados por intereses privados. Hoy en día las guerras son mayoritariamente financiadas por la explotación ilegal de drogas, armamento y recursos naturales.

Los recursos naturales, que podrían ser vistos como una fuente de riqueza y crecimiento económico, se convierten en lo que los académicos han dado por denominar ¨la maldición de los recursos naturales¨.

En este trabajo nos centramos en los conflictos financiados por la explotación ilegal de recursos naturales (oro, diamantes y Coltan, entre otros). Y dedicamos especial atención al mercado del Coltan y su relación con el conflicto armado aún vigente en República Democrática del Congo (RDC).

Coltan es lo que se denomina un metal precioso, esencial para la industria de armamento y la alta tecnología. El Coltan es uno de los lazos de unión más importantes entre nuestro mundo evolucionado y el conflicto en RDC y que hace en cierta medida responsable a los países desarrollados de los abusos que se están llevando a cabo en RDC.

Cuando tomamos la decisión de comprarnos un móvil, posiblemente guiados por la necesidad básica de comunicarnos y de no conocer las consecuencias de nuestra acción, indirectamente podríamos estar financiando la guerra que ha costado ya millones de vidas en RDC.

Hemos dividido nuestro análisis en los siguientes tres capítulos:

El primer capítulo presenta un análisis detallado de la naturaleza y tipos de conflicto. Y en él se examina la opinión de distintos investigadores sobre las causas y los factores que influencian las guerras civiles, especialmente aquellas financiadas por la explotación de recursos naturales. Terminamos el capítulo presentando diversas medidas adoptadas por distintos organismos con la finalidad de regular los mercados de recursos naturales y aportar soluciones que conduzcan a estabilidad en la zona y la creación de una situación de paz.

El capítulo dos presenta un análisis político-económico de RDC, desde una perspectiva histórica. Y analiza el negocio de Coltan en RDC.

El capítulo tres, es un análisis de las causas económicas de los conflictos bélicos, inspirado por las palabras del General Carl von Clausewitz (1832), que ya en el siglo XIX, dijo que ¨el mundo de los negocios era una forma de competencia humana que se parecía mucho a los conflictos bélicos¨. A través de la modelización económica y a través de la metodología de inducción hacia atrás hemos analizado el efecto de contagio de la guerra entre dos países limítrofes que compiten en el mercado internacional de un mismo producto, y donde el Gobierno compite con el sector privado en el mercado laboral para la contratación de soldados. De forma que la decisión de la cantidad del número de soldados que el Gobierno opta por contratar y los impuestos que el Gobierno establece para financiar el conflicto, afectan directamente al sector privado y por ende al mercado de output.

Nuestros modelos corroboran que las guerras financiadas por la explotación de recursos naturales se deben a:

1. La existencia de un recurso natural que supone una oportunidad de negocio para las empresas y por tanto, éstas se establecen en el país. Esto permite al Gobierno obtener financiación para sustentar la guerra, por medio de la imposición de tributos.
2. El mercado de trabajo es muy elástico en los países en vía de desarrollo, y observamos que el beneficio del Gobierno incrementa cuanto más elástico es el mercado laboral.

Los modelos por tanto prueban un efecto de contagio entre países donde existe una complementariedad estratégica y además explica por qué los Gobiernos pueden tener una motivación especial en apoyar los conflictos bélicos en los países donde concurren las dos siguientes circunstancias:

1. Existencia recursos naturales.
2. El mercado laboral es muy elástico.

Por tanto, concluimos que las autoridades y organizaciones internacionales necesitan hacer un análisis amplio del contexto económico en la zona de conflicto antes de diseñar e implementar políticas económicas y estrategias de paz.

También hemos hecho referencia a diferentes soluciones que se han llevado a cabo tanto por Naciones Unidas, el Gobierno USA o la OCDE. Sin embargo, tras nuestro análisis de la situación actual de la RDC, observamos que ninguna de estas acciones han tenido los efectos esperados o mejorado en gran medida la situación económica y social en el país.

GENERAL INTRODUCTION

The twentieth century was a convulsive one in terms of wars, political conflicts and terrorism. Crime is now more international than it has ever been before. These days, geographical borders do not limit any war; conflicts are cross-border. The nature of armed conflicts has suffered a deep transformation. The most relevant change is moving from state-financed wars to armed conflicts financed by private parties with dark financial interests.

The end of the Cold War established the end of an era where the State had the central role in the establishment and financing of the conflict. We now speak about "New Wars" (Kaldor, 2012). State armies no longer characterise the conflicts of the post-Cold War era; states have lost the monopoly of violence (Munkler, 2002). The new actors leading the "new wars" are local warlords, paramilitary units, criminal gangs and mercenary groups who challenge the authority of the state (Kaldor, 2013).

Currently, the figures by IISS ("Institute for International Strategic Studies") reflect 42 active conflicts and two global, Al Qaeda and ISIS (Islamic State). Crime has expanded internationally and can affect directly or indirectly each single individual; and civil wars have not only national consequences but also international ones.

These days, no matter where we are, we cannot hide and we can always be the targets of any type of crime. Fear lives among us in airports, in trains or even at our office. However, we should be aware of the moral, legal and political responsibility that we, developed world, have on the on-going conflicts in the developing countries. Despite the lack of acknowledgment in the official discourse, most of the natural resources nourishing the current conflicts are destined to the consumer market in the developed countries. We could be supporting financially an on-going civil war somewhere in the world with only the simplest act of buying a mobile phone.

Mobile phones contain a very little portion of a mineral called Coltan, short for Columbite-Tantalite. This Coltan most probably has been extracted in Democratic Republic of Congo (DRC). Nonetheless, the phone producer might have bought the Coltan in Rwanda. The way our little portion of Coltan went from DRC to Rwanda was probably illegal. The consequences of this "conflict" trade are linked to the nature of the current armed conflicts and to the reasons for the contemporary

conflicts. If we can analyse what are the causes, then, could we envisage what are the solutions?

There is a large number of scholarly and political studies about the political economy of many of our contemporary armed conflicts, especially those characterised by the predatory exploitation of natural resources and the criminalisation of economic life (Berdal and Malone, 2000). The common point among these conflicts is mainly their "self-financing" nature. These war economies are based on the illegal trade of natural resources facilitated by the economic globalisation and the financial market liberalization.

As we will see in this work, civil wars can have a contagion effect upon adjacent countries. It is this complicated reality of intra-state wars that presents policymakers with a twofold challenge. Firstly, to assess accurately the impact of resource predation on the economics and dynamics of the conflict. Secondly, to develop and implement effective policies of conflict prevention, conflict resolution and peacebuilding (Ballentine and Nitzsche, 2005).

Traditionally, scholars focused on the study of the economic dimensions of inter-state wars. However after the Cold War, studies began to focus on the intra-state conflicts as it has been demonstrated that countries with an abundance of natural resources show macroeconomic instability, high level of corruption, oppressive elites and increasing level of poverty. This is known as the "paradox of plenty", or the "resource curse", as for these countries, resource wealth is more a curse than a blessing.

This work intends to be an overview of the economics of armed conflicts. We focus on those conflicts that are financed by the exploitation of natural resources and we run some empirical analysis on the effect of governmental measures to control or promote war. We aim to raise awareness on the lack of social and political accountability from governments and international institutions of the developed world on the current conflicts financed by the illicit trade of natural resources in developing countries.

Our first chapter provides the reader with a general background on the economics and dynamics of armed conflict and gives an update on the current theories and findings. We analyse what is an armed conflict and offer a comprehensive analysis of the dimensions that define the nature and type of war. We characterise the different types of wars as per location and scope; and we also examine the diverse opinions of

scholars on the causal roles of economic factors in civil wars and how natural resources are linked to conflict. In the last section, we evaluate the possible solutions that United Nations might implement in order to achieve conflict resolution and peacebuilding.

Chapter 2 provides a general overview of the political and economic environment in DRC, a country rich in natural resources, and especially in Coltan. That is the product to which we will pay special attention in Chapter 3 when we analyse the competitive interaction in the labour market between governments and producers.

We introduce in Chapter 3 a different set of models, theoretical and empirical where we evaluate the effects of governmental responses (economic policy tools), which are often presented in the political discourse as mechanisms for conflict prevention and resolution. We analyse the effect of a tax on product and tax on profits in an economy where market and war activities exist at the same time.

We suggest a novel approach to the interaction between markets and war activities. Specifically the former are assumed to both favour war by generating the resources necessary to sustain it, as well as compete with war activities in a labour market in which both workers and soldiers are recruited. We argue that war activities in two different countries may be interdependent as long as production and exports in an international market make the two countries' producers interact with each other. In such a framework, strategic substitutability in the product market should be combined with strategic relations between economic and war activities in each country to determine the predicted strategic relation between war activities across countries.

The conclusions to our work can be found in the last section.

CHAPTER 1

WAR & PEACE

FOREWORD

"Those who wish to facilitate peace will be well advised to understand the nature of war. Yet the label "war" is one that often conceals as much as it reveals. We think we know what a war is, but this in itself is a source of difficulty: throwing a label at the problem of conflict may further obscure its origins and functions; and the label, moreover, may be very useful for those who wish to promote certain kinds of violence."

David Keen, 2000-b

1 - INTRODUCTION

Unfortunately, in the twenty-first century, armed conflicts are not a story of the past yet.

Most probably, each one of us has at least once a week read an article in the press about some war going on somewhere in the world. We might even have some specific pieces of information about the current situation in the area of conflict, little snippets that we have gleaned here and there, so we have come up with some kind of conclusion on who are the goodies and who are the baddies.

Following the latest figures published by the International Institute for Strategic Studies (ISS), in 2014, there were 42 active conflicts that caused 180,000 fatalities and 12,181,000 refugees worldwide. Two of these conflicts are considered global and come under the umbrella of International Terrorism derived from Al Qaeda and the Islamic State (ISIS).

In the light of these figures, the need for a better understanding of war reveals our lack of knowledge on the concept.

The reality is that the approach to the armed conflicts is complicated. War is mutant, it transforms over time and it is influenced by multitude of factors: demographic, religious, geographical, political … the concept is not simple, quite the opposite, it is complicated to understand and even more difficult to resolve. One of the goals of this current work is to analyse the nature of war. We try to provide at least a general vision on the concept of armed conflict.

There are multitudes of books and articles tackling the war from very different approaches. We will begin from a very general historical overview to begin step-by-step to concentrate our discussion on what has been denominated as “resource wars”. The resource wars are part of a more general concept defined by Kaldor (2012) called “new wars”.

We have seen throughout the twentieth century how wars have transformed from state-financed conflicts to self-financed wars. The end of the Cold War had great impact on the patterns of war and peace in developing countries; the end of the military support by United States and Soviet Union provided, in some cases, new opportunities for conflict resolution and, in other cases, it resulted in an increase of

instability, precipitating indirectly the appearance of new civil wars. We see that the nature and dimensions of the armed conflict have changed. The behaviour of combatants reveals not only how the war is fought but also why. Keen (2000-a) has suggested that, where combatants engage in conflict to resource accumulation, "there may be more to war than winning".

Today, also accelerated by the global crisis, we are observing rapid shifts from traditional great powers to emerging actors within the international system. New conflict drivers threaten to increase social tensions in fragile states, where elites and non-state actors accumulate control over civilians, territory and market share. In this always-evolving landscape, different organisations and actors seek for new crisis-response strategies to maintain international peace and security.

We present in this chapter a comprehensive analysis of the dimensions that define the nature and type of war. We characterise the different types of wars as per the location and scope of the armed conflict, and we present the general definition of what inter-state, intra-state, non-state and extra-state conflicts are.

Following scholars such as Kaldor (2012), Gates (2002) and Collier and Hoeffler (1998) among others, we identify the different types of source of conflict and establish the status of the conflict in relation to its intensity; we provide a tabulation of the forty-two active conflicts identified by the ISS. And lastly, in this identification of the factors defining the nature of war, we discuss the financial dimension, introducing the concept of "new wars", to which we will dedicate special attention in a separate section.

In our journey, we also examine the diverse opinions of scholars on the causal roles of economic factors in civil wars. Following Collier and Hoeffler (1998), we discuss the importance of the economic agendas of the rebels as a potential cause and we present his famously recognised model of Greed and Grievance where he utilises different proxy variables to measure the impact of greed and grievance on the conflict. We will discover that Collier arrives at unexpected results.

Another possible cause of conflict is the relation between the predatory exploitation of natural resources and the violent conflict. Ballentine and Nitzche (2005) identify three connection points: "The paradox of plenty", the duration of the conflict and the moral, legal and political responsibility of the developed countries' players (companies and

governments) on the dynamics of the conflict. We also extend our research to the views of other scholars, who, through case studies, provide evidence that the existence of natural resources have contributed to the inception, duration and intensity of civil wars. We present the results of Ross (2001) who analyses thirteen conflicts between 1994 and 2000, concluding that natural resources tend to influence separatist conflicts differently to non-separatist.

In our last section, we present the possible actions to resolve civil wars. We first analyse the policy tools and strategies for conflict prevention and resolution. And, secondly, we present and evaluate the different actions that have been carried out from international bodies such as the United Nations Security Council to resolve civil wars or implement strategies of peacemaking, peacebuilding and peacekeeping (United Nations, 2003).

When analysing the policy tools and strategies, we begin presenting the links between the financial outcome of the exploitation and trade of the natural resources and the armed conflict identified by Humphreys (2005):

1. National elites can monopolise the rents obtained by the exploitation of natural resources.
2. The wealth originated by a country's natural resource can derive in political grievances 'that may ultimately turn violent".
3. The economic instability derived from the socio-political distortions associated with the high level of dependence of the country on the wealth of natural resources.
4. The exploitation of natural resources to sustain the conflict alive via supporting financially their combatants.
5. Under circumstances where parties in a conflict gain more during wartime than in a period of peace, the likelihood of a longer warfare increases.

We then address certain policy instruments and initiatives that have been implemented successfully as "the name and shaming" initiative by Democratic Republic of Congo (DRC), the Kimberley Certificates or the Financial Action Task Force on Money Laundering (FATF) to monitor the financial transactions involved in conflict trade. We realise that the technology at the reach of criminal networks and

globalisation are determinant on the shape of the "new war", which seems quite difficult to control only geographically.

After this, we will concentrate our attention on the analysis of the level of involvement of United Nations (UN) in conflict resolution. We first introduce briefly the institution itself for a better understanding of its nature and goals. However, to find out how UN decides upon which conflict to engage, we follow Cockayne et al. (2010) who present a complete analysis of the level of engagement of UN from the year of 1989 to 2006. We will end this chapter by evaluating the strategies of UN and making certain recommendations for a more efficient strategy of peace implementation by UN, following Downs and Stedman (2002).

2 - WHAT IS WAR? Inside the Nature of the Armed Conflict

Since Clausewitz[1] in the nineteenth century wrote in his treaty about the science of war that "war belongs not to the province of Arts and Sciences but to the province of social life … It would be better, instead of comparing it with any Art, to liken it to business competition, which is also a conflict of human interests and activities", much has been said about armed conflicts.

Clausewitz defined war as an act of violence intended to compel our opponent to fulfil our will. He establishes that "violence" is the means and "the submission of the enemy to our will" is therefore the object.

However, the object of war has since transformed into much more than just the search for the surrender of the enemy.

Kaldor (2012) contends that what we (the general public), the policymakers and military forces tend to regard as war is in reality an evolution of a specific phenomenon that took shape in Europe between the fifteenth and eighteenth century. This was a phenomenon deeply related with the evolution of the modern state and which went through different states as the Table 1 on the next page shows.

Different types of military forces, strategies and techniques characterised each of these stages. However, globalisation and the current modern state give shape to new types of Government and therefore, the armed conflict as we conceive it today is

1 General Carl Von Clausewitz was born at Burg in 1780. He joined the Prussian Army in 1792 and served in the campaigns of 1793-94 on the Rhine, after which he devoted some time to the study of his military leadership. He wrote during his lifetime a treaty on the science of war, which was published by his wife after his death. It has been published in nine volumes.

becoming outdated. The current concept of warfare is just an evolution of the stylised notion of war, reminiscent of a type of war predominantly European. Nevertheless, this archaic notion of war still influences our concept of war and dominates, even these days, how policymakers conceive national security. Kaldor (2012) counters that it is this preoccupation with the old war that prevents us from developing policy-relevant analysis and that attention should be focused on the concept of human security as a way to address "new wars". For further details on this concept, see Kaldor (2007) and Kaldor and Beebe (2010).

Table 1: The evolution of Old Wars.

	17th and 18th Centuries	**19th Century**	**Early 20th Century**	**Late 20th Century**
TYPE OF POLITY	Absolutist State	Nation-State	Coalitions of States; Multinational States; Empires	Blocs
GOALS OF WAR	Reasons of State; dynastic conflict; consolidation of borders	National conflict	National and ideological conflict	Ideological conflict
TYPE OF ARMY	Mercenary/professional	Professional/conscription	Mass armies	Scientific-military elite/professional armies
MILITARY TECHNIQUE	Use of firearms, defensive manoeuvres, sieges	Railways and telegraph, rapid mobilisation	Massive firepower, tanks and aircraft	Nuclear weapons
WAR ECONOMY	Regularisation of taxation and borrowing	Expansion of administration and bureaucracy	Mobilisation economy	Military-industrial complex

Source: Kaldor (2012)

However, there must be some light at the end of this tunnel; the wave of peaceful protest started in the Middle East and that has extended worldwide has marginalised extremist militant groups including Al Qaeda. This response by the general public, which Kaldor labelled as "cosmopolitan politics", is key to finding a solution for the new wars. However, the outcome depends on the effect that this global response has on the institutional response.

In order to produce an effective response to the warfare, institutions and politicians need to begin with a broad study of the problem. As we will see later on, Downs and Stedman (2002) recommend that to implement effective strategies on conflict resolution or peacebuilding, institutions such as United Nations need to carry out an assessment of the conflict.

We identify the following four dimensions defining the nature of the conflict:

1. Geographical dimension

The impact of geography on armed conflict has been studied in deep analysis and we can find multitude of studies where geography is analysed as a relevant factor.

Sprout (1963) already claimed that climate, topography and location were determinants of state behaviour. More recent studies focus on the relation between geographic proximity and conflict. Bremer (1992) finds geographic proximity to both facilitate and exist as a source of conflict. Gates (2002) in a paper on the microfoundations of rebellion, identifies geography, ideology and ethnicity as the factors determining the military success and shaping rebel recruitment. Buhaug and Gates (2002) considered location and scope to be key on the definition of the characteristics of any armed conflict.

Considering the geographical dimension of the armed conflict, we can identify the following types of conflicts:

- Inter-state conflicts involve an armed conflict between two or more countries/governments and usually begin with a formal declaration.
- Intra-state conflicts take place between state and non-state armed forces. We may find that sometimes one of the groups involved is supported by troops of a foreign country. These are commonly known as “Civil wars”.
- Non-state conflict involves the use of armed forces by two or more organised groups, none of which are the Government.
- Extra-state conflict occurs when an armed conflict involves a Government and a political entity outside the state boundaries. We can define it as state vs. an independent non-state player.

Diehl (1991) analyses broadly the impact of geographical factors on inter-state conflicts from two standpoints: taking geography as a facilitating condition for

conflict and taking geography as a source of conflict. Buhaug and Gates (2002) state that geographical factors are determinant on how a civil war (intra-state conflict) is fought and who will prevail. The authors using ordinary least squares (OLS) and three-stage least squares (3SLS) estimation techniques analyse factors that determine the scope and location of the conflict; finding that factors such, as for instance, the incidence of natural resources shaped the scope of the conflict. In addition, they also find evidence of an endogenous relationship between variables, scope and location.

2. Source of conflict

Another dimension in the study of armed conflict is the identification of the source or nature of the conflict, which can be political, socio-cultural, economic or territorial. However, usually, the sources of conflict are inter-linked and we can identify more than one unique source of conflict. Our perception of the nature and origin of the conflict may also be altered by the media, which often consider the main reason of every conflict to be of cultural or religious dimension.

Collier and Hoeffler (2004) state that economic agendas are central to understanding why civil wars start, as conflicts are more likely to happen because of economic opportunities than grievance. Those groups that benefit from the conflict –even when they are a minority; will feel motivated to initiate it and sustain it despite of the conflict destroying economic opportunities for the majority. The conflict might appear because the rebels search to increase their wealth by capturing resources illegally or because they aspire to rid the nation, or a certain group of people with whom they identify, of an unjust regime. These two extremely different motivations imply very different types of policy intervention by the international community when promoting peace. We shall discuss the different types of approach to peace at a later stage in this work.

3. Status of the conflict

Also important is to identify the status of the conflict and its intensity: the frequency and duration of the violent attack and the social impact of the conflict. ISS categorises the forty-two identified conflicts per its intensity, defining:

- High Intensity: *frequent armed clashes (involving fatalities) between governments, government forces and insurgents, or among non-state armed groups.*

- Medium Intensity: *frequent armed clashes (involving fatalities) between governments, government forces and insurgents, or among non-state armed groups.*
- Low Intensity: *occasional armed clashes between governments, government forces and insurgents, or among non-state armed groups.*

All forty-two conflicts are organised by status as we see in Table 2:

Table 2: Status of Conflicts

STATUS	COUNTRIES	
HIGH INTENSITY	Afghanistan	Somalia
	Iraq	South Sudan
	Nigeria (Boko Haram)	Syria
	Pakistan (Kpk and Northwest)	
MEDIUM INTENSITY	Central African Republic	Myanmar
	Central America (Northern Triangle)	Pakistan (Balochistan)
	China (Xinjiang)	Pakistan (Sectarian Violence)
	Colombia	Russia (North Caucasus)
	Democratic Republic of the Congo (DRC)	Southern Thailand
	Egypt (Sinai)	Sudan (Darfur)
	India (Naxalites)	Mali (The Sahel)
	India-Pakistan (Kashmir)	Turkey (PKK)
	Israel-Palestine	Ukraine
	Libya	Yemen (Houthis/AQAP/SMM)
	Mexico (Cartels)	
LOW INTENSITY	Armenia-Azerbaijan (Nagorno-Karabakh)	Lebanon-Hizbullah-Syria
	Central Asia	Nigeria (Delta Region)
	Ethiopia (ONLF/ONLA and OLF/OLA)	Philippines (ASG)
	India (Assam)	Philippines (MILF)
	India (Manipur)	Philippines (NPA)
	India (Nagaland)	Southeast Asian Islamist Terrorism (SAIT)
	International Terrorism/Al-Qaeda	

Source ISS Armed Conflict Database, year 2014.

4. Financial dimension

Another aspect on the study of the nature of armed conflict is the financial dimension. Grossman and Han (1991) present an extensive analysis of the finance and war-spending policies of a state that faces a war; their analysis takes explicit account of the historical experiences of lenders who face debt repudiation if the state that they

supported is defeated or partial default even if the state avoids defeat, because of the unfavourable material consequences of the war for the debtor state.

At this point, where we are focusing on the way the armed conflict is financed, when we need to draw a clear line between those wars that occurred before the end of the Cold War era and those that happened from the 1990s onwards.

The end of the Cold War, as we mentioned in our introduction, meant the end of military and financial support from external patrons and, since then, wars have mostly become self-financed conflicts.

Our work will be focusing from now on upon these self-financed wars, also called "new wars" or "resource wars".

3 - THE OLD AND NEW WARS

Kaldor (2013) establishes a clear distinction between the "old wars" (from the Cold War era) and the "new wars" and creates a review of the literature on "new wars". Williams (2014) argues that the obsession with the "newness" of wars misses the point about the logic of new wars and that, although the data should be used with caution, it does seem to offer support for some elements of the new war thesis, which contends that the actors, goals, methods and modes of financing wars after the Cold-War have changed as a result of globalisation.

State armies no longer characterise the conflicts of the post-Cold War era; states have lost the monopoly on violence (Munkler, 2002). The new actors leading the "new wars" are local warlords, paramilitary units, criminal gangs and mercenary groups who challenge the authority of the state (Kaldor, 2013). A higher level of civilian casualties also characterises "new wars", as these are not clearly distinguished from combatants because the conflicts are more intra-state (Munkler, 2002). Also the goals of these "non-state" actors are different to the goals of the "old wars" where the conflicts where fought for ideological and/or geopolitical interests whereas, in the "new wars", the goals are more ethnic, religious or the actors seeking to gain access into the state for specific groups rather than public interest (Kaldor, 2013).

Finally, Kaldor's "new war" thesis contends the appearance of a "new war economy" which is self-financed by illegal trade in drugs, weapons, natural resources with these

non-state actors seeking to maintain economic interest. This also differs from "old wars", which the State financed through taxation or outside patrons (Kaldor, 2013).
This concept of wars subsidised by elites is not new in history. However, since the early 1990s, the study of civil wars or armed conflicts self-financed from the revenues obtained from the exploitation of natural resources has gained an unprecedented central role in the public and political debate. So much attention has been devoted to its analysis that scholars have even created a new term to refer to it "resource wars".
One of the most outstanding examples of a "resource war" is the situation still alive in Democratic Republic of Congo where the conflict derived from the illegal trade and exploitation of their natural resources (copper, diamonds, gold, cobalt, coffee and Coltan) has had a devastating effect on their population and enriched certain elites; we will dedicate special attention to DRC throughout this work.

4 - CAUSAL ROLES OF ECONOMIC FACTORS

A - Economic Agendas as Causes of Conflict - The Greed-Grievance Model by Collier.

Collier (1999) establishes a distinction between greed ("causal factors that are broadly consistent with an economic motivation" - economic factors) and grievance when describing the causes that might lead rebels into war. However he puts forward the idea that it is not easy to determine whether greed or grievance is the rebels driving force. Collier says "even where the rationale at the top of the rebel organization is essentially greed, the actual discourse might be entirely dominated by grievance" because "narratives of grievance play much better with a community than narratives of greed, by playing upon a sense of grievance, the rebel organisation may therefore be able to add more recruits cheaply".
In his model, Collier uses three proxies to capture the notion of the economic agenda of the rebels: the importance of exports of primary commodities, the cost of attracting recruits to the rebellion and the income-earning opportunities - which he proxies by the amount of education in the country. Grievance is proxied by four factors: to which extent society is fractionalised by ethnicity or religion, economic inequality, a lack of political rights and government economic competence.

The results of contrasting the economic factors with those that proxy grievance are overwhelming – says the author, as they confirmed the importance of the economic agendas, as opposed to grievance.

Interestingly enough, Collier finds out that, all other things being equal, a country highly dependent on its primary commodity exports (with a quarter of its GDB[2] coming from them) has a four-times greater risk of conflict than a country without primary commodity exports. A high number of young men in the society also increases the risk of conflict, whereas each additional year of education reduces the risk of conflict by around 20 per cent.

So Collier concludes that a country with large endowment of natural resources, with a large number of young males and a low education level is at a higher risk of conflict than one with the opposite characteristics.

Collier also finds that the only result supporting the grievance approach to conflict is that each five per-cent block of annual growth has the same effect on the risk of conflict as one additional year of education. With all other things equal, a society growing at a five per cent rate is around 40 per cent safer than one that is declining by five per cent. According to the data, inequality has no impact upon the level of risk of conflict, which is quite surprising given that inequality has been used often as a reason or source of conflict. However inequality has proved to be significant in explaining economic growth. Regarding the political regime operating in the country, the results show that a society that is fully democratic is safer than one that is partially democratic. However, severe repression proves safer than partial democracy.

And, last but not least, ethnic and religious fractionalisation reduces the risk of conflict significantly. Fractionalised societies are safer than the homogenous ones.

Therefore, the grievance theory of conflict does not seem to have much support from data. Inequality does not prove significant on the level of risk; and political repression and ethnic and religious fractionalisation has the opposite effect to what is expected.

[2] GDB index: Growth and Development Bridge.

B - The Connection points between Natural Resources and War

There is a clear relation between the predatory exploitation of natural resources and the violent conflict. Ballentine and Nitzche (2005), identify three connection points:

1. "The paradox of plenty" or "the resource curse". In developed countries, natural resources are a source of economic development. On the other hand, in developing countries, it could be deemed a curse and have detrimental effects on their socioeconomic and political stability. Therefore, adequate political responses are important in promoting a more equitable economic development and fair trade.
2. The duration of the conflict, which may depend on the level of revenue generated by the predatory exploitation of lucrative natural resources. The highest the revenue, the lesser the interest of the elites on terminating the conflict, creating barriers or "spoilers" for postconflict peacebuilding.
3. The moral, legal and political responsibility of the developed countries' players (companies and governments) on the dynamics of the conflict.

Multiple scholars have found statistical evidence - a strong correlation between the state dependence on their natural resources and the likelihood of entering into a civil war or, alternatively, the duration of the civil war once it has begun (Collier and Hoeffler, 1998; De Soysa, 2000; Elbadawi and Sambanis, 1999; Ross, 2003).

Also case studies provide evidence that the existence of natural resources have contributed to the inception, duration and intensity of civil wars. Ross (2001) presents the analysis of thirteen conflicts between 1994 and 2000 concluding that natural resources tend to influence separatist conflicts differently to non-separatist, further distinguished by the lootability of the resource. But are all natural resources equally likely than others to generate or lengthen civil conflict?

Ross (2003) addresses this question with the help of a sample of data on which resources were involved in a list of civil wars - data extracted from Collier and Hoeffler (1998). Table 3 below summarizes information on twelve civil wars by type of resource involved.

Referring to the Table 3, Ross (2003) concludes that the resources most frequently linked to conflicts are diamonds and other gemstones (seven conflicts, all of them civil wars); oil and natural gas (seven conflicts, six of them civil wars); illicit drugs (five conflicts, all of them civil wars); copper or gold (four conflicts, two of them civil

wars); and timber (three conflicts, all of them civil wars). Legal agricultural crops played a role in two conflicts (both civil wars), although in both cases other natural resources played a more important role.

However, Ross seems unsatisfied with these results and addresses two very determinant questions for the understanding of the link between the existence of natural resources and armed conflict.

Table 3: Conflicts by Resource

COUNTRIES	DURATION	TYPE	RESOURCES
AFGHANISTAN	1978-2001	Lootable	Gems, opium
ANGOLA (UNITA)	1975-	Both	Oil, diamonds
ANGOLA (CABINDA)[1]	1975-	Unlootable	Oil
BURMA	1949-	Lootable	Timber, gems, opium
CAMBODIA	1978-1997	Lootable	Timber, gems
COLOMBIA	1984-	Both	Oil, opium, coca
CONGO	1997	Unlootable	Oil
DEMOCRATIC REPUBLIC OF CONGO	1996-1998	Both	Copper, coltan, diamonds, gold, cobalt, coffee
INDONESIA (ACEH)	1975-	Unlootable	Natural gas
INDONESIA (WEST PAPUA)[1]	1969-	Unlootable	Copper, gold
LIBERIA	1989-1996	Lootable[2]	Timber, diamonds, iron, palm oil, cocoa, coffee, marijuana, rubber, gold
PAPUA NEW GUINEA[1]	1988-	Unlootable	Copper, gold
PERU	1980-1995	Lootable	Coca
SIERRA LEONE	1991-2000	Lootable	Diamonds
SUDAN	1983-	Unlootable	Oil

Source Ross (2003)

Notes: Italic indicates separatist conflict.

1 The war did not generate 1,000 battle deaths within a one-year period.

2 Ross (2003) classifies the resources as lootable instead of both because the resources in Liberia were overwhelmingly lootable.

Do civil wars occur more frequently among producers of a common resource (for instance oil or drugs) than among non-producers, more frequently among producers of a less common resource (for instance timber) than among non-producers?

Ross points out to the possible subtle causal links between civil wars and natural resources that are difficult to observe in case studies, and for that simple reason some conflicts might have been excluded from the above table by error.

Ross proposes to resolve these questions by observing the rate of dependency of a state on the export of a given resource (highly, moderate or minimally dependent). If civil war occurs at above-average rate among states that are highly dependent on a given resource, this would imply that the resource is tied to the occurrence of the conflict. However, this analysis is exceedingly simple in statistical terms and has some major limitations. Despite these limitations, the data suggests that:

1. There is no obvious difference in the civil war rates among the states dependent on the analysed categories of natural resources (Oil and Gas, Minerals (does not include gemstones), Food Crops and Nonfood Crops).
2. Higher rates of timber production and export do not appear to be linked to higher rates of civil war.
3. It appears to be a high level of association between civil war and the production and export of diamonds and drugs (especially coca and opium).

Therefore, we can conclude that diamonds and illegal drugs appear to be more strongly linked to civil wars than other resources, as for instance timber. Other categories such as Oil and Gas, Minerals, Food Crops and Nonfood crops seem to be equally tied up to civil war.

In the second part of his study Ross analyses the impact that the qualities of certain resources – especially its susceptibility to low-cost extraction or "looting"- have on the incidence and duration of civil wars. Lootable resources (gemstones, agricultural crops –including drugs) were strongly associated with civil war in the 1990s and are commonly viewed as the most troublesome resources. Ross also concludes that the lootable resources also tend to produce more widespread benefits for local people, and the poor, than the unlootable resources do.

As we saw in the previous section, Collier's model of "greed and grievance", as Ross, also concludes that "lootable resources" or what is the same "exports of primary commodities" are highly significant in the level of risk of conflict in a country.

But why are "lootable resources" so influential? "Lootable resources" are easily taxable and, therefore, they are the most heavily taxed component of the GDP of developing countries. They are a primary commodity, which can be highly profitable as they only depend on the level of natural endowments instead of complicated processes in manufacturing. Their production can survive predatory taxation as usually

they are originated in rural areas, which can be controlled easily by the rebels. In addition to this, taxation on primary commodities has an additional advantage for the rebels, as it can be levied in kind, and because they are generic, their source or origin is difficult to be identified and therefore is easier to sell them in the international market.

Given that lootable resources are easily taxable, this affects the Government income that can be used to promote or finance war and therefore governmental decisions on where to allocate public funds. We will see throughout this work the level of contagion or interconnection between adjacent wars when the countries compete in the same output market.

In those countries where an armed conflict is active, the labour force might be used either for war or the extraction of natural resources. We will analyse in Chapter 2 the trade-off between the output and labour markets. We will study the level of motivation of Governments to promote war, in countries with precious natural resources, to finally find out that a contagion effect exists between adjacent wars and Government is better off when more soldiers are recruited.

We will focus our study in Democratic Republic of Congo (DRC). DRC has an important endowment of Coltan and the exploitation of its precious natural resources provides enough funds to finance a civil war, which has killed 5.4 million people so far.

In this political scenario, countries such as Rwanda, Uganda, Angola, Zimbabwe and Burundi have been accused of using the revenues from Coltan contraband on promoting war in the area.

Throughout this work we study the interaction of two countries competing in the international market, and focus in the natural resources market, especially the Coltan market. We analyse the interaction between a productive sector and war activities assuming that two countries are the suppliers of an input in the international market. Both of them are the users of the domestic labour force, which may be employed in two activities: production and war. We study whether and how the strategies followed in the domestic market may affect the second market. In a second model, we extend our research to study the impact in war activities of Government decisions of industrial policy.

Although we find extensive research on the relation between natural resources and growth, the interaction between the natural resources sector and the labour market; and the relation between natural resources and war. Little has been said about the triangle of war, natural resources and labour market, which we intend to analyse throughout this work.

5 - ACTIONS TO RESOLVE CIVIL WARS

A - Policy Tools and Strategies for Conflict Prevention and Resolution

When reading Ballentine and Nitzche (2005), who, with the support of different scholars, provide an extended analysis on the policy tools and strategies that should be followed by policymakers in order to tackle all the economic dimensions of the armed conflicts, we find that the authors allow for different scholars to present their own views on the cause-effect link between natural-resource wealth and armed conflict; and the possible policy responses as a mechanism for conflict prevention and resolution.

We then realise the multiple reasons or linkages between the financial outcome of the exploitation and trade of the natural resources and the armed conflict. However, we will focus on Humphreys (2005), who summarises these in five possible linkages:

1. Rent seeking: national elites can monopolise the rents obtained by the exploitation of natural resources. This can result in three types of conflict:

    a. As we can see in DRC, the rebels use violence to gain control of the resource wealth (rents) over the State.

    b. The lack of transparency on the transactions does not allow a real sense of how much revenue is generated from the natural resources and therefore is commonly associated with corruption. The whole situation is perceived as elites selling off the national patrimony and provides rebels with a reason to undertake action against the State.

    c. Governments that receive financial support from “unearned income” such as revenues from natural resources tend to fail in creating strong institutions and therefore are more likely to be exposed to “citizen alienation and violent protest”, as we’ve seen in DRC, Zaire and Sierra Leone.

2. Grievances: We can find different ways in which the wealth originated by a country's natural resources can originate political grievances 'that may ultimately turn violent". These grievances are mostly associated with the "mal-distribution" of the natural-resource rents, the migratory flows in the production regions and the level of security provided in the extraction sites of the production regions.

3. Economic instability derived from the socio-political distortions associated with the high level of dependence of the country on the natural-resource wealth. Economies that are highly dependent on natural resources are more vulnerable to the effects of trade shocks. The shocks become a source of dissatisfaction on those groups highly affected by them and lead to violent opposition to the government. Therefore, for effective results, the political strategies must target long-term development plans and revenue management.

4. Conflict financing: even when natural resources may not be the origin of the conflict, their exploitation sustains the conflict alive via supporting financially their combatants. Therefore, policies need to focus on methods to cut the funding to the conflict. This financing comes from the illegal exploitation and illegal activities related to the natural resources. However, sanctions are not always successful because smugglers and criminals find new ways to develop their activities avoiding the sanctions. In order for sanctions to become more effective, these have become more "sophisticated".

5. Peace spoiling: under circumstances where parties in a conflict gain more during wartime than in a period of peace, the likelihood of a longer period of warfare increases. The belligerents take advantage of the opportunities of engaging in illegal activities that could not be possible during peacetime, either because their actions would be considered illegal or because their success depends on their ability to use violence. The national policies and international intervention programs (such as the ones of the United Nations) to create new employment opportunities, even when entail efficiency costs, are proving successful in the promotion of peace. The United Nations has applied strategies of disarmament and reintegration in countries such as Sierra Leone, where surveys results reveal, "fighters in Sierra Leone saw the provision of training and job creation as among the most important items of peace negotiations and an important incentive for laying down arms". However, the

dilemma is that to create these "alternative livelihoods" certain levels of investment are necessary, which are difficult to achieve in wartime and post-conflict settings due to the social, economical and political risks associated. One possible solution to this predicament is to encourage and facilitate the involvement of the private sector and development planners in peace processes.

One of the central points of the political debate on conflict resolution is the development of "control regimes" aimed at diminishing the self-financing dimension of "resource wars" and conflict trade. There have been many policy instruments, initiatives and policy mechanisms that have been put into practice to curtail resource flows. However, the one that has proven more successful is sanctions on targeted commodity and financial sanctions on government elites and rebel groups. Within this type falls the so-called "naming and shaming" sanctions that were put into practice in DRC successfully as a method to curtail the illegal resource exploitation. Another successful initiative is the Kimberley Certificate for rough diamonds, which is fairly simple: exporting countries certify their diamonds confirming the stones have been obtained legally; importing countries must agree to reject any diamonds without the certificate. The Kimberly system intends to tackle the trading diamonds obtained illegally, which has been one of the most important sources of the self-financing of armed conflicts. The Kimberley Process Certification Scheme (KPCS) in 2003 intended to become the first system to deal with a commodity that has been deeply involved in the funding of wars. We can find reports pointing to Al Qaeda laundering money via the acquisition of diamonds, which demonstrates the clear links between conflict trade and terrorism.

The success of the KPCS is due mainly not only to the nature of the commodity but also to the nature of the industry. The diamond industry is a cartel, leaded by De Beers and located principally in Antwerp (Belgium). De Beers and the Belgian government were heavily enrolled on the success and implementation of KPCS. Other commodities/industries (as the Coltan in DRC – for example) do not have equivalents and Governments do not enrol at the same level that the Belgian Government did – a key player in the KPCS achievements. KPCS worked not only as a curative but also as a preventive measure to ensure illegal trading in diamonds never happens again.

Another promising means of curtailing the self-financing of armed conflicts is the surveillance of the financial transactions involved in conflict trade. At the moment there is no system or anti-money laundering policy that specifically covers a conflict dimension or addresses explicitly transactions derived from the illicit trade of natural resources or conflict commodities. However, we can find initiatives such as the FATF created in 1989, that have developed and implemented international standards to combat money laundering and the financing of terrorism. FATF has created control protocols on the sources of the funds moving through the financial institutions. All the financial institutions have the obligation to red-flag and report to their relevant authorities any transaction or individual which/who can be a source of concern. Many countries have now created laws to avoid the financial markets to be used for money laundering and financing of crime/terrorism purposes. The European Union, for instance, is part of FATF.

One of the main sources of concern for FATF at the moment is the "cyber banking". The cyber banks or financial entities that deal primarily in "digital credits" present money-launderers and criminals with new opportunities. When a digital credit is created, this can be used for any type of transaction without leaving any trace or record of it. These types of products have no value limit and "most disturbingly, some will allow to be accessed and transferred without the need for financial institution intervention". This means the entire money laundering/tax evasion control/deterrence structure put into place by FATF can be evaded.

Therefore we see as the technology at the reach of criminal networks and globalisation are determinant on the shape of the warfare that we have identified in previous sections as "new war", which seems quite difficult to control only geographically. These days we see zones of peace and conflict side by side in the same territorial space. So we wonder, if it is not possible to deter wars territorially, could we achieve it politically? Is it possible to achieve pacification without territorial boundaries? Kaldor (2012) contends that every era has a complex relationship between processes of governance, legitimacy (which gives the Government power to govern) and forms of security and that there is no self-evident answer to the question. Today's main problem is the lack of certainty about future patterns of governance and the direction of security policies.

B - From peace agreements to peace implementation in civil wars

We have seen previously different policy tools and mechanisms that can be put into practice when seeking peacebuilding and conflict resolution. However, significant attention needs to be paid to the major Supranational Institution with powers to intervene; this is the United Nations (UN), its main goals being world-peace and cooperation.

The UN was born from the commitment of the WWII allies to extend their alliance to ensure economic and social security. The origin of the UN Declaration is the Declaration of St. James Palace, signed in June 1941 by the representatives of Great Britain, Canada, Australia, New Zealand, the Union of South Africa and of the exiled governments of Belgium, Czechoslovakia, Greece, Luxembourg, the Netherlands, Norway, Poland, Yugoslavia and General de Gaulle of France. These are extracts from the Declaration, two sentences that still today represent the main goal and essence of the United Nations:

"The only true basis of enduring peace is the willing cooperation of free peoples in a world in which, relieved of the menace of aggression, all may enjoy economic and social security;

"It is our intention to work together, and with other free peoples, both in war and peace, to this end."

By August 14th of that same year, 1941, President Roosevelt and Prime Minister Churchill would issue a declaration what was called the "Atlantic Charter", where they communicated to the world "*certain common principles in the national policies of their respective countries on which they based their hopes for a better future for the world."*

The eighth clause of the Atlantic Charter states the goal of general security and therefore establishes the outline for a system of peacebuilding:

"They believe that all of the nations of the world, for realistic as well as spiritual reasons, must come to the abandonment of the use of force. Since no future peace can be maintained if land, sea or air armaments continue to be employed by nations which threaten, or may threaten, aggression outside of their frontiers, they believe, pending the establishment of a wider and permanent system of general security, that the disarmament of such nations is essential. They will likewise aid and encourage all other practicable measures which will lighten for peace-loving peoples the crushing burden of armaments."

Twenty-six[3] countries signed the United Nations Declaration on January 1st of 1942, which meant no other than the adhesion of these countries to the common programme of purposes and principles embodied in the Atlantic Charter.

To this day, out of the 196 countries in the world, only three remain non-members of the UN: Kosovo, Vatican City and Taiwan.

The level of enrolment of the UN in peace agreements and peace implementation programmes in areas of conflict has evolved considerably from the end of the Cold War. The United Nations Charter empowers the Security Council to intervene when a conflict becomes an international threat or danger for international peace and security.

Once the Security Council engages in the management of the war it seeks not only to end it but also to encourage the parties in the conflict to reach and implement political and governance arrangements that can promote and sustain peace in the zone and prevent a conflict relapse.

The way the Security Council operates is by issuing resolutions, which include specific demands to the parties in conflict. After the end of the Cold War, the Security Council had to readjust its toolbox to the special circumstances of the civil wars and their resolutions mostly include demands requesting the parties in the conflict to conduct themselves according to a course of action previously agreed in the peace agreements. The Security Council also began to issue demands regarding post-conflict situations.

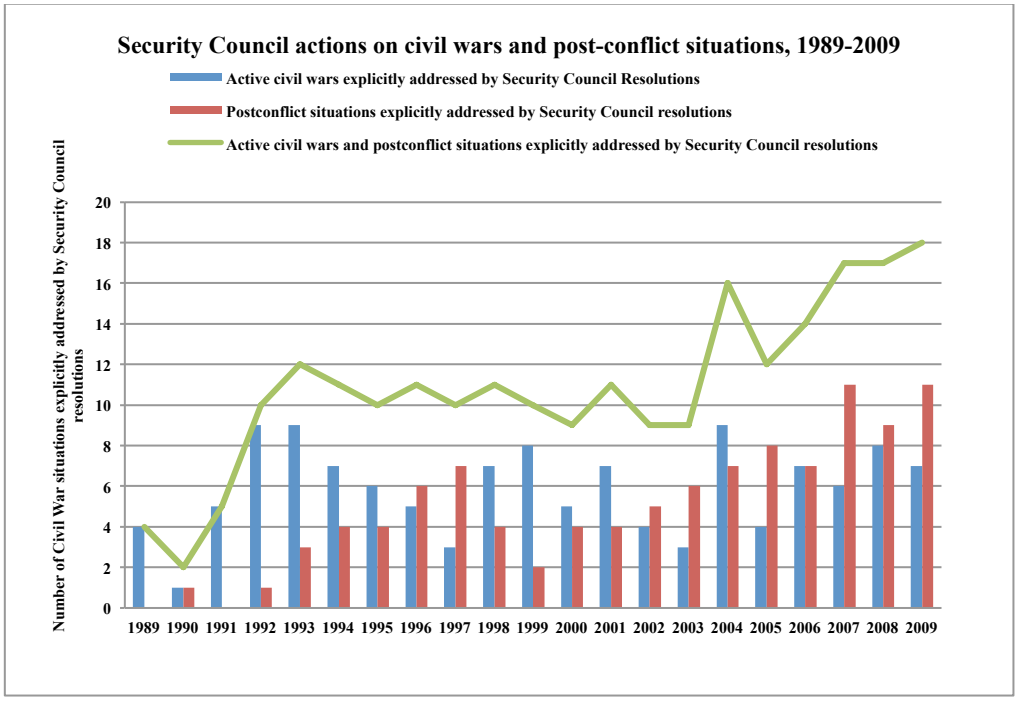
Peace operations became essential when addressing political aspects of the post-conflict peacebuilding process.

But how does the Security Council decide on which Civil Wars to engage in?

Following Cockayne et al. (2010) who present a complete analysis of the level of engagement of UN from the year of 1989 to 2006, we see that, despite the level of involvement not being constant during this time, there is indeed a heavy engagement to civil wars - the Security Council issued 617 resolutions on twenty-seven out of the forty-four active conflicts over this period.

[3] The twenty six original signatories were: the United States of America, the United Kingdom of Great Britain and Northern Ireland, the Union of Soviet Socialist Republics, China, Australia, Belgium, Canada, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, El Salvador, Greece, Guatemala, Haiti, Honduras, India, Luxembourg, Netherlands, New Zealand, Nicaragua, Norway, Panama, Poland, Union of South Africa, Yugoslavia. Consecutive adherents to the Declaration were (in order of signature): Mexico, Philippines, Ethiopia, Iraq, Brazil, Bolivia, Iran, Colombia, Liberia, France, Ecuador, Peru, Chile, Paraguay, Venezuela, Uruguay, Turkey, Egypt, Saudi Arabia, Syria, Lebanon.

Figure 1: Security Council actions on civil wars and post-conflict situations, 1989-2000.



Source Cockayne, et al. (2010)

Their analysis focuses on variables of the country of the conflict such as location, military expenditure, total population, national energy consumption, duration of the conflict and fatalities among others. The analysis shows that the Security Council, during the period from 1989 to 2006, may have been more inclined to engage in civil wars that were taking place in less populous countries, with lower military expenditures than 58 per cent of all other states, with marginally lower level of economic development, with fewer political rights and fewer civil liberties for their citizens than those countries experiencing civil wars where the Security Council did not engage. In the light of these conclusions, it seems that the Security Council was more likely to intervene in countries with non-democratic civil wars; which is part of a broader post-Cold War strategy of encouraging democracy in war-torn countries.

The effect of the interventions shows that those conflicts addressed by the Security Council ended with nine per cent fewer direct fatalities and five years before than those conflicts where there was no intervention.

The primary focus of the Security Council interventions is the containment of spillover effects to other countries and/or provide humanitarian aid to war victims. In a more extended view, it also seeks for ending the hostilities and addressing the underlying political or economic differences that are the origin of the conflict. In other cases, the intervention is only due to the motivation of certain members to be seen as "doing something" in response to a burgeoning crisis.

The Security Council disposes of a diverse and expanding "toolbox" when it comes to strategies, the latest additions being targeted sanctions, international criminal prosecution and multidimensional peacekeeping. Some of the observed responses of the Council when engaging in civil wars, are for instance, the adoption of resolutions to reinforce existing or emerging peace processes between the parties in the conflict; the establishment of compliance monitoring mechanisms with the Council's demands to the parties in the conflict; the authorisation of peace operations; and the implementation of incentives, threats and sanctions.

Downs and Stedman (2002) present an interesting work on evaluating the issues in peace implementation, arriving at certain recommendations for identifying what peace agreements UN should implement. The pair examine three issues associated with the implementation of peace agreements in civil wars:

1. The difficulty of estimating the success of individual operations, in order to this the authors use certain proxies ("outcome indicators") as a measure of success, such as: mandate achievement, resolution of the underlying conflict, or the level achieved on human rights, elections, disarmament and refugee repatriation in the area of conflict;
2. The contextual variables that are associated with the implementation success which they identify as: the number of warring parties; the lack of a peace agreement before intervention or a coerced peace agreement; the likelihood of spoilers (factions or leaders who oppose the peace agreement and use violence to undermine it); a collapsed state; the number of soldiers; the presence of valuable and disposable natural resources (such as gems, timber or Coltan – among others); the presence of hostile neighbouring states or networks; and demands for secession. It appears that the variable with a higher level of influence in the level of success when implementing a strategy is the extent to which a major or regional power defines a particular case as

of interest to national security. Empirical evidence proves that the UN can only succeed in the easiest environments when there is an absence of this major or regional power interest.

3. Some of the problems associated with determining and improving the relative effectiveness of different implementation strategies that the authors identify as strategic misrepresentation and incentive compatibility, which is associated with the level of support and willingness of the regional powers. Incentive compatibility affects not only the choice of the main strategy but also the availability of mechanisms that are necessary to facilitate strategic coherence and coordination. The less easy the environment, the higher the need for strategic coordination.

With this extensive analysis, the authors conclude that, for the UN missions to be more effective and for when the UN is selecting what peace agreements to implement, UN must invest in intelligence gathering and assess not only the problem/conflict but also the elements that will affect the level of success, such as the level of difficulty of the case and its environment; the likelihood of the major or regional powers supplying the necessary resource given the interests of this major or regional power; the identification of implementation spoilers; and the improvement of the UN contingency planning for peace missions. And last but not least, when the UN is trying to implement a peace agreement in a country with natural resources (spoilers) or adjacent to a hostile state to the peace process, the UN should make sure to have the strategy, necessary resources and commitment to regulate these commodities and the inflow of assistance to the spoilers.

6 - CONCLUSION

As we have seen, there is urgency for analysing the entire nature of armed conflicts, so politicians and institutions can find effective solutions. We have presented the nature of the conflict to be determined by its location and scope; the source of conflict - which usually is more than one as we need to take into consideration the different agendas of all the parties involved; its status and intensity; and its funding or financial dimension.

But the nature of war is mutant and has evolved over time, Kaldor (2013) establishes a clear line between what she defines as the “old wars” and the “new wars”. The end

of the Cold War had great impact on the patterns of war as it forced the end of the support for the United States and Soviet Union; meaning, in some cases, the origin of new civil wars, and in others, creating opportunities for conflict resolution. State armies no longer characterise the conflicts of the post-Cold War era; new wars are now led by local warlords, paramilitary units, criminal gangs and mercenary groups who challenge the authority of the State and financed themselves and the conflict via illegal trade in drugs, weapons or natural resources. The "new wars" are now dictated by the agendas of the different parties involved (Collier and Hoeffler, 1999), which lead to a "new war economy". Collier finds certain interesting results such as that a society growing at a five per cent rate is around 40 per cent safer than one that is declining by five per cent. Growth appears to be one of the leading variables to take into consideration when assessing actions and policies to promote peace in a conflict area.

Certain conflicts are financially supported by the exploitation of the endowment of natural resources, and since the 1990s, scholars have referred to "resource wars" when discussing this type of conflict.

Natural resources might be seen as a source of growth or economic development; however, this is true only for the developed countries. Multiple studies such as Ross (2001) prove that, in the developing countries, natural resources become a curse that has a detrimental effect on their socio-economic and political stability. Hence, the importance of finding and implementing adequate political responses to promote a more equitable economic development and fair trade.

"Control regimes" aimed at diminishing the self-financing dimension of resource wars and conflict trade have taken the centre of the public debate. Sanctions on targeted commodity and financial sanctions on government elites and rebel group have proved to be one of the most successful measures. Other alternatives such as the surveillance of the financial transactions involved in conflict trade attempt to combat the money-laundering and the financing of terrorism. However, we see how the technology and globalisation have granted to criminal networks the means to breach the controls established by local governments, international agreements and institutions.

Institutions, such as the United Nations, are born with the legitimate goal of ensuring economic growth and social security. When the Security Council of United Nations

engages in the management of a conflict, it seeks not only to end it but also to encourage the parties in the conflict to reach and implement political and governance arrangements that can promote and sustain peace in the area and prevent a conflict relapse.

Scholars such as Downs and Stedman (2002) present certain recommendations for the United Nations to consider when evaluating peace agreements. Issues such as the assessment on the level of success that can be achieved by individual operations, and the contextual variables that affect the level of success or the problems associated with determining and improving the relative effectiveness of different implementation strategies, are some of the suggestions by the authors.

However, what we feel it is possibly the most important addition and recommendation by the authors is that when the UN is trying to implement a peace agreement in a country with natural resources (spoilers) or adjacent to a hostile state to the peace process, UN should evaluate the strategy and resources necessary to succeed on regulating these commodities and inflow of assistance to the spoilers.

We will discuss in Chapter 3 a modified alternative to the above. Instead of speaking about adjacent hostile states to the peace process, we will evaluate the contagion effect between adjacent wars. We analyse the dynamics of the armed conflict in two countries competing in the Coltan international market, which is defined internally by the amount of labour that each country invests in the output industry/mining sector. Each country has a given endowment of labour, which must be shared between the war and mining activities.

This is a novel approach to the analysis of the dynamics of "resource wars", where we focus our attention on the labour input. The "natural resource industry" is labour intensive, and so is war.

CHAPTER 2

RESOURCE WARS:

The Case of Coltan

FOREWORD

"All we know here is that everything that happened was under the influence of the international community. If they want to invest in our country, they should no longer collaborate with foreign countries and come OFFICIALLY to sign national contracts. This way, we will all benefit, and may eat at the same table"

Pascal Ndako
Former Coltan Negotiator
Source "In Focus, Congo's bloody Coltan" documentary
Produced by the Pulitzer Center on Crisis Reporting

1 - INTRODUCTION

As we stated in the previous chapter the lack of social accountability and high level of corruption guide countries into unfair and illegal wars, which throw their populations deeper into poverty and deep social problems such as human traffic, child exploitation and sexual harassment and so on.

Most of today's armed conflicts have in common the nature of their self-financing entities. The origin of these funds is primarily based on the predatory exploitation of the lucrative natural resources of the countries involved, which create sufficient revenue to support these "intrastate" wars. The case of DRC is one of the most recent. The only hope is to find a quick route to end this violence and those corrupt governments supporting illegal wars that have been taking place for years. Mostly, they are subsidised by private parties with financial interests.

Historically, violence has been determinant for the construction of the State and its institutions. The monopoly of legitimate violence is the primary condition for the existence of the State. This monopoly implies the non-existence of other armed powers, which challenge the authority in the territory, and, nowadays, the legitimacy implies respect for the human rights.

The criminal violence operating in many countries has seen the weakness of the State and need of institutions. In most of these countries, the security is in the hands of institutions inherited from previous authoritarian governments.

The possible solutions suggested by the international political opinion differ from legalisation to taxes/tariffs upon the trade of the illegal products, which, in one or another form is used to pay for the violence prevailing in these countries.

The legalisation, as a "magical solution", could be just seen as an excuse from the Government to "overlook at it" instead of reinforcing the State. As a result, the "institutionalization" of crime could appear. As an example, we could point to Guatemala, where private armies have three times more men than the State; the rich refuse strongly to pay taxes; the police are extremely corrupt; and the criminals control extensive territories and during the 1980s, killed more than 100,000 civilians. The current Guatemalan government is one of the leaders at international level in promoting the legalisation of drugs for instance.

Therefore, we could say that policy-makers find themselves with a twofold challenge:

- To analyse the impact of resource predation and illegal funding on the dynamics of the conflict and,
- Develop efficient policies to prevent or resolve the conflict and promote peace.

The promotion of peace becomes the ultimate goal and the primary challenge when defining and implementing policies.

Economical intervention does not depend only on Government decisions and policies. The International independent agencies and the "elite" groups also have a significant impact on the economy of an area and how peace can be promoted for the benefit of society. Also, companies in the developed world have a moral and even legal obligation, which arises from their commercial links with the local war economies. Although it is rarely "officially" mentioned, most of the outcome of the "resources wars" (a term that has started to be used by scholars to refer to wars mostly financed by the exploitation of natural resources) are destined to each consumer markets in the so-called "developed world". Bank secrecy in safe havens of the developed world continues to protect the funds of "unclear" origin of certain elites and to facilitate money-laundering.

We will see during this chapter how the United States (US) Government and OECD have tried to implement measures[4] or solutions to bring transparency and due diligence into the trade of minerals such as tantalum (Coltan), gold, tin and tungsten. Both entities intend to raise corporate responsibility awareness (Joseph-Gabriel, 2015) among the companies operating in the DRC market, since these companies are partly responsible for the abuse of human rights and the conflict in the area.

The chapter is divided in four sections. Our next section is Section 2, a general overview of the political and economical environment in DRC, where we present from an objective perspective the evolution of the country from 1959, when the country emerged from the Belgian colonial rule to the present.

Section 3 presents the Coltan business in DRC, what it means for the country and the use of Coltan to finance the current conflict. It is also in this section where we present certain international measures to provide transparency in the Coltan trade, which have been undertaken by the US Government and the OECD – we refer to the Dodd-Frank

[4] PWC (2014). In Brief: SEC issues guidance on conflict minerals disclosures.

Act section 1502 by the US Government and the Due Diligence Guide by OECD (2013).

In Section 4, we present our conclusions.

2 - A REAL WORLD CASE: THE POLITICAL AND ECONOMIC ENVIRONMENT IN DEMOCRATIC REPUBLIC OF CONGO

Democratic Republic of Congo was known until 1997 as Zaire. It is a country located in Central Africa, sharing borders with Congo, Central Africa Republic, South Sudan, Angola, Uganda, Rwanda, Burundi, United Republic of Tanzania and Zambia, as per figure 2 below. Geographically the country is located in a landlocked area, which leaves it partly isolated due to its low level of infrastructure.

Surrounding conflicts are still alive in Central African Republic (of medium intensity) and South Sudan (of high intensity) - please refer to Chapter 1 for further detail on the definition of the measurement of the intensity of the conflict.

Figure 2: Democratic Republic of Congo political map.

DRC has a population around 70 million, with the lowest per capita GDP according to International Monetary Fund (IMF). It is the eighteenth most populous nation in the world and the fourth in Africa. The malnutrition affects approximately two-thirds of the country´s population and we can find sharp social and economic inequalities between its provinces and among its rural and urban areas. The Government has launched a medium-term plan to improve the infrastructure of the country, which will mean better links and connection between areas and should become a source of growth.

Violence has plagued DRC since its emergence from the Belgian colonial rule in 1959. In 1965, after the assassination of the Independence leader Patrice Lumumba (first president elected democratically), General Joseph Mobutu consolidated his power supported by the United States, the United Kingdom and Belgium. Mobutu gave to the country three decades of dictatorship during which time he amassed a vast personal wealth. Mobutu's power overcame the challenges of the rebellion of 1967 and insurrections of 1977 and 1978, thanks to the financial support of his patrons, the United States, France and Belgium (Schatzberg, 1991). In 1997, with the refugee crisis initiated after the Rwandan genocide and after decades of human rights' abuses, deep poverty, high level of corruption and lack of social and governmental accountability, Mobutu's dictatorship came to an end. Laurent Kabila took power, supported militarily by Uganda and Rwanda, financially backed by the American Mineral Fields and ethnically upheld by the Tutsi Katangans and Mai Mai. Kabila was assassinated in 2001. At present, his son Joseph Kabila presides over the country.

The Second Congo War began in 1998, after Kabila cut ties with his former patrons Rwanda and Uganda. The two countries, along with Burundi and financial support from the United States, IMF and World Bank, then invaded DRC in support of the anti-Kabila rebels. Zimbabwe, Angola, Namibia, Chad and the hutus and mai-mai militias responded by sending troops in defence of the DRC State.

The UN sent a mission with more than 5,000 peacekeepers to implement peacebuilding strategies. However, the result was not successful.

This war has been the biggest conflict since World War II, and fighting still continues in the east of the country where the prevalence of rape and other sexual violence is described as the worst in the world, killing 5.4 million people up until now.

Since 1999, all efforts by the UN to support the ceasefire have not achieved the expected results, despite the repeated appeals by Ban Ki-moon and his predecessor Kofi Annan to the international parties for more funding. Countries such as the United States have claimed that the bill is already too expensive and, therefore, the conflict is still active.

Despite the undesirable economic situation of its citizens, DRC is a nation endowed with vast natural resources. Nevertheless, since the conflict began, the national output and government revenue have dramatically declined, external debt has increased, and the population situation is untenable.

Some controversial reports such as the ones by the UN and RAID[5] (2004) point to the exploitation of Congo's precious natural resources such as diamonds, gold, uranium, petroleum and Coltan as the main funding activities of the conflict. The Congolese economy is mainly based on the mining sector, and therefore it could play an important role in improving living conditions in DRC but the domestic political elite has failed to take action, probably, because of the western countries' unwillingness to commit to solving the conflict, given the economic and geopolitical interests.

As said above, at the present, the economy of the DRC is mainly based on the exploitation of precious minerals as Coltan (80% of Coltan world resources are located in DRC). This export of mined Coltan requires traders. A Belgian company, Cogecom Sprl, obtained a granted monopoly on all Coltan exports in 2000. Corrupt officials and traffickers through neighboring countries carry out the rest of the illegal Coltan exports. So, the path of Coltan to reach the rest of the world is a highly convoluted one, where legitimate mining operations are mixed with illegal rebel ones.

The African Development Bank (AFDB) has reported a 9% growth in 2014, driven specially by the extractive and manufacturing industries, agriculture, commerce and construction, and helped by a strong external demand and high raw material prices. However, there is no improvement in the country's social indicators because only certain sectors have shown growth but with very little job creation. The unstable political climate and low level of security still continues and is a source of continuing vulnerability for the country.

[5] RAID: Rights and Accountability in Development (RAID) is a charity that advocates for binding corporate accountability frameworks, particularly the development of international norms on the human rights responsibilities of companies.

Therefore the challenge for the Government and its population is to engage in a development process that helps the country to get out of its fragile situation.
The AFDB gives the following recommendations to improve the population's living conditions:

1. Strengthening of governance and consolidation of peace.
2. Economic diversification, acceleration of growth and employment promotion.
3. Improved access to basic social services and building human capital.
4. Environmental protection and climate-change control.

Despite the efforts of the Government, the private sector and society, the country is still far from reaching the Millennium Development Goals (MDG). DRC shows high level of poverty, large development disparities mainly due to the slow decentralisation process and low level of infrastructure.
The Millennium Goals were agreed at the Millennium Summit in September 2000. The largest gathering of world leaders ever committed their nations to a new global partnership to reduce extreme poverty and set up economic and social targets to be accomplished by 2015. These goals are now known as the MDG. These are the main goals:

1. Eradicate extreme hunger and poverty.
2. Achieve universal primary education.
3. Promote gender equality and empower women.
4. Reduce child mortality.
5. Improve maternal health.
6. Combat HIV/AIDS, malaria and other diseases.
7. Ensure environmental sustainability.
8. Develop a global partnership for development.

In an attempt to allow the DRC population to share their views on development, the UN Secretary undertook a program of national consultations via a national survey from December 2012 to mid-May 2013. The consultations involved 50 to 80 people per province from all areas and social strata and among heterogeneous socio-professional groups. The analytical report was issued on September 18, 2013, during a workshop attended by politicians, bureaucrats and general members of the civil

society with the aim of helping to develop new initiatives that foster the growth and development that the country and its population are hoping for.

These are some of the statistics reported for 2014 by UNDP (United Nations Development Program) as per Table 4 below:

Table 4: UNDP indicators and values.

INDICATORS	VALUES
Life expentancy at birth (years)	48.7
Infant mortality rate (per 100 births)	17%
Gross rate of school enrolment (girls/boys)[1]	54%
Literacy rate (15 years +)	66.8%
Mobile telephone penetration rate	18%
Rainforest (second place after Brazil)	55%
Forest Reserve (million hectares), or 48% of the rainforest of Africa and 3% of the world's forests	210
Congo river (Km), fifth longest river in the world after the Nile, the Amazon, the Mississippi and the Yangtze. But second in terms of flow, after the Amazon	4,700
River and lake network (thousands of Km)	25
Roads (thousands of Km)	140
Infrastructure (aerodromes, including five international airports)	175

Source UNDP.

In the last ranking published by UN regarding the HDI (Human Development Index), DRC was 186th out of 188 countries, with a HDI value of 0.338 compared to the 0.944 of Norway –the first country in the ranking.

The HDI is a geometric mean of normalised indices for three dimensions: a long and healthy life, being knowledgeable and have a decent standard of living. It was created by UN to emphasize that people and their capabilities should be the main criteria to assess the level of development of a country instead of considering only the economic growth.

The life expectancy at birth is used as a proxy to compute the health dimension. The standard of living is measured by the gross national income per capita. And the education component is measured following the values provided by the UNESCO for

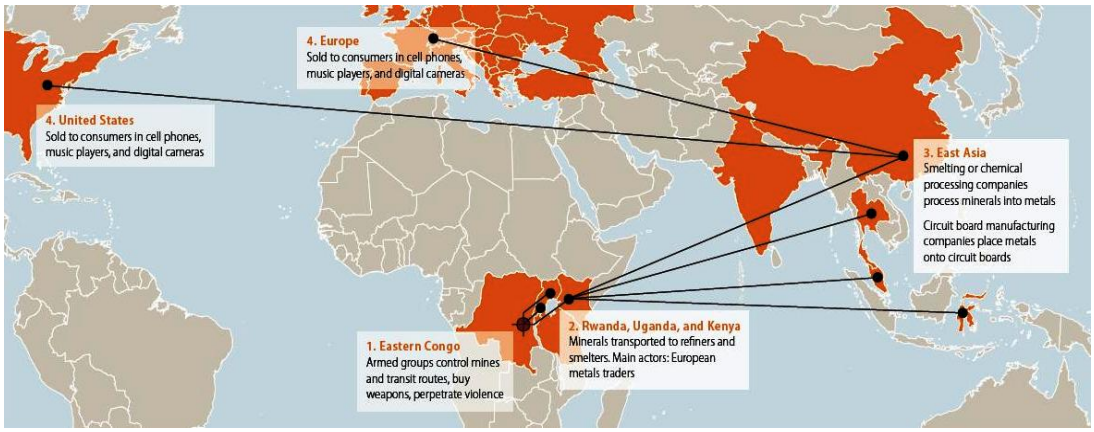
the mean years of schooling, which is calculated based on enrolment by age at all levels of education.

We are seeing how the Congolese Government is working on reforms at macroeconomic level to reach a sustainable level of growth and development. However, there is still a long way ahead to reach the MDG, and the Government, its institutions and society in general remain fragile and under recovery from a long period of instability and conflict. The country needs to continue working towards a sustainable growth in partnership with the private sector and international community. It is key to restore peace in order to foster development and investment.

3 – THE COLTAN BUSINESS

Coltan, short for Columbite-Tantalite, was an unknown resource until the end of the last century, but became a very well known input when the technological industry changed into one of the most profitable businesses for the western countries. As per Figure 3 below, the Coltan moves around the globe, from DRC to East Asia and the Western countries, through the different stages of its life-cycle.

Figure 3: Coltan Life-Cycle



Source Congo Forum

Coltan is mainly mined in Australia, Canada, Brazil, Mozambique and Democratic Republic of Congo (DRC). However, DRC differs from the rest of the producers in its fragile state and high level of corruption. In 2014, DRC was ranked 154th out of

175 countries in the Corruption Perception Index[6], by Transparency International. Mining is an artisanal activity controlled by rebel and elite groups linked to multinational companies operating in the country, which have fallen into bad business practices out of the international and governmental surveillance.

This metallic ore is a basic input in the production of mobile phones, computer game consoles, jet engines, ballistic missiles and nuclear reactors among others. Its importance for the hi-tech industry is demonstrated by the fact that Coltan mining is the best-paid activity in the country. An average Congolese worker makes $10 per month, while a Coltan miner can make from $10 to $50 a week.

Despite the fact that there are other reserves of Coltan are in Africa, in Australia or the Americas, most of the Coltan traded in the world has been extracted in DRC (please see Table 5 on page 59 for more details on Coltan-mining countries). What is the reason for this?

The reasons are basically economical. It is far cheaper for any multinational to set itself up in DRC than in any other country, given the low level of governmental control, higher level of corruption and near-inexistent labor laws, which, evidently, minimise the set-up and operating costs.

An additional reason is that some countries as China have imposed different barriers to trade such as export tariffs and export quotas, targeting the protection of their national reserves, which conserve their resources and give preference to the national producers. The case is still on-going in the World Trade Organization (WTO) after United States, the European Union and Japan accused China of the violation of international trade rules by imposing quotas on earth minerals (such as Coltan).

Countries as Rwanda, Uganda, Angola, Zimbabwe and Burundi have been accused of smuggling Coltan from DRC and using the revenues generated from the high price of Coltan to sustain their efforts in the war. The Rwandan Army obtained at least $250 million in a period of 18 months through Coltan sales, even though no Coltan is mined in Rwanda. All these countries defend themselves by stating they exploit their own resources. The Rwandan government said it was extracting 1,440 tonnes of Coltan per year from its own mines. This contradicts the UN report, which shows official Rwandan government statistics of Coltan production revealed they mined 83

[6] The Corruption Perceptions Index ranks countries and territories based on how corrupt their public sector is perceived to be. A country or territory's score indicates the perceived level of public sector corruption on a scale of 0 (highly corrupt) to 100 (very clean). A country or territory's rank indicates its position relative to the other countries and territories in the index (Transparency International, 2015)

tons per year. In an additional report, the UN states that the APR (Armée Patriotique Ruandés) has established an ad-hoc structure to supervise and control the DRC mining activity and facilitate contracts with the European and Occidental companies. The report also claims that different companies have been created in partnership between European and American Coltan negotiators and members from the circle of the Rwandan president Paul Kagame in order to manage Coltan sale and distribution worldwide.

The subject of the interest of neighbouring countries on keeping alive the conflict was discussed by Downs and Stedman (2002) who conclude that when UN is trying to implement a peace agreement in a country with natural resources (spoilers) or adjacent to a hostile state to the peace process (as mentioned above, DRC's situation with Rwanda, Uganda, Angola, Zimbawe and Burundi), the UN should make sure to have the strategy, necessary resources and commitment to regulate these commodities and the inflow of assistance to the spoilers.

For the UN missions to be more effective and when the UN is selecting what peace agreements to implement, UN must invest in intelligence gathering and assess not only the problems/conflict but als the elements that will affect the level of success such as the level of difficulty of the case and its environment; the likelihood of the major or regional powers supplying the necessary resource given the interests of this major or regional power; the identification of implementation spoilers; and the improvement of the UN contingency planning for peace missions.

Before any intervention, the UN needs to assess the economic and political interests involved. When examining the causes of the DRC conflict, the UN needs not only to concentrate on the DRC supply of natural resources and demand for arms and weapons but also to consider the demand for natural resources and arms supply from the developed countries – generally these arms are produced in the permanent five (P-5)[7] members of UN. Therefore, UN decisions on intervention are most often subordinated to the interests of the P-5.

Regarding the actions by International bodies and Governments to control the trade of illegally mined minerals in DRC, we find special measures taken by the USA and the OECD. However, the results are still to be evaluated since both are quite new.

[7] The five permanent members of UN are China, France, Russia, the United States and the United Kingdom.

In the US, Barack Obama signed on July 21, 2010 the Dodd-Frank Wall Street Reform and Consumer Protection Act which relates to corporations and conflict minerals. On August 22nd 2012, the U.S.A. Securities and Exchange Commission (SEC) issued the final rule to implement the Dodd-Frank Act, which requires companies to disclose their use of conflict minerals (tantalum, tin, gold and tungsten). The rule was approved because of the concerns of the US Government over the exploitation and trade of conflict minerals being used by armed groups to finance the conflict still alive in DRC (U.S. Securities and Exchange Commission Factsheet, 2014).

June 2, 2014 was the first deadline for companies to submit their information to comply with the Conflict Mineral Rule. The rule requires issuers to disclose whether their products contain minerals "DRC conflict free", have "not been found to be "DRC conflict free", or are "DRC conflict undeterminable". The requirement to report whether any of the products has "not been found to be "DRC conflict free" was seen to violate the First Amendment by the United States Court of Appeals for the District of Columbia Circuit. The Court upheld the rest of the Rule.

The OECD also revealed the corporate responsibility of companies associated with extracting, trading, handling and exporting minerals from conflict-affected and high risk-areas. The OECD published in 2011 the "Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas" backed by the Governments of the eleven members of the Great Lakes Conference[8] and UN. The guide raises awareness on the impact of their actions of the local communities, being at risk of contributing to human rights abuse and conflict.

The guide is structured around a five-step framework defined as:

1. Establish strong company management systems.
2. Identify and assess risk in the supply chain.
3. Design and implement a strategy to respond to identified risks.
4. Carry our independent third-party audit of supply-chain due diligence at identified points in the supply chain.
5. Report on supply-chain due diligence.

[8] Angola, Burundi, Central African Republic, Republic of Congo, Democratic Republic of Congo, Kenya, Rwanda, Sudan, Tanzania, Uganda and Zambia.

Table 5: World Tantalum (Coltan) Mine Production per country within the period 1994-2014 (Data in metric tons of tantalum content unless otherwise noted)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014 (estimate)
Australia	238	274	276	302	330	350	485	660	940	765	730	730	850	435	557	81					
Brazil	50	50	55	55	60	90	90	340	200	200	250	250	250	180	180	180	180	180	140	98	98
Burundi								7	28	14	6	6						13	33	20	14
Canada	28	26	48	54	61	52	57	77	58	55	69	70	68	45	40	25			50	5	
China																				60	60
DRC							130	60	60	15	60	25			100			95	100	200	200
Ethiopia							38	47	35	35	35	45	70	77				76	95	8	40
Mozambique									12	75	280	81	70			113	120	260	39	115	85
Namibia										11	11	3									
Nigeria	2	2	2	2	3	3	4	3	3	23	21	5						50	63	60	60
Rwanda	2	2						95	53	14	40	40	62	42	100		110	93	150	600	600
Thailand																					
Uganda									5	2	5	0.1									
United States																					
Zaire	1	1																			
Zimbabwe	2	2	2					9	144	1	4										
Other Countries		1	1				32						32		188	162	271				
World Total (rounded)	323	358	384	413	454	495	836	1298	1538	1210	1511	1255.1	1402	779	1165	561	681	767	670	1166	1157
	Source: U.S. Geological Survey, Mineral Commodity Summaries																				

This guide, not legally binding, invited companies to set up an easy due-diligence protocol on their supply-chain to implement good practices in the minerals trade; by companies assessing the risks associated with their activities and relations.

However, different parties and scholars have questioned the outcome of these two measures, the Conflict Mineral Rule and the OECD guidance. Seay (2012) argues that the Dodd-Frank 1502 Act, even when well intentioned, has already had unintended consequences that harm those it was meant to help. The rule has actually contributed to a boycott on Congolese minerals. Due to the high level of uncertainty and lack of regulation in the country, companies cannot deliver what they are asked for by the ruling and have reacted by pulling out of the Congolese market place.

Nowadays, the Coltan route is a convoluted one that, despite the current efforts of the International Community, needs a coordinated action from the Government, its institutions, the Congolese private sector and the International Community to ensure it becomes a source of growth instead of a source of conflict, as it is still today.

4 - CONCLUSION

We have presented in the previous chapter the model of Greed and Grievance by Collier (1999 & 2004), which offers a very useful starting-point for a discussion about the commercial or economic motivations in a civil war context. Collier asserts "even when the rationale at the top of the rebel organization is essentially greed, the actual discourse may be entirely dominated by grievance"… "Narratives of grievance play much better with a community than narratives of greed, and by playing upon a sense of grievance, the rebel organization may therefore be able to add more recruits cheapily."

Therefore, when the conflict is active, resource accumulation becomes paramount and part of a "vicious circle in which war has become a business, and business is used to wage war" (Raeymaekers, 2002). The interests of the rebels who control the natural resources and the interests of transnational criminal enterprises are complementaries, since the latter can provide the distribution, transportation and marketing necessary to place the natural resources in the global consumer markets. As Naylor (1993) says, "any insurgency using the international black market to finance its activities inevitably forms mutually profitable and likely quite durable relations with international criminal groups". Transnational crime organisations provide an additional service as arms suppliers. Sometimes, this armed trade is based

on barter arrangements (Williams and Picarelli, 2005) because of the advantages for both parties. Barter arrangements allow the rebels to have an easier and cheaper access to arms since they don't require up-front financing, and the criminal enterprise obtains a considerable opportunity for profit-making; for example, the arms dealers Viktor Bout and Sanjivan Ruprah obtained special concessions on Coltan and diamonds in DRC (Bagley, 2004):

Bout's actions bring to light the "strong connection that exists between occupying armies, mineral businesses and the regional proliferation of arms. While he has been supplying most of the warring parties with military equipment, his close relations to regional commodity traders has assured him of his involvement in the exploitation of precious resources such as Coltan and diamonds. In turn, the trade in these resources has provided the military actors with their necessary cash flows to secure their power".

It is this complicated puzzle of interests that sets up the different economic agendas to which Collier (1999) was referring as a primary motive for warfare. Collier contests that economic agendas are central to understanding why civil wars start, as conflicts are more likely to happen because of economic opportunities than by grievance. Those groups that benefit from the conflict – even when they are a minority - will feel motivated to initiate it and sustain it, despite the conflict destroying economic opportunities for the majority.

The political and economic disruptions caused by civil wars set the ground for the rebels and elites to obtain their goals more easily. The informal economy facilitates informal transactions and loose trade networks that provide the necessary clandestine cover. Usually, the main players in the economic activities are linked to the civil war protagonists.

In the former Zaire (DRC), there were four major trading routes used by belligerents and neighbouring countries to export "fraudulently" natural resources mostly looted from DRC. Agricultural and manufactured products were transferred via Kampala in Uganda. Goods and people were transported via Bujumbura in Burundi. Coffee, precious materials, manufactured goods and foreign currencies were sent via the Oriental Province of Congo to Uganda and from there to Nairobi and Dubai. The fourth major route was via Dar-es-Salam in Tanzania by railway. The profits of this informal trade were reported to go to a private bank, specifically set up in Dar-es-

Salam (Tanzania), with the only purpose of laundering the earnings from this illegal trade of natural resources.

Currently these routes have become extremely dangerous, controlled by rebel armies who force any trader willing to use them to fall upon their rules and cooperate either with cash payments, foods, clothes etc in return for personal security. These businessmen become sponsors of the rebels and financial supporters of the conflict. In DRC, the warring groups and the informal traders coexist in a very complex way.

However, the multiple agendas from the different groups taking part in a conflict are difficult to determine. By definition, civil war means the use of force against the Government by its opponents. The Government contends the "illegality" of the conflict based on the violation of internationally accepted principles that the international community usually endorses. Per contra, the rebels defend the illegal character of the State and its lack of legitimacy as the reasons to enter into warfare.

In certain cases, private parties become central actors of the conflict benefiting from their support to one or other side, rebels or Governments. The economic agendas of all parties involved in the conflict are mutant and change as the war progresses.

Nevertheless, even if it were possible to determine the economic agendas of the different parties for the pursuit of their economic gains, we still face the challenge of determining the true total volume of the economic transactions carried out informally (Mwanasali, 2000), mostly because of the difficulty of monitoring these informal transactions in the local markets. Therefore, when assessing the economic situation in the conflict zone, we cannot just rely on the macroeconomic indicators offered up by the Government, international agencies or any other type of organization, as these do not reflect the reality.

CHAPTER 3

WAR AS AN EXTERNALITY OF AN INTERNATIONAL DUOPOLY

FOREWORD

We say therefore War belongs not to the province of Arts and Sciences, but to the province of social life. It is a conflict of great interests, which is settled by bloodshed, and only in that is it different from others. It would be better, instead of comparing it with any Art, to liken it to business competition, which is also a conflict of human interests and activities; and it is still more like State policy, which again, on its part, may be looked upon as a kind of business competition on a great scale. Besides, State policy is the womb in which War is developed, in which its outlines lie hidden in a rudimentary state, like the qualities of living creatures in their germs.

General Carl von Clausewitz, 1874

1 - INTRODUCTION

In our previous chapters, we have studied the evolution of armed conflicts and we have discussed the tight relation between war and financial interests. We have seen how countries with an important endowment of natural resources fund their wars with the outcome from the trade of these. Many authors have already pointed to the many similarities between warfare and business competition, sharing even certain expressions such as "warlike conditions", "casualties" or "conflict", for instance.

Carl von Clausewitz already noted in the nineteenth century that business was a form of human competition that greatly resembled war. Under this statement, we could think of many questions, but maybe one of the oldest and most controversial among political scientists is:

What is the cause-effect relation between war and trade?

From a theoretical standpoint and depending on which school we stick to, we may defer from the idea that trade promotes peace (liberal school) to that asymmetric trade drives to conflicts (neo-marxist school). Please refer to Barbieri and Schneider (1999), or Kapstein (2003), for more recent studies. A remarkable exception is the paper by Glick and Taylor (2005), who study the opposite causal link from war to trade.

Contrary to what one could think, many of the poorest countries of the world are rich in natural resources such as oil, gas and other minerals. Nevertheless, the lack of social accountability and high level of corruption of their governments guide these countries into unfair and illegal wars that send their populations further into poverty.

Corruption undermines trade and the economic development by discouraging direct investment and new small businesses from establishing within the country because of the high "start-up costs" required due to corruption. Anderson and Marcouiller (2002) argue that corruption and imperfect contract enforcement reduce international trade dramatically; they also find that inadequate institutions constrain trade as much as tariffs do.

Specifically, transnational organised crime such as drug, firearms, human trafficking and money-laundering among others, is considered as one of the biggest threats for the social, economical and cultural development of societies.

NGOs and other international bodies such as the United Nations dedicate a large share high level of their budgets to create control instruments and shed light on the political and economical situation of third-world countries, targeting more transparency in their

government and therefore in the flow of revenues from oil, gas and mining companies to the State.

Different lines of research have been developed on the study of the level of success of control policies on industries with "illegal or non-desirable" products.

Researchers such as Stimming (1999), Anderson and Bandiera (2005) and United Nations (2003) among others have shown their interest in these lines of investigation.

Stimming (1999), for example, presents in a differential game between two symmetrical firms; provided with a clean and dirty production activity, he analyses of how investment and emissions are affected by environmental regulation. His conclusion is that each firm's investment levels increase with a stricter environmental policy towards its rival, which causes more emissions by this firm. On the other hand, Anderson and Bandiera (2005) study why state policies to disrupt or reduce illegal trade usually fail or do not obtain the expected result. Their proposal of a simple model of trade outside the law preyed on by robbers and possibly protected by private robbers conclude that safety in numbers has important implications for the existence of trade and for the success of state policies against illegal trade. Anderson (2015) analyses if bigger markets are safer and how governmental policies should respond to terrorist threats.

Our paper suggests a third line of study, a theoretical framework for analysing the interaction between a productive sector and the war activities in a context of international duopolistic competition.

This theoretical framework is also used to develop an analysis of a real case - the Coltan market vs war activities in Democratic Republic of Congo and Rwanda.

Coltan is a mineral labelled as metallic ore for the technological industry. Its importance is such that it is the best-paid activity in the producer countries. In average a Congolese miner makes four to five times more money than any other regular Congolese worker. Countries such as Rwanda have been accused of using the revenues generated from the high price of Coltan to sustain their efforts in the war.

Our study analyses the interaction between a productive sector and war activities, assuming that two countries are the suppliers of an input in the international market. Both of them are the users of the domestic labour force, which may be employed in two activities: production and war.

We study whether the strategies followed in the domestic market may affect the second market.

The analysis begins in section 2a following the line of Bulow et al. (1985).[9]

We firstly assume that a monopolist decides to compete in a second market with other firm (duopolist). Secondly, we imagine there is a positive shock (decrease in tax) in the domestic market of the monopolist. We wonder which strategy the duopolist will decide to follow within this scenario.

We find out that the strategies of each firm are defined depending on whether competitor's products are strategic substitutes[10] or strategic complements, which are defined below, but we can provide a rough explanation now: conventional substitutes and complements can be differentiated by whether a more "aggressive" strategy put in place by firm 1 (or country A) increases or decreases firm 2´s total profits or analogously firm 2´s marginal profits (or country B).

We conclude that, when products are substitutes and the shock is positive, the monopolist opts to sell more so the duopolist must play less aggressively. After this conclusion, we decide to extend our model to both firms competing in both countries, and we assume there is a civil war taking place in each country, which is financed by the tax on profits.

As we have seen in our previous chapters, wars financed by the State were typical until the twentieth century when armed conflicts began to become more complicated and more global, and it is not enough to contain them geographically as the consequences of the conflict extend outside their borders. It is what Kaldor (2012) defines as the "new war", what we have discussed at length in Chapter 1.

According to our model, an increase in war activities in country A will cause war in country B if produces the strategic complementarity, relation suggests that national and/or supranational authorities must take into account this phenomenon of war contagion when any regulatory decision is implemented.

Our models also capture the fact that war is possible because it is supported by the profits of the producers. We assume that producers dedicate a percentage X of their profits to finance war activities. In our model, the Government decides this unilaterally. This implies an optimal r (where r is the tax on profits established by the government), which exists because an excessively high tax will discourage producers from producing and therefore the war will not have the funds needed.

[9] Bulow and Geanokoplos (1983) analyse in terms of a perfect Nash equilibria of Cournot-type game in which two identical firms must choose between cheap and expensive production in each of two periods.

[10] Brander (1981) argues that the usual approach to intra-industry trade is to assume that such trade arises because slightly different commodities are produced and traded to satisfy consumer's tastes for variety. However Brander demonstrates that there are reasons to expect two-way trade even in identical products, due to strategic interaction among firms.

The aforementioned situation means that "the input market" has two externalities over this parallel labour market, which we label as "war":

A positive one, because higher profits of the input producer imply higher investment of capital in the "war" sector.

A negative one, because the greater the labour recruited in the productive sector, the higher the wage in the labour market from which war also recruits soldiers.

Thus we study a two-stage game in section 2b, which will be solved using backward induction.

Firstly, we will focus on the equilibrium in the international duopoly, taking war activities in each market as a given. Secondly, we will calculate the government value V_i due to the employment levels obtained in the Nash equilibrium at the first-stage.

In section 3 we extend our model. The Government now applies two taxes, not just r (tax on profits) but also γ, which is a tax on the output.

Under these scenarios, we analyse how producers will react to the Governmental decisions of applying different levels of taxes and if the Government is more motivated on the promotion of war (hiring more soldiers) or the promotion of peace (hiring fewer soldiers).

As we mentioned above, several of the elements of the model are closely designed to capture features of a real-world example, based on the case of the Coltan mining sector in the Democratic Republic of Congo and Rwanda, which we have seen in our previous chapter.

2 - MODEL 1:

Analysis of the interaction between war activities and the productive sector

There are studies dealing with the relationship between military conflicts and trade from theoretical and empirical points of view. Martin, Mayer and Thoenig (2007) test the effect of trade on the probability of military conflict and conclude that regional and bilateral trade agreements, which foster regional and bilateral trade flows, may have positive consequences for political relations. They show that, even in a model where trade increases welfare and war is Pareto dominated by peace, higher trade flows may not lead to peace. The authors suggest that the intuition that trade promotes peace may be only partially right because bilateral trade increases the opportunity cost of bilateral war; indeed, it deters bilateral war. However multilateral trade openness has a different effect

on the opportunity cost of bilateral war and it increases the probability of war between any given pair of countries, given that it weakens the incentive to make concessions during negotiations.

Our model follows the line marked by Bulow et al. (1985) who analysed how the strategies of a competitor in a second market change when a firm affects its own marginal costs in the first market. Two factors will determine whether the changes in the competitor´s strategies will result in higher or lower profits: a) both markets exhibit joint economies or diseconomies; and b) the relation between the products of both competitors, whether they are strategic substitutes or strategic complements. Basically, strategic substitutes and complements are defined by whether a more "aggressive" strategy by firm 1 lowers or raises firm 2´s marginal profits.

A - The Simplest Model of Strategic Relationships across different domains

As stated above, based on the analysis developed by Bulow et al. (1985), we may run an analysis about the effect of one firm strategies on the strategies of the other.

We wonder how much the profit of firm 1 would be affected if its profitability is increased in market A. The result will depend on the level of change of firm 2´s strategy in that market.

Let´s create the simplest model of analysis of strategic effects, assuming that we have two firms, firm 1 and 2; in two countries, country A and B. Firm 1 is a monopolist in country A and firm 2 is a duopolist with firm 1 in country B.

The demand function in the international market is defined as $P = D(Q)$ where $Q = Q_A + Q_B$.

According to a production function $Q_i = f(l_{ji})$ where l_{ji} is the level of workers chosen as strategic variable by each firm j in country i, $\forall\, j = 1, 2$ and $i = A, B$. Therefore, a higher level of workers used by a firm means a "more aggressive" play.

We can assume in market A that $l_{1A} = q_{1A} = Q_A$ because, as a monopolist in market A, firm 1 will be choosing its quantity. Similarly, $l_{1B} + l_{2B} = q_{1B} + q_{2B} = Q_B$.

Finally, we imagine there is a shock in market A, defined as a decrease in r (the government collects $T_i = r\pi_j$ as a tax on profits). Equivalently, it can be interpreted as either shifting firm 1´s marginal revenue curve (as a function of quantity) in country A upward by one unit or shifting its marginal cost curve downward by one unit.

We may analyse then the effect on the marginal profitability of a firm, as regards the strategy followed by its competitor.

As we have stated in Chapter 2, in year 2000, a Belgian company called Cogecom Sprl obtained a granted monopoly in DRC on all Coltan exports. Therefore, the rest of all Coltan exports are illegal and carried out by corrupt officials and traffickers. Cogecom enjoys a leading position in the market, and its decisions affect other markets.

We define the profit of firm 1, a monopolist in market A, π_{1A} , as:

$$\pi_1 (l_{1A}, l_{1B}, l_{2B}, r) = \pi_{1A}(l_{1A}) + \pi_{1B}(l_{1B}, l_{2B}) - C_1(l_{1A}, l_{1B}, l_{2B}) + r l_{1A} \quad (1)$$

Because, as previously said, $l_{ji} = q_{ji}, \forall\, j = 1,2$ and $i = A, B$.

Firm 2 is a duopolist since it competes in market B with firm 1, its profit is defined as:

$$\pi_2 (l_{1B}, l_{2B}) = \pi_{2B}(l_{1B}, l_{2B}) - C_2(l_{1B}, l_{2B}) \quad (2)$$

If the profit functions are all differentiable, then we have three first-order conditions (FOC), which must be satisfied, at an interior Nash equilibrium:

$$\frac{\partial \pi_1}{\partial l_{1A}} = \frac{\partial \pi_{1A}}{\partial l_{1A}} - \frac{\partial C_1}{\partial l_{1A}} + r = 0 \quad (3)$$

$$\frac{\partial \pi_1}{\partial l_{1B}} = \frac{\partial \pi_{1B}}{\partial l_{1B}} - \frac{\partial C_1}{\partial l_{1B}} = 0 \quad (4)$$

$$\frac{\partial \pi_2}{\partial l_{2B}} = \frac{\partial \pi_{2B}}{\partial l_{2B}} - \frac{\partial C_2}{\partial l_{2B}} = 0 \quad (5)$$

To analyse the effect of a shock (decrease in "r"), which makes market A more profitable, we differentiate the FOC:

$$\frac{\partial^2 \pi_1}{\partial l_{1A} \partial l_{1A}} dl_{1A} + \frac{\partial^2 \pi_1}{\partial l_{1A} \partial l_{1B}} dl_{1B} + \frac{\partial^2 \pi_1}{\partial l_{1A} \partial l_{2B}} dl_{2B} + \frac{\partial^2 \pi_1}{\partial l_{1A} \partial r} dr = 0 \quad (6)$$

$$\frac{\partial^2 \pi_1}{\partial l_{1B} \partial l_{1A}} dl_{1A} + \frac{\partial^2 \pi_1}{\partial l_{1B} \partial l_{1B}} dl_{1B} + \frac{\partial^2 \pi_1}{\partial l_{1B} \partial l_{2B}} dl_{2B} + \frac{\partial^2 \pi_1}{\partial l_{1B} \partial r} dr = 0 \quad (7)$$

$$\frac{\partial^2 \pi_2}{\partial l_{2B} \partial l_{1B}} dl_{1B} + \frac{\partial^2 \pi_2}{\partial l_{2B} \partial l_{2B}} dl_{2B} = 0 \quad (8)$$

If we simplify these equations further $\frac{\partial \pi_1}{\partial r} = q_{1A}$; therefore, $\frac{\partial^2 \pi_1}{\partial l_{1A} \partial r} = 1$.

Since, $l_{1A} = q_{1A}$ and $\frac{\partial^2 \pi_1}{\partial l_{1B} \partial r} = \frac{\partial q_{1A}}{\partial l_{1B}} = 0$; equations (3), (4) and (5) may be summarised as

$$\begin{pmatrix} \frac{\partial^2 \pi_1}{\partial l_{1A} \partial l_{1A}} & \frac{\partial^2 \pi_1}{\partial l_{1A} \partial l_{1B}} & \frac{\partial^2 \pi_1}{\partial l_{1A} \partial l_{1B}} \\ \frac{\partial^2 \pi_1}{\partial l_{1B} \partial l_{1A}} & \frac{\partial^2 \pi_1}{\partial l_{1B} \partial l_{1B}} & \frac{\partial^2 \pi_1}{\partial l_{1B} \partial l_{2B}} \\ 0 & \frac{\partial^2 \pi_2}{\partial l_{2B} \partial l_{1B}} & \frac{\partial^2 \pi_1}{\partial l_{2B} \partial l_{2B}} \end{pmatrix} \cdot \begin{pmatrix} dl_{1A} \\ dl_{1B} \\ dl_{2B} \end{pmatrix} = \begin{pmatrix} -dr \\ 0 \\ 0 \end{pmatrix} \quad (9)$$

We can make the following assumptions:

ASSUMPTION 1:

The equilibrium is strictly stable, and then the determinant $|\pi| < 0$ in (9); this means that in the absence of market A, market B would still be strictly stable, $\pi_{22}\pi_{33} > \pi_{32}\pi_{23}$ what means that $\frac{\partial^2\pi_1}{\partial l_{1B}\partial l_{1B}} \cdot \frac{\partial^2\pi_1}{\partial l_{2B}\partial l_{2B}} > \frac{\partial^2\pi_2}{\partial l_{2B}\partial l_{1B}} \cdot \frac{\partial^2\pi_1}{\partial l_{1B}\partial l_{2B}}$

ASSUMPTION 2:

The products are substitutes, $\frac{\partial\pi_1}{\partial l_{2B}} < 0$ and $\frac{\partial\pi_2}{\partial l_{1B}} < 0$.

We can now resolve (9):

1. $\frac{dl_{1A}}{\partial r} > 0$ A positive shock[11] to the marginal profitability of market A causes 1 to sell more.
2. $\pm\frac{dl_{1B}}{dr} = \pm\left(\frac{\partial^2\pi_1}{\partial l_{1A}\partial l_{1B}}\right)$

Therefore, under a positive shock, the monopolist firm 1 will adopt a more aggressive strategy in its domestic market when a decrease in "r" takes place. Nevertheless the strategy followed by firm 1 in market B will be defined whether markets A and B exhibit joint economies (more aggressive) or joint diseconomies (less aggressive).

$$\pm\frac{dl_{2B}}{dr} = \pm\left(\frac{\partial^2\pi_1}{\partial l_{1A}\partial l_{1B}}\right)\cdot\left(\frac{\partial^2\pi_2}{\partial l_{2B}\partial l_{1B}}\right)$$

The equilibrium strategy of B will depend on:

a) Whether there are joint economies or diseconomies across markets.
b) Whether a more aggressive strategy by firm 1 in market B (increase l_{1B}) raises or lowers firm 2´s marginal profitability.

$\frac{\partial^2\pi_2}{\partial l_{2B}\partial l_{1B}}$ represents the change in the marginal profitability to firm 2 when firm 1 increases its quantity (or it is more "aggressive").

With undifferentiated product (as Coltan) and constant elasticity demand, we define strategic substitutes $\frac{\partial^2\pi_2}{\partial l_{2B}\,\partial l_{1B}} < 0$ when $q_{2B} < q_{1B}$ and strategic complements as $\frac{\partial^2\pi_2}{\partial l_{2B}\partial l_{1B}} > 0$ when $q_{2B} > q_{1B}$.

The optimal response of firm 2 depends on the relation:

- With strategic substitutes, to a more aggressive play by firm 1; firm 2 must play less aggressive (decrease l_{2B}).

[11] Positive shock is defined as a decrease in "*r*"; being *r* the factor of the tax on profits established by the government.

- With strategic complements, to a more aggressive play by firm 1; firm 2 must play more aggressive as well (increase l_{2B}).

B - The Two-stage Game

We may extend our model to a Two Stage Game and we consider two countries, A and B, with a single firm located in each (firms 1 and 2). The firms compete in quantity and prices in each market, producing a non-differentiated good. Firms have access to the same production technology.

Let firm j where $j \in \{1, 2\}$, operate in country i, where $i \in \{A, B\}$, producing Coltan in an international market with a demand function $P = D(Q)$ where $Q = Q_A + Q_B$ according to a common production function $Q_i = f(l_i)$ where $l_i = l_j$ is the amount of workers employed in Coltan production in country i. A civil war is also taking place in each country. Soldiers are recruited as "labour" for the military sector, which is dedicated to the civil war activities. Salary levels in country i positively depend on the soldiers s_i and workers l_i demanded by the two sectors of the country according to an inverse supply function $w_i = w\ (s_i + l_i)$, where $w_i = w_j$.

Each country's Coltan duopolist is facing fixed costs F (they can be seen as the reservation profit of the investors, below, which they would move their funds to another country):

Being,

$$C_j = w_j l_j + F \tag{10}$$

$$\pi_1 = pq_1 - w_1 l_1 - F \tag{11}$$

$$\pi_2 = pq_2 - w_2 l_2 - F \tag{12}$$

Bearing this in mind, and the fact that government wants to motivate its country's duopolist to maximise profit from Coltan (which is then used to finance the war), the government collects $T_i = r\pi_j$ as a tax on profits. These funds are used as capital employed in war activities whose value to the government is determined as the difference between a (Cobb-Douglas) war-production function: $V_i = T_i s_i$ and soldiers recruiting costs: $C_i = w_i s_i$.

Thus, the government acts as a leader employing s_i to maximise $G_i = T_i s_i - w_i s_i$ and firms follow employing l_j to maximise $\pi_j = (1 - r)\left[Pf(l_j) - w_j l_j\right] - F$.

Regarding the tax established by the government $T_i = r\pi_j$, Eaton and Grossman (1986) take the level of output as strategic variable, concluding that trade or industrial policy

decisions may raise domestic welfare if oligopolistic profits can be shifted to home country firms. Furthermore, in a duopoly case as ours, profits may be shifted only if firm´s conjectural variations differ from the real equilibrium strategies that would result if they were to alter their output quantities. The decision between a subsidy or a tax will depend in this specific case on whether the domestic firm´s output in the laissez-faire equilibrium overpasses or not the quantity under "consistent" or Stackelberg hypothesis.

We can solve our two-stage game using backward induction. Thus, we focus, firstly, on the equilibrium in the International Coltan duopoly taking war activities in each market as given.

As per above, $l_i = l_j$ and $w_i = w_j$, therefore, firm j's profit-maximising problem is equivalent to:

$Max[D(f(l_A) + f(l_B))f(l_A) - w(s_A + l_A)l_A]$ which should be achieved by (l_A, l_B, s_A) satisfying the following F.O.C:

$$\frac{\partial \pi_1}{\partial l_A} = \frac{\partial\left[D\left(f(l_A) + f(l_B)\right)f(l_A) - w(s_A + l_A)l_A\right]}{\partial l_A} = 0 \implies$$

$$\implies \frac{\partial\left[D\left(f(l_A) + f(l_B)\right)f(l_A)\right]}{\partial l_A} = \frac{\partial[w(s_A + l_A)l_A]}{\partial l_A} \implies$$

$$\implies \frac{\partial[D(f(l_A)+f(l_B))]}{\partial l_A} f(l_A) + D\left(f(l_A) + f(l_B)\right)\frac{\partial f(l_A)}{\partial l_A} = \frac{\partial[w(s_A+l_A)]}{\partial l_A}\, l_A + w(s_A + l_A) \implies$$

$$\implies \frac{\partial P}{\partial Q_A} \cdot \frac{\partial Q_A}{\partial l_A} Q_A + P\frac{\partial Q_A}{\partial l_A} = \frac{\partial w}{\partial l_A}\, l_A + w \implies$$

$$\implies \frac{\partial Q_A}{\partial l_A}\left[\frac{\partial P}{\partial Q_A} Q_A + P\right] = \left[\frac{\partial w}{\partial l_A}\, l_A + w\right] \implies$$

$$\implies \frac{\partial Q_A}{\partial l_A} P\left[1 - \frac{1}{\varepsilon_{D_A^C}}\right] = w\left[1 - \frac{1}{\varepsilon_{D_A^l}}\right] \qquad (13)$$

Where $\varepsilon_{D_A^C}$ is the Coltan demand elasticity and $\varepsilon_{D_A^l}$ is the miners' demand elasticity in country A.

Suppose for a moment the elasticities $\varepsilon_{D_A^C}$, $\varepsilon_{D_A^l}$ are constant.

Therefore, when an increase of soldiers in one country raises wages to maintain the above FOC, price must also increase, implying a lower employment of labour. In fact, the decrease in labour will be higher (lower), the more (less) productive are the workers in the Coltan sector. Obviously, the slope of demand D and salary w functions will also play a role if elasticities are not constant.

Assume $(l_A^N(s_A, s_B), l_B^N(s_B, s_A))$ are the Nash equilibrium employment levels resulting from the solution of the system of FOCs obtained from the analysis of the Coltan market competition stage of the game.

Government A's objective is to maximise $G_i = r\pi_j s_i - w_i s_i$.

$$Max\ [r\pi_1^N(s_A, s_B)s_A - w(s_A, s_B)s_A] \Longrightarrow r\pi_1 \left[\frac{\partial \pi_1}{\partial s_A} \cdot \frac{s_A}{\pi_1} + \frac{\pi_1}{\pi_1}\right] = w\left[\frac{\partial w}{\partial s_A} \cdot \frac{s_A}{w} + \frac{w}{w}\right] \Longrightarrow$$

$$\Longrightarrow r\pi_1\left(1 - \varepsilon_{\pi,\, s_A}\right) = w\left(1 - \frac{1}{\varepsilon_{D_A^S}}\right) \tag{14}$$

Where $\varepsilon_{D_A^S}$ is the soldiers demand elasticity in country A and $\varepsilon_{\pi,\, s_A}$ is the elasticity of the profits of firm 1 in country A with respect to the soldiers' demand in country A.

If we take the elasticities $\varepsilon_{D_A^S}$ for the moment to be constant, but ε_{π, s_A} depending positive or negatively on s_i, w will obtain two possible results; if $\varepsilon_{\pi,\, s_A}$ is negative, a higher recruitment of soldiers means a lower level of producers' profits, but the contrary holds when the ε_{π, s_A} is positive.

If the aforementioned relation holds, meaning that, $r\pi_1\left(1 - \varepsilon_{\pi,\, s_A}\right) = w\left(1 + \frac{1}{\varepsilon_{D_A^S}}\right)$ the Government's decision of setting a determined level of r must be compensated in the labour market, through the wage level, w. Therefore, when the relation among the level of profits of the producers and the level of soldiers is positive, the Government may establish a higher r to the level that would set if $\varepsilon_{\pi,\, s_A} < 0$.

We conclude that when country B hires more soldiers, wage also increases and therefore Coltan price must also increase to compensate this effect, implying a lower level of labour. Therefore, a positive relation among number of soldiers and Coltan profits holds, and the Government may set a higher r.

As we already stated above, r defines the level of funds for Government to finance the war. This leads to a value for the Government defined as $G_i = r\pi_j s_i - w_i s_i$ that Government will maximise when ε_{π, s_A} is positive.

An interesting extension to this line of research would be to analyse the impact on the "war sector" of Governmental trade policy decisions (export subsidy, tariffs or quotas) assuming both firms produce only for third markets, following for instance Brander and Spencer (1984).

3 - A NUMERICAL APPLICATION OF MODEL 1

Coltan sector vs War activities in African countries.

The Coltan market is quite a convoluted one as we have mentioned in our previous sections. Currently, two countries, Democratic Republic of Congo (DRC) and Rwanda, are the main exporters of Coltan to third countries (developed countries, mainly the United States and North European States).

The political situation within DRC is untenable despite the efforts of NGOs and International Organisations to obtain a ceasefire; the exploitation of the precious natural resources provides enough funds to finance a civil war, which has killed 5.4 million people already.

In this political scenario, countries such as Rwanda, Uganda, Angola, Zimbabwe and Burundi have been accused of using the revenues from Coltan contraband to promote war in the area.

We analyse in this section the level of motivation of governments to promote war, to finally find out that a contagion effect that exists between adjacent wars and Government is better off (higher value of V) when more soldiers are recruited.

We consider a Coltan world demand function $P = A - Q$ where Q is defined as $Q = q_A + q_B$, the sum of each country (A, B) Coltan production, on the basis of domestic labour (k: productivity). Then, $q_A = kl_A$ and $q_B = kl_B$.

Formation of domestic wages w_A, w_B following labour l_A, l_B and soldier s_A, s_B demand as:

$w_A = w_0 + t(l_A + s_A)$

$w_B = w_0 + t(l_B + s_B)$

Where t defines the market power of the monopsonist or what is the same, the slope of the labour-supply function.

In our model, we have a duopsony, the Government hiring soldiers (s_A) and the Coltan mine owner (l_A) hiring miners. Therefore, the higher the monopsonist market power, the higher is the effect of the employed labour increase over *w*.

Domestic profits from Coltan are defined as:

$\pi_A = pq_A - w_A l_A$

$\pi_B = pq_B - w_B l_B$

Firms' strategic variables are employment levels l_A, l_B. Applying FOCs $\frac{\partial \pi_i}{\partial l_i} = 0, \forall\, i = A, B$ (and securing SOCs $\frac{\partial^2 \pi_i}{\partial l_i^2} < 0$ are also satisfied) we obtain reaction function in A's labour market:

$R_A \to l_A = \frac{Ak - k^2 l_B - t s_A - w_0}{2(k^2+t)}$ and analogous for $R_B \to l_B = \frac{Ak - k^2 l_A - t s_B - w_0}{2(k^2+t)}$

Whose simultaneous solution gives equilibrium employment levels:

$$l_A = \frac{A(k^3 + 2kt) - 2t(ts_A + w_0) - k^2(2ts_A - ts_B + w_0)}{3k^4 + 8k^2 t + 4t^2}$$

$$l_B = \frac{A(k^3 + 2kt) - 2t(ts_B + w_0) - k^2(2ts_B - ts_A + w_0)}{3k^4 + 8k^2 t + 4t^2}$$

Yielding equilibrium profits:

$$\pi_A = \frac{(k^2 + t)\left(-A(k^3 + 2kt) + 2t(ts_A + w_0) + k^2(2ts_A - ts_B + w_0)\right)^2}{(3k^4 + 8k^2 t + 4t^2)^2}$$

$$\pi_B = \frac{(k^2 + t)\left(-A(k^3 + 2kt) + 2t(ts_B + w_0) + k^2(2ts_B - ts_A + w_0)\right)^2}{(3k^4 + 8k^2 t + 4t^2)^2}$$

Assume now that a Government derives "value" according to a Cobb-Douglas "war production function" minus recruiting (labour) costs as:

$V_{gA} = r_A \pi_A s_A - w_A s_A$

$V_{gB} = r_B \pi_B s_B - w_B s_B$

We could assume that "soldiers" (s_A, s_B) require a risk premium q above the domestic wage, but, for simplicity, we assume a uniform wage across "professions", which does not affect qualitatively the results presented here.

For the moment, assume: $w_0 = 0; r = 0.9;\ k = 1; t = 1; A = 100$.

The graph below (assuming No War in country B, or $s_B = 0$) indicates there is an optimal number of soldiers (achieving maximal Government value).

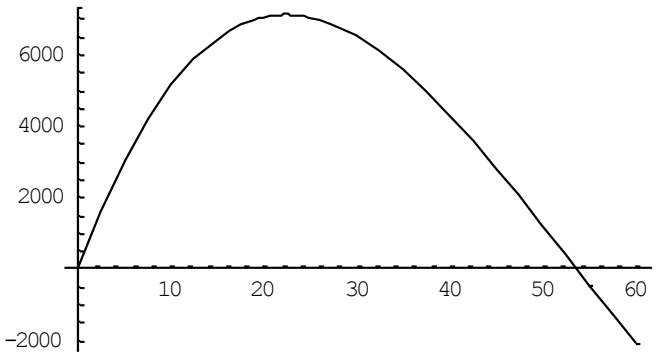


Figure 4:
Government value in country A, in accordance to the number of soldiers (s_A) and $r = 0.9$.

In addition, if the other country has also war ($s_B > 0$).

The following graph shows the relation between adjacent "wars".

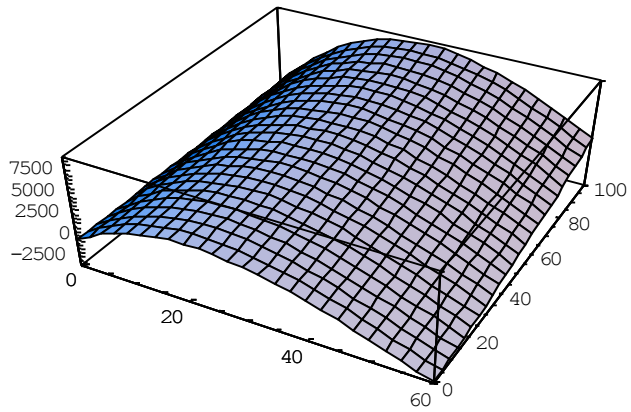


Figure 5:

War Transmission through International Trade.

Surface represents Government *A* benefits as a function of soldier recruitment in Country *A* and Country *B*.

Finally, it is clear that, for higher r, the optimal army force increases and so does the Government's "value" V_{gA}.

$s_B = 0; r = 0.5$

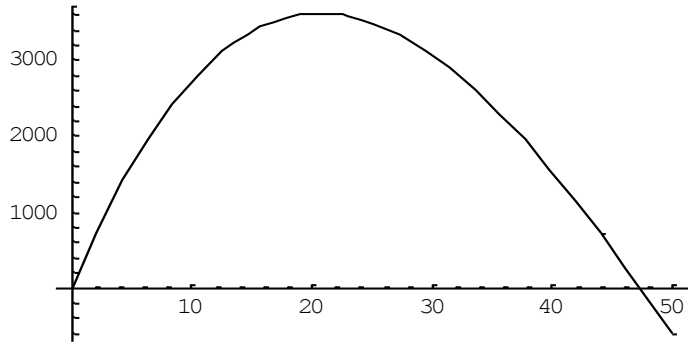


Figure 6:

Government value in country *A*, in accordance to the number of soldiers (s_A) and ($r = 0.5$).

With optimal $s_A = 21$ and maximal $V_{gA} = 3611.16$ vs $s_B = 0, r = 0.9$

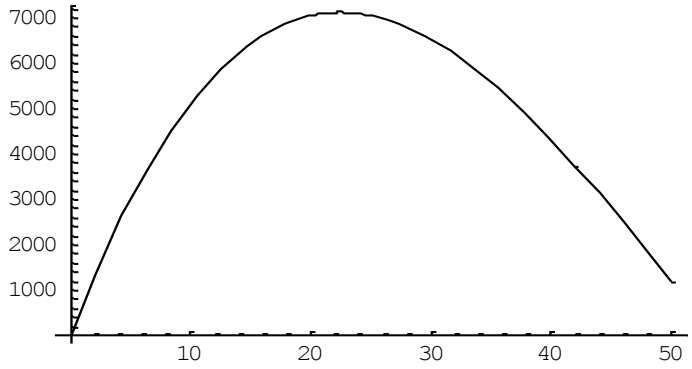


Figure 7:

Government value in country *A*, in accordance to the number of soldiers (s_A) and ($r = 0.9$).

With optimal recruitment of soldiers at $s_A = 23$ and maximal Government value, $V_{gA} = 7112.64$

A maximal value of V_{gA} demonstrates that the Government prefers to increase the share of profits that goes to the war industry, which also leads to a higher soldier-recruiting level

4 - MODEL 2:

Analysis of the effect of industrial policy decision on war activities

Governments can use industrial policy efficiently as a control tool in the trade of illegal goods. An efficient intervention may reward with an increase on the level of national welfare and political stability.

Industrial policy decisions as output taxes and subsidies affect not only the level of competitiveness of the firms operating in the market but also the welfare of their consumers. A central assumption in the debate for the analysis of the effects of interventionist policies is that international markets are oligopolistic or imperfectly competitive, either because:

- Governments have cartelised the domestic firms via tax policy or marketing arrangements,
- There are only a few firms competing in the market; or
- The products are differentiated.

There is extensive literature in the analysis of how interventionist trade policies can increase national welfare in environments with different levels of competition. In 1984, Brander and Spencer analysed how in a model Nash-Cournot with two monopolists competing in a third market, the Government can establish an optimal export subsidy before firms make product decisions. Later, Dixit extended their model to a case with more than two firms and concluded that an export subsidy is still optimal as long as the number of firms in each market is not too large. Krugman (1984) also demonstrated as under increasing returns to scale, protection of domestic firms could prove positive for the firm´s advantage in foreign markets by lowering its marginal costs. And finally, Eaton and Grossman analysed the welfare effects of trade and industrial policy decisions in an oligopoly and characterised optimal intervention under different assumption on market structure and conduct, concluding that subsidy is usually indicated for Cournot behaviour, but a tax proves to be optimal when firms engage in Bertrand competition.

Our purpose here is to analyse the effect of a tax on product unit in an environment when two domestic firms are competing with a perfect substitutable good.

A - The model

As per our previous model, we will assume the simplest form of oligopolistic competition, a single domestic (country A) with one firm (firm 1) competing with a single foreign firm (firm 2) in a foreign market (market B): $j \in \{1,2\}, i \in \{A,B\}$, demand function $P = D(Q)$ where $Q = Q_A + Q_B$, $Q_i = f(l_i)$ where $l_i = l_j$ and $w_i = w\ (s_i + l_i)$ where $w_i = w_j$.

l represents the labour force and w the salary in each country.

Each country's Coltan duopolist is facing fixed costs defined as F.

Each market's Government establishes a tax on product unit defined as $\gamma_{A,B}$.

Being $C_j = \gamma q_j + w_j l_j + F$, equations (11) and (12) are now:

$\pi_1 = pq_1 - \gamma q_1 - w_1 l_1 - F$

$\pi_2 = pq_2 - \gamma q_2 - w_2 l_2 - F$

The Government now applies not only a tax on profit as we have seen in Model 1, but also a tax on output. Therefore, the Government now collects:

$$T_i = r\pi_j + \gamma Q_i \quad (15)$$

Where r is the tax on profits established by the Government as we presented in the model 1 and γ is the new tax on output.

These T_i funds are public capital employed in war activities whose value to the Government is $V_i = T_i s_i$ and soldier-recruiting costs are $C_i = w_i s_i$.

We assume the Government acts as a leader, employing s_i to maximise its profit G_i.

$G_i = T_i s_i - w_i s_i \Longrightarrow G_i = (r\pi_j + \gamma Q_i)s_i - w_i s_i \Longrightarrow G_i = (r\pi_j + \gamma Q_i - w_i)s_i$

Firms 1 and 2 are the followers, they are employing l_j to maximise their own profit $\pi_j = (1-r)\left[Pf\left(l_j\right) - \gamma f(l_j) - w_j l_j\right] - F$.

Considering that $w_i = w_j$ and $l_i = l_j$, firm j's profit-maximising problem is:

$Max[(D(f(l_A) + f(l_B))f(l_A) - \gamma f(l_A) - w(s_A + l_A)l_A)]$

Equation (13) is now:

$$\frac{\partial \pi_1}{\partial l_A} = \frac{\partial\left[D\left(f(l_A) + f(l_B)\right)f(l_A) - \gamma f(l_A) - w(s_A + l_A)l_A\right]}{\partial l_A} = 0$$

$$\Longrightarrow \frac{\partial\left[D\left(f(l_A) + f(l_B)\right)f(l_A)\right]}{\partial l_A} - \frac{\partial[\gamma f(l_A)]}{\partial l_A} = \frac{\partial[w(s_A + l_A)l_A]}{\partial l_A} \Longrightarrow$$

$$\frac{\partial[D(f(l_A)+f(l_B))]}{\partial l_A} f(l_A) + D\left(f(l_A) + f(l_B)\right)\frac{\partial f(l_A)}{\partial l_A} - \gamma = \frac{\partial[w(s_A+l_A)]}{\partial l_A} l_A + w(s_A + l_A)$$

$$\Longrightarrow \frac{\partial P}{\partial Q_A}\cdot\frac{\partial Q_A}{\partial l_A}Q_A + P\frac{\partial Q_A}{\partial l_A} - \gamma\frac{\partial Q_A}{\partial l_A} = \frac{\partial w}{\partial l_{1A}}\ l_A + \ w \ \Longrightarrow$$

$$\Longrightarrow \frac{\partial Q_A}{\partial l_A}\left[\frac{\partial P}{\partial Q_A}Q_A + P\right] - \gamma\frac{\partial Q_A}{\partial l_A} = \left[\frac{\partial w}{\partial l_{1A}}\ l_A + \ w\ \right]\Longrightarrow$$

$$\Longrightarrow \frac{\partial Q_A}{\partial l_A}P\left[1 - \frac{1}{\varepsilon_{D_A^C}}\right] - \gamma\frac{\partial Q_A}{\partial l_A} = w\left[1 - \frac{1}{\varepsilon_{D_A^l}}\right] \qquad (13')$$

Where $\varepsilon_{D_A^C}$ is the Coltan demand elasticity and $\varepsilon_{D_A^l}$ is the miners' demand elasticity in country A.

Therefore, we can conclude that any increase in s_A will mean an increase in the salary w and a decrease in the labour force of country A (l_A), implying an increase in the margin $(P-\gamma)$ when the Government establishes γ and $P^\gamma > P$.

We now assume $(l_A^N(s_A, s_B), l_B^N(s_B, s_A))$ as the Nash equilibrium employment levels resulting from the above FOC's .

The Government A's objective is to maximise its profit G_A:

$$Max\ [G_A = [r\pi_1^N(s_A, s_B) + \gamma Q_A - w(s_A, s_B)]s_A]$$

$$\Longrightarrow r\pi_1\left[\frac{\partial \pi_1}{\partial s_A}\cdot\frac{s_A}{\pi_1} + \frac{\pi_1}{\pi_1}\right] + \gamma Q_A\left[\frac{\partial Q_A}{\partial s_A}\cdot\frac{s_A}{Q_A} + \frac{Q_A}{Q_A}\right] = w\left[\frac{\partial w}{\partial s_A}\ \cdot\frac{s_A}{w} + \frac{w}{w}\right]\Longrightarrow$$

$$\Longrightarrow r\pi_1\left(1 - \varepsilon_{\pi, s_A}\right) + \gamma Q_A(\,1 - \varepsilon_{D_A^C, s_A}) = w\left(1 - \frac{1}{\varepsilon_{D_A^s}}\right) \qquad (16)$$

Where $\varepsilon_{D_A^s}$ is the soldiers' demand elasticity in country A and ε_{π, s_A} is the elasticity of the profits of firm 1 in country A with respect to the soldiers' demand in country A. $\varepsilon_{D_A^C, s_A}$ defines the elasticity of the Coltan demand in country A with respect to the soldiers' demand in country A.

If we now compare equations (14) and (16), then the max G_A for Model 1 and 2 respectively, is in Table 6 below:

Table 6: Model 1 and Model 2 Maximisation solutions

MODEL 1	$r\pi_1\left(1 - \varepsilon_{\pi, s_A}\right) = w\left(1 - \frac{1}{\varepsilon_{D_A^s}}\right)$	(14)
MODEL 2	$r\pi_1\left(1 - \varepsilon_{\pi, s_A}\right) + \gamma Q_A(\,1 - \varepsilon_{D_A^C, s_A}) = w\left(1 - \frac{1}{\varepsilon_{D_A^s}}\right)$	(16)

We observe that the government's decision of setting r and γ must be compensated in the labour market, through the wage level, w. Therefore, when $\varepsilon_{\pi, s_A} > 0$ and $\varepsilon_{D_A^C, s_A} > 0$, the government may establish a higher r and γ to the level that would set if $\varepsilon_{\pi, s_A} < 0$ and $\varepsilon_{D_A^C, s_A} < 0$.

We also observe a trade-off effect between r and γ, the higher is r the lower will be the level of output and therefore, the lower will be the level of capital obtained via γQ_A.

The dependence and relation among the governmental profit and the level of soldiers hired by the Government relies on the elasticity of the labour force within the country. If the Government benefits from a higher profit, the higher is the elasticity of the labour force; we could then argue this might be one of the possible reasons for the promotion of war in countries of a low income level where the soldiers' labour elasticity is >1.

5 – A NUMERICAL APPLICATION OF MODEL 2

As we did in section 3, we may now develop a numerical application of the model presented in section 4.

We consider a linear Coltan world-demand function as $P = A - Q$.

Our model also considers two firms, firm 1 and 2 and two countries, country *A* and *B*.

Q is defined as $Q = q_1 + q_2$, the sum of each firm (1, 2) Coltan production. The production level of each firms depends on the quantity of workers hired by the firm and their productivity represented by k, where $q_1 = kl_1$ and $q_2 = kl_2$.

Formation of domestic wages w_A, w_B following labour l_A, l_B (where $l_A = l_1$ and $l_B = l_2$) and soldier s_A, s_B demand:

$w_A = w_0 + t(l_A + s_A)$

$w_B = w_0 + t(l_B + s_B)$

Where t defines the market power of the monopsonist or what is the same, the slope of the labour supply function.

In our model, we analyse the effect of Government industrial policy decisions where the Government opts for adding new taxes, which will evidently affect the domestic profits from Coltan for each firm, now defined as:

$\pi_1 = (1 - r_A)(pq_1 - \gamma_A q_1 - w_A l_1)$

$\pi_2 = (1 - r_B)(pq_2 - \gamma_B q_2 - w_B l_2)$

Where r_A, r_B, γ_A and γ_B are the taxes established by each Government in countries A and B.

Firms' strategic variables are employment levels l_1, l_2. Applying FOCs $\frac{\partial \pi_j}{\partial l_j} = 0$ (and securing SOCs $\frac{\partial^2 \pi_j}{\partial l_j^2} < 0$ are also satisfied), we obtain reaction function in A's labour market:

$R_1 \rightarrow l_1 = \frac{k(A-kl_B-\gamma_A)-ts_A-w_0}{2(k^2+t)}$ and analogous for $R_2 \rightarrow l_2 = \frac{k(A-kl_A-\gamma_B)-ts_B-w_0}{2(k^2+t)}$.

Whose simultaneous solution gives equilibrium employment levels:

$$l_1 = \frac{A(k^3+2kt)-2t(ts_A+w_0)-k^2(2ts_A-ts_B+w_0-\gamma_B k)-2\gamma_A k(k^2+t)}{(3k^4+8k^2w+4w^2)}$$

$$l_2 = \frac{A(k^3+2kt)-2t(ts_B+w_0)-k^2(2ts_A-ts_A+w_0-\gamma_A k)-2\gamma_B k(k^2+t)}{(3k^4+8k^2w+4w^2)}$$

Yielding equilibrium profits:

$$\pi_1 = \frac{(k^2+t)(-A(k^3+2kt)+2t(ts_A+w_0)+k^2(2ts_A-ts_B+w_0-\gamma_B k)+2\gamma_A k(k^2+1))^2}{(3k^4+8k^2t+4t^2)^2}$$

$$\pi_2 = \frac{(k^2+t)(-A(k^3+2kt)+2t(ts_B+w_0)+k^2(2ts_B-ts_A+w_0-\gamma_A k)+2\gamma_B k(k^2+1))^2}{(3k^4+8k^2t+4t^2)^2}$$

Assume now that a Government derives "value" according to a Cobb-Douglas "war production function" minus recruiting (labour) costs and taxes:

$V_{gA} = (r_A\pi_A + \gamma q_1 - w_A)s_A$

$V_{gB} = (r_B\pi_B + \gamma q_2 - w_B)s_B$

We could assume that "soldiers" (s_A, s_B) require a risk premium q above the domestic wage, but for simplicity we assume a uniform wage across "professions" that does not affect qualitatively the results presented here.

We may now run a comparison on the values we obtain in Model 1 - where we apply only a tax on profits, and Model 2 – where we apply a tax on profits r and a tax on output γ. Table 7 below shows the optimum for each scenario:

We assume there is no war on the other country, so $s_B = 0$.

Table 7: Model 1 and Model 2 Optimal Solutions

Model	**Parameters**		**Optimal Solution**
Model 1	$r_i = 0.5$	$\gamma_i \neq$	$s_A = 21$ Maximal $V_{gA} = 3611.16$
Model 2		$\gamma_i = 0.5$	$s_A = 21$

			Maximal $V_{gA} = 3703.14$
		$\gamma_i = 0.9$	$s_A = 21$ *Maximal* $V_{gA} = 3775.51$
Model 1	$r_i = 0.9$	$\gamma_i \nexists$	$s_A = 23$ Maximal $V_{gA} = 7112.64$
Model 2		$\gamma_i = 0.5$	$s_A = 23$ *Maximal* $V_{gA} = 7158.86$
		$\gamma_i = 0.9$	$\boldsymbol{s_A = 23}$ $\boldsymbol{Maxima\ V_{gA} = 7194.77}$

The parameters values for both Models are: $w = 1;\ k = 1; l = 1; A = 100; w_0 = 0\ \forall\ i = A, B$

We observe that the main driver of the Governmental profits is r - the tax on profits. The higher the tax rate applied on the producers' profit, the higher is the Government profit, V_{gA}.

r also defines the number of soldiers the Government will hire, the higher is r, the higher is s_A. In both models when $r_i = 0.5$, the optimal number of soldiers is $s_A = 21$. When r_i increases to $r_i = 0.9$, the optimal increases as well to $s_A = 23$.

The addition of a new tax, γ_i, does not change the optimal number of soldiers that the Government will hire but V_{gA} will increase slightly.

Therefore, the higher level of V_{gA} is reached with $\boldsymbol{r_i = 0.9; \gamma_i = 0.9.}$

We observe that because there is a positive relation among the number of soldiers and producers' profits, the government may set a higher tax rate on profit.

The level of labour hired by the Government for war activities will have consequences on the wage level; and so it does over the price of the input, which will adjust accordingly via an increase.

6 - CONCLUSION

Our paper suggests a theoretical framework for analysing the interaction between production and war sectors in a context of international duopolistic competition. We can assume two countries supply an input in the international market and both of them are users of the domestic labour force, which may be employed in two activities: production and war.

We conclude that the strategies followed by the production sector in the domestic market may affect the second market, so companies define their strategies depending on whether the competitor´s products are strategic substitutes or complements. Such decisions will imply two kinds of externalities:

1. War is possible because it is supported by the profits of the producers. When producers maximise their own profits, they are equally maximizing the Governmental value $V_i = s_i \cdot T_i$ which defines the level of funds dedicated by the Government to war activities.
2. The level of labour hired by the Government for war activities will have consequences on the wage level; and so it does over the price of the input, which will adjust accordingly via an increase. Therefore, a positive relation among number of soldiers and producers' profits holds, and the government may set a higher tax rate on profit.

Our model proves that a phenomenon of war contagion among countries appears when strategic complementarity stands. Therefore, authorities must take it into account when defining their policies.

We conclude that the dependence and relation between the Governmental profit and the level of soldiers hired by the Government relies on the elasticity of the labour force within the country. The Government will enjoy a higher profit the higher is the elasticity of the labour force.

We argue this could be one of the possible reasons for the promotion of war in countries of a low income level where the soldiers labour elasticity is >1.

Therefore with our model we explain why Governments might be motivated to promote war in countries where the following circumstances occur:

1- There exists a Natural Resource that produces an opportunity for companies to set themselves up in the country. This allows the Government to obtain funding to support the war.

2- The labour market is very elastic. The Governmental profit increases when the elasticity of the labour force is greater. We observe that countries with low level of income are more elastic than developed countries.

Some extensions to this research could be related to the type of information that the firms have at their disposal. Collie and Hviid (1999) present an interesting study about the effect of the tariffs established by the government on the decision-making process of the firms (i.e. the equilibrium) depending on the level of information of the game.

Cooper and Riezman (1988) investigate the design of trade policies in a world of certainty; with a sufficient amount of uncertainty, both governments regulate their firms through subsidies.

Authors such as Furusawa et al. (2004) examine which policy measures should be put in place (derive the optimal tariff or import quota) to maximise domestic welfare.

CHAPTER 4

FINAL THOUGHTS

FOREWORD

"It isn't enough to talk about peace. One must believe in it. And it isn't enough to believe in it. One must work at it."

Eleanor Roosevelt.
Broadcast. Voice of America, 11 November 1951.

1 - CONCLUSION

We began this work with the goal of raising awareness of the responsibility that the developed world has toward the active conflicts in the developing countries. Sometimes, the physical distance from a conflict immunises us from the death and violence that is happening thousands of miles away and so we rely upon our Governments and International Institutions to sort out the issue. We have seen throughout this work the efforts and strategies that have been set-up to control the illegal traffic of the inputs that is used by certain elites and different groups to keep the conflict active and therefore support their own financial interests. We have discussed certain initiatives such as the Dodd-Frank 1502 act or the OECD guidance, for instance, still have not brought the expected results.

The reality is that an isolated action cannot change a political situation and improve the living conditions of an entire society. We know that. However, the joint action of the international community, international institutions, governments, private organisations and business community can definitely make a difference.

We believe that solutions cannot be found if there is not a deep analysis of the sources of conflict and a broad study of all the roles and interests of all the parties involved. The agendas of the participants define the current and future conflict strategies that the participants will implement in order to achieve their goals (Collier, 1999), leading to a "new war economy".

The deep transformation that wars have suffered leads us to think that solutions that had positive results before the Cold War would not make any difference in today's conflicts. Most of the current conflicts have a self-financing nature where the State is not the central player. State armies no longer characterise the conflicts of the post-Cold War era; new wars are now led by local warlords, paramilitary units and mercenary groups who challenge the authority of the State and finance themselves and the conflict via illegal trade in drugs, weapons and natural resources.

We have centred our analysis on the conflict financed by the predation of natural resources and we have specifically focused on the war still active in DRC, mostly financed by the illegal exploitation of Coltan.

Coltan is a metallic ore, essential for the hi-tech industry among others. Despite natural resources being seen as a source of growth or economic development, this is only true

for the developed world. In the developing countries as Ross (2001) said, they become a curse that has detrimental effects on their socio-economic and political stability. Hence, the importance of finding and implementing adequate political responses to promote more equitable economic development and fair trade.

Chapter three has presented our contribution to the analysis of the effect of state policies and/or governmental actions on conflicts. We have introduced a theoretical framework for analysing the interaction between a productive sector and the war activities in a context of duopolistic competition. The model proves a phenomenon of war contagion among countries when strategic complementarity stands. In addition, it explains why Governments might have a motivation for the promotion of war in countries where these two circumstances occur:

1- there are natural resources;
2- the labour market is highly elastic.

And therefore, we conclude that authorities and organisations need to extend the scope of their analysis when assessing the design and implementation of new policies and strategies.

As a final reflection, we would like to add that we are all aware that conflicts have a high cost for society: massive capital destruction, casualties, enormous decrease of the level of security and welfare, etc. However, wars also act as an economical sector within the labour market – as we demonstrated through our models. The level of activity in the war sector affects directly the production sectors via the labour market. This thought has been the basis of this thesis, which could be extended in the near future by adding certain variables to our models and testing their effect on the medium and long run. We bear in mind variables such as the number of deaths, casualties, the detriment of human capital and variability on wages, among others.

As mentioned above, we have also discussed different solutions that have been implemented either by the United Nations, the US Government or the OECD. However, we have seen after our analysis of the current situation in DRC, that none of these actions has had so far a remarkable effect on the level of development of the country or the improvement of the living conditions for the local community.

The country still appeared, in the 2014 ranking of HDI (Human Development Index by UN), in 186th position out of 188 countries and remains far from reaching the MDG (Millenium Development Goals), which were supposed to be accomplished by 2015.

So, what has failed? Why is DRC still lagging behind despite being a country rich in natural resources and despite the efforts and co-operation of the international community? The response is not just straight and clear. However, it looks to us that the dark and hidden interest of certain parties (those agendas to which we were referring) and the high level of corruption do not allow the country to catch up with other African economies showing double-digit growth rates. Ethiopia is growing at a 10% annual rate, for example, and is the 173th country in the HDI ranking; in addition, Ethiopia has reached their target in the MDG. However the source of Ethiopia's growth is not its endowment of natural resources (not as vast as the one of DRC) but its services and agricultural industry. This drives us back to our starting point when we referred to the "resource curse", where natural wealth is for most of these countries more of a curse than a blessing.

Certainly measures, such as the Dodd-Frank 1502 Act and the OECD guidance are important steps for the regulation of the Coltan market. We have seen the success of the Kimberley Certificate process on the regulation of the diamond market. However the success comes from the goodwill of all the parties involved. We expect and hope that the Coltan market will see more brilliant days in the near future and that regulation and transparency becomes a reality.

We would like to finish with a message of optimism and appeal to the goodwill and co-operation of the developed world. We all can make a difference if we are aware of the outcome and effect of our actions.

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