“Trade policy and internal armed conflict: can tariffs reduce the negative economic impact of war?”

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Introduction

This paper analyzes the effects of trade policy in economies affected by internal armed conflict from a theoretical and empirical point of view. Particularly, the effect of the use of tariffs as second best instruments in economies where markets are distorted by the incidence of armed conflict is examined. Despite the considerable costs that internal armed conflicts generate to the economy, the analysis about the effects that different economic policies have on these particular economies have only recently gained attention in mainstream economics (The World Bank, 2011; Collier et al., 2003).

Internal armed conflicts are often cited as one the main causes for low economic development in several countries, especially during the period following the Second World War (Collier, 2007). Armed conflicts have terrible and lasting effects on the general wellbeing of the people and generate economic as well as social costs for the countries affected. The social costs of conflicts are mainly associated with the fatalities and displacement of populations, but also with the persistent health, emotional, institutional and political legacies that a conflict generates (Collier et al., 2003). The social cost adds to the direct economic burden and in this sense the decline in economic activity will be reflecting both types of cost.

Although the consequences of conflicts go well beyond the economic scope, the onset of civil strife generates a decline in overall economic activity that could be of considerable magnitude. A review of the literature shows that the negative effects of conflict are estimated in a range between 1 and 3.5 percentage points of reduction in yearly income per capita growth (Collier, 1999; Gardeazabal, 2012; Imai & Weinstein, 2000). Hence, an internal armed conflict lasting ten years could account for a 10.5% difference in the income level[1] compared to a non-conflict situation, using the lower estimates.

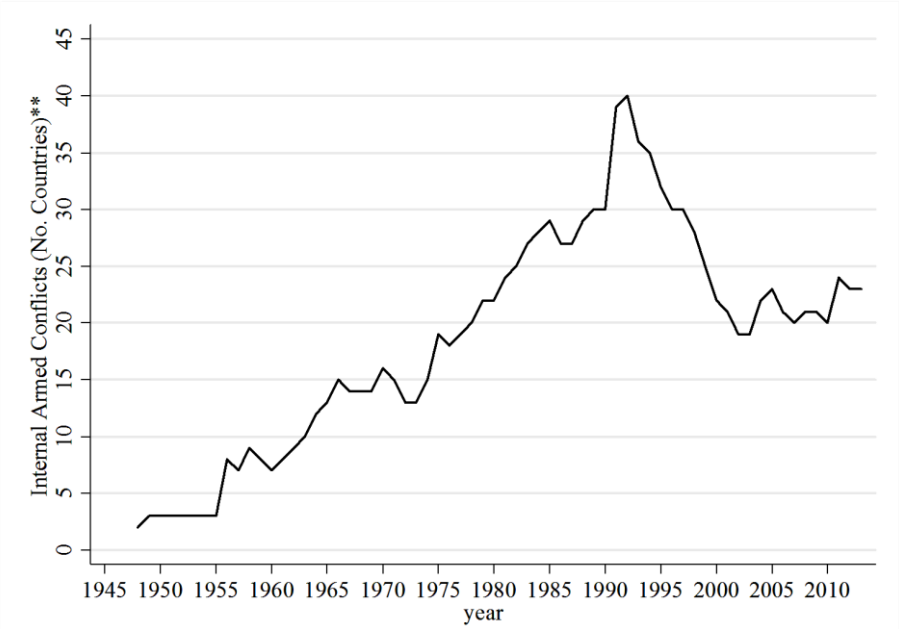
Unfortunately, internal conflicts are not an unlikely event. After the end of the Second World War, there was a steady increase in the number of countries affected by civil wars[2]. The internal armed conflict incidence reached its peak in 1990, after this year there was a rapid decrease in the number of conflicts, and the trend has stabilized

[1] The different estimates could reflect different empirical methods and samples but also different intensities of conflicts considered.

[2] According to the definition of the Political Instability Task Force Project. See section 3.3.1

between 20 to 25 countries affected in the last decade[3]. According to a recent report of the Uppsala Conflict Data Program (UDCP) in recent years the number and intensity of armed conflicts had reduced considerably (Themnér & Wallensteen, 2013). However, the onset of high-intensity conflicts in Syria, Libya, the separatist movement in Ukraine and the increase of the insurgency activity in Iraq could change this trend.

Graph 1. Countries affected by civil war 1948-2013



Source: Authors calculation based on Political Instability Task Force Project: Internal Wars and Failures of Governance 1955-2012 database. **See section 3.3.1 for the definition of internal armed conflict employed

On the other hand, during the 1990's the finalization of the negotiations of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) led to the creation of the World Trade Organization (WTO). Some authors coined the period as the "Great Liberalization of the 1990's" (Estevadeordal & Taylor, 2013). However, some common criticism of the process of economic liberalization is that it generates destabilization and reduces the trade policy maneuver of countries to face it. Therefore, liberalization processes would trigger internal conflicts or exacerbate the effect of the existing ones (Curtis, 2007; Nieman, 2011). The evidence seems to contradict this view, but the theoretical links between trade policies and the incidence of conflict is not clear (Elbadawi & Hegre, 2008).

This paper seeks to shed light on the possibility that trade policy measures have a different effect on overall economic activity when applied in conflict-affected

[3] The same general trend is observed when focusing on the number of battle related deaths using the UCDP Battle-Related Deaths Dataset (Available at: http://www.pcr.uu.se/research/ucdp/datasets/)

economies. The theoretical model employed by Dal Bó & Dal Bó (2011) and its predictions are the main motivations of this paper. The authors proposed, that apparently inefficient interventions, like international trade restrictions or cross subsidies schemes, could lead to relatively lower decline of income growth in economies affected by conflict. The main objective of this paper is to determine whether there is some empirical support for this theoretical prediction; focusing on the specific effects of tariffs, although the research also covers the theoretical effect of other policy instruments.

The model proposed by Dal Bó & Dal Bó (2011) introduces armed conflict as an income appropriation sector in an otherwise standard Heckscher, Ohlin, Samuelson (HOS) international trade model. The model allows studying how different income shocks and economic policies affect the economy given the existence of the appropriation sector. The main result of this model is that the general economic effects of conflicts are the result of two balancing forces, the opportunity cost of engaging in appropriation activities instead of the productive sector, in relation to the magnitude of the appropriable resources.

Formally, any income shock or policy that generates a relative increase (decrease) in the remuneration paid by productive sectors to labor will reduce (increase) appropriation activities and therefore reduce (increase) the negative effects of conflict on the total production (thus, consumption and welfare) of the economy; as long as, the appropriation sector is labor-intensive relative to the overall economy. Therefore, changes in relative prices like international income shocks or changes as a result of an economic policy intervention could have non-linear effects over the overall economy depending on whether they are affected by internal conflict.

The preceding result leads to the hypothesis that tariff interventions that bias the structure of tariffs towards the protection of labor-intensive productive sectors would induce an increase in relative wages. Consequently, there would be a reduction of the incidence of appropriation activities via the opportunity cost and then an increase in the overall output.

In this paper, the income and tariff data for a panel of 107 economies during the period 1986-2010 is employed to evaluate the proposed theory. Using detailed tariff data from the UNCTAD-TRAINS database; two measures of labor-bias-of-tariffs were computed, the bias towards the agriculture sector and a more direct measure of the bias towards

labor-intensive sectors using and index of capital intensity at the product level (Shirotori et al., 2010). The general results only give evidence in favor of a positive and significant direct relation of the labor-bias-of-tariffs and economic growth once the internal armed conflict effect is accounted for. However, and given that tariffs are distorting instruments, the simultaneous effect of conflict and labor-bias-of-tariffs is still negative. Therefore, the main hypothesis proposed in this paper is not supported by the data and methods employed.

Despite these results, it cannot be concluded that the main propositions derived from the theoretical framework are incorrect or are not fitting the data. Indeed Dal Bó & Dal Bó (2012) show that tariffs to international trade will be an instrument dominated by other policy measures that could reduce the conflict intensity without generating the distortionary effects.

The organization of this paper is as follows. Following this introduction, section 1 provides a literature review on the subject of conflict, tariffs conceived as an instrument for achieving second best outcomes and the armed conflict effects on economic growth. Section 2, presents a general version of the model of Dal Bó & Dal Bó (2011) and the main results are derived. Furthermore, the null hypothesis about the effects of tariffs when there is an appropriation sector in the economy is developed. Section 3, presents the methodology applied for the indicators and describes the estimation procedures as well as the data sources. Section 4, shows the main results of the estimations of the cross-country growth regressions and some robustness checks. Finally, as a conclusion of the paper, section 5 summarizes the main findings, points out their implications regarding the initial research question, discusses the shortcomings of the empirical methodology and proposes some options of further research.

1. Literature Review

The economic analysis of Internal Armed Conflicts (IAC) and their effects on wellbeing, long run economic development, or growth is a relatively new field in the economic literature. As highlighted by Blattman & Miguel (2010), consistent analysis of internal conflicts and their economic causes and consequences had been scarce in the economic profession until the mid-1990s. Although, the proportion of conflicts affected by an IAC increased steadily during the second part of the twentieth century and often civil strife is often cited as the cause of underdevelopment of several developing

countries especially in Africa (Collier, 2007). However, many of the recent research in the field have centered attention on which are the determinants of internal armed conflict rather than on its economic consequences.

The principal channel through which conflict affects the economy according to the existing literature is the destruction of part of the stock of factors of production, human or capital resources, the *destruction effect* according to Collier (1999). Warfare destroys infrastructure and leads to the loss of lives of part of the population (and therefore labor), but also makes part of the labor force become temporally or even permanently unproductive due to physical and emotional wounds or the forced displacement (relocation) from some production zones (Collier, 1999). Another related effect is the diversion of the public and private investment from productive activities to defense activities, the *diversion effect* (Knight et al., 1996) or the increased production costs associated with making property rights enforceable (Blattman & Miguel, 2010; Collier, 1999). Countries affected by conflict also tend to suffer from a fall in savings generating an additional effect to the destruction of capital stock, or relocation resources (physical and human) out of the country, generating a *portfolio substitution effect* (Collier, 1999; Collier et al., 2004).

Internal armed conflicts, or war in general, are expected to generate other effects not directly related to factors of production. There could be a disruption of production in the economy as the fear of attacks or the physical disconnection between some parts of the country could potentially lead to a disruption of the supply chain. Moreover, internal conflicts could even lead to deterioration of institutional quality, political institutions and cause social disorder, distorting the existing arrangement of property rights in a society (Blattman & Miguel, 2010; Collier, 1999; Collier et al., 2003).

A common criticism of the process of economic liberalization is that it generates destabilization, increases the external vulnerability of countries and reduces the trade policy maneuver to face it. Therefore, liberalization processes are often blamed of trigger internal conflicts or exacerbate the effect of the existing ones. In this sense, this argument could be used as support for the introduction of international trade restrictions or control to the international movement of factors of production, given that conflict poses a greater distortion, in search for a second best result (Lipsey & Lancaster, 1956).

However, Elbadawi & Hegre (2008) in a study of the effects of international trade on the likelihood of internal armed conflicts onset, do not find robust support for the

conclusion that trade is a cause for the onset of internal conflicts. On the other hand, Nieman (2011) argues that greater exposure to international markets could trigger internal armed conflicts if the process is too fast and overwhelms the capacity of national states to cope with the associated transition effects and provides some supporting evidence. In a related argument, Curtis (2007) states that economic liberalization reduces the trade policy maneuver of developing countries to face the increased vulnerability that comes with a greater openness in developing countries.

In a related context Dal Bó & Dal Bó (2011) include the existence of armed conflict as a sector dedicated to appropriation activities in a standard international trade HOS model. This allows them, to study how different types of income shocks affect the economy given the incidence of social conflict. Their main result is that the intensity of appropriation activity, and therefore the negative economic effect of conflict, is a result of two opposing effects. The opportunity cost of allocating productive resources to appropriation activities instead of the productive sectors and the rapacity effect induced by the income of the economy susceptible to be appropriated by force.

Therefore, Dal Bó & Dal Bó (2011, p.648) claim *"…interventions must distort the prices perceived by agents in order to reduce appropriation; non-distortionary lump sum redistribution cannot affect appropriation in this economy. This can explain why we observe distortionary policies in reality: they buy social peace.*" Moreover, they argue that an example of the interventions susceptible to accomplish this objective could be the use of *"…trade interventions that lower the protection of capital-intensive industries relative to labor-intensive ones*." The model proposed by these authors and their results are the main motivations of this paper, their proposed instrument is confronted with the data on growth and detailed tariff figures to construct measures of protection to labor-intensive sectors.

1.1. Second best policies

In the field of welfare economics, second best policies, or second best optimums refer to those in which introducing additional distortions into the economy could be welfare improving. This result derives from the application of the general theorem of the second best (Lipsey & Lancaster, 1956). In the presence of distortions that impede the fulfillment of all the Pareto optimality conditions, the theorem implies that applying policies to partially achieve the optimality conditions or eliminate only some of the

actual distortions into the economy will reduce welfare and be a non-desirable result. Therefore, introducing new distortions and consequently altering other equilibrium conditions could be a welfare improving situation, although always second to the direct elimination to the original distortion (first best). The theory of the second best has been widely applied in economics and used as a theoretical framework to justify market interventions[4].

The seminal paper of Bhagwati (1971) provides a classification of the different types of distortions identified in the existing economic literature at that time. Moreover, the author offers a classification of types of distortions and factors causing them and provides a ranking of the most efficient interventions under those settings. The main premise about second best interventions is that if some variable in the economy should be constrained based on a second best policy, the most efficient instrument to achieve this goal is one that affects the variable directly (Bhagwati, 1971).

In a related paper, Dal Bó & Dal Bó (2012) explore the different interventions susceptible to be welfare improving for conflict-affected economies and classify them according to the Bhagwati (1971) ranking. The authors show that, in their model, conflict activities withdraw resources from productive sectors and therefore could be assimilated to a distortion in the factor markets. In this case, the most efficient intervention is a direct tax-subsidy scheme that affects the prices of the productive factors. Moreover, following Bhagwati (1971) we could consider social conflict in general, and specifically an internal armed conflict as an "autonomous" distortion, e.g. a historical accident. In this sense, the model employed in this paper do not account for the motivations and rationality for the emergence of an appropriation sector.

1.2. Tariffs and income growth

The focus of this paper is on tariffs for two reasons. Firstly, because the idea of tariffs as efficiency enhancers, thus an argument for protectionism; goes against one of the most important theoretical results in international trade theory. The welfare effects after imposing tariffs in a small economy, taking world prices as given, are negative. Moreover, even if it is assumed that the government redistributes income, the efficiency losses are deadweight for the economy. The result is so widely accepted that Rose (2013) states that the sole idea could be responsible for the apparent disconnection

[4] See Krishna & Panagariya (2000) for a survey of the main results of applying the second best theorem in international trade theory.

between tariffs and economic cycles after the Second World War. The second reason is the data availability, as will be discussed further in the methodology section; there is no widely available information for tax-subsidies schemes applied in different countries or other forms of distortions at the product or sector level[5].

However, the effect of direct measures of trade policy liberalization in the last decades has been a matter of controversy. The first wave of studies about the effects of trade liberalization, or openness to international markets in general, as growth enhancers found a positive relation between trade and growth (Sachs et al., 1995; Frankel & Romer, 1999; Dollar & Kraay, 2003). However, recent research has questioned those initial results on the basis of their methods as well as their theoretical approaches (Rodrik, 2006). Additionally, the widely cited works of Sala-i-Martin et al. (2004) and Ciccone & Jarocinski (2010) about the robustness of long run economic growth predictors do not find any openness related measure being a strong predictor of long run economic growth.

Moreover, in recent years the debate was centered on the fundamental causes of growth: institutions, geography, culture and luck; instead of economic policies, among them trade policy liberalization (Acemoglu et al., 2001; Rigobon & Rodrik, 2004; Rodrik et al., 2004; Sachs, 2003).

In contrast to the previous debate, a relatively recent and emerging literature has focused the analysis on the structure of tariffs over long run economic development rather than on the average level of tariff protection. Nunn & Trefler (2010) find evidence for a positive correlation between protection and long term growth when the tariff structure is biased towards sector intensive in skilled labor. Minier & Unel (2013) in a related study find a positive association between average tariffs and growth for skill-abundant countries.

Finally, Estevadeordal & Taylor (2013) argue in favor of a positive effect of trade liberalization on long run economic growth, but relates the effect on the relatively faster reduction of tariffs for capital goods and intermediate goods, therefore resembling the concept of effective protection rates (Corden, 1966). However, none of these results give support to the idea that a tax structure biased towards labor-intensive goods could foster economic growth.

[5] The recently published Estimates of Distortions to Agricultural Incentives (DAI) 1955-2011 described in Anderson et al. (2008) offer the opportunity for further research in this direction.

1.3. Conflict and income growth

The theoretical impacts of internal armed conflict over economic growth are linked to the general theories about economic growth in the long run. In the neoclassical growth model augmented for human capital e.g. Mankiw et al. (1992), the impact of internal armed conflict depends greatly on its effects over the stock of factors of production; as well as the perception that agents in the economy have about the effects of conflict.

Under the neoclassical Solow growth framework, it is expected that any effect of internal armed conflict on the economy will be temporal, i.e. only perceivable in the short run. Therefore, once conflict has ceased the stocks of factors of production should return to the long run steady state levels and therefore having high growth rates once conflict have ceased, the so-called *peace dividend* (Blattman & Miguel, 2010).

However, if agents perceive the income shock as temporary, the consumption smoothing could potentially reduce the short run effects of conflicts, but affect the long run through a decrease in the saving rate. Although, there is a theoretical possibility for saving rates (and therefore consumption) to reduce only marginally during civil strife episodes, conflict could also affect the risk perception and expected life horizons of agents. This in turn distorts saving and investment decisions, adding to the capital stock losses attributed to the direct destruction effect, despite the initial consumption smoothing reaction, and affect economic growth in the short and long run (Echeverry et al., 2001).

On the other hand, the endogenous economic growth theories (Barro & Sala-i-Martin, 2003) predict that the effects of conflict on the reduction of the stocks of factors of production could have persistent effects over long run income. The transitional growth rate to the steady-state is reduced even after conflict have ceased, as well as the possibility of a peace dividend.

The mechanics of the neoclassical growth model, in which steady-state levels of income are reached relatively faster after the end of the conflict, relies on the strong assumption that the technological change rate and the institutional framework of the economy are not affected during the conflict. This assumption is inconsistent with the recent literature about the economic effects of conflicts in which, as shown before, conflicts could affect the institutional framework of the economy generating a negative shock to productivity due to an increase in costs to enforce property rights, e.g. military

expenditure will be high even after the end of war (Blattman & Miguel, 2010; Collier et al., 2003).

The preceding discussion leads to a relation between growth and conflict that is mediated by the other variables that could affect economic growth or could be correlated with internal armed conflict; for instance, the institutional framework (Acemoglu et al., 2001; Rodrik et al., 2004). Accounting for these factors leads to the conditional convergence models like the one employed in this paper. In fact, just the inclusion of country-specific effects allows for permanent income differences in the steady state, therefore allowing for different steady-state income levels (Durlauf et al., 2005).

Most of the empirical literature about the economic costs of the incidence of armed conflicts uses a counterfactual approach to the problem. This method is preferred to a direct accounting method (like measuring military expenditure), because it could capture a broader set of effects like the ones previously discussed that are not readily linked to conflict. The usual approach is to establish a cross-country growth regression or a panel data version of it under the assumption of conditional convergence (Gardeazabal, 2012)[6].

The main results in the literature about the effects of internal armed conflicts on economic growth indicate a negative effect in the short and medium term and mixed evidence over the long run economic growth. The effect of internal armed conflict is in general negative and statistically significant for medium term growth (5-10 years); ranging between a reduction in growth rates of 1 percentage point[7] and 3.5 percentage points, according to the different studies. Furthermore, Gardeazabal (2012), who reviews the measuring of conflict costs, concludes that the effects are of a considerable magnitude and in general statistically significant, even though the channels and precise estimates vary considerably. However, cross-section analyses of robust regressors of economic growth do not identify war or related variables as strong predictors of long-term income growth (Ciccone & Jarocinski, 2010; Sala-i-Martin et al., 2004). These results could be explained by the lack of accounting for endogeneity in the variables or

[6] Gardeazabal (2012) presents a survey of the different methods for measure the cost of social conflict in a broad sense i.e. including riots, terrorism and other closely related forms of conflict besides armed conflict and summarizes some important results.

[7] For instance, for two similar countries which are expected to growth at 5% in peace full times, if one of them is affected by an armed conflict it is expected to grow at 4%.

for the omitted variable bias inherent in the data for conflict-affected economies (Gardeazabal, 2012).

With respect to the effects of internal armed conflicts on a purely neoclassical growth model setting, Murdoch & Sandler (2002) estimate cross-country growth regressions for a panel of countries between 1960 and 1990. Their main findings suggest that a civil war within the country or on its neighbors have a negative effect of around -1.83 percentage points[8] on yearly average income growth. However, they found little evidence for an effect of civil conflict on long run growth. The authors catalog these results as consistent with the predictions of the neoclassical growth model. The initial effect of conflict over the human and physical capital endowments of the economy will be accounted in subsequent periods by the initial income variable, leaving lower effects for the rest of the periods affected by civil war.

Knight et al. (1996), analyze the effect of a reduction in military expenditure on long run economic growth for a sample of 79 countries and five-year periods from 1971 to 1985. They propose that civil wars affect growth directly and indirectly through their effect on private investment. Their results show a negative effect of armed conflict of around -3.5 percentage points of per capita income growth. The previously mentioned study of Collier (1999) for 78 countries during 1960 to 1989 using decade averages, estimates that that during civil wars, the annual per capita income growth rate is reduced on average by 2.2 percentage points.

In general, the studies of the incidence of armed conflict consider each episode as a similar event using dummies or the duration of war as a measure of armed conflicts, without considering the different characteristics of armed conflicts. Imai & Weinstein (2000), argue that it is possible that conflicts could have different manifestations given their magnitude. They exploit an earlier version of the data employed in this paper, provided by the Political Instability Task Force Project[9] about different dimensions of conflict and an assessment of its intensity (Goldstone et al., 2010). They estimate the effect of a widespread civil war as a reduction of 1.25 percentage points on the annual per capita income growth in a sample of 104 countries using decade averages between 1960 to1998. Blomberg et al. (2004), use the same database and estimate the negative effect of conflict as a reduction of 1.3 percentage points in annual per capita income

[8] Original coefficient estimate is -0.073 for the growth of the complete 4 years spans, e.g. 1981-1985.
[9] This database is explained in the methodological section.

growth using a Structural VAR methodology, on a sample of 177 countries from 1968 to 2000.

As previously stated, the recent literature about internal armed conflicts was centered on the determinants of conflict rather than on its economic effects. The most cited results in this field are the association between low levels of income and incidence of conflict, as well as a relation between income growth shocks and the onset of internal armed conflicts. Although, in the latter case the actual sign and channel of the effect remains open to debate. Blattman & Miguel (2010) argue that the effect of income shocks over conflict onset or incidence are difficult to identify and interpret, due to the reverse causality issues. Additionally, the apparent connection between conflict and income or income growth could be jointly determined by a third factor like institutions.

In a widely cited paper, Miguel et al. (2004) address the reverse causality between conflict and income growth using rainfall shocks as instruments for yearly economic growth in Sub-Saharan Africa. They find a negative and significant effect for lagged income growth, but an insignificant effect for contemporaneous income growth. In addition, once controlling for income growth the other determinants of conflict incidence lose their statistical significance.

Likewise, Ciccone (2013) argue that the rainfall instrument will be more appropriate in a model where conflict is related to transitory income shocks rather than permanent ones and finds that negative transitory income shocks reduce conflict. Thus, any empirical application relating income and conflict should acknowledge the possibility of bias in the estimated effect of conflict on economic growth due to reverse causality.

2. Theoretical framework

As previously mentioned, the theoretical framework employed in this paper is based on the model proposed by Dal Bó & Dal Bó (2011). The economy is described as a HOS international trade model but augmented by the existence of an appropriation sector, which represents social conflict (in this paper armed conflict) over the distribution of income. In this setting, the appropriation sector produces a total effort of appropriation α in order to appropriate a fraction $A(\alpha)$ of the total households income by force[10] i.e. the

[10] Given the standard assumption of constant returns to scale, the household income, i.e. payments to factors of production, will be equal to the total value of production of the economy. Therefore if the appropriation sector is assumed to appropriate production instead of income the results will be similar.

rents of labor and capital. Hence, there is always an incentive to appropriate a larger fraction and generates a *rapacity effect*. Nevertheless, the appropriation effort α requires the use of factors of production (labor and capital) and will divert resources from productive sectors. Those resources will only be reallocated to appropriation activities if the net rents derived from the appropriation effort are greater than or equal to the ones obtained in the productive sector generating an *opportunity cost effect*.

2.1. Production and consumption

The production and consumption in the economy are defined as in the standard HOS trade model; with two sectors of production (industries), 1 and 2, which output levels will be represented by q_1 and q_2. The price of the product for industry 1 will be denoted by p_1 and p_2 for industry 2. These sectors use capital (K_i) and labor (L_i) as inputs in their productions process, the endowment of these factors are fixed and denoted by $\bar{K}$ and $\bar{L}$ the rental price of capital is represented by r and the rental price of labor by w. Moreover, each production sector is characterized by many profit-maximizing firms, producing with constant returns to scale technologies and under perfect competition. Each firm in each sector uses the same technology for production; however technologies of production differ between sectors 1 and 2 in their relative factor intensities.

The consumers in this economy have identical homothetic preferences over bundles of the goods 1 and 2. The maximization of the utility of consumers given their preferences, the relative prices p_1/p_2 and the income M defines the demands for the goods of industries 1 and 2, and are represented by $d_1(p_1/p_2,M)$ and $d_1(p_1/p_2,M)$. Finally, it is assumed that the economy is small; therefore in the case of being open to international trade the prices of the consumption goods will be given by the international markets.

2.2. The appropriation sector

Following Dal Bó & Dal Bó (2011), the existence of social conflict is introduced in this model as a third sector that does not produce, but instead appropriates a share of the total income or production of the economy by force, this sector is denominated the "appropriation" sector. This paper develops a general case of the model of Dal Bó & Dal Bó (2011)[11], in which the appropriation could use capital and labor as inputs in order to appropriate income or production by force.

[11] The authors present this general case in their appendix A.

The appropriation sector is formed by a number n of appropriation groups hiring labor (l_i) and capital (k_i) for their appropriation activities $a_i = a_i(l_i,k_{i,})$, the total fraction of wealth that is appropriated in the economy is a function $A(a_1 + a_2 + a_3 + \dots + a_n)$, where $A(0) \geq 0$ and $A(a(\bar{K}, \bar{L})) \leq 1$. It is assumed that the amount that each group receives from the total appropriated income in the economy is proportional to their effort a_i. In this sense, appropriation groups are entities in a similar way to the firms in a conventional neoclassical model. Each group chooses l_i and k_i at the minimum possible cost (Dal Bó & Dal Bó, 2011). Moreover the appropriation sector must pay factor prices net of appropriation, $[1- A(.)]w$ and $[1- A(.)]r$; thus l_i,and k_i are defined as the minimum cost demand functions $l_i(w/r, a_i)$ and $k_i(w/r, a_i)$. The total amount of labor and capital allocated to appropriation by the n appropriation groups in the economy is represented by L_A and K_A respectively.

In addition, it is assumed the appropriation sector is competitive[12] and the different group's technology of appropriation (a_i) has constant returns to scale. Nonetheless, the aggregate share appropriated $A(.)$ is strictly concave[13], thus $A'(.)>0$ and $A''(.) <0$. This could be justified as "congestion effects" caused by coordination failures among the different groups (Dal Bó & Dal Bó, 2011 p. 650). The strict concavity is a key assumption of the model and implies that the average revenue derived from appropriation is decreasing in the amount of resources allocated to it.

Therefore, each group i maximizes its net revenue, given the endowments and the gross factor prices defined in the production sectors of the economy, according to:

$$\arg\max_{a_i \geq 0} \frac{a_i}{\sum_{j=1}^{n} a_j} A(a_1 + \cdots + a_n)\left[r(\bar{K} - K_A) + w(\bar{L} - L_A)\right] - \left[1 - A(a_1 + \cdots + a_n)\right]\left[rk_i(w/r, a_i) + wl_i(w/r, a_i)\right]$$

Taking the derivative of this expression establishes the first order conditions for maximization. As usual, it is assumed the symmetry of the equilibrium for each group ($a_1 = \dots = a_n = a$) in order to simplify the expression. Moreover, it is possible to exploit the assumption for constant returns to scale in a_i, which implies marginal costs are constant and equal to mean costs. Finally, taking the limit of the resulting expression

[12] The specific industrial organization setting of the appropriation sector does not affect the main conclusions of the model. See the Appendix A of Dal Bó & Dal Bó (2011) for a detailed demonstration of this result assuming an arbitrary number of N appropriation groups.

[13] As highlighted by Dal Bó & Dal Bó (2011) the concavity assumption is made for convenience, the result will hold with a linear function as long as $A'() >0$.

when $n \to \infty$, leads to the following expression (see the appendix A of Dal Bó & Dal Bó (2011), for a detailed derivation of this expression).

$$A(\alpha)\left[r(\bar{K}-K_A)+w(\bar{L}-L_A)\right]=\left[1-A(\alpha)\right]\left[rK_A\{A(\alpha)\}+wL_A\{A(\alpha)\}\right]$$
$$\text{where} \quad K_A\{A(\alpha)\}=f(A(\alpha)) \quad \text{and} \quad L_A\{A(\alpha)\}=f(A(\alpha)) \tag{1}$$

Where $\alpha = \lim_{n\to\infty} na$, establishes that the overall extraction effort[14] among the groups ($a_1 + a_2 + a_3 + \ldots + a_n = na$) converges to a finite value. Moreover, $K_A\{A(\alpha)\}$ and $L_A\{A(\alpha)\}$ stress that the total amount of resources diverted to appropriation activities is a function of the total appropriative effort α and the effect over the total appropriation share $A(.)$.

The equation (1) is the equivalent of equation (5) in Dal Bó & Dal Bó (2011), for the general case in which appropriation sector uses labor and capital for its activities; it then has the same straightforward interpretation. The right-hand side of the equation establishes that the total amount of income appropriated given the total appropriative effort α should be equal to the economy-wide net payment (after appropriation) for the total amount of resources diverted to the appropriation sector. Therefore, equation (1) establishes a no-arbitrage condition in the economy and implicitly defines the amount of resources allocated to the appropriation sector.

2.3. The equilibrium

The general equilibrium in this economy given the endowments of capital and labor and the technologies of production and appropriation determines the quantities produced and consumed q_1, q_2, d_1, d_2 and the equilibrium prices[15] of the goods p_1 and p_2. Equally, the resources allocation in the economy for the sectors of production (1 and 2) and the appropriation (A) sector K_1, L_1, K_2, L_2, K_A, L_A and the gross factor prices of the economy w and r.

Before proceeding, the minimum unit-cost input requirements in each industry (c_{ij}) are defined as the minimum amount of input j necessary to obtain a unit of output i, given the technologies of production and factor prices w and r. Therefore, the minimum unit cost-input requirements c_{ij} are a function of the relative factor prices w/r.

[14] The $\lim_{n\to\infty} na$ must be finite given the limited amount of resources in the economy. If we interpret a as the average appropriative effort of the n groups; then when n increases the average appropriative effort must decrease.

[15] As will be shown later; for the open economy case prices are set in the international markets given the assumption of a small economy.

Following Dal Bó & Dal Bó (2012), the competitive equilibrium requires the following set of conditions:

Zero profit conditions for the industries:

$$rc_{1K} + wc_{1L} = p_1 \tag{2}$$

$$rc_{2K} + wc_{2L} = p_2 \tag{3}$$

Clearing of goods markets:

If the economy is closed, the product markets must clear and the following conditions must hold.

$$d_1(p_1, p_2, M) = q_1 \tag{4}$$

$$d_2(p_1, p_2, M) = q_2 \tag{5}$$

If the economy is open, as it is assumed in this paper, and given the assumption of a small economy, the relative prices will be determined in the international markets.

$$\frac{p_1}{p_2} = \frac{p_1^*}{p_2^*} = p^* \tag{6}$$

Clearing of factor markets:

The preceding two blocks of equations define the prices p_i, w and r and quantities q_i produced in the economy. In this block, the clearing of factor markets and the allocation of resources will be defined. Note that resources allocated to appropriation in this economy are defined as residuals and therefore the incidence of conflict as an appropriation sector do not affect the gross prices of factors w and r. However, it reduces the net income received by the households (recall that equation 1 implies households receive payments net of appropriation [1- A(.)]w and [1- A(.)]r). Since, conflict (the appropriation sector) is similar to a negative externality to the economy in which the factors of production K_i and L_i employed in the productive sectors 1 and 2 become endogenous, they are defined after some of them are reallocated to the appropriation effort. Consequently, the economy works under a distortion in the factors markets (Dal Bó & Dal Bó, 2012).

$$q_1 c_{1K} + q_2 c_{2K} = \bar{K} - K_A \tag{7}$$

$$q_1 c_{1L} + q_2 c_{2L} = \bar{L} - L_A \tag{8}$$

Finally, the no-arbitrage condition expressed in equation (1) must hold to define the allocation of resources between productive sectors and appropriation activities. Rewriting equation (1) in order to define it in terms of the relative price of factors of production it is obtained:

$$A(\alpha)\left[\bar{K}+\frac{w}{r}\bar{L}\right]=K_A\{A(\alpha)\}+\frac{w}{r}L_A\{A(\alpha)\} \tag{9}$$

The basic condition for the existence of an interior solution is that, given the assumptions of the conflict technology, the distortion in the allocation of resources due to the appropriation sector drag of resources, does not generate specialization in production of the economy. Therefore, in the remainder of the paper the analysis is restricted to no specialization equilibria. The detail set of conditions for the existence of the equilibrium under the distortions induced by conflict can be found in Dal Bó & Dal Bó (2011).

2.4. The effects of conflict in an open economy

The equation (1) establishes the basic results of this model that can be summarized in four results as follows:

1) There are opposing forces that determine the overall reaction of the economy and the conflict intensity to shocks in income (endowments) and international prices. The left-hand side shows the magnitude of the appropriable income and therefore the incentive to appropriate as much as possible. As indicated before it accounts for the rapacity effect. Meanwhile, the right-hand side represents the opportunity cost of engaging in appropriation activities instead of applying those resources in the productive sector and accounts for the opportunity cost.

2) The incidence of armed conflict reduces welfare for households in the economy because it creates a wedge between the gross payments to factors *w* and *r* and the actual payments received by households[16]. The right-hand side of equation (1) shows that although the gross prices of labor and capital are not affected by the incidence of conflict, the net payments for factors after appropriation i.e. the effective payments received by households for their capital and labor are now [1- *A*(.)]$r\bar{K}$ and [1- *A*(.)]*w*

[16] Recall that for obtaining equation 1.1, it was assumed that each one of the appropriation groups receives an equal portion of the total appropriated income. Deviations in the way the total appropriated income is shared between the appropriation groups are not covered in this paper and don not change the main results.

$\bar{L}$. Therefore, in a conflict the owners of factors of production are worse off, in this sense the model do not account for the rationality of the existence of an internal armed conflict (the appropriation sector). Instead, it focuses on the effects of a given conflict over the economy.

3) For a small open economy with internal armed conflict, there will be a relative decrease in the production of the sector that intensively use the same factor of production in which the technology of the appropriation is relatively intense. This result is derived directly from the application of the Rybczynski theorem (Rybczynski, 1955). As noted earlier equations (7) and (8) define the allocation of resources to appropriation as residuals, in other words, they could be interpreted as an endogenous change in the endowments of the productive sectors of the economy. Therefore, given the international prices, if the appropriation sector is labor (capital) intensive the relative endowment of the economy ($\bar{K}$ -K_A)/($\bar{L}$ -L_A) is larger (smaller) than the relative endowment without conflict $\bar{K}/\bar{L}$. As a result, there is a relative increase in the production of the sector that uses capital (labor) intensively in its production process, as long as both goods are produced. This change in the conflict relative endowment could be so important that might potentially change the patterns of trade of the economy (Dal Bó & Dal Bó, 2012).

4) Given the above assumptions, a relative increase (decrease) in the price of the good produced by the industry that intensively uses the same factor of production in which the appropriation sector is relatively intense will reduce (increase) the conflict intensity. This result follows in two parts; first the Stolper-Samuelson Theorem (Stolper & Samuelson, 1941) establishes that an increase in the relative price of a good will increase the relative price of the factor used intensively by the industry that produces it. The second part implies that the total appropriation effort decreases when there is an increase in the relative price of the factor used intensively in the appropriation sector.

   Formally, it is necessary to establish the determinants of the sign of the derivative of $A(.)$ with respect to a change in the relative prices of factors (w/r) in equation (9). Taking the derivative on both sides of the equation, taking into account that $A(.)$ is a function the total appropriation effort α and rearranging:

$$\frac{d\alpha}{d(w/r)} = \frac{L_A\{A(\alpha)\} - A(\alpha)\bar{L}}{\frac{dA(\alpha)}{d\alpha}\left[\bar{K} + \frac{w}{r}\bar{L} - \left(\frac{dK_A}{d\alpha} + \frac{w}{r}\frac{dL_A}{d\alpha}\right)\right]}$$

Using the equation (9) to replace $A(\alpha)$ and $\bar{K} + w/r\,\bar{L}$, note that:

$$A(\alpha) = \frac{K_A\{A(\alpha)\} + \frac{w}{r}L_A\{A(\alpha)\}}{\bar{K} + \frac{w}{r}\bar{L}} \quad \text{and} \quad \bar{K} + \frac{w}{r}\bar{L} = \frac{K_A\{A(\alpha)\} + \frac{w}{r}L_A\{A(\alpha)\}}{A(\alpha)}$$

Replacing this expressions the following equation is obtained, where the functional definition of $K_A\{A(\alpha)\}$ and $L_A\{A(\alpha)\}$ is omitted for convenience.

$$\frac{d\alpha}{d(w/r)} = \frac{L_A(A(\alpha)) - \frac{K_A + \frac{w}{r}L_A}{\bar{K} + \frac{w}{r}\bar{L}}\bar{L}}{\frac{dA(\alpha)}{d\alpha}\left[\frac{K_A + \frac{w}{r}L_A}{A(\alpha)} - \left(\frac{dK_A}{d\alpha} + \frac{w}{r}\frac{dL_A}{d\alpha}\right)\right]} \tag{10}$$

The denominator of the equation (10) is negative given the assumption of concavity in the appropriation function *A()*, i.e. the overall appropriation costs are convex, and realizing that the terms in brackets are the difference between the average cost of the appropriation share in the economy and the marginal cost of it. This difference will be negative because the marginal cost of the appropriation activity will grow faster than the average cost[17]. The numerator of this expression will determine the sign of the derivative; it can be shown easily that it will be positive or negative depending on the relative factor intensity of the appropriation sector compared to the relative factor endowment of the economy.

$$\begin{aligned} &\textit{if} \quad \frac{\bar{K}}{\bar{L}} > \frac{K_A}{L_A} \quad \rightarrow \quad \frac{d\alpha}{d(w/r)} < 0 \\ &\textit{if} \quad \frac{\bar{K}}{\bar{L}} < \frac{K_A}{L_A} \quad \rightarrow \quad \frac{d\alpha}{d(w/r)} > 0 \end{aligned} \tag{11}$$

Therefore, if the international relative price of the labor intensive good increases (and leading to an increase in *w/r* too, following the Stolper-Samuelson theorem) and the

[17] Note that, as mentioned before, strict concavity of *A*() is assumed for simplicity, quasiconcavity will lead to the same result, although after some value of α, the congestion effects kick in and there should be a reduction in the average revenue of appropriation.

conflict sector is labor-intensive compared to the economy, there will be a reduction in conflict intensity. The opportunity cost dominates the direct incentives to appropriate (rapacity), or in the opposite case where the appropriation technology is capital-intensive it is expected an increase in conflict intensity.

The preceding third and fourth results have important implications for the empirical analysis of the effects of trade flows on economies affected by internal conflict as well. It is safe to assume the most plausible case in which the appropriation sector is labor-intensive relative to the economy, but the economy is still labor-intensive relative to the world, as it is the case of most developing economies. There will be a relative increase in the production of industries that are capital-intensive as a consequence of the incidence of conflict, i.e. the conflict is affecting the relative endowment of the economy.

Moreover, it would also be expected that any negative shock to the relative prices of the labor-intensive goods will have a broader effect on conflict economies. First, the conflict will reduce the production in the economy especially the labor intensive sector due to terms of trade deterioration, but the reduction in relative wages could also increase the magnitude of the conflict and potentially generate a broader negative effect on the overall production of the economy.

The results above have important implications concerning the main objective of this paper. Some a priori inefficient interventions could be efficiency enhancers of overall production, and therefore welfare improving if the incidence of conflict is accounted for, e.g. like the introduction of trade restrictions to protect labor-intensive sectors, or factor tax-subsidy schemes.

2.5. Trade policy and conflict

The implications of the model presented above derive into policy implications for countries under the incidence of armed conflict. Dal Bó & Dal Bó (2011) show several policy options that would have positive effects for the economy under conflict distorted markets. One policy suggested by the authors is the imposition of tariffs for the imports of the labor-intensive good given that is the the same factor of production that is used intensively in the appropriation sector. The predicted effect is readily derived from the main results of the model presented above, and proceeds as follows:

In the presence of tariffs for goods 1 and 2, the relative prices in equation (6) could be represented as:

$$\frac{p_1}{p_2} = \frac{p_1^*(1+t_k)}{p_2^*(1+t_l)} = p^* \frac{(1+t_k)}{(1+t_l)}$$

Assuming that $t_l > t_k$ implies that the sector that produces the labor-intensive good is relatively more protected that the capital-intensive sector, in the simpler case it could be assumed that $t_l > 0$ and $t_k = 0$. The first effect of this setting derives from the Stolper-Samuelson theorem and therefore it is expected that the relative price of labor (w/r) will increase as well. The net effect clearly depends on the relative factor intensity of the appropriation sector compared to the total economy as shown in result 4 in section 2.4. In the most plausible case, in which the appropriation sector is labor-intensive compared to the whole economy, there will be a reduction in the negative effects of conflict in the economy. This is explained by a reduction to the incentives to appropriate due to an increase in the opportunity cost as a result of the new tariff scheme, as could be deduced from equations (10) and (11).

Moreover, going back to the third result in section 2.4 above, under positive levels of conflict there is an excessive production of the capital-intensive good. Therefore, based on the Rybczynski theorem, the increase of relative price of labor induced by tariffs will generate an increase in the production of the relatively labor-intensive good (q_2), as a consequence of the reduction in the distortion induced to the terms of trade by the appropriation activities (conflict). The total effect suggests a marginal increase in the total production of the economy mainly due to a reduction in conflict levels.

Therefore, the first hypothesis derived from the theoretical framework could be stated as:

> *For countries under the distortion of an armed conflict, if a tariff protecting the labor-intensive sector, relative to the capital-intensive one, is introduced, the negative effect of the conflict to the overall production of the economy should be reduced.*

However, what could be the expected magnitude of this effect? It is possible that the appropriate tariff structure could even eliminate conflict in this setting? As explained previously, internal armed conflicts could be considered as an "autonomous" distortion that diverts factors of production from production activities into the appropriation

sector. In this case, tariff interventions would be dominated by other kind of interventions, the most efficient one would be a tax-subsidy scheme in the capital and labor markets directed to increase the demand of labor in the productive sectors. Moreover, there are no price interventions (tariffs or price taxes and subsidies schemes) that could eliminate the incentive for appropriation completely and therefore return the economy to the undistorted production possibility frontier[18] as shown by Dal Bó & Dal Bó (2012).

Therefore, the second hypothesis derived from the theoretical framework is:

> *For countries under the distortion of the armed conflict, the effect of any tariff intervention that could reduce the conflict burden on the economy should have a relatively low effect and could not eliminate the direct effect of conflict completely.*

3. Methodology

3.1. Indicators of the structure of tariff protection

The structure of tariff protection for the sample is measured using the difference between the average tariffs applied to labor-intensive goods and the average tariffs applied to the non-labor-intensive goods

$$DIFFtlab = \ln\left(\frac{(1+t_l)}{(1+t_k)}\right) = \ln(1+t_l) - \ln(1+t_l) \qquad (12)$$

However trying to link theory with evidence is difficult due to the lack of an exact definition of goods that could be considered as labor-intensive. In a similar way to the indicators employed by Nunn & Trefler (2010), two different measures to approximate the level of bias in tariffs towards the labor-intensive sectors (labor-bias-of-tariffs measures) were computed. The first measure *Diff_Agriculture* considers the agriculture sector as the products classified in the Division 1 of the International Standard Industrial Classification of Goods (ISIC) Rev. 2. and covers agriculture, hunting, forestry and fishing sectors and the non-agricultural sector that includes the remaining products.

The second proposed measure *Diff_Lintensive* tries to address the labor intensity of goods directly using the index of relative capital intensity (RCI) at the product level

[18] See proposition 6. in (Dal Bó & Dal Bó, 2012).

(digits 4 and 5) of the Standard International Trade Classification of Goods (SITC) Rev. 1. produced by Shirotori et al. (2010). The index of relative capital intensity is measured as real capital per worker, in 2000 US dollars from 1962 to 2007 in its last update[19]. The values of the index for the year 2000 were used as the benchmark year for the calculations in this paper. The relative factor intensity of a product is calculated using the weighted average factor abundance of countries that export this good, giving more weight to the countries that show more revealed comparative advantage[20] in the export of the product (Shirotori et al., 2010).

Following the methodology proposed by Shirotori et al. (2010), the 1165 products of the SITC Rev.1. were divided into five clusters using the means partition-clustering method[21], and organized from the less to the more capital-intensive products. Therefore, the products classified in clusters 1 or 2 (217 products) are considered relatively labor-intensive and products classified in cluster 5 are considered capital-intensive (392 products)[22]. The following table shows a summary of the resulting divisions using this method.

Table 1. Summary products classified according to capital intensity-RCI (Values in US dollars from 2000)

Clusters	Mean	Median (p>50%)	S.D.	Min	Max	N
1	11,331.1	12,464.1	4,357.9	1,987.8	17,015.1	67
2	29,352.4	29,780.5	5,949.3	17,587.2	39,349.3	150
3	54,542.0	54,493.1	8,212.6	39,534.0	68,070.3	237
4	86,102.9	86,008.2	10,522.6	68,285.8	104,578.3	319
5	128,809.5	126,468.3	16,174.6	104,874.2	204,931.6	392
Total	**82,445.2**	**81,922.8**	**40,962.1**	**1,987.8**	**204,931.6**	**1165**

Source: Authors calculations, based on data from Shirotori et al. (2010).

3.2. Empirical specification

The theoretical framework previously exposed leads to some empirically testable results. Specifically, we could estimate the potentially non-linear effects of trade policy on income growth in countries affected by internal armed conflict. In order to evaluate these effects in a sample of countries, a canonical cross-country growth regression will

[19] Available at http://www.unctad.info/en/Trade-Analysis-Branch/Data-And-Statistics/Other-Databases/
[20] The comparative advantage in assessed using the Balassa's revealed comparative advantage index.
[21] The optimal division into five clusters was determined using the stopping rule of the Duda and Hart indices.
[22] Tables in Annex 2. show a more detailed division of the products. The complete list is available upon request.

be performed using non-overlapping five years spans of data from 1986 to 2010[23] for an unbalanced panel of 107 countries[24]. The sample period and country coverage is restricted by the availability of tariff data.

The selected five-year length of the spans follows the empirical application proposed by Barro (1997), who argues that the cross-country growth regression model relates to long-term growth. Therefore, the high frequency (yearly) data could be dominated by the short run dynamics making it prone to measurement error bias (Durlauf et al., 2005). Following Durlauf et al. (2005), the regression equation is defined as:

$$\gamma_{i;t,t-p} = \psi_0 + \beta \ln y_{i,t-p} + \psi X_{it-p} + \theta_1 iac_{i,t} + \theta_2 DIFFtl_{i,t} + \theta_3 iac_{i,t} * DIFFtl_{i,t} + \Pi Z_{it-p} + \alpha_i + \mu_t + \varepsilon_{it} \quad (13)$$

Where $\gamma_{i,t,t-p}$ represents the average annual growth rate of GDP per capita in country *i* between periods *t* and *t-p*. The GDP per capita is measured in terms of the employed population, and accounts for product per worker as in Durlauf et al. (2008). The variable $yi_{,t-p}$ accounts for the initial GDP per capita level on each five-year span and captures the conditional convergence in income levels. The vector X_{it} includes variables that capture the other neoclassical (Solow) determinants of economic long run growth i.e. it includes proxies for fixed and human capital accumulation.

In a similar way, the vector Z_{it} accounts for the control variables and includes proxies for the other "proximate" or "fundamental" determinants of economic growth according to the distinction made by Durlauf et al. (2008) and Acemoglu (2008). The regression equations include a series of country-specific effects captured by the parameters α_i that can be assumed to be fixed and control for unobserved heterogeneity and omitted variables bias. The parameters μ_t are time fixed effects and capture exogenous productivity shocks at world level and other common fluctuations like shocks to world commodity prices. Finally, ε_{it} accounts for the error term in the equation.

The coefficients of principal interest are the parameters θ_i, these parameters capture the effects on economic growth from the conflict and tariffs variables. The variable iac_{it} is a proxy of the incidence or the intensity of an internal armed conflict during the period while the variable $DIFFtl_{it}$ denotes the measures of labor-bias-of-tariffs.

[23] The spans are defined as 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2005-2010.

[24] The sample is relatively balanced between developed and developing countries. Among the 107 countries, 47 are high-income economies according to the World Bank´s income categories and the remainder are classified as medium and low-income economies.

According to the theoretical framework proposed, it is expected that the measures of labor-bias-of-tariff are positively associated with income growth through the effect on reducing conflict. However, if the conflict variable is not included as a control, it is expected that the point estimates of the labor-bias-of-tariffs measures should be biased downwards. Once controlling for conflict and according to the null hypothesis proposed, the estimate for any of the labor-bias-of-tariff measures should be positive.

Moreover, the estimated coefficient of the interaction term between the labor-bias-of-tariff measure and the proxy for conflict should capture the marginal reduction in the negative effects of conflict over the income growth rate. Therefore, the estimated coefficient of the interaction term is expected to be positive, although insignificant or its estimated value could not imply a cancelling out of the direct effects of conflicts on growth, according to the second hypothesis proposed. As will be shown in the results section, the main specification is also adjusted to include the average tariff as a control, in order to isolate the effect of the labor-bias-of-tariffs measures.

The equations are estimated using the ordinary least squares method on a fixed effects panel data estimator. Moreover, the variance-covariance matrix is estimated using the robust to heteroskedasticity estimator (Huber-White) and the errors are clustered at country level in order to allow for intragroup autocorrelation. The use of a random effect estimator is avoided because the theoretical and dynamic construction of the growth regression equations implies a non-zero correlation between the explanatory variables and the individual effects (Durlauf et al., 2005), violating the principal assumption of the estimator. Moreover, it is considered that the country-fixed and time effects would minimize the possible bias due to omitted variables.

The bias related to measurement error could be an important issue when working with data for conflict-affected countries (Collier & Hoeffler, 2004; Montalvo & Reynal-Querol, 2005). The measurement error is reduced by the empirical design using five-year period averages and, as long as the measurement errors occur in a random way, the estimated coefficients will be biased towards zero. Then, this allows to an interpretation of any finding of significant estimates as lower bounds for actual parameters. This is especially important when dealing with the different variables in order to measure the incidence of conflict (Gardeazabal, 2012). Moreover, it is also expected to incur in measurement error bias when calculating the average of applied tariffs rates for each

span given the large proportion of missing data for this variable; this will be discussed further in the data sources section.

In order to reduce the incidence of reverse causality bias, the investment rate and population growth are included in the equations as lagged variables, in addition the human capital accumulation proxies are included as initial period values. The estimation methodology does not instrument the endogenous variables using lags of the variables like Durlauf et al. (2008), but rather they are included as predetermined (lagged values) which is equivalent to a reduced form specification. Thus, the initial GDP per capita, the population growth, and the proxies for fixed and human capital accumulation constitute the baseline regressors of the empirical specification.

However, the reverse causality bias is not completely addressed in this paper. Firstly, as mentioned in the literature review income levels and growth are related with the onset and incidence of internal armed conflict, therefore a case of reverse causality. Secondly, other endogeneity-related shortcoming arises from the dynamic specification of the model, which leads to a dynamic panel data bias (Durlauf et al., 2005). The Dynamic GMM (Arellano & Bond, 1991) and System GMM (Blundell & Bond, 1998) estimation procedures have been applied to deal with a dynamic specification in panel data as well as for the reverse causality problems of the covariates and constitute an avenue for future research[25]. However, it is not clear that instruments based only on lags of the variables will allow for proper identification of effects without imposing strong assumption of the dynamic relations among the variables. Therefore, the estimations could be improved if there is an opportunity to exploit external instruments (Angrist & Pischke, 2009; Durlauf et al., 2005).

Finally, in the case of the tariffs related variables it is considered that any bias related with reverse causality arising from income growth should be relatively low and therefore is not a big concern. The idea of conceiving tariffs as exogenous variations relative to growth comes from two recent empirical analyses. First, Rose (2013) argues that tariffs have become systematically independent from the economic cycles in the period after the Second World War. In addition, Estevadeordal & Taylor (2013) use instrumental variables to account for the possible endogeneity of tariffs in a growth

[25] Initial applications of this methodology showed that the number of instruments is relatively high compared with the number of observations in the sample. Estimations using the System GMM estimator imply use around 159 instruments in a sample of 224 usable observations after first differencing.

regression and finds no significant difference in their estimations with respect to OLS estimates. Moreover, Nunn & Trefler (2010) argue that theoretically tariffs will be more related to the structure of the economy and the political process as in the protection for sale model of Grossman and Helpman (1994), and not necessarily to overall income growth.

To summarize the discussion about the estimation methods employed in this paper, the results should be interpreted as an empirical investigation of the main hypothesis derived by the theoretical model developed previously, rather than an inference of a causality effect among the variables.

3.3. Data sources and variables description

3.3.1. Internal armed conflict data

The first problem that any research project related to internal armed conflicts faces is the definition of conflict itself. Most of the available systematic collection of information about internal armed conflicts relies on the definition of conflict as an incompatibility between two or more organized parties, one of them being a state; that results in the use of armed force and battle-related deaths. Moreover, it is usual practice to use the imposition of a minimum threshold of battle-related deaths (Gleditsch et al., 2002). However, the discussion of a proper definition of internal armed conflict is outside the scope of this paper.

The second issue that arises working with internal armed conflict data; relates to the appropriate indicator to be used. The researcher has to decide whether to use a measure of the onset of armed conflict or a measure of incidence of it instead. For the purposes of this paper, and given that the theoretical model employed do not account for the onset of armed conflicts, the variables used will be related to the incidence of these events.

The internal armed conflict data comes from the Internal Wars and Failures of Governance 1955-2012 database produced by the Political Instability Task Force Project[26]; the database is described in Goldstone et al. (2010). This database lists information about revolutionary wars, ethnic wars, adverse regime changes, and genocides and political assassinations. Only the datasets for ethnic and revolutionary wars were employed in this research. The threshold identifications of an internal armed conflict (termed as civil wars in the database) are: each party must mobilize at least

[26] Available at the Center for Systemic Peace web page: http://www.systemicpeace.org/inscrdata.html

1000 armed agents (troops). Additionally, there should be at least 1000 direct conflict-related deaths since the onset of the conflict. Moreover, the annual conflict-related deaths should be greater than 100 fatalities in at least one year during the course of the conflict (Marshall et al., 2014).

The advantage of the Internal Wars and Failures of Governance 1955-2012 database is that it provides indexes of existence and intensity of civil war according to three characteristics, based on public information about the conflicts and analyst judgment of the Political Instability Task Force Project (Marshall et al., 2014). The three characteristics are the number of rebel combatants or activists, the annual number of fatalities related to fighting and the portion of the country affected by fighting. Finally, the three indicators are combined to calculate an "average magnitude of conflict" measure (*Avemag*). The indexes range from 0 (peace) to 4 (high-intensity conflict) in a discrete scale, the average magnitude of conflict index changes in 0.5 units[27]. Based on the Avemag variable, two dummy variables identifying incidence of ethnic or revolutionary conflicts were constructed (*Statefailcw*). In an analogous way, it is possible to obtain the same variables discriminated among revolutionary (*Avemagrev and Statefailcwrev*) and ethnic conflicts (*Avemagethn and Statefailcwethn*). However, the focus of the research is centered on the aggregate measures.

Another widely used database in the recent literature of internal armed conflict is the UCDP/PRIO Armed Conflict Dataset 1946-2012 version 4-2013[28] described in Gleditsch et al. (2002). However, in this database conflicts are defined with a minimum threshold of 25 battle-related deaths. The additional information this database could provide, compared to the Political Instability Task Force Project, is about the marginal effects of conflict which might not necessarily be relevant from an economy-wide perspective (Imai & Weinstein, 2000). The UDCP/PRIO also produces a database of battle-related deaths, the UCDP Battle-Related Deaths Dataset 1989-2012 version 5-2013[29]. The dataset includes a "best" estimate of the fatalities of a conflict based on publicly available data; when there are missing values for the best estimate, the average between the low and high estimates is used instead. The variable *Battledeaths* accounts for battle-related deaths in millions of casualties. However, the results employing this

[27] For details about the coding and methodology see: Marshall et al. (2014) available at: http://www.systemicpeace.org/inscr/PITFProbSetCodebook2013.pdf
[28] Available at: http://www.pcr.uu.se/research/ucdp/datasets/ucdp_prio_armed_conflict_dataset/
[29] Available at: http://www.pcr.uu.se/research/ucdp/datasets/ucdp_battle-related_deaths_dataset/

variable were mostly not statistically significant as will be discussed in the results section.

3.3.2. Tariffs data

The tariffs data comes from the Trade Analysis and Information System (UNCTAD[30] - TRAINS) database using the World Integrated Trade Solution (WITS) software from the World Bank[31]. The UNCTAD–TRAINS database covers around 160 countries since 1988 to 2011; however, the actual reporting for each year varies considerably (Table 2 shows the availability of the data). In order to reduce the loss of data, especially for the span 1986-1990, the averages for tariffs were calculated allowing for some missing values as follows: for the first span 1986-1990, the average was calculated allowing for missing values without restriction. For the latter spans, the averages were calculated allowing for a maximum of two missing values.

There is no guide in the literature about the proper way of working with tariff data on periods prior the closing of the Uruguay Round that led to the creation of the World Trade Organization (WTO) in 1995 and therefore to the systematic collection and reporting of tariff data. However, Estevadeordal & Taylor (2013) and Nunn & Trefler (2010) use periods of around three years to calculate the initial values for the tariff data they employ in their analyses. Therefore, the approach employed here is considered appropriate.

In all the calculations, the "applied" ad valorem tariffs, i.e. including regional and bilateral preferences, are used instead of the Most Favored Nation (MFN) tariffs. It is considered that applied tariffs are a better indicator of the trade policy stand of a country, especially in the last two decades where there was a huge increase in regional trade agreements. For instance, by mid-2014 the WTO reports that 379 regional trade agreements were in force (The World Bank, 2014a). Finally, for the cases in which there are specific tariffs for certain products, the equivalent ad-valorem tariffs using the UNCTAD method option in WITS was selected[32].

Table 2. Number of countries reporting data in UNCTAD-TRAINS database

Year	Number of Countries Reporting

[30] Acronym for United Nations Conference on Trade and Development.
[31] Available at https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx
[32] See http://wits.worldbank.org/WITS/docs/AVEmeth.doc for more information.

1988	30
1989	35
1990	41
1991	48
1992	63
1993	70
1994	84
1995	97
1996	100
1997	98
1998	104
1999	101
2000	132
2001	150
2002	149
2003	143
2004	142
2005	153
2006	156
2007	158
2008	157
2009	151
2010	146

Source: Author's calculations based on UNCTAD-TRAINS database.

Using the data provided by UNCTAD –TRAINS, the simple average applied rates at country-year level (*Tappl*), the averages for the agriculture sector defined as division 1 of ISIC rev. 2 (*Tappl_agr*) and the non-agricultural sector (*Tappl_noagr*) were computed for the period 1988-2010. The use of the simple average instead of the value of imports weighted average reduces the endogeneity of the variable. This is a common criticism given that the weighting process is dependent of economic growth. Moreover, the simple average also reduces the underestimation bias of tariff protection measurements resulting when taxes for certain products are imposed on prohibitive levels shutting down imports (Rodríguez, 2007).

In order to calculate the alternative measure for the labor-bias-of-tariff, the classification of capital intensity by each product of the SITC Rev1 based on (Shirotori et al., 2010) was used to compute the simple average applied rates for the labor-intensive (*Tappl_lint*) and capital-intensive goods (*Tappl_kint*).

3.3.3. Income and control variables

The income and total employment data used comes from the Penn World Tables version 8. (Feenstra et al., 2013). The average annual growth rate of GDP per capita ($\gamma_{t,t0,i}$) was calculated using the average change in the natural logarithm of the real GDP per

worker[33] at constant 2005 national prices in millions of US dollars of 2005. The initial income per capita corresponds to the natural logarithm of the output-side real GDP per capita at chained purchasing power parity (PPP) in millions of US dollars of 2005 (*lnGDPpc initial*). The use of national accounts data to calculate the growth rates and PPP adjusted values for the convergence terms follow the recommendations of Feenstra et al. (2013).

The vector X_{it} accounts for the neoclassical determinants of economic long run growth; it includes the investment rate (lnS_k) and the population growth over each period (η), the source for both variables is the Penn World Tables version 8. The human capital accumulation proxies include the natural logarithm of the average years of schooling for population aged 15 and over (*lnSchool*) calculated by Barro & Lee (2013) and the logarithm of life expectancy at birth (*lnLexpect)* from the World Bank World Development Indicators database (The World Bank, 2014b)[34].

In order to control for possible biases due omitted variables that are relevant for income growth, several proxies for the proximate and fundamental causes for growth where considered. The proposed variable in order to account for the effect of institutions is the Index of Legal Structure and Security of Property Rights from the Economic Freedom of the World Report, published by the Fraser Institute[35]. The index ranges from 0-10 where 0 corresponds to the lowest level of Legal Structure and Security of Property Rights and 10 to the highest (Gwartney et al., 2012). Regarding the variables that proxy for the other fundamental causes of growth like geographical or cultural factors, the usual controls employed in the literature are mostly time invariant, therefore they already accounted for by the country-specific effects.

Among the proximate causes related to the macroeconomic environment a measure of price of household consumption volatility (*inflation volatility*) in the period and the lagged value of the Government consumption share over GDP ($lnGovt_{t-1}$) are included, the source of this data is the Penn World Tables Database version 8. Finally, the initial level of trade in goods and services over GDP ($lnTrade_{initial}$) for each span is included in order to account for the effects of openness of the economy and comes from the from

[33] Then average growth rate of Y is equal to$(ln(Yt)-ln(Yt-4))/4$.

[34] Data retrieved form the World Bank Data web page http://data.worldbank.org/data-catalog/world-development-indicators on 7th August 2014.

[35] Avilable at http://www.freetheworld.com/datasets_efw.html. Another widely used indicators like the World Bank World Governance Indicators (Kaufmann et al., 2010), were not considered because the period coverage of the data begins in 1996.

the World Bank World Development Indicators. The next table presents a summary statistics of the data for the 107 countries included in the sample.

Table 3. Summary statistics for the countries in the sample

VARIABLES	Mean	S.D.	N.	Min	Max
GrowthGDPpc (5 year span)	0.0157	0.0319	525	-0.1552	0.2104
$GDPpc_{initial\ year\ of\ span}$	29069.7	27115.0	525	575.6	176577.6
Sk_t *(Inv. Rate)*	21.14	7.87	525	1.59	49.89
$School_{initial\ year\ of\ span}$	7.26	2.84	535	0.78	12.86
$Lexpect_{initial\ year\ of\ span}$	68.60	9.61	535	42.12	85.16
η_t *(Pop. Growth Rate)*	0.0148	0.0140	527	-0.0553	0.1466
$Tappl_t$	0.0819	0.0979	257	0.0	1.0540
$Tappl\_agr_t$	0.0855	0.0925	257	0.0	0.8757
$Tappl\_noagr_t$	0.0816	0.0986	257	0.0	1.0625
$Tappl\_lint_t$	0.0825	0.0988	257	0.0	1.1437
$Tappl\_kint_t$	0.0595	0.0788	257	0.0	0.7472
$Diff\_Agriculture_t$	0.0035	0.0410	257	-0.1283	0.2038
$Diff\_Lintensive_t$	0.0205	0.0278	257	-0.0534	0.2121
$Statefailcw_t$	0.1813	0.3856	535	0.0	1.0000
$Statefailcw\ Revolutionary_t$	0.0617	0.2408	535	0.0	1.0000
$Statefailcw\ Ethnic_t$	0.1439	0.3513	535	0.0	1.0000
$Avemag\ IAC_t$	0.3379	0.8160	535	0.0	3.4000
$Avemag\ Revolutionary_t$	0.1144	0.5120	535	0.0	3.4000
$Avemag\ Ethnic_t$	0.2553	0.7018	535	0.0	3.4000
$Battledeaths_t$	0.0009	0.0039	535	0.0	0.0577
Leg. Str. & Prop. Rights $_{initial\ for\ span}$	6.11	1.99	449	1.42	9.62
Trade $_{initial\ year\ of\ span}$	82.99	55.03	515	12.01	430.36
$Govt_{t-p}$	0.1817	0.0866	535	0.0	0.6538
$Inflation\ Volatility_t$	0.0676	0.0668	525	0.0	1.0963

Source: Author's calculations based on: Political Instability Task Force Project. UCDP/PRIO. UNCTAD-TRAINS database. Penn World Tables version 8. Barro & Lee (2013). World Bank World Development Indicators database. The Fraser Institute.

4. Results

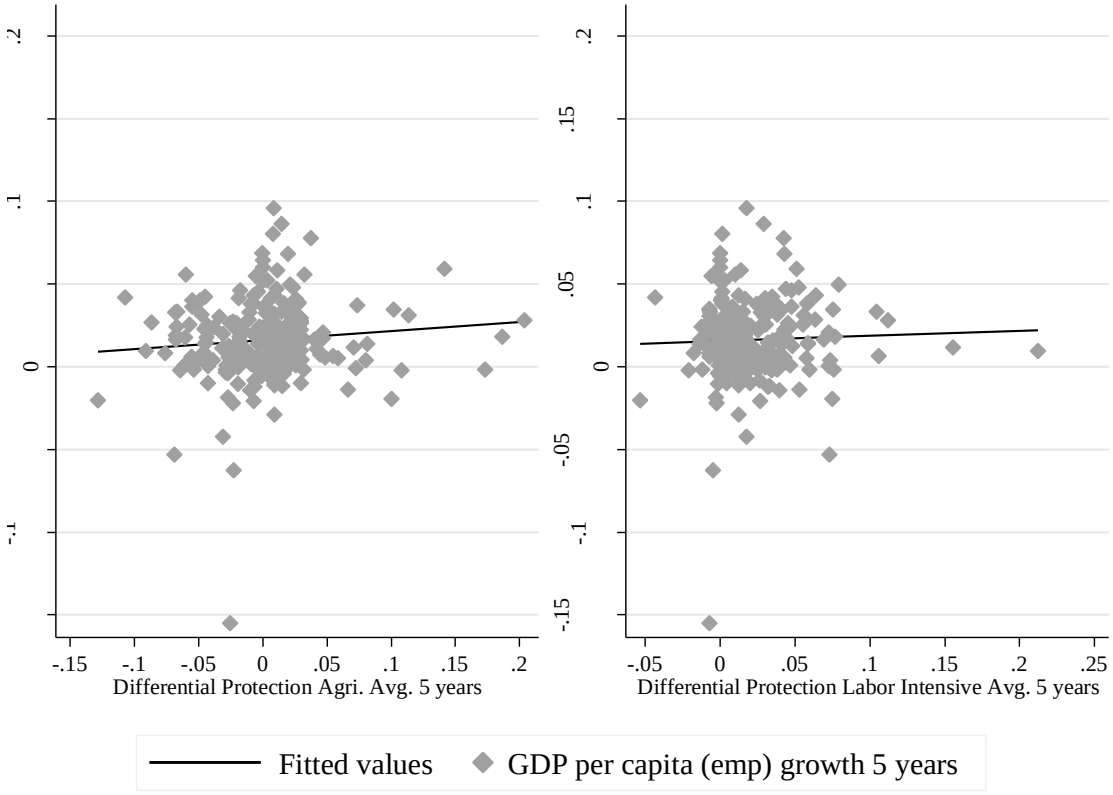
The theoretical framework suggests that the measures of labor-bias-of-tariffs should be positively associated with income growth especially if countries are affected by armed conflict, which is the first null hypothesis explored in this paper. The Graph 2 shows the scatterplots of the relation between the 5 year average annual growth rate of GDP per capita in the Y-axis[36] and the constructed measures of labor-bias-of-tariffs in the agricultural and labor-intensive sectors respectively in both of the X-axes for the 107 countries included in the sample during the 5 spans defined over the period 1986 to 2010.

As can be seen in Graph 2, there is not a clear relation between the labor-bias-of-tariffs measures and income growth rates for the sample considered. Although, the estimated

[36] As explained earlier, measured by the average annual log change in per capita GDP over the duration of each span.

Pearson correlation coefficients are positive for both measures (represented by the straight lines in both graphs), none of the point estimates is statistically significant at 95% confidence.

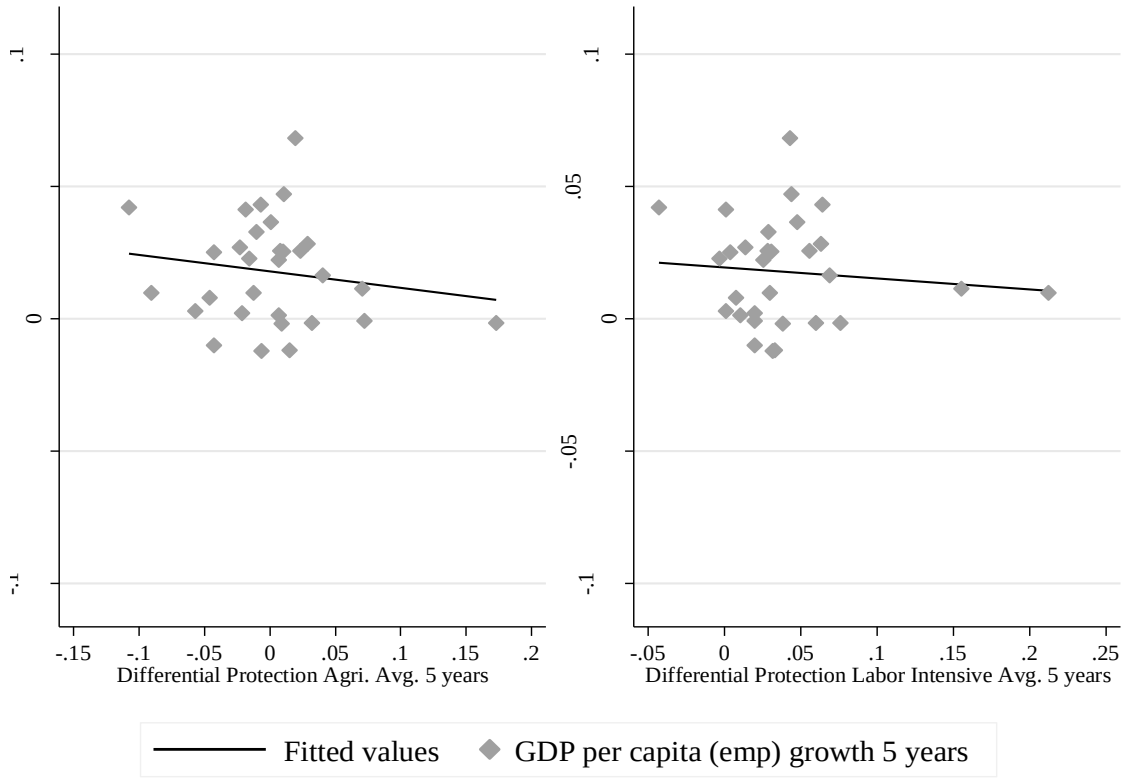
Graph 2. Labor-bias-of-tariffs and income growth



Source: Author's calculations based on: Political Instability Task Force Project. Penn World Tables version 8.

However, according to the proposed hypotheses the lack of apparent relation between the variables could be explained by the fact of not accounting for the incidence of conflict. The Graph 3 shows the same scatterplots for the five-year average annual growth rate of GDP per capita and the measures of labor-bias-of-tariffs. Although in this case, only the country-year observations in which there is an active conflict are included (i.e. *Statefailcw*=1*).*

Graph 3. Labor-bias-of-tariff and growth in conflict episodes



Source: Author's calculations based on: Political Instability Task Force Project. Penn World Tables version 8.

In the same way, the graphs do not show a clear relation between the labor-bias-of-tariff and income growth during the episodes of conflict. Moreover, in this case the estimated correlations are negative -0.16 in the case of the bias towards the agricultural sector and -0.1 for the measure of bias towards labor-intensive goods, although none of them is statistically significant at 95% confidence. This result would only be consistent with the second hypothesis proposed.

The initial evidence does not give any support to the theoretical predictions. However, the hypotheses are derived using marginal results and therefore should be evaluated in a setting that controls for the incidence of other factors that are affecting growth simultaneously. In the next section, the estimations of the cross-country growth regression equations are presented.

4.1. Main results

This section presents the results of the estimation of different versions of the general model of growth regressions presented in equation (13). The proposed variables are introduced in a sequential way in order to establish the relations between average income growth, tariffs, the labor-bias-of-tariffs and its estimated partial correlations once controlling for the conflict variables. The estimations were carried out using fixed

effects estimator and adjusting the standard errors for heteroskedasticity and clustered for autocorrelation in each panel (country level). The total number of observations in most of the regressions is 257, implying an average of 2.4 observations per country.

Table 4. Regressions income growth and tariff measures

	Dependent Variable: Average Growth Rate of GDP per capita (worker)							
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
$lnGDPpc_{initial\ year\ of\ span}$	-0.059***	-0.055***	-0.056***	-0.055***	-0.055***	-0.054***	-0.057***	-0.059***
	(0.012)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
$lnSk_{t-p}$	-0.007	-0.007	-0.006	-0.007	-0.006	-0.009	-0.004	-0.003
	(0.005)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
$lnSchool_{initial\ year\ of\ span}$	0.002	0.014	0.017	0.014	0.015	0.010	0.019	0.019
	(0.011)	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)	(0.015)	(0.015)
$lnLexpect_{initial\ year\ of\ span}$	0.093***	0.017	0.029	0.017	0.019	0.009	0.035	0.048
	(0.034)	(0.050)	(0.050)	(0.050)	(0.050)	(0.049)	(0.050)	(0.054)
lnh_{t-p}	-0.267	-0.038	-0.090	-0.036	-0.040	0.044	-0.121	-0.160
	(0.332)	(0.450)	(0.448)	(0.451)	(0.451)	(0.451)	(0.460)	(0.459)
$\ln(1+Tappl)_t$		-0.038						
		(0.037)						
$\ln(1+Tappl\_agr)_t$			-0.026					
			(0.028)					
$\ln(1+Tappl\_noagr)_t$				-0.038				
				(0.037)				
$\ln(1+Tappl\_lint)_t$					-0.030			
					(0.031)			
$\ln(1+Tappl\_kint)_t$						-0.078		
						(0.055)		
$Diff\_Agriculture_t$							0.004	
							(0.039)	
$Diff\_Lintensive_t$								0.058
								(0.058)
Constant	0.209	0.491**	0.443**	0.492**	0.476**	0.529***	0.412*	0.370
	(0.156)	(0.209)	(0.217)	(0.209)	(0.209)	(0.200)	(0.229)	(0.234)
Observations	515	257	257	257	257	257	257	257
R-squared	0.231	0.300	0.299	0.300	0.299	0.309	0.295	0.298
Number of Countries	107	107	107	107	107	107	107	107

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include time and fixed effects.

Table 4 above presents the result for the estimates of the base specification and the partial relations between income growth, the tariff measures and the labor-bias-of-tariff measures. With respect to the Solow regressors, only the conditional convergence term appears to be statistically significant in all specifications. Although, the estimated convergence parameter appears to be high compared to the ones obtained by Murdoch & Sandler (2002), of around 3% which are more in line with the results of the growth regressions literature of around 2.5% from Barro (1997).

The lack of significance for the Solow determinants of economic growth, besides the convergence term, is in line with the results obtained by Estevadeordal & Taylor (2013), who also use tariff data and economic growth but rather in a difference-in-difference method application. With respect to the human capital proxies, the estimated coefficients have the correct sign but are statistically insignificant once the tariff measures are included in the specification.

With regard to the different tariff measures, all the actual estimates are negative but statistically insignificant, a result consistent with the recent literature (Nunn & Trefler, 2010). As expected, the measures of labor-bias-of-tariffs have a positive although insignificant coefficient estimates. However, if the opportunity cost channel is at work, the lack of significance of the labor-bias-of-tariffs coefficients could be explained by a downward bias due to omitted variables as explained in the methodology section.

Table 5. Regressions income growth and conflict measures 1986-2010

Dependent Variable: Average Growth Rate of GDP per capita (employees)							
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
lnGDPpcinitial year of span	-0.059***	-0.058***	-0.059***	-0.059***	-0.058***	-0.060***	-0.059***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
lnSkt-p	-0.009*	-0.008	-0.009	-0.010*	-0.008	-0.009*	-0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
lnSchoolinitial year of span	0.000	0.004	-0.001	0.001	0.004	-0.001	0.002
	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)	(0.011)
lnLexpectinitial year of span	0.092***	0.090***	0.095***	0.087***	0.091***	0.091***	0.092***
	(0.035)	(0.033)	(0.035)	(0.033)	(0.033)	(0.034)	(0.034)
lnht-p	-0.263	-0.266	-0.266	-0.266	-0.262	-0.270	-0.268
	(0.327)	(0.330)	(0.330)	(0.325)	(0.330)	(0.327)	(0.332)
Statefailcw$_t$	-0.015**						
	(0.006)						
Statefailcw Revolutionary$_t$		-0.013					
		(0.008)					
Statefailcw Ethnic$_t$			-0.011*				
			(0.007)				
Avemag IAC$_t$				-0.008***			
				(0.003)			
Avemag Revolutionary$_t$					-0.005		
					(0.004)		
Avemag Ethnic$_t$						-0.009**	
						(0.004)	
Battledeaths$_t$							-0.197
							(0.288)
Constant	0.223	0.215	0.211	0.250*	0.215	0.244	0.214
	(0.154)	(0.152)	(0.156)	(0.150)	(0.152)	(0.154)	(0.155)
Observations	515	515	515	515	515	515	515
R-squared	0.246	0.240	0.237	0.249	0.236	0.245	0.232
Number of Countries	107	107	107	107	107	107	107

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include time and fixed effects.

Table 5 above presents the result for the estimates of the partial correlations between growth and the different indicators for conflict measures for the countries included in the sample for the five spans between 1986 and 2010. As stated in the literature review, one common finding is a relatively low effect of conflict on growth if the average growth rates are calculated on longer periods. Column 1, presents the estimated coefficient of the incidence of internal armed conflict, which is statistically significant at 95% confidence. Thus, given the sample, a country affected by conflict has on average an income growth rate that is 1.46 percentage points lower than a similar country in peace. The result is similar to the general findings in the literature about the cost of conflict, but larger than the results Imai & Weinstein (2000) and Blomberg et al. (2004) obtain using the previous version of the same database for conflicts.

With respect to the estimated coefficients for the variables of conflict incidence detailed by revolutionary and ethnic wars, the point estimates are negative, lower than the total incidence variable and not significant at the 95% confidence (columns 2 and 3).

Regarding the coefficients for the measures of conflict magnitude; the total magnitude measure is highly significant and implies that an increase of one unit in the average magnitude of conflict reduces the average per capita income growth rate by 0.78 percentage points (column 4). Likewise, a country affected by the maximum magnitude of civil war in the sample (3.4 units) would expect to have a 2.65 percentage points lower per capita income growth compared to a similar country without conflict.

An intriguing result is the negative but insignificant coefficient estimate for the battle-related deaths. This result could obey to an improper formulation of the indicator (Mueller, 2014), or to a decline in the global incidence of civil war and the risk of deaths attributable to civil strife (Lacina et al., 2006). Given that this result was relatively frequent, the analysis presented in the remaining of the paper does not include this variable.

Table 6. Regressions income growth, conflict and labor-bias-of-tariffs measures

	Dependent Variable: Average Growth Rate of GDP per capita (worker)					
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$\ln(1+Tappl)_t$	-0.026	-0.025				
	(0.045)	(0.039)				
$Diff\_Agriculture_t$			0.013	0.010		
			(0.040)	(0.040)		
$Diff\_Lintensive_t$					0.134**	0.107*
					(0.060)	(0.057)
$Statefailcw_t$	-0.018**		-0.018**		-0.022***	
	(0.008)		(0.008)		(0.008)	
$Avemag\ IAC_t$		-0.007***		-0.007***		-0.008***
		(0.003)		(0.003)		(0.003)
Constant	0.416*	0.371*	0.369	0.321	0.258	0.226
	(0.216)	(0.216)	(0.226)	(0.230)	(0.220)	(0.231)
Observations	257	257	257	257	257	257
R-squared	0.332	0.322	0.330	0.321	0.343	0.329
Number of Countries	107	107	107	107	107	107

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include the baseline regressors (initial values of GDP, years of education and life expectancy at birth and lags of investment rate and population growth), as well as time and country effects.

Table 6 presents the results for the inclusion of tariffs and conflict measures simultaneously. The table is restricted to the overall conflict variables and the labor-bias-of-tariff measures because of space limitations. However, in all the specifications, the baseline Solow regressors are included. As expected, the estimated coefficients for the labor-bias-of-tariffs measures are positive and now more than double relative to previous point estimates presented in Table 4. This is consistent with the positive

association of labor-bias-of-tariffs and income growth via the opportunity cost channel. Increases in relative prices for labor-intensive goods induced by tariffs should generate a reduction of appropriation activity, fostering production as proposed by the theoretical framework. However, only the labor-bias-of-tariffs measure for labor-intensive goods is significant at 95% confidence for the estimation including conflict incidence and only marginally significant when included with the intensity measure. The point estimates for the conflict measures do not show any significant change in value, although there is a gain in significance.

Next, the interaction terms between the tariffs related variables and conflict indicators are included in the regressions; the estimation results are presented in Table 7. The inclusion of average tariff level and the conflict incidence measure show a reduction in the negative point estimate for the coefficient of average tariffs, but now it is statistically significant at 95% (column 1 of Table 7). Moreover, the estimate for the interaction term between average tariffs and the conflict measures is positive and significant. Thus, for a conflict affected country, the expected negative effect of tariffs is to some extent reduced. The lack of significance of the tariffs variable without the interaction term implies that the estimation in Table 6 is not accounting for this apparent nonlinear effect of tariffs. Hence, it is advisable to include the average tariff measure in order to control for the average structure of tariffs in the regressions (Nunn & Trefler, 2010).

Table 7. Regressions growth, conflict, labor-bias-of-tariff measures and interactions

	Dependent Variable: Average Growth Rate of GDP per capita (worker)					
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$\ln(1+Tappl)_t$	-0.146**			-0.135**		
	(0.058)			(0.061)		
$Diff\_Agriculture_t$		0.024			0.018	
		(0.039)			(0.041)	
$Diff\_Lintensive_t$			0.147			0.114
			(0.101)			(0.089)
$Statefailcw_t$	-0.038***	-0.019***	-0.021*			
	(0.013)	(0.007)	(0.011)			
$Avemag\ IAC_t$				-0.019***	-0.008**	-0.008***
				(0.006)	(0.003)	(0.003)
Interaction IAC*Trdpol	0.142**	-0.301***	-0.026	0.081**	-0.057	-0.009
	(0.058)	(0.098)	(0.148)	(0.034)	(0.053)	(0.065)
Constant	0.411*	0.437**	0.269	0.369*	0.351	0.231
	(0.208)	(0.208)	(0.233)	(0.215)	(0.220)	(0.229)
Observations	257	257	257	257	257	257
R-squared	0.357	0.344	0.344	0.347	0.323	0.329
Number of Countries	107	107	107	107	107	107
P-Value (F-test IAC=Trdpol=IAC*Trdpol=0)	0.010	0.005	0.019	0.004	0.065	0.003
P-Value (F-test Trdpol=IAC*Trdpol=0)	0.041	0.010	0.091	0.057	0.560	0.153
P-Value (F-test IAC=IAC*Trdpol=0)	0.012	0.002	0.012	0.003	0.029	0.005

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include the baseline regressors (initial values of GDP, years of education and life expectancy at birth and lags of investment rate and population growth), as well as time and country effects.

In regard of the other estimation results in Table 7, the point estimate for conflict incidence variable (*Statefailcw*) controlling for the average tariff is now more than twice as large as the previous estimates (column 1 of Table 7). This implies a direct negative effect of conflict on growth of 3.8 percentage points. Therefore, in this setting the average expected negative effect of conflict, conditional on the level of tariffs, is around -1.63 percentage points (-0.038+0.142*ln(1+16.64))[37] marginally lower than the previous estimates (column 1 Table 6). Nevertheless, the difference is not statistically significant given the estimated standard deviation for the coefficient.

Moreover, the estimated coefficients for labor-bias-of-tariffs measures are not significant, and the interactions are negative (columns 2 and 3 in Table 7). These results indicate that the marginal effect of labor-bias-of-tariffs is not associated with a lower conflict burden on the economy; the results for the intensity measures are susceptible to a similar interpretation (columns 5 and 6 in Table 7). Overall, the results in Table 7 point to a specification in which the average tariff measure should be included along with the measures labor-bias-of-tariffs in order to control for the average structure of tariffs.

Table 8. Regressions income growth, conflict, labor-bias-of-tariff measures and interactions, controlling for the average level of protection

Dependent Variable: Average Growth Rate of GDP per capita (worker)				
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
$ln(1+Tappl)_t$	-0.095**	-0.036	-0.118**	-0.098*
	(0.041)	(0.037)	(0.050)	(0.056)
$Diff\_Agriculture_t$	0.028	0.019		
	(0.042)	(0.042)		
$Diff\_Lintensive_t$			0.188**	0.158*
			(0.093)	(0.086)
$Statefailcw_t$	-0.017***		-0.031***	
	(0.006)		(0.011)	
$Avemag\ IAC_t$		-0.008**		-0.011***
		(0.004)		(0.003)
*Interaction IAC*Trdpol*	-0.569***	-0.079	0.193	0.085
	(0.193)	(0.074)	(0.210)	(0.103)
Constant	0.710***	0.447**	0.334*	0.312
	(0.244)	(0.214)	(0.187)	(0.193)
Observations	257	257	257	257
R-squared	0.365	0.327	0.367	0.347
Number of Countries	107	107	107	107
P-Value (F-test IAC=Trdpol=IAC*Trdpol=0)	0.001	0.137	0.001	0.001
P-Value (F-test Trdpol=IAC*Trdpol=0)	0.012	0.555	0.006	0.072

[37] The total effect is now, $\theta_{\text{Statefailcw}} + \theta_{\text{interaction}}$*ln(1+tapp). The average tariff average for a conflict country-year episodes is 16.64% then ln(1+tapp)=0.154.

P-Value (F-test IAC=IAC*Trdpol=0)	0.000	0.066	0.009	0.001

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include the baseline regressors (initial values of GDP, years of education and life expectancy at birth and lags of investment rate and population growth), as well as time and country effects.

Once controlling for the average level of tariffs (Table 8), the results confirm part of the previous findings of the association between the bias in the structure of tariffs towards agriculture in labor-intensive sectors and per capita income growth. The partial correlation for the average tariffs and income growth is estimated to be negative as expected. The measure of labor-bias-of-tariffs towards the agricultural sector is not statistically significant, but the interaction is negative and significant in the specification presented in column 1 in Table 8. On the other hand, the measure of labor-bias-of-tariffs based on factor intensity shows a positive and significant estimate, although the coefficient of the interaction is not significant (column 3 in Table 8)[38].

The previous results would imply that in the sample of countries and periods under study, increases in labor-bias-of-tariffs towards labor-intensive sectors are associated with increases in the growth rate directly and indirectly, conditional on the incidence of conflict. However, in a similar way of the estimations for average tariffs and the interaction term in column 1 of Table 7 discussed above. The estimated coefficient for the conflict variable is now higher implying that the total negative effect of conflict, including the interaction term, is even larger than previously estimated.

To summarize, the results of the proposed estimations only give support for the hypothesis of a positive and significant partial correlation of the labor-bias-of-tariffs measures and income growth once the effect of conflict is accounted for. The relation is stronger when the bias in tariffs is targeted to labor-intensive sectors and not to agriculture in general. However, the distortions caused by the tariffs or labor-bias-of-tariff are associated with negative coefficients for the interaction terms or to an estimated coefficient of the negative partial correlation of conflict that is larger. The preceding results signal that, on average higher labor-bias-of-tariffs will be associated with a null change in income growth or even negative in some cases; in other words, the changes are cancelling each other out.

[38] However, the F-Test for the null hypothesis of the total interaction estimated coefficients being zero or just one of the variables plus de interaction is rejected even at 1%.

4.2. Robustness checks and sensitivity analysis:

In order to assess the robustness of the results obtained in the previous section, the usual robustness checks are applied to the regression models employed. As mentioned in the data description section, alternative indicators for proximate and fundamental causes for growth were considered. The proposed variables are the initial value of the index of legal and security of property rights, the consumer price inflation volatility based on the deflator of consumption in GDP. Additionally, the controls also include the lagged value of the Government consumption share over GDP ($lnGovt_{t-1}$) and the initial level of trade in goods and services over GDP ($lnTrade_{initial}$).

Table 9. Robustness checks: Omitted variables

	Dependent Variable: Average Growth Rate of GDP per capita (worker)							
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(9)**	**(10)**	**(11)**	**(12)**
$ln(1+Tappl)_t$	-0.095**	-0.087*	-0.093*	-0.092**	-0.114**	-0.108**	-0.116**	-0.115**
	(0.040)	(0.045)	(0.048)	(0.039)	(0.049)	(0.053)	(0.054)	(0.046)
$Diff\_Agriculture_t$	0.044	0.032	0.020	0.028				
	(0.051)	(0.043)	(0.043)	(0.043)				
$Diff\_Lintensive_t$					0.217**	0.188**	0.170*	0.186**
					(0.099)	(0.093)	(0.101)	(0.089)
$Statefailcw_t$	-0.018***	-0.018***	-0.017***	-0.017***	-0.030***	-0.031***	-0.031***	-0.030***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.010)	(0.011)	(0.011)	(0.011)
*Interaction IAC*Trdpol*	-0.580***	-0.554***	-0.564**	-0.545***	0.155	0.186	0.218	0.186
	(0.166)	(0.198)	(0.226)	(0.185)	(0.200)	(0.211)	(0.218)	(0.204)
Leg. Str. & Prop. Rights $_{initial\ for\ span}$	-0.004				-0.003			
	(0.002)				(0.002)			
$lnTrade_{initial\ year\ of\ span}$		0.005				0.006		
		(0.012)				(0.012)		
$lnGovt_{t-p}$			-0.006				-0.006	
			(0.007)				(0.007)	
$Inflation\ Volatility_t$				0.047				0.049
				(0.037)				(0.037)
Constant	0.831***	0.699***	0.691***	0.727***	0.435**	0.328*	0.321*	0.366**
	(0.275)	(0.243)	(0.250)	(0.235)	(0.212)	(0.184)	(0.185)	(0.181)
Observations	237	257	257	257	237	257	257	257
R-squared	0.366	0.366	0.371	0.375	0.368	0.369	0.373	0.379
Number of Countries	93	107	107	107	93	107	107	107
P-Value (F-test IAC=Trdpol=IAC*Trdpol=0)	0.000	0.001	0.002	0.001	0.000	0.001	0.004	0.001
P-Value (F-test Trdpol=IAC*Trdpol=0)	0.003	0.016	0.044	0.012	0.003	0.008	0.022	0.004
P-Value (F-test IAC=IAC*Trdpol=0)	0.000	0.000	0.001	0.000	0.003	0.007	0.011	0.011

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include the baseline regressors (initial values of GDP, years of education and life expectancy at birth and lags of investment rate and population growth), as well as time and country effects.

The results of the robustness checks once controlling for omitted proxies of fundamental and proximate causes of conflict are presented in Table 9. As expected, given the inclusion of country and time effects in the regression equations, there are not in general important changes in the point estimates, signs and statistical significance of the estimated coefficients for the variables of interest.

Additionally, a second robustness check deals with the possible sample bias in the estimates due to the more likely inclusion of countries consistently reporting tariffs data. The number of periods and countries included in the main estimation results in Table 8 are determined by the availability of tariff data, especially before 1995.

The estimations results suggest that measurement error is a greater problem that sample bias in the sample considered, as allowing for lower quality in tariff data does not add to the efficiency of the estimations. Table 10 presents the estimations without constraining the number of missing values for the average tariffs calculations[39]. The base regressors like the conditional convergence and the life expectancy at birth turn to be highly significant; meanwhile none of the tariff related measures is significant. In principle these results are expected; as the sample bias decreases, the measurement error bias should be larger. Thus, explaining the bias towards zero in the estimated coefficients for the tariff related measures.

Table 10. Robustness checks: allowing for missing values in the calculation of average tariffs

	Dependent Variable: Average Growth Rate of GDP per capita (worker)			
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
$lnGDPpc_{initial\ year\ of\ span}$	-0.058***	-0.058***	-0.057***	-0.057***
	(0.010)	(0.010)	(0.010)	(0.010)
$lnSk_{t-p}$	-0.000	-0.000	-0.000	-0.000
	(0.007)	(0.007)	(0.007)	(0.007)
$lnSchool_{initial\ year\ of\ span}$	0.024	0.024	0.025	0.025
	(0.017)	(0.017)	(0.017)	(0.017)
$lnLexpect_{initial\ year\ of\ span}$	0.129***	0.116***	0.117***	0.109***
	(0.029)	(0.032)	(0.031)	(0.032)
$ln\,\eta_{t-p}$	-0.145	-0.181	-0.175	-0.198
	(0.218)	(0.212)	(0.211)	(0.208)
$ln(1+Tappl)_t$	0.003	-0.004	-0.014	-0.016
	(0.027)	(0.023)	(0.026)	(0.024)
$Diff\_Agriculture_t$	0.008	0.016		
	(0.032)	(0.035)		
$Diff\_Lintensive_t$			0.018	0.028
			(0.065)	(0.073)
$Statefailcw_t$	-0.009*		-0.011*	
	(0.005)		(0.006)	
$Avemag\ IAC_t$		-0.006**		-0.006**
		(0.003)		(0.003)
*Interaction IAC*Trdpol*	0.083	0.021	0.028	0.009
	(0.062)	(0.030)	(0.081)	(0.043)
Constant	-0.002	0.043	0.033	0.065
	(0.120)	(0.128)	(0.133)	(0.133)
Observations	467	467	467	467
R-squared	0.270	0.270	0.266	0.269
Number of Countries	131	131	131	131
P-Value (F-test IAC=Trdpol=IAC*Trdpol=0)	0.164	0.045	0.343	0.148
P-Value (F-test Trdpol=IAC*Trdpol=0)	0.278	0.462	0.845	0.803
P-Value (F-test IAC=IAC*Trdpol=0)	0.093	0.020	0.193	0.074

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include time and fixed effects.

[39] Therefore, if a country only reports tariffs for one year during the span, the average will be equal to that single observation.

As a final robustness check of the results, the regression equations are estimated excluding specific group of countries. Certainly, it is interesting to evaluate if the results of the relation between the labor-bias-of-tariffs, conflict and income growth rates are non-linear on the development level of countries.

For instance, it is possible that conflict technologies change with the level of economic development of countries and therefore the conditions established by the inequalities in equation (11) will hold simultaneously in the employed sample. Consequently, the average effects captured in the estimation of the growth equations will be biased towards zero because the estimations are picking up positive and negative associations simultaneously. The Table 11 presents the result of the estimations excluding the countries classified as "Advanced Economies" according to the World Economic Outlook 2014 (International Monetary Fund, 2014) [40] and including only the measure of incidence for civil war.

Table 11. Robustness checks: results excluding Advanced Economies

	Dependent Variable: Average Growth Rate of GDP per capita (worker)							
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
$lnGDPpc_{initial\ year\ of\ span}$	-0.039**	-0.036**	-0.041**	-0.035**	-0.030**	-0.036**	-0.034***	-0.026*
	(0.018)	(0.017)	(0.019)	(0.015)	(0.014)	(0.014)	(0.013)	(0.015)
$lnSk_{t-p}$	-0.019	-0.021	-0.020*	-0.018	-0.020	-0.021*	-0.020	-0.021**
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)	(0.010)
$lnSchool_{initial\ year\ of\ span}$	0.023	0.014	0.017	0.015	0.003	-0.001	0.021	0.004
	(0.020)	(0.023)	(0.021)	(0.021)	(0.024)	(0.023)	(0.028)	(0.022)
$lnLexpect_{initial\ year\ of\ span}$	0.075	0.043	0.079	0.083	0.045	0.096*	-0.022	0.056
	(0.068)	(0.070)	(0.070)	(0.059)	(0.057)	(0.052)	(0.071)	(0.061)
$ln\,\eta_{t-p}$	-1.351	-0.952	-1.096	-1.177	-0.672	-0.556	-0.427	-0.140
	(0.868)	(0.975)	(0.937)	(0.859)	(0.977)	(0.983)	(1.073)	(1.051)
$ln(1+Tappl)_t$	-0.041	-0.049	-0.084	-0.029	-0.038	-0.114**	-0.106**	-0.065
	(0.036)	(0.038)	(0.060)	(0.044)	(0.045)	(0.047)	(0.047)	(0.054)
$Diff\_Agriculture_t$		0.108			0.132*		0.153**	
		(0.083)			(0.078)		(0.074)	
$Diff\_Lintensive_t$			0.148			0.309***		0.540***
			(0.136)			(0.110)		(0.176)
$Statefailcw_t$				-0.015**	-0.016**	-0.023***	-0.016***	-0.008
				(0.007)	(0.007)	(0.008)	(0.005)	(0.010)
*Interaction IAC*Trdpol*							-0.485**	-0.442*
							(0.215)	(0.253)
Constant	0.129	0.245	0.138	0.065	0.202	0.050	0.486	0.098
	(0.294)	(0.303)	(0.297)	(0.267)	(0.257)	(0.222)	(0.310)	(0.242)
Observations	135	135	135	135	135	135	135	135
R-squared	0.318	0.334	0.334	0.364	0.388	0.421	0.430	0.446
Number of Countries	73	73	73	73	73	73	73	73
P-Value (F-test IAC=Trdpol=IAC*Trdpol=0)							0.000	0.001
P-Value (F-test Trdpol=IAC*Trdpol=0)							0.011	0.007
P-Value (F-test IAC=IAC*Trdpol=0)							0.000	0.001

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include time and fixed effects.

[40] The Annex 1contains the list of countries included in the sample and classifications criteria.

The general results excluding the advanced economies group are consistent with the ones for the whole sample. The tariffs based measures are not significant without including conflict, which is the usual result in the literature. Once accounting for the effects of conflict the point estimates for the labor-bias-of-tariffs measures are larger, positive and significant. Once again, the latter is consistent for the relation of tariff induced increases of relative prices for labor-intensive goods and a positive effect on income growth due to the reduction of conflict activity proposed by the theoretical framework.

Nevertheless, the preceding result goes hand in hand with an increase in the negative estimates of the coefficients for the conflict incidence or magnitude variables and a negative estimate of the interaction terms. These results imply that the effect of conflict conditional on a positive level of labor-bias-of-tariffs is larger and therefore any increase in the tariff bias will only have a limited or null effect on overall growth.

The main results are consistent, when the regressions are performed excluding high-income economies or regions of the world according to the classifications employed according to the World Development Indicators of the World Bank (see Annex 3). When the East Asia & Pacific or the Latin American countries are excluded from the regressions, the estimated coefficient for labor-bias-of-tariffs towards labor-intensive sector turns non-significant and the estimated coefficients for interactions terms are positive, although only significant when the East Asia & Pacific countries are excluded. In both cases the estimate for the direct partial correlation of conflict is twice the estimated without the interaction terms in line with the main results of Table 8.

5. Conclusions:

This paper analyzes the effects of trade policy in economies affected by internal armed conflict from a theoretical and empirical point of view. Specifically, it explores the effects of the imposition of tariffs to labor-intensive products as a second best policy in economies where markets are distorted by the incidence of armed conflict. The present research is considered innovative in the sense that it sheds some light on the mechanisms behind the economic effects of internal conflicts and the conduct of economic policy in conflict-affected economies.

The theoretical framework is based on a modified version of the HOS model of international trade proposed by Dal Bó & Dal Bó (2011), in which armed conflict could be considered similar to a distortion in factor markets. Therefore, economic policy instruments like tariffs and other instruments are susceptible to be used in order to reduce the negative effects of conflict on the economy. A null hypothesis derived from this framework is that tariff interventions that bias the structure of tariffs towards the protection of labor-intensive sectors would reduce the negative effect of conflict on the overall production of the economy.

A panel of cross-country growth regressions was employed to evaluate this theoretical possibility, constructing measures of the bias in tariffs towards labor intensive goods the agriculture sector and towards labor-intensive products. The results only offer evidence in favor of a positive and significant partial correlation of the labor-bias-of-tariffs measures and income growth once the variables for internal armed conflicts incidence or magnitudes are accounted for. This relation is clear when the measure based on labor intensity of products is used and apparently weak when the tariffs are biased on a sectorial basis, in this case towards agriculture. This result is consistent with the tariff induced increase in the opportunity cost of allocating resources (mainly labor) to appropriation activities as proposed in the theoretical framework.

This result seem a priori inconsistent with the results of Nunn & Trefler, (2010), who found evidence of a positive correlation of the bias in tariff structures towards skilled labor sectors on economic growth. However, it is important to stress that the positive association between labor-bias-of-tariffs and economic growth is only statistically significant when accounting for conflict. Moreover, the preceding result is always associated with negative coefficients for the interaction between conflict and the labor-bias-of-tariffs measures or to an estimated larger negative correlation of conflict and growth. The latter results are explained by the additional distortions created by tariffs.

Based on the evidence presented in this paper it is possible to conclude that tariffs cannot be considered second best policies that reduce the distortions created by internal armed conflicts. The results show that the distortions generated by the tariffs, even for conflict-affected economies, could cancel out the direct positive effect on growth of a tariff induced reduction in appropriation activities. The preceding result is consistent with the structure of analysis of the second best theory (Bhagwati, 1971). Under this framework, it is possible to conclude that the preferred instrument (the least distorting

one) is a direct tax-subsidy intervention in the factor markets as is shown by Dal Bó & Dal Bó (2012). Thus tariffs will not be the best policy instruments in this case.

Despite this result, it cannot be concluded that the main propositions derived from the theoretical framework are incorrect or are not fitting the data. On the contrary, the results favor the idea that increases in the relative price of labor; reduce the economic effects of conflicts through an increase in the opportunity cost of engaging in conflict activities.

The research adds to a relatively new field of research in economics that has focused the attention on explaining the covariates and causes of conflicts rather than on its effects on the economy (Blattman & Miguel, 2010). Moreover, the present research has highlighted a number of possible topics that could be valuable in the economic analysis of conflicts.

In this paper, a presumably exogenous variation in relative prices given by the tariffs was exploited to investigate the differential effects of internal armed conflicts on the production of the economy. A similar approach could be used to evaluate the theoretical implications of the model relative to the changes in relative prices of goods and the intensity of conflicts in a similar way to Besley & Persson (2008) and Dube & Vargas (2013). The results presented in this paper are encouraging although the empirical design does not allow for strong causality statements and more research is needed in this line.

As discussed in the methodological section, the reverse causality bias originated from the relation between income growth and civil conflict on one side and the dynamic panel data bias on the other, is not addressed in this paper. An application of an estimation procedure that properly addresses the reverse causality bias in dynamic panel data like the System GMM (Blundell & Bond, 1998) constitutes a prospect for future research. However, the estimations could be further improved if there is an opportunity to exploit external instruments for the conflict variable.

An important extension to the present research would be to consider other trade policy measures affecting the agricultural sector and other labor-intensive sectors in developing countries. The recently published Estimates of Distortions to Agricultural Incentives (DAI) 1955-2011[41] described in Anderson et al. (2008) offers an important

[41] Available at http://go.worldbank.org/YAO39F35E0

source of information of different instruments employed specifically in the agricultural sector. This database could allow for the analysis of another one of the policy options proposed by Dal Bó & Dal Bó (2011), the elimination of the subsidies to agriculture in developed countries. Those instruments could have a pervasive effect on developing countries affected by conflict according to the theoretical framework presented in this paper.

Finally, it is expected that the research presented in this paper has contributed to the analysis of economic policy in conflict-affected economies. The human suffering and enormous distortions created by these events go beyond the economic realm and allow for a rich multidisciplinary approach to the analysis and policy prescriptions for these countries.

References

Acemoglu, D. (2008). *Introduction to modern economic growth*. Princeton, N.J.: Princeton University Press.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *The American Economic Review, 91*(5), 1369-1401.

Anderson, K., Kurzweil, M., Martin, W., Sandri, D., & Valenzuela, E. (2008). *Measuring distortions to agricultural incentives, revisited.* (Policy Research Working Paper No. WPS4612). Washington, DC.: World Bank.

Angrist, J. D., & Pischke, J. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton, NJ [etc.]: Princeton University Press.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297.

Barro, R. J. (1997). *Determinants of economic growth: A cross-country empirical study*. Cambridge, Mass.: The MIT Press.

Barro, R. J., & Sala-i-Martin, X. (2003). *Economic growth* (2nd ed.). Cambridge and London: MIT Press.

Besley, T. J., & Persson, T. (2008). *The incidence of civil war: Theory and evidence.* (NBER Working Paper No. w14585). Cambridge, MA: National Bureau of Economic Research.

Bhagwati, J. N. (1971). The generalized theory of distortions and welfare. In J. Bhagwati, R. Jones, R. Mundell & J. Vanek (Eds.), *Trade, balance of payments and growth* (pp. 69-90). Amsterdam: North Holland.

Blattman, C., & Miguel, E. (2010). Civil war. *Journal of Economic Literature, 48*(1), 3-57.

Blomberg, S. B., Hess, G. D., & Orphanides, A. (2004). The macroeconomic consequences of terrorism. *Journal of Monetary Economics, 51*(5), 1007-1032.

Ciccone, A. (2013). Estimating the effect of transitory economic shocks on civil conflict. *Review of Economics and Institutions, 4*(2), 1-14.

Collier, P. (1999). On the economic consequences of civil war. *Oxford Economic Papers, 51*(1), 168-183.

Collier, P. (2007). *The bottom billion: Why the poorest countries are failing and what can be done about it*. New York, NY, [etc.]: Oxford University Press.

Collier, P., Elliott, V. L., Hegre, H., Hoeffler, A., Reynal-Querol, M., & Sambanis, N. (Eds.). (2003). *Breaking the conflict trap: Civil war and development policy*. Washington, DC: The World Bank. doi:10.1596/0-8213-5481-7

Collier, P., & Hoeffler, A. (2004). Greed and grievance in civil war. *Oxford Economic Papers, 56*(4), 563-595.

Collier, P., Hoeffler, A., & Pattillo, C. (2004). Africa's exodus: Capital flight and the brain drain as portfolio decisions. *Journal of African Economies, 13*(suppl 2), ii15-ii54.

Corden, W. M. (1966). The structure of a tariff system and the effective protective rate. *Journal of Political Economy, 74*(3), 221-237.

Curtis, M. (2007). Designing conflict-sensitive trade policy. In O. Brown, M. Halle, S. Peña Moreno & S. Winkler (Eds.), *Trade, aid and security: An agenda for peace and development* (pp. 18-40). London [etc.]: Earthscan.

Dal Bó, E., & Dal Bó, P. (2011). Workers, warriors, and criminals: Social conflict in general equilibrium. *Journal of the European Economic Association, 9*(4), 646-677.

--- (2012). Conflict and policy in general equilibrium: Insights from a standard trade model. In M. R. Garfinkel, & S. Skaperdas (Eds.), *The oxford handbook of the economics of peace and conflict* (pp. 611-632). New York, New York: Oxford University Press.

Dollar, D., & Kraay, A. (2003). Institutions, trade, and growth. *Journal of Monetary Economics, 50*(1), 133-162.

Dube, O., & Vargas, J. F. (2013). Commodity price shocks and civil conflict: Evidence from colombia. *The Review of Economic Studies, 80*(4), 1384-1421.

Durlauf, S. N., Johnson, P. A., & Temple, J. R. W. (2005). Growth econometrics. In P. Aghion, & S. N. Durlauf (Eds.), *Handbook of economic growth* (pp. 555-677) Elsevier.

Durlauf, S. N., Kourtellos, A., & Tan, C. M. (2008). Are any growth theories robust? *The Economic Journal, 118*(527), 329-346.

Echeverry, J. C., Salazar, N., & Navas, V. (2001). El conflicto colombiano en el marco internacional. In A. Martinez Ortiz (Ed.), *Economía, crimen y conflicto* (pp. 77-128). Bogotá D.C., Colombia: Universidad Nacional de Colombia.

Elbadawi, I., & Hegre, H. (2008). Globalization, economic shocks, and internal armed conflict. *Defence and Peace Economics, 19*(1), 37-60.

Estevadeordal, A., & Taylor, A. M. (2013). Is the washington consensus dead? growth, openness, and the great liberalization, 1970s-2000s. *Review of Economics and Statistics, 95*(5), 1669-1690.

Feenstra, R. C., Inklaar, R., & Timmer, M. (2013). *The next generation of the penn world table.* (NBER Working Paper No. 19255).National Bureau of Economic Research.

Frankel, J. A., & Romer, D. H. (1999). Does trade cause growth? *American Economic Review, 89*(3), 379-399.

Gardeazabal, J. (2012). Methods for measuring aggregate costs of conflict. In M. R. Garfinkel, & S. Skaperdas (Eds.), *The oxford handbook of the economics of peace and conflict* (pp. 227-251). New York, New York: Oxford University Press.

Gleditsch, N. P., Wallensteen, P., Eriksson, M., Sollenberg, M., & Strand, H. (2002). Armed conflict 1946-2001: A new dataset. *Journal of Peace Research, 39*(5), 615-637.

Goldstone, J. A., Bates, R. H., Epstein, D. L., Gurr, T. R., Lustik, M. B., Marshall, M. G., . . . Woodward, M. (2010). A global model for forecasting political instability. *American Journal of Political Science, 54*(1), 190-208.

Gwartney, J., Lawson, R., & Hall, J. (2012). *2012 economic freedom dataset, published in Economic freedom of the world: 2012 Annual report* . ().Fraser Institute.

Imai, K., & Weinstein, J. M. (2000). *Measuring the economic impact of civil war.* (CID Working Papers No. 15).Center for International Development at Harvard University.

International Monetary Fund. (2014). *World economic outlook (WEO):Recovery strengthens, remains uneven.* (World Economic And Financial Surveys No. April 2014). Washington, DC: International Monetary Fund.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators : Methodology and analytical issues.* (Policy Research Working Paper Series No. 5430).The World Bank.

Knight, M., Loayza, N., & Villanueva, D. (1996). *The peace dividen: Military spending cuts and economic growth.* (Policy Research Working Paper No. 1577).The World Bank.

Krishna, P., & Panagariya, A. (2000). A unification of second best results in international trade. *Journal of International Economics, 52*(2), 235-257.

Lacina, B., Gleditsch, N. P., & Russett, B. (2006). The declining risk of death in battle. *International Studies Quarterly, 50*(3), 673-680.

Lipsey, R. G., & Lancaster, K. (1956). The general theory of second best. *The Review of Economic Studies, 24*(1), 11-32.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics, 107*(2), 407-437.

Marshall, M. G., Gurr, T. R., & Harff, B. (2014). *PITF - state failure task force: Internal wars and failures of governance, 1955-2013.* (Dataset and Coding Guidelines). Vienna, VA: Societal-Systems Research Inc,.

Miguel, E., Satyanath, S., & Sergenti, E. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy, 112*(4), 725-753.

Minier, J., & Unel, B. (2013). When is trade protection good for growth? *Economic Inquiry, 51*(1), 62-71.

Montalvo, J. G., & Reynal-Querol, M. (2005). Ethnic polarization, potential conflict, and civil wars. *American Economic Review, 95*(3), 796-816.

Mueller, H. (2014). *Growth and violence: Argument for a per capita measure of civil war*. (Working Paper No. 756). Barcelona: Barcelona GSE Working Paper Series.

Murdoch, J. C., & Sandler, T. (2002). Economic growth, civil wars, and spatial spillovers. *Journal of Conflict Resolution, 46*(1), 91-110.

Nieman, M. D. (2011). Shocks and turbulence: Globalization and the occurrence of civil war. *International Interactions, 37*(3), 263-292.

Nunn, N., & Trefler, D. (2010). The structure of tariffs and long-term growth. *American Economic Journal: Macroeconomics, 2*(4), 158-94.

Rigobon, R., & Rodrik, D. (2004). Rule of law, democracy, openness, and income: Estimating the interrelationships. *National Bureau of Economic Research Working Paper Series, No. 10750*

Rodríguez, F. (2007). Openess and growth: What have we learned? In J. A. Ocampo, J. K. Sundaram & R. Vos (Eds.), *Growth divergences: Explaining differences in economic performance* () Zed Books.

Rodrik, D. (2006). Goodbye washington consensus, hello washington confusion? A review of the world bank's *Economic growth in the 1990s: Learning from a decade of reform*. *Journal of Economic Literature, 44*(4), 973-987.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: The primacy of institutions over geography and integration in economic development. *Journal of Economic Growth, 9*(2), 131-165.

Rybczynski, T. M. (1955). Factor endowment and relative commodity prices. *Economica, 22*(88), 336-341.

Sachs, J. D. (2003). *Institutions don't rule: Direct effects of geography on per capita income.* (NBER Working Paper No. 9490). Cambridge, MA: National Bureau of Economic Research.

Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity, 1995*(1, 25th Anniversary Issue), 1-118.

Shirotori, M., Tumurchudur, B., & Cadot, O. (2010). *Revealed factor intensity indices at the product level.* (Policy Issues in International Trade and Commodities Study

Series No. 44). New York and Geneva: United Nations Conference on Trade And Development.

Stolper, W. F., & Samuelson, P. A. (1941). Protection and real wages. *The Review of Economic Studies*, *9*(1), 58-73.

The World Bank. (2014a). Regional trade agreements.August 19 Retrieved, 2014, Retrieved from http://www.wto.org/english/tratop_e/region_e/region_e.htm

--- (2014b). World development indicators, the world bank.August 7 Retrieved, 2014, Retrieved from http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators

Themnér, L., & Wallensteen, P. (2013). Armed conflicts, 1946–2012. *Journal of Peace Research*, *50*(4), 509-521.

Annex 1. Countries included classification and internal conflict incidence

ISO country code	Name	Income Group World Bank	Advanced Economy According to IMF (X)	OECD Member (X)	Periods of civil war according to PITF (Spans 1986-2010)	
					No war	War
ARG	Argentina	Upper middle			0	5
AUS	Australia	High: OECD	X	X	5	0
AUT	Austria	High: OECD	X	X	5	0
BDI	Burundi	Low			1	4
BEL	Belgium	High: OECD	X	X	5	0
BEN	Benin	Low			5	0
BGD	Bangladesh	Low			4	1
BGR	Bulgaria	Upper middle			5	0
BHR	Bahrain	High : nonOECD			5	0
BLZ	Belize	Upper middle			5	0
BOL	Bolivia	Lower middle			5	0
BRA	Brazil	Upper middle			5	0
BRB	Barbados	High : nonOECD			5	0
BRN	Brunei Darussalam	High : nonOECD			5	0
BWA	Botswana	Upper middle			5	0
CAN	Canada	High: OECD	X	X	5	0
CHE	Switzerland	High: OECD	X	X	5	0
CHL	Chile	High: OECD		X	5	0
CHN	China	Upper middle			3	2
CIV	Cote d'Ivoire	Lower middle			4	1
COD	Congo, Dem. Rep.	Low			1	4
COL	Colombia	Upper middle			0	5
CRI	Costa Rica	Upper middle			5	0
CYP	Cyprus	High : nonOECD	X		5	0
CZE	Czech Republic	High: OECD	X	X	5	0
DEU	Germany	High: OECD	X	X	5	0
DNK	Denmark	High: OECD	X	X	5	0
DOM	Dominican Republic	Upper middle			5	0
ECU	Ecuador	Upper middle			5	0
ESP	Spain	High: OECD	X	X	5	0
EST	Estonia	High: OECD	X	X	5	0
FIN	Finland	High: OECD	X	X	5	0
FRA	France	High: OECD	X	X	5	0
GBR	United Kingdom	High: OECD	X	X	5	0
GRC	Greece	High: OECD	X	X	5	0
GTM	Guatemala	Lower middle			3	2
HKG	Hong Kong SAR, China	High : nonOECD	X		5	0
HND	Honduras	Lower middle			5	0
HRV	Croatia	High : nonOECD			4	1
HUN	Hungary	Upper middle		X	5	0
IDN	Indonesia	Lower middle			2	3
IND	India	Lower middle			0	5
IRL	Ireland	High: OECD	X	X	5	0
ISL	Iceland	High: OECD	X	X	5	0
ISR	Israel	High: OECD	X	X	0	5
ITA	Italy	High: OECD	X	X	5	0
JOR	Jordan	Upper middle			5	0
JPN	Japan	High: OECD	X	X	5	0
KEN	Kenya	Low			5	0
KGZ	Kyrgyz Republic	Low			5	0
KHM	Cambodia	Low			4	1
KOR	Korea, Rep.	High: OECD	X	X	5	0
KWT	Kuwait	High : nonOECD			5	0
LKA	Sri Lanka	Lower middle			1	4
LSO	Lesotho	Lower middle			5	0
LTU	Lithuania	High : nonOECD			5	0
LUX	Luxembourg	High: OECD	X	X	5	0
LVA	Latvia	High : nonOECD	X		5	0
MAC	Macao SAR, China	High : nonOECD			5	0
MAR	Morocco	Lower middle			5	0
MDV	Maldives	Upper middle			5	0
MEX	Mexico	Upper middle		X	4	1
MLI	Mali	Low			3	2
MLT	Malta	High : nonOECD	X		5	0
MNG	Mongolia	Lower middle			5	0
MOZ	Mozambique	Low			4	1
MUS	Mauritius	Upper middle			5	0
MWI	Malawi	Low			5	0
MYS	Malaysia	Upper middle			5	0

NAM	Namibia	Upper middle				5	0
NER	Niger	Low				5	0
NLD	Netherlands	High : OECD	X		X	5	0
NOR	Norway	High : OECD	X		X	5	0
NPL	Nepal	Low				3	2
NZL	New Zealand	High : OECD	X		X	5	0
PAK	Pakistan	Lower middle				1	4
PAN	Panama	Upper middle				5	0
PER	Peru	Upper middle				3	2
PHL	Philippines	Lower middle				0	5
POL	Poland	High: OECD			X	5	0
PRT	Portugal	High: OECD	X		X	5	0
PRY	Paraguay	Lower middle				5	0
QAT	Qatar	High : nonOECD				5	0
ROU	Romania	Upper middle				5	0
RUS	Russian Federation	High : nonOECD				1	4
SAU	Saudi Arabia	High : nonOECD				5	0
SDN	Sudan	Lower middle				0	5
SEN	Senegal	Lower middle				4	1
SGP	Singapore	High : nonOECD	X			5	0
SLV	El Salvador	Lower middle				4	1
SVK	Slovak Republic	High: OECD	X		X	5	0
SVN	Slovenia	High: OECD	X		X	5	0
SWE	Sweden	High: OECD	X		X	5	0
SWZ	Swaziland	Lower middle				5	0
TGO	Togo	Low				5	0
THA	Thailand	Upper middle				3	2
TUN	Tunisia	Upper middle				5	0
TUR	Turkey	Upper middle			X	0	5
TZA	Tanzania	Low				5	0
UGA	Uganda	Low				1	4
UKR	Ukraine	Lower middle				5	0
URY	Uruguay	High : nonOECD				5	0
USA	United States	High: OECD	X		X	5	0
VEN	Venezuela, RB	Upper middle				5	0
VNM	Vietnam	Lower middle				5	0
ZAF	South Africa	Upper middle				3	2
ZWE	Zimbabwe	Low				5	0
					Total Episodes.	451	84

* Political Instability Task Force Project. See section 3.3.1 for the definition of internal armed conflict employed

Annex 2. Definition of the labor-intensive and capital-intensive goods

The next tables present a summary of the goods included in each one of the factor intensive groups by sections (1 digit) of the SITC classification. A complete list is available upon request. The index of relative capital intensity is measured as real capital per worker, in 2000 US dollars.

Labor-intensive goods according to RCI and cluster division (cluster 1 and 2)

SITC Rev. 1	SITC sectors at 1 digit (Sections)	No of Products	Average RCI (K/L US$ from 2000)
0	Food and live animals	43	22509
1	Beverages and tobacco	2	22433
2	Crude materials, inedible	65	21416
3	Mineral fuels, lubricants	5	35117
4	Animal and vegetable oils and fats	15	19088
5	Chemicals	14	30088
6	Manufacted goods classified chiefly	44	25496
7	Machinery and transport equipment	1	37035
8	Miscellaneous manufactured articles	27	25798
9	Commod. & transacts. not class. acc	2	24023
	Total labor-intensive goods	218	23814

Source: Auhor's calculations based on: Shirotori et al. (2010)

Capital-intensive goods according to RCI and cluster division (cluster 5)

SITC Rev. 1	SITC sectors at 1 digit (Sections)	No of Products	Average RCI (K/L US$ from 2000)
0	Food and live animals	10	125072
1	Beverages and tobacco	2	120061
2	Crude materials, inedible	20	126306
3	Mineral fuels, lubricants	2	137417
4	Animal and vegetable oils and fats	0	n.a.
5	Chemicals	89	127620
6	Manufacted goods classified chiefly	107	127948
7	Machinery and transport equipment	104	130915
8	Miscellaneous manufactured articles	56	130496
9	Commod. & transacts. not class. acc	6	124189
	Total capital-intensive goods	396	128810

Source: Auhor's calculations based on: Shirotori et al. (2010)

Annex 3. Robustness Checks: Regressions excluding countries by level of development and regions

	Dependent Variable: Growth Rate of GDP per capita (worker)															
	Exclu.-Advanced Economies IMF	Exclu.-High Income W.Bank	Exclu.-East Asia & Pac.	Exclu.-Europe & Central Asia	Exclu.-Latin America & Caribbean	Exclu.-Middle East & North Africa	Exclu.-South Asia	Exclu.-Sub-Saharan Africa	Exclu.-Advanced Economies IMF	Exclu.-High Income W.Bank	Exclu.-East Asia & Pac.	Exclu.-Europe & Central Asia	Exclu.-Latin America & Caribbean	Exclu.-Middle East & North Africa	Exclu.-South Asia	Exclu.-Sub-Saharan Africa
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
$lnGDPpc_{initial\ year\ of\ span}$	-0.034***	-0.025**	-0.048***	-0.042***	-0.045**	-0.055***	-0.051***	-0.058***	-0.026*	-0.014	-0.049***	-0.039**	-0.048**	-0.060***	-0.053***	-0.065***
	(0.013)	(0.012)	(0.015)	(0.014)	(0.018)	(0.014)	(0.013)	(0.014)	(0.015)	(0.012)	(0.014)	(0.017)	(0.020)	(0.016)	(0.015)	(0.016)
$lnSk_{t-p}$	-0.020	-0.027*	-0.013	-0.012	0.007	-0.010	-0.007	-0.007	-0.021**	-0.025**	-0.014	-0.012	0.008	-0.011	-0.009	-0.009
	(0.012)	(0.014)	(0.010)	(0.010)	(0.006)	(0.008)	(0.008)	(0.009)	(0.010)	(0.012)	(0.010)	(0.010)	(0.007)	(0.009)	(0.008)	(0.009)
$lnSchool_{initial\ year\ of\ span}$	0.021	0.001	0.015	0.038*	0.003	0.015	0.018	0.021	0.004	-0.012	-0.002	0.027	-0.008	-0.004	-0.000	0.001
	(0.028)	(0.026)	(0.017)	(0.022)	(0.014)	(0.016)	(0.016)	(0.022)	(0.022)	(0.019)	(0.018)	(0.020)	(0.014)	(0.016)	(0.017)	(0.024)
$lnLexpect_{initial\ year\ of\ span}$	-0.022	-0.045	-0.007	-0.048	-0.045	-0.035	-0.047	-0.186	0.056	0.015	0.083**	0.034	0.022	0.076	0.047	-0.177
	(0.071)	(0.062)	(0.075)	(0.058)	(0.060)	(0.061)	(0.082)	(0.191)	(0.061)	(0.054)	(0.039)	(0.048)	(0.062)	(0.047)	(0.048)	(0.184)
$ln\ \eta_{t-p}$	-0.427	0.389	-0.163	0.507	0.218	0.202	0.214	0.259	-0.140	0.868	-0.005	0.583	0.136	0.063	0.173	0.093
	(1.073)	(1.093)	(0.538)	(0.788)	(0.440)	(0.448)	(0.441)	(0.422)	(1.051)	(1.004)	(0.517)	(0.768)	(0.447)	(0.465)	(0.441)	(0.439)
$ln(1+Tappl)_t$	-0.106**	-0.114**	-0.097	-0.098***	-0.034	-0.098**	-0.133**	-0.107**	-0.065	-0.068	-0.195***	-0.071	-0.019	-0.117**	-0.162***	-0.143***
	(0.047)	(0.046)	(0.063)	(0.034)	(0.035)	(0.046)	(0.051)	(0.050)	(0.054)	(0.055)	(0.042)	(0.050)	(0.048)	(0.051)	(0.043)	(0.049)
$Diff\_Agriculture_t$	0.153**	0.173**	0.010	0.071	0.023	-0.004	0.021	0.041								
	(0.074)	(0.079)	(0.051)	(0.060)	(0.038)	(0.058)	(0.044)	(0.044)								
$Diff\_Lintensive_t$									0.540***	0.598***	0.143	0.469***	-0.027	0.186*	0.211**	0.244**
									(0.176)	(0.173)	(0.110)	(0.125)	(0.070)	(0.100)	(0.100)	(0.098)
$Statefailcw_t$	-0.016***	-0.016**	-0.014*	-0.016***	-0.022***	-0.017***	-0.019***	-0.020***	-0.008	-0.005	-0.037***	-0.013	-0.031**	-0.031***	-0.021**	-0.037***
	(0.005)	(0.006)	(0.009)	(0.005)	(0.006)	(0.006)	(0.007)	(0.007)	(0.010)	(0.010)	(0.007)	(0.011)	(0.016)	(0.011)	(0.009)	(0.014)
*Interaction IAC*Trdpol*	-0.485**	-0.422**	-0.499	-0.559***	-0.357**	-0.543***	-0.594**	-0.578**	-0.442*	-0.541**	0.515***	-0.300	0.182	0.198	-0.162	0.164
	(0.215)	(0.207)	(0.354)	(0.174)	(0.168)	(0.207)	(0.279)	(0.232)	(0.253)	(0.253)	(0.165)	(0.245)	(0.202)	(0.207)	(0.203)	(0.217)
Constant	0.486	0.525*	0.540	0.599**	0.643**	0.719***	0.732**	1.386	0.098	0.156	0.220	0.229	0.403	0.338*	0.395**	1.467*
	(0.310)	(0.270)	(0.333)	(0.252)	(0.246)	(0.252)	(0.318)	(0.840)	(0.242)	(0.209)	(0.170)	(0.200)	(0.252)	(0.193)	(0.190)	(0.798)
Observations	135	112	218	149	209	244	248	226	135	112	218	149	209	244	248	226
R-squared	0.430	0.469	0.312	0.346	0.535	0.372	0.382	0.388	0.446	0.500	0.361	0.366	0.525	0.375	0.384	0.402
Number of Countries	73	60	91	73	88	98	101	86	73	60	91	73	88	98	101	86
P-Value (F-test IAC=Trdpol=IAC*Trdpol=0)	0.000	0.005	0.253	0.000	0.003	0.002	0.000	0.002	0.001	0.002	0.000	0.000	0.122	0.003	0.000	0.001
P-Value (F-test Trdpol=IAC*Trdpol=0)	0.011	0.020	0.345	0.007	0.108	0.035	0.105	0.028	0.007	0.003	0.000	0.000	0.665	0.014	0.100	0.003
P-Value (F-test IAC=IAC*Trdpol=0)	0.000	0.005	0.133	0.000	0.001	0.001	0.000	0.001	0.001	0.002	0.000	0.001	0.056	0.011	0.001	0.012

*** Significant at 1%, ** significant at 5%, * significant at 5%. Robust standard errors adjusted for clustering at the country level in parentheses. All specifications include time and fixed effects.