

# ***Civil Wars and Poverty: the Role of External Interventions, Political Rights and Economic Growth***

By

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## **1. Introduction**

Civil wars and poverty are inextricably linked. By their very nature, civil wars have direct effects on poverty in war affected regions of a country through destruction of capital, displacement of people and increased insecurity. The indirect effects of war on poverty that could impact a whole country, or even other neighboring countries, operate through the growth channel. Civil wars reduce both actual and “desired” capital stock, immediately and overtime. Therefore, they do not only produce impact effects that reduce levels of output, but also the rates of growth of output. In addition to the destructive effect of war on capital---broadly defined to include human and social capital as well---three more channels through which civil wars can affect growth could be identified (Collier, 1998). Civil wars can be disruptive to capital or transactions-intensive activities (such as roads, production of manufactures, or financial services); they can divert expenditure and the societies resources from economic services to the war efforts; and they can divert portfolios from domestic investment into capital flight. The detrimental effects of the risk of civil wars on growth, predicted through these channels, were robustly corroborated by international evidence (e.g. Collier, 1998,1999, Collier and Gunning, 1999).

On the other hand, poverty can be a cause of future civil wars, because it influences the probability of a civil war. At the microeconomic level, the opportunity cost of a civil war from the perspective of a potential rebel enlistee is relatively smaller in poor countries with low levels of incomes. Needless to say that governments of poor countries are “perceived” to be the least capable of defending themselves against a rebellion, which also increases the

probability of a civil war. Moreover, to the extent that poverty has usually been associated with dysfunctional governments that do not respect political and individual rights, or with regional or ethnic income inequalities--the inherent risk of a civil war may very well be realized in the form of a movement motivated by either *national* and/or *regional/ethnic grievances*.

While poverty is the key *inherent* cause of civil wars; ethnic fractionalization plays an important role as well, because, for a given level of poverty, it influences both the costs of initiating as well as sustaining a rebellion. However, evidence from recent research suggests that the relationship between the hazard of war and ethnic fractionalization is non-monotonic. This suggests that a higher risk of civil wars obtains in ethnically *polarized* societies rather than in ethnically more *homogeneous* or more *diverse* societies (e.g. Collier, 1998; Collier and Hoeffler, 1998). Similarly, ethnically fractionalized societies could experience a sudden rise in poverty as a result of external shocks operating through the growth channel. Recent research finds that external shocks could lead to an immediate and substantial deceleration in growth in societies characterized by the presence of “latent” social conflicts (e.g. high ethnic diversity), and low institutional or social capacity for resolving conflicts (as manifested for example in low political and individual rights) (Rodrik, 1998)<sup>1</sup>.

Moreover, both poverty and the risk of civil wars are subject to other influences. For example, anticipated or actual “net” external intervention in favor of the rebels could reduce the cost of coordinating a rebellion for a given level of ethnic fractionalization. This could cause previously “safe” societies to become vulnerable to a higher risk of civil wars (i.e. external intervention in favor of the rebels causes an upward shift in the hazard function of

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<sup>1</sup> Dani Rodrik shows that this effect robustly explains the deceleration of growth in most of the developing world before and after the episode of external terms of trade shocks that started in 1975.

war for any given level of ethnic fractionalization). No matter how defined, it is clear that the prominence of external interventions in intra-state conflicts could not be overemphasized. Using a fairly generic definition of intra-state conflicts and of external interventions, Regan (1999) for example, finds that out of 138 conflicts since World war II, 89 had at least one third party intervention. Moreover, he finds that within these 89 conflicts there were a total of 190 cases of individual interventions.

As pointed out by Regan (1999: chapter 2), attaining a coherent and useful definition of intervention is complicated by the need to understand the nature of the conflict that underlies the intervention, in addition to accounting for the complex mix of factors that can shape an intervention strategy. The latter ranges from punishments to rewards, incremental policies to massive onslaughts, and from supporting the government to supporting the opposition. These complexities aside, I follow Regan (1999) and define *external intervention* to mean: [u]nilateral intervention by one (or more) third party government(s) in a civil war in the form of military, economic or mixed assistance in [f]avor of either the government or the rebels movement involved in the civil war. This mode of interventions is *biased* in favor of one of the two parties involved in the intra-state conflict. I distinguish between this type of interventions and what I call the "*external agency*" type of interventions. I define external agency interventions as: *multilateral* and essentially *neutral* mode of interventions that is aimed at promoting or facilitating peaceful resolution of conflicts, based on an explicit set of criteria that both parties to the conflict regard as providing an acceptable framework for initiating a process for resolving the conflict. I will argue in this paper that the two modes of intervention are very different in terms of their potential impacts on conflicts.

Ruling out "ethnic cleansing" as an option, there are two available responses to societies trapped by high risk (or persistent duration) of civil wars and high poverty. These are the

adoption of high standards of political and individual rights and the achievement of high growth. The minimum “bars” for both goals will be higher the more the society is polarized or the more the rebels enjoy external support. In addition, this paper will argue that there are limits to what these national policy responses can do, especially with regard to affecting the duration of wars once they started. This is because governments fighting wars are likely to be less effective in dealing with poverty and, more importantly, whatever political reforms they adopt remain incredible as far as the rebels are concerned, hence they are not likely to lead to resolution of ongoing conflicts. This argument motivates a potentially decisive role for supra-national “external agency” in resolving this “credibility failure” and, therefore, bringing a speedy end to civil wars.

Section 2 formalizes the above discussion by developing a simple theory for determining the levels of ethnic fractionalization consistent with: (i) stationary levels of poverty, given the prevailing *unconditional* probability of war; and (ii) zero probability of a fresh war, provided that the initial period was peaceful. The model assumes that a “reasonable” government should attempt to achieve these two most basic objectives, through maximizing a welfare function depending on the level of poverty and the probability of war, and subject to the behavioral characteristics of the two variables. This model allows derivation of interesting comparative static experiments for analyzing the role of “external interventions”, “external agency”, political rights and growth. Section 3 discusses empirical estimation strategy. Section 4 concludes.

## **2. Theory**

Assume that for a given level of ethno-linguistic fractionalization ( $\text{elf}$ ), a government will attempt to prevent the occurrence of a civil war provided that it did not happen in the

previous period. In addition to this very basic objective for virtually any government, I assume that the government is also concerned about poverty. Formally, I assume that the government maximizes the following welfare function:

▮  
 $MaxW(p_r(w/w_0^c), P(p_r(w)); elf)$ , subject to behavioral equations determining growth, poverty and risk of wars, and where  $p_r(w/w_0^c)$  is the *conditional* probability of occurrence of war in the current period given that there was no war in the initial period and  $P$  is a measure of the extent of poverty, which depends on the hazard of war measured by the *unconditional* probability of war. The solution to this problem is provided by finding  $\tilde{p}_r$  such that  $\tilde{p}_r(w/w_0) = 0$  and  $P(\tilde{p}_r(w))$  is minimum for any given level of  $elf$ . To characterize this solution we need to model the probability of war as well as the determinants of poverty.

*i. The Determinants of Risk of Civil Wars:*

Recent research by Paul Collier and his research associates (e.g. Collier, 1998; Collier and Hoeffler, 1998, 1998a; Collier, Hoeffler and Soderbom, 1998) develops a theory for analyzing the determinants of the probability of civil wars, based on the microeconomic decision of a potential rebel recruit about whether or not to enlist in the rebel movement. In one version of this theory (the employment motive approach), Collier (1998) constructs a utility function for the potential rebel recruit, which for any point in time,  $t$ , and any duration of war,  $D$ , is given by:

$$U_w = h(y, x, x^2, elf, elf^2 / D) \cdot s(y, x) - c(y), \quad \text{where } h(y, x, x^2, elf, elf^2 / D) \text{ is the}$$

$\begin{matrix} (-) & (+) & (-) & (+) & (-) \end{matrix}$

probability of victory, which depends on the capacity of the government to defend itself and on the capacity of the rebels to organize the rebellion. The first factor depends, in turn, on the taxable base available to the government, which Collier proxies by per capita income

( $y$ ); and on the presence of a natural resource base, proxied by the share of primary exports in GDP ( $x$ ). The effects due to both factors are theoretically ambiguous, but the assumed signs are consistent with available empirical regularities (see Collier, 1998). In particular, the effect of the natural resource base is assumed to be non-monotonic, where presence of a natural resource base tends to increase the probability of rebel victory, especially if the main deposits happen to be in rebel-controlled regions. However, sufficiently high amounts of natural resources are usually associated with capable governments that are able to defend themselves, hence ( $x^2$ ) enters negatively. The ability of the rebels to organize is facilitated by the extent of divisions in the society, measured by ethno-linguistic fractionalization ( $elf$ ). However, if there is too much ethnic diversity keeping rebel cohesiveness may be difficult, suggesting that ( $elf^2$ ) should enter negatively. Contingent upon rebel victory, the spoils from victory,  $s(y, x)$ , depends on the tax base of the economy, and in particular on the presence of a natural resource base. Finally, the cost of war,  $c(y)$ , depends on its opportunity cost, given by  $y$ .

I will introduce two small extensions to the this model by assuming that in a world of ethnic diversity “net” external, and especially regional, interventions in favor of the rebel movement could further enhance the capacity of the movement to coordinate the rebellion and to sustain rebel cohesiveness for any given duration,  $D$ . This will affect the probability of victory as follows:  $h(y, x, x^2, elf, elf * ext, elf^2 / D)$ , where ( $ext$ ) stands for “net”

external intervention in favor of the rebels<sup>2</sup>. Moreover, if we also assume that potential rebel recruits may also be motivated by national grievances, where conditional on rebel victory the rebels derive satisfaction from ridding their country from a dysfunctional government (Collier, 1998), then the spoil from victory could be generalized to include this dimension as well:  $s(y, x, elf^{*}right)$ , where the last term (with “ *right* ” being an inverse index of political and civil rights) is a proxy for dysfunctional government, because its is an indicator of the inability of a government to resolve conflicts (e.g. Rodrik, 1998). With the above extensions,  $U_w$  could be stated as follows:

$$(1) \quad U_w = h(y, x, elf, elf^{*}ext, elf^2 / D) \cdot s(y, x, elf^{*}rights) - c(y)$$

Now following Collier (1998), we note that the probability of civil war is an increasing function of the expected value of  $(1+r)^{-t}U_w$  over time and over the distribution of D, where r is the discount rate. Abstracting from the unknown F(D), the desired probability can be written in the following general form:

$$(2) \quad p_w = p_r(y, x, x^2, elf, elf^{*}ext, elf^{*}rights, elf^2).$$

Now I write equation 2 in the following linear form:

$$(3) \quad p_w = \partial_0 elf + \partial_1 elf^{*}ext + \partial_2 elf^{*}rights - z_1 elf^2 + z' F_w,$$

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<sup>2</sup> In addition, external support to the rebels could directly reduce the cost of war from the perspective of the rebels, independent of the extent of ethnic fractionalization:  $c(y, ext)$ . However, to keep matters simple we abstract from this channel of the effect of external intervention.

where  $\mathbf{z}' = (-z_y, z_x, -z_{x^2})$  and  $F_w' = (y, x, x^2)$ . By defining

$\mathbf{z}_0 = (\partial_0 + \partial_1 * ext + \partial_2 * rights)$  and  $p_w^F = \mathbf{z}' F_w$  we write:

$$(4) \quad p_w = \mathbf{z}_0 elf - \mathbf{z}_1 elf^2 + p_w^F$$

One of the two conditions for solving the welfare maximization problem in (1) is to find  $p_w^*$

such that :

$$(5) \quad p_r^*(w/w_0^c) = 0.$$

However, note that:

$$(6) \quad p_w = p_r(w/w_0^c) + p_r(w/w_0) = p_r(w/w_0^c) + p_r(D > 0),$$

Therefore (5) and (6) suggest that one of the conditions for maximization of (1) is that the hazard of war is one of persistence of a civil war that has already started in the initial period:

$$(7) \quad p_w^* = p_r(D > 0),$$

*ii. The Duration of Civil Wars:*

In a departure from earlier literature that models persistence and occurrence of civil wars as being jointly determined by the same factors (e.g. Collier, Hoeffler and Soderbom, 1998), Collier (1998) models the hazard of persistence as being an outcome of a forecast error on the part of the rebels about the military capability of the government relative to the rebels military capability. Moreover, according to Collier, unlike international wars, civil wars are usually prolonged wars. This is because rebels who decide to fight, and hence cause a latent risk of war to be realized, tend to be over-optimistic about their relative military

capability, but not too over-optimistic to the extent of leading to a quick military defeat of the rebel movement. Hence they produce stalemates. In this theory, the hazard of duration is basically determined by the ability of the rebel movement to remain intact and to avoid defection as the war proceeds. The predictions of this theory was strongly corroborated by empirical evidence, where from among the right hand side variables of equation (3) only ( $elf$ ) and ( $elf^2$ ) were found to be robustly and significantly associated with the hazard of persistence of civil wars (Collier, 1998).

While providing the important insight that, unlike international wars, civil wars are likely to last longer, this theory does not account for dynamic considerations and strategic interactions among participants. A theoretical framework proposed by Intriligator and Brito (1988) (hereafter IB), accounts for these two key features by analyzing the determinants of the rates of growth of rebel and government forces over time<sup>3</sup>. I will use IB theory as a basis for deriving, in the context of our two period framework, the probability that the duration of a civil war spills over into the following period:  $p_r(D > 0)$ .

Denoting the sizes of rebel and government forces at time  $t$  by  $n_r(t)$  and  $n_g(t)$ , respectively, and the size of population living in territories under rebel control by  $pop_r(t)$ , IB state the following three differential equations describing the evolution of the three variables over time:

$$(8) \quad \dot{n}_r = (\mathbf{p}_1 pop_r - \mathbf{p}_2 n_g) n_r, \quad \mathbf{p}_1, \mathbf{p}_2 > 0$$

$$(9) \quad \dot{n}_g = (\mathbf{p}_3 - \mathbf{p}_4 n_r) n_g, \quad \mathbf{p}_3, \mathbf{p}_4 > 0$$

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<sup>3</sup> The representation of IB's theoretical framework is based on a review article by Sandler and Hartley (1995). See also Brito and Intriligator (1989, 1992).

$$(10) \quad \dot{pop}_r = \mathbf{p}_5 n_r - \mathbf{p}_6 n_g, \quad \mathbf{p}_5, \mathbf{p}_6 > 0$$

The first equation of motion suggests that the growth in rebel forces over time depends positively on the interaction of this force with the population under its control and negatively on its interaction with the government forces. The second equation suggests that the growth in the size of government army depends positively on its initial size and negatively on its interactions with rebel forces. Finally, the third equation assumes that the growth of the size of population living under rebel controls depends positively on the size of the rebel forces and negatively on the size of government forces.

The steady state and the corresponding phase diagram, depicting behavior along and around the steady state, are described by the following six equations:

$$(11) \quad \dot{n}_r = 0 \quad \text{if} \quad \frac{n_g}{pop_r} = \frac{\mathbf{p}_1}{\mathbf{p}_2} = \mathbf{p}', \text{ for } n_r > 0$$

$$(12) \quad \dot{n}_g = 0 \quad \text{if} \quad n_r = \frac{\mathbf{p}_3}{\mathbf{p}_4} = \mathbf{p}'', \text{ for } n_g > 0$$

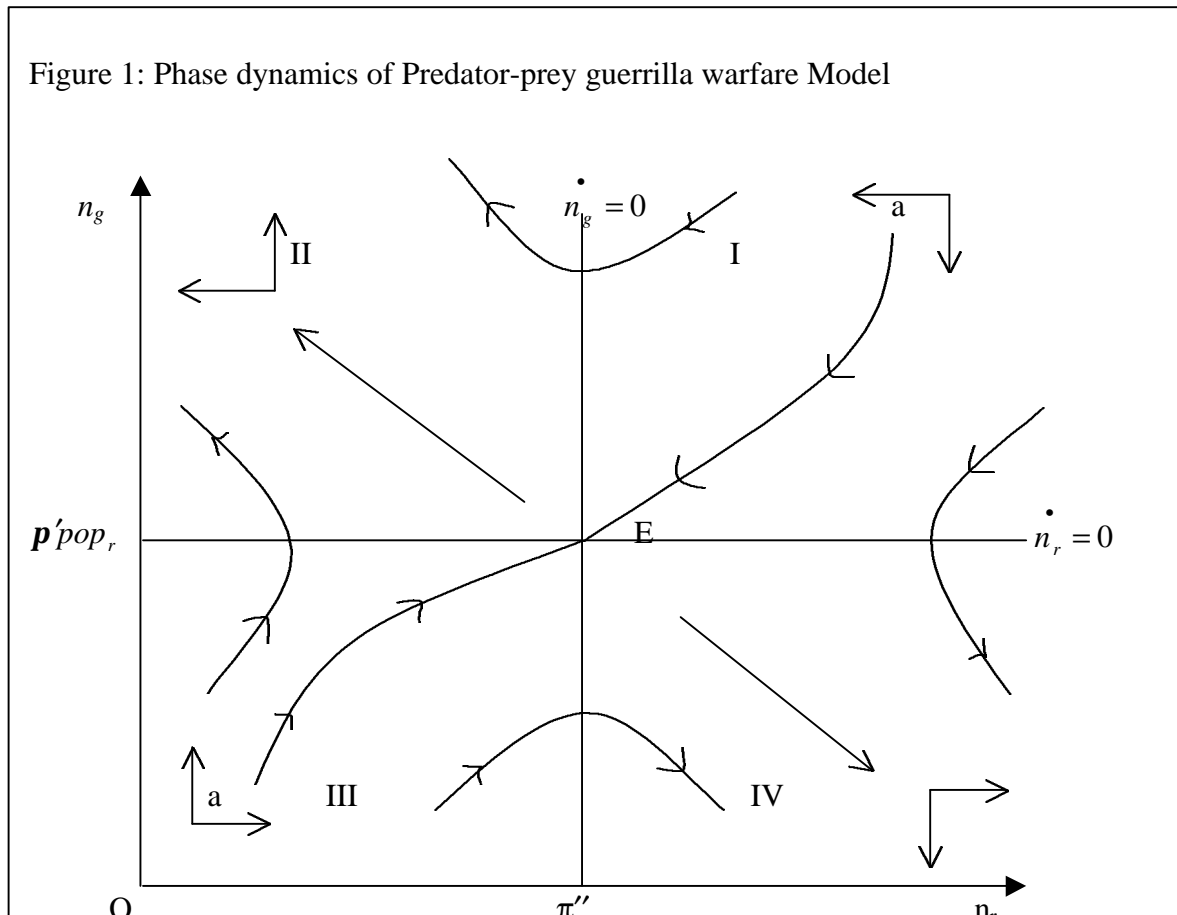
$$(13) \quad \dot{n}_r > 0 \quad \text{if} \quad \frac{n_g}{pop_r} > \mathbf{p}',$$

$$(14) \quad \dot{n}_r < 0 \quad \text{if} \quad \frac{n_g}{pop_r} < \mathbf{p}'$$

$$(15) \quad \dot{n}_g > 0 \quad \text{if} \quad n_r > \mathbf{p}'',$$

$$(16) \quad \dot{n}_g < 0 \quad \text{if} \quad n_r < \mathbf{p}'',$$

where  $p'$  denotes the critical ratio of the size of government forces to the size of population living under rebel controls for there to be no change in the size of rebel forces, while  $p''$  indicates the critical size of the rebels forces consistent with a stationary size of the government army. Equations (11) –(16) give rise to a phase diagram in the  $(n_r, n_g)$  space (see Sandler and Hartley, 1995: Figure 13.1), which I reproduce here for convenience. Both of phases II and IV are associated with short wars, where phase II (IV) suggests a quick government (rebels) victory, due to the rapid expansion of government (rebel) army while the rebels (government) forces shrink at the same rapid pace. On the other hand phases I and III are consistent with longer and stalemated wars, where in phase I (III) both forces shrink (expand) over time. I expand this framework in two important dimensions, recommended by Sandler and Hartley (1995) in their review article, by introducing uncertainty and by allowing the sizes of the phases (i.e. the probability events) to depend on behavioral determinants.



The four phases of the diagram can be expressed in terms of four events, which determine the probability of duration of war:

$$\text{I: } A_1(\mathbf{p}'_{pop_r, \mathbf{p}''}) = \{n_g > \mathbf{p}'_{pop_r, n_r} > \mathbf{p}''\}$$

$$\text{II: } A_2(\mathbf{p}'_{pop_r, \mathbf{p}''}) = \{n_g > \mathbf{p}'_{pop_r, n_r} < \mathbf{p}''\}$$

$$\text{III: } A_3(\mathbf{p}'_{pop_r, \mathbf{p}''}) = \{n_g < \mathbf{p}'_{pop_r, n_r} < \mathbf{p}''\}$$

$$\text{IV: } A_4(\mathbf{p}'_{pop_r, \mathbf{p}''}) = \{n_g < \mathbf{p}'_{pop_r, n_r} > \mathbf{p}''\}$$

In the context of our two period framework (where I characterize short wars as those that end in the same period and do not spill over into the following one):  $p_r(D = 0) = p_r(A_2 \cup A_4)$  and  $p_r(D > 0) = p_r(A_1 \cup A_3)$ . Both probability statements could in turn be written as functionals of  $(\mathbf{p}'_{pop_r, \mathbf{p}''})$ , albeit for both functionals the net effect of these parameters could not be a priori signed. However, in the interest of subsequent analytical tractability, I will assume that the relevant event for determining the probability of stalemated civil war is  $A_3$ . Even though this assumption is subject to empirical testing, the prediction of this event that over time the sizes of the two armies in stalemated wars tend to grow (rather than shrink as predicted by  $A_1$ ) appears to be more consistent with most actual civil war experiences.

With this assumption, I write:

$$(17) \quad p_r(D > 0) = p_r[A_3(\underset{(+)}{\mathbf{p}'pop_r}, \underset{(+)}{\mathbf{p}''})]$$

The parameter  $(\mathbf{p}'pop_r)$  is influenced by factors that determine effectiveness of rebels' recruitment operations and the sympathy of certain segments of the population to the rebels' cause. In addition, it is also partially determined by factors that influence the capability of the rebel fighting force relative to that of the government forces (e.g. relative availability of resources to pay for soldiers salaries and training or for purchases of arms). To fix the discussion I write the following specification for  $(\mathbf{p}'pop_r)$ :

$$(18) \quad \mathbf{p}'pop_r = f\{\underset{(+)}{elf}, \underset{(+)}{elf * ext}, \underset{(+)}{elf * \mathbf{d}(rights^{\oplus})}, \underset{(-)}{elf^2}, \underset{(+)}{x_r}\},$$

where the latter set of factors are proxied by the ratio of the flow of natural resources controlled by rebels relative to real GNP ( $x_r$ ), where GNP is assumed to reflect the government's overall spending ability. The rest of the factors are assumed to influence the sympathy of the population with, and recruitment effectiveness of, the rebels. Ethnic fractionalization ( $elf$ ) helps the rebels on both counts, and especially in the presence of favorable external interventions ( $elf * ext$ )<sup>4</sup>. However, as in the case of hazard of war theory, too much ethnic fractionalization could negatively affect both objectives: hence ( $elf^2$ ) enters negatively. Finally, the variable  $elf * \mathbf{d}(rights^{\oplus})$  (where  $\mathbf{d}(\dots)$  is an indicator

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<sup>4</sup> However, the implication of this model for the effect of external intervention on the probability of duration of civil wars is not as straight forward as the case of the hazard of civil wars. The concept of intervention I adopt here is in terms of "net" intervention, which implies that external interventions in favor of the government should reduce duration. This, however, may run counter to some preliminary evidence, which suggests that interventions in favor of governments, rebels or both tend to lengthen intra-state conflicts (Regan, 1996, 98, 99). Again the model can accommodate a broader definition of interventions that allows interventions in favor of government to enter separately from those in favor of the rebels.

function) suggests that in the presence of ethnic fractionalization if government repression exceeds a certain threshold ( $rights^{\oplus}$ ), rebels' recruitment efforts and the sympathy toward them among the population will be enhanced. Increased government repression makes it easier for the population to sympathize with the rebel movement, especially if they come from ethnic groups targeted by government repression. Rebel recruitment efforts could also be helped by increased repression, since other less violent forms of political expressions are now very costly.

The remaining parameter ( $p''$ ) depends on factors that determine the initial stock of government forces in addition to the factors that influence capabilities of the government forces relative to those of the rebels. I specify the stock of government forces to be positively dependent on the total size of population in the country ( $pop$ ) and the relative effectiveness of government forces to be a positive function of per capita income ( $y$ ):

$$(19) \quad p'' = g(\underset{(+)}{pop}, \underset{(+)}{y}).$$

Now equations (17)-(19) allow statement of the following expression for the probability of stalemated civil wars:

$$(20) \quad p_r(D > 0) = p_D \{ \underset{(+)}{elf}, \underset{(+)}{elf * ext}, \underset{(+)}{elf * d(rights^{\oplus})}, \underset{(-)}{elf^2}, \underset{(+)}{x_r}, \underset{(+)}{pop}, \underset{(+)}{y} \}.$$

Taking equation (7) above into consideration and abstracting from  $(x_r, pop, y)$ <sup>5</sup>, I now rewrite (20) in the following linear form:

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<sup>5</sup> This simplification is useful for focussing the analysis on ethnic fractionalization and other variables that operate through it. Obviously, the eliminated variables have important analytical and policy value, which could be addressed in future work.

$$(21) \quad p_w^* = p_r(D > 0) = \mathbf{b}_0 elf - \mathbf{b}_1 elf^2 \quad (\Leftrightarrow p_r(w/w_0^c) = \dot{p}_r(w/w_0^c) = 0),$$

where  $\mathbf{b}_0 = \{\mathbf{g}_0 + \mathbf{g}_1 ext + \mathbf{g}_2 d(rights^\oplus)\}$  and “ $\bullet$ ” over a variable indicates a rate of change  $(\frac{dx/dt}{x})$ .

iii. *Poverty, Growth and the Hazard of Civil Wars:*

The second condition for the maximization problem of equation (1) is to find  $p_w^\circ$  such that  $P(p_w^\circ)$  is minimum and  $\dot{P} = 0$  at  $p_w = p_w^\circ$ . First, I state the following basic equations:

$$(22) \quad g = g(p_w, F_g) = -\mathbf{h} p_w + \Omega' F_g = -\mathbf{h} p_w + g^F$$

$$(23) \quad P = P\left(\frac{\mathbf{m}}{z}, m\right) \Rightarrow$$

$$(24) \quad \dot{P} = -(1 - \mathbf{e})\mathbf{s} \dot{\mathbf{m}} + \mathbf{q} \dot{m}$$

$$(25) \quad \dot{P} = -(1 - \mathbf{e})\mathbf{s}g + \mathbf{q} \dot{m}$$

$$(26) \quad \dot{m} = \mathbf{n} \dot{\mathbf{m}} + \mathbf{n}_0 = \mathbf{n}g + \mathbf{n}_0 \quad (\text{obtained by differentiation of a particular specification of}$$

the Kuznet curve:  $\log m = \mathbf{n} \log \mathbf{m} + \mathbf{n}_0 t + \mathbf{n}_{00}$ ), (25) and (26) lead to:

$$(27) \quad \dot{P} = -\mathbf{a}g + \mathbf{a}_0,$$

where  $\mathbf{a} = (1 - \mathbf{e})\mathbf{s} - \mathbf{q}\mathbf{n}$  and  $\mathbf{a}_0 = \mathbf{q}\mathbf{n}_0$ ;  $g$  is the rate of real growth;  $m$  is a measure of inequality;  $F_g$  = vector of other growth fundamentals(policy variables, human capital,

institutions, initial income: etc);  $P$  = as before, an index of poverty;  $\mu$  = mean income;  $z$  = poverty line;  $\varepsilon$  = elasticity of poverty line with respect to mean income;  $-s$  = elasticity of poverty index with respect to  $\mu$ ;  $\theta$  is the elasticity of  $P$  relative to  $m$ . Equations (22) is a growth equation with a special focus on the effect of hazard of war (e.g. Collier, 1999)<sup>6</sup>, while equations (23)- (26) are standard specifications in the poverty literature (e.g. Ali, 1998).

First, I characterize  $\mathbf{a}_0 = \mathbf{q}\mathbf{n}_0$  (which reflects distributional characteristics) as a residual. One way of explaining this residual is to link it to the effect of external shocks propagated by social polarization and weak institutions for conflicts resolution, which has been analyzed in recent literature as a possible cause of deceleration of growth (e.g. Rodrik, 1998). Therefore, I set  $\mathbf{a}_0 = \mathbf{I}t \text{ elf} * \text{rights}$ , where  $\lambda$  is a parameter;  $\tau$  is a measure of a negative exogenous shocks;  $\text{elf}$  is a measure of the extent of social polarization; and  $\text{rights}$  is an (inverse) index of the effectiveness of institutions for resolving social conflicts.

Using (22) in (27) and substituting for  $\mathbf{a}_0$  leads to the following expression for  $\dot{P}$ :

$$(28) \quad \dot{P} = \mathbf{a}\mathbf{h} p_w - \mathbf{a}g^F + \mathbf{I}t \text{ elf} * \text{rights}$$

Equation (28) allows derivation of the probability of war  $p_w^\circ$  such that  $P(p_w^\circ)$  is minimum

and  $\dot{P} = 0$  at  $p_w = p_w^\circ$ :

$$(29) \quad p_w^\circ = \frac{1}{\mathbf{h}} g^F - \mathbf{m} \text{elf},$$

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<sup>6</sup> Unlike Collier, however, the growth model posited here accounts for "endogenous" policy components of the growth fundamentals.

where  $\mathbf{m} = \frac{\mathbf{1}t \text{ rights}}{\mathbf{h}a}$ .

iv. *Some Comparative Statics*

The intersection of equations (21) and (29) in the  $(p_w, elf)$  plane solves for the stationary level of ethno-linguistic fractionalization ( $elf^*$ ) and  $\tilde{p}_w$  consistent with the two conditions of the maximization problem in (1): (i)  $\tilde{p}_r(w/w_0^c) = \dot{\tilde{p}}_r(w/w_0^c) = 0$ ; and (ii)  $P(\tilde{p}_w) \leq P(p_w)$  for all  $p_w$  and  $\dot{P} = 0$  at  $p_w = \tilde{p}_w$ . Equating (21) and (29) leads to two levels of  $elf^*$  that satisfy the two above conditions:

$$(30) \quad elf_1^* = \frac{(\mathbf{b}_0 + \mathbf{m}) - \sqrt{(\mathbf{b}_0 + \mathbf{m})^2 - 4\mathbf{b}_1 \frac{1}{\mathbf{h}} g^F}}{2\mathbf{b}_1},$$

$$(31) \quad elf_2^* = \frac{(\mathbf{b}_0 + \mathbf{m}) + \sqrt{(\mathbf{b}_0 + \mathbf{m})^2 - 4\mathbf{b}_1 \frac{1}{\mathbf{h}} g^F}}{2\mathbf{b}_1}.$$

From (21), the level of  $elf$  that maximizes  $p_w$  is  $elf^* = \frac{\mathbf{b}_0}{2\mathbf{b}_1}$  and noting that from (29) we

have  $0 \leq \mathbf{m} elf \leq \frac{1}{\mathbf{h}} g^F \leq 1 \Rightarrow \mathbf{m} \leq \frac{1}{elf}$  for all  $elf$ , it can easily be shown that:

$$(32) \quad 0 \leq elf_1^* \leq elf^* \leq elf_2^*.$$

Equations (21), (29)-(32) allow us to draw Figure 2.A, which depicts the equilibrium conditions in the  $(p_w, elf)$  plane. The locus of  $p_w^*$  shows the pairs of  $(p_w, elf)$  which satisfy the condition that: the probability of a fresh war in the current period is zero conditional upon that no war has taken place in the initial period. This is equivalent to stating that the locus of the curve describes the events where the only source for the hazard of war in the current period is provided by old wars with positive duration (i.e. duration that spill over into the current period). On the other hand, the combinations of  $(p_w, elf)$  along the  $p_w^\circ$  curve are consistent with a stationary and minimum level of poverty for given levels of  $elf$ . The two curves intersect at points A and B of Figure 2.A, which means that these are the only two points where both poverty is stationary and the probability of a fresh war is zero. However, the ethnically diverse equilibrium (point B) provides a lower probability of duration than the ethnically homogenous equilibrium (point A). The extent to which this probability is lower depends on the curvature of the two curves. For example, a combination of steep  $p_w^\circ$  and flat  $p_w^*$  curves produces a large probability differential.

This result is almost intuitive, since if the only source for the risk of civil war is provided for by lingering wars that took place in an earlier time, rebels in highly ethnically diverse societies are likely to have harder time sustaining the rebellion, even though it would be easier to start a rebellion in diverse rather than homogeneous societies. Moreover, for given levels of adverse external shocks ( $t$ ) and of political rights (*rights*) the rise in poverty will be larger in ethnically diverse societies, which would require that the risk of war in the latter be lower for poverty to be at its minimum stationary level in both societies. Figure 2.A also shows the predicament of countries with ethnically polarized societies:  $elf$  around  $elf^*$  --

the level which maximizes the probability that the duration of war is positive. In these countries wars will last longer and poverty will be rising (since  $p_w^*$  is larger than  $p_w^\circ$ , the requirements for stationary level of poverty will not be realized). On the other hand, at levels of  $elf$  smaller than  $e\tilde{f}_1$  or larger than  $e\tilde{f}_2$  there will be both a lower risk of war and a declining poverty ( $p_w^*$  is actually lower than  $p_w^\circ$ ) (e.g. points  $A'$  and  $B'$ ).

Table 1 presents the elasticities of  $(e\tilde{f}_1, e\tilde{f}_2, p_w^*, p_w^\circ)$  with respect to  $\{ext, rights, \mathbf{d}(rights^\oplus), g^F\}$  and Figures 2.B-2.F provide some comparative static experiments based on the elasticities of Table 1. Assuming that an index of external intervention is available, an increase in this index (or the presence of external intervention relative to the counterfactual of no intervention)<sup>7</sup> will shift the  $p_w^*$  curve outward, with  $p_w^\circ$  unchanged, this will cause a shift in the equilibrium from  $(A, B)$  to  $(A', B')$ , which corresponds to either much more ethnically homogenous or much more ethnically diverse societies. The extent of ethnic fractionalization consistent with equilibrium will shift from  $(e\tilde{f}_1, e\tilde{f}_2)$  to  $(e\tilde{f}_1', e\tilde{f}_2')$ . Assuming that ethnic cleansing is not feasible, under increased external intervention societies with the original levels of ethnic fractionalization,  $(e\tilde{f}_1, e\tilde{f}_2)$ , will now be part of the ethnic polarization zone and are therefore subject to the gloomy prospects of longer wars and rising poverty.

<sup>7</sup> This will be the appropriate comparison when the available index of external intervention does not allow different degrees of interventions (i.e. the index is a binary measure indicating presence or absence of external interventions). In fact the only available index to my knowledge is of this nature (Regan, 1999).

Fortunately, there are options other than “ethnic cleansing”. Starting with nationally-based economic and political reforms, the model suggests two policy/institutional responses, both operating through the  $p_w^\circ$  curve.

One response to increased external interventions could be by enhancing efforts at reducing poverty through the growth channel. For example a shift from  $\frac{1}{h}g^F$  to  $\frac{1}{h}g^{F'}$  reduces the rate of increase in poverty by  $(\frac{1}{h}g^{F'} - \frac{1}{h}g^F)$  for a given level of  $elf$  and hence will shift the  $p_w^\circ$  curve outwards to a new parallel curve  $p_w^{\circ'}$  (Figure 2.C). For an unchanged  $p_w^*$  curve, the new equilibrium will shift inward to points  $(A', B')$  and the levels of ethnic fractionalization consistent with the new equilibrium also shifts inward to  $(\tilde{elf}'_1, \tilde{elf}'_2)$ . The same qualitative results obtain under improved political rights (from rights to rights'). In this case the  $p_w^\circ$  curves shifts outward to  $p_w^{\circ'}$ , which is flatter than  $p_w^\circ$  but has the same intercept as  $p_w^\circ$  (Figure 2.D). With no change in external interventions, both types of policy/institutional improvements allow societies with the original levels of ethnolinguistic fractionalization  $(\tilde{elf}_1, \tilde{elf}_2)$  (in addition to more homogenous or more diversified societies) to be able to prevent risks of fresh wars from starting as well as reduce poverty. This suggest that for a given *incipient* rise in external intervention, it is theoretically possible to design a package of political and economic reform measures to at *least* restore the original equilibrium of zero probability of a start of a new war and a stationary and minimum level of poverty, given the prevailing probability of persistence of old wars (Figure 2.E).

However, as I pointed out in the introduction to this paper, while higher growth and improved political rights may help prevent poverty from rising or a latent civil conflict from being realized, they are very likely to fail in reducing the probability of prolonged wars once they started. This is because political reforms introduced by a government in a midst of a civil war, are not likely to be taken seriously by the rebels, and therefore, the probability of duration will remain invariant to these unilateral reforms. This suggests an important role for an external agency for addressing this credibility problem. I will assume that the indicator function,  $\mathbf{d}(\text{rights}^{\oplus})$ , is not responsive to subsequent *actual* government improvements in political and individual rights. This assumption is very plausible because it suggests that once the threshold of repression ( $\text{rights}^{\oplus}$ ) was surpassed, any subsequent reforms would lose credibility with the rebels. This is because without some form of commitment to political reforms that the government cannot reverse once the rebels lay down their arms, it is in the best interest of the government to renege (Collier, 1998). This feature of the model is very interesting because it formalizes the potentially very important role that an external (and presumably neutral) agency (such as a supra-national regional body) could play in conflict resolution. Such an agency could either facilitate introduction of credible political reforms by the government, or ensure that reforms introduced unilaterally by the government is credible enough to persuade the rebels to accept peace. In terms of the model parameters this will have the effect of setting  $\mathbf{d}(\dots)$  equal to zero.

Now let us assume that a “positive” action by an external agency takes place, which causes the indicator function  $\mathbf{d}(\dots)$  to be zero. This shifts the  $p_w^*$  curve *inward*, with the  $p_w^{\circ}$  unchanged, the equilibrium shifts from  $(A, B)$  to  $(A', B')$ , which corresponds to either much lower ethnically homogenous or ethnically diverse societies (Figure 2.F).

Correspondingly, the degree of ethnic fractionalization consistent with equilibrium shifts from  $(e\tilde{l}f_1, e\tilde{l}f_2)$  to  $(e\tilde{l}f_1', e\tilde{l}f_2')$ . To the extent that such a regime of a positive external agency is sufficiently effective (as depicted in the Figure), only the most polarized of societies would be subject to high probability of longer wars and rising poverty. Instead, all other societies with  $(elf < e\tilde{l}f_1')$  and  $(elf > e\tilde{l}f_2')$  will enjoy the win-win combination of much lower probability of stalemated wars and declining poverty.

Table 1: Some Comparative Static Elasticities

	<i>Ext</i>	<i>rights</i>	$d(rights^A)$	$g^F$
$\frac{d\tilde{elf}_1}{dx} \cdot \frac{x}{\tilde{elf}_1}$	$-\frac{\mathbf{g}_1}{\mathbf{j}} \cdot ext < 0$	$-\left(\frac{\mathbf{lt}}{\mathbf{ha}}\right) rights < 0$	$\frac{\mathbf{g}_2}{\mathbf{j}} > 0$	$\frac{1}{\mathbf{hj}} \cdot \frac{g^F}{\tilde{elf}_1} > 0$
$\frac{d\tilde{elf}_2}{dx} \cdot \frac{x}{\tilde{elf}_2}$	$\frac{\mathbf{g}_1}{\mathbf{j}} \cdot ext > 0$	$\left(\frac{\mathbf{lt}}{\mathbf{ha}}\right) rights > 0$	$-\frac{\mathbf{g}_2}{\mathbf{j}} < 0$	$\frac{1}{\mathbf{hj}} \cdot \frac{g^F}{\tilde{elf}_2} < 0$
$\frac{dP_w^*}{dx} \Big _{elf=\tilde{elf}}$	$\mathbf{g}_1 \cdot \tilde{elf} > 0$	---	$-\mathbf{g}_2 \tilde{elf} < 0$	---
$\frac{dP_w^\circ}{dx} \Big _{elf=\tilde{elf}}$	---	$-\left(\frac{\mathbf{gt}}{\mathbf{ha}}\right) \tilde{elf} < 0$	---	$\frac{1}{\mathbf{h}} > 0$

Notes:

*Elf*: an index of ethno-linguistic fractionalization;

*Ext*: an indicator of “net” external intervention in favor of the rebel movement;

*Rights*: index of political and individual rights, measure in a descending order ( a high index means poor rights).

$d(\text{rights}^A)$ : equals to 1 if political rights is so poor such that  $\text{rights} > \text{rights}^A$  and equals to zero otherwise

$g^F$ : the component of growth determined by policy and other growth fundamentals (not including the effect due to the risk of civil wars)

$$j = \sqrt{(b_0 - m)^2 - 4b_1 \frac{1}{h} g^F}$$

The elasticity due to  $\delta(\cdot)$  is evaluated as  $\delta$  converges from 1 to 0:  $\frac{d \tilde{elf}}{d d(\dots)} \cdot \frac{d(\dots)}{\tilde{elf}} \Big|_{d_1=1 \rightarrow d_2=0}$  ;

the same also applies for  $\frac{d P_w^*}{d d}$  and  $\frac{d \dot{P}_w}{d d}$ .

Figure 2.A: Ethnolinguistic Fractionalization, Poverty and the Hazard of War

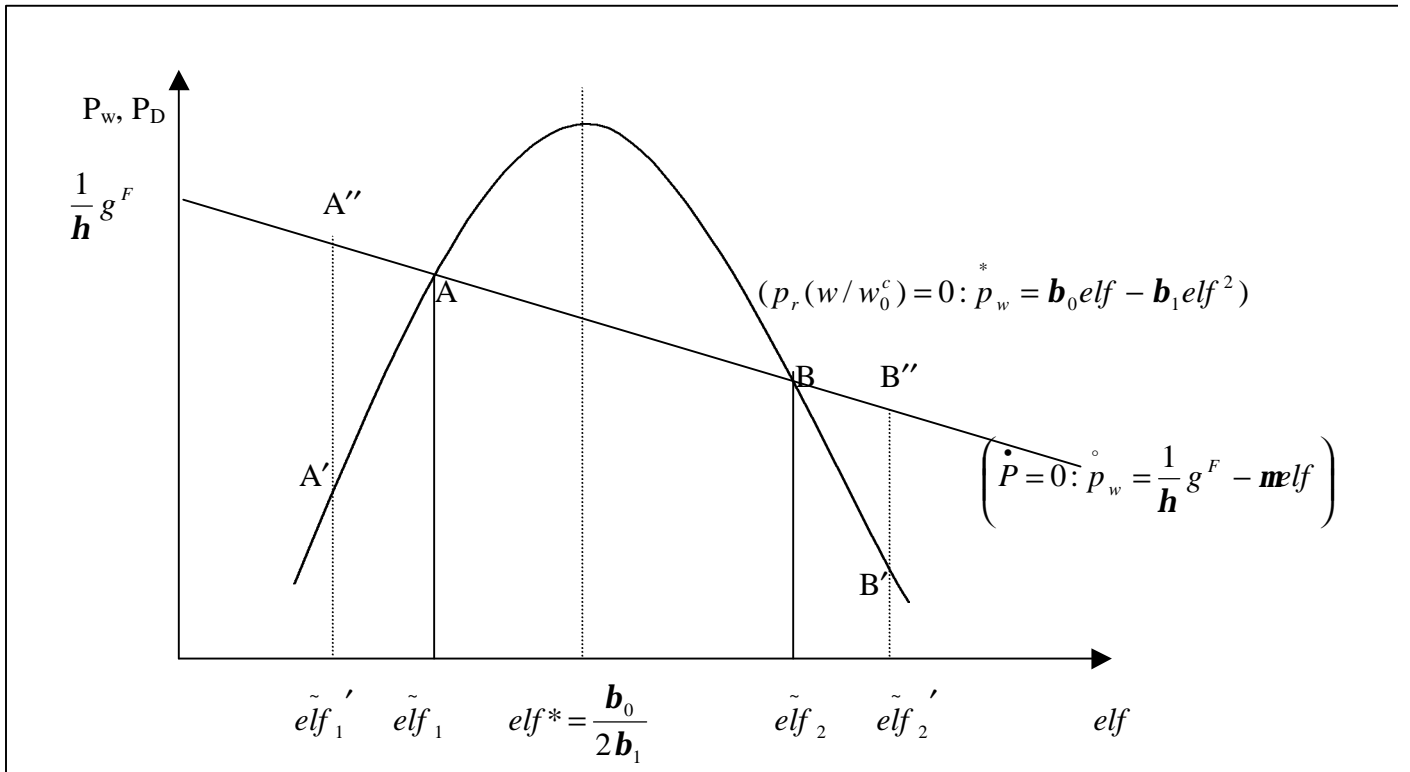


Figure 2.B: The Effects of “External Interventions” in Favor of the Rebels

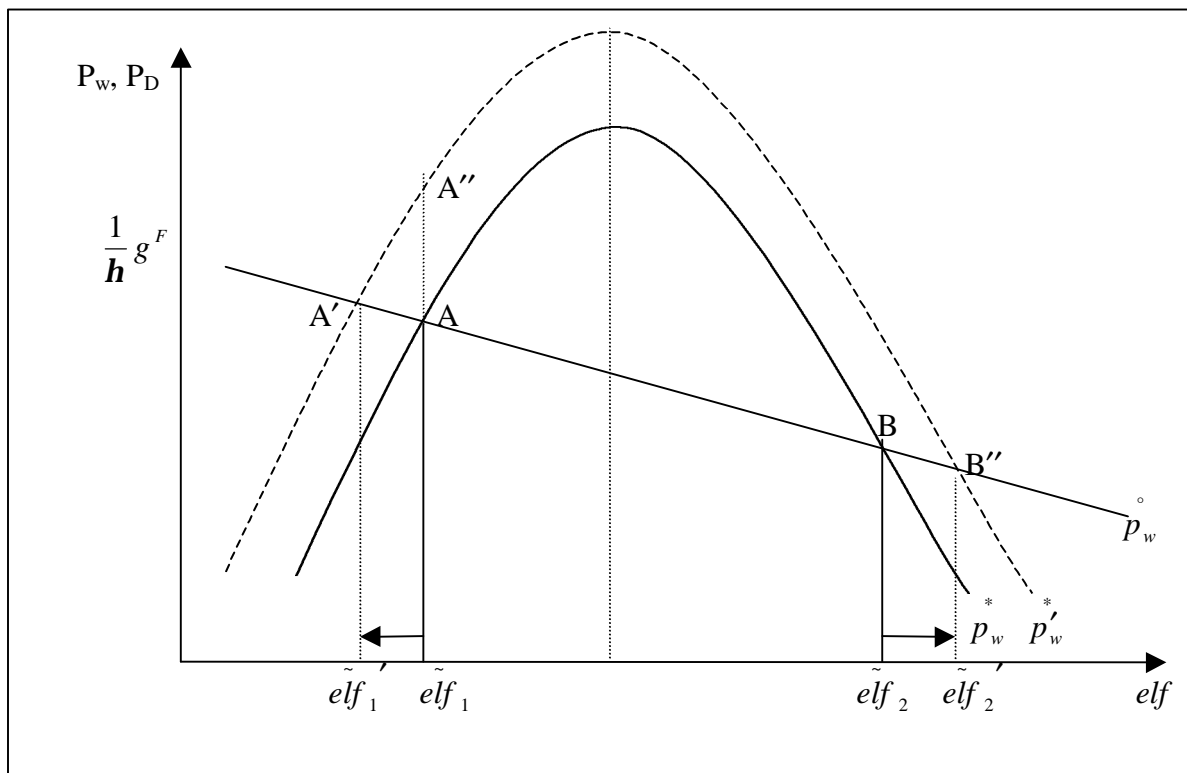


Figure 2.C: Effect of Good Policy through the Growth Channel

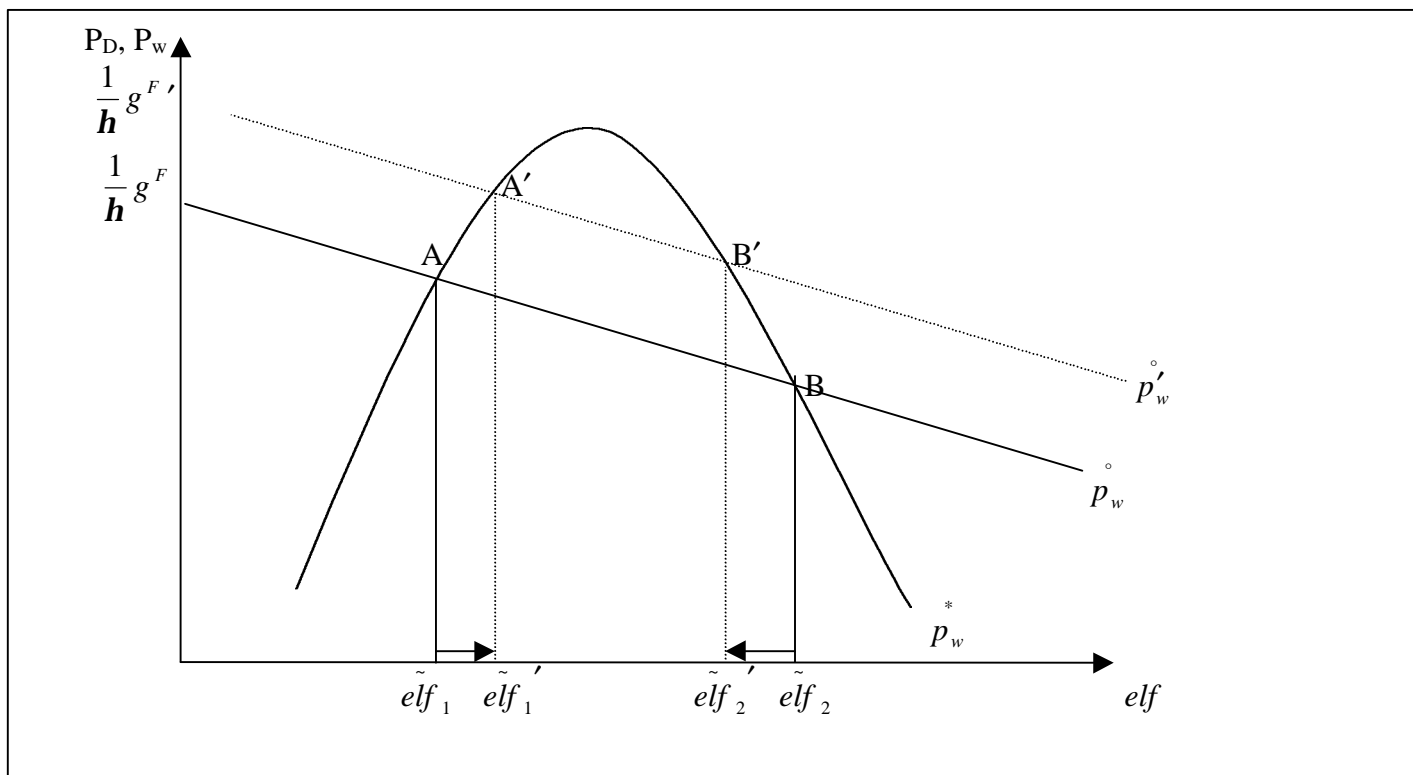




Figure 2.E: The Role of Political Rights and Good Policy in Restoring Original Equilibrium without “Ethnic Cleansing”

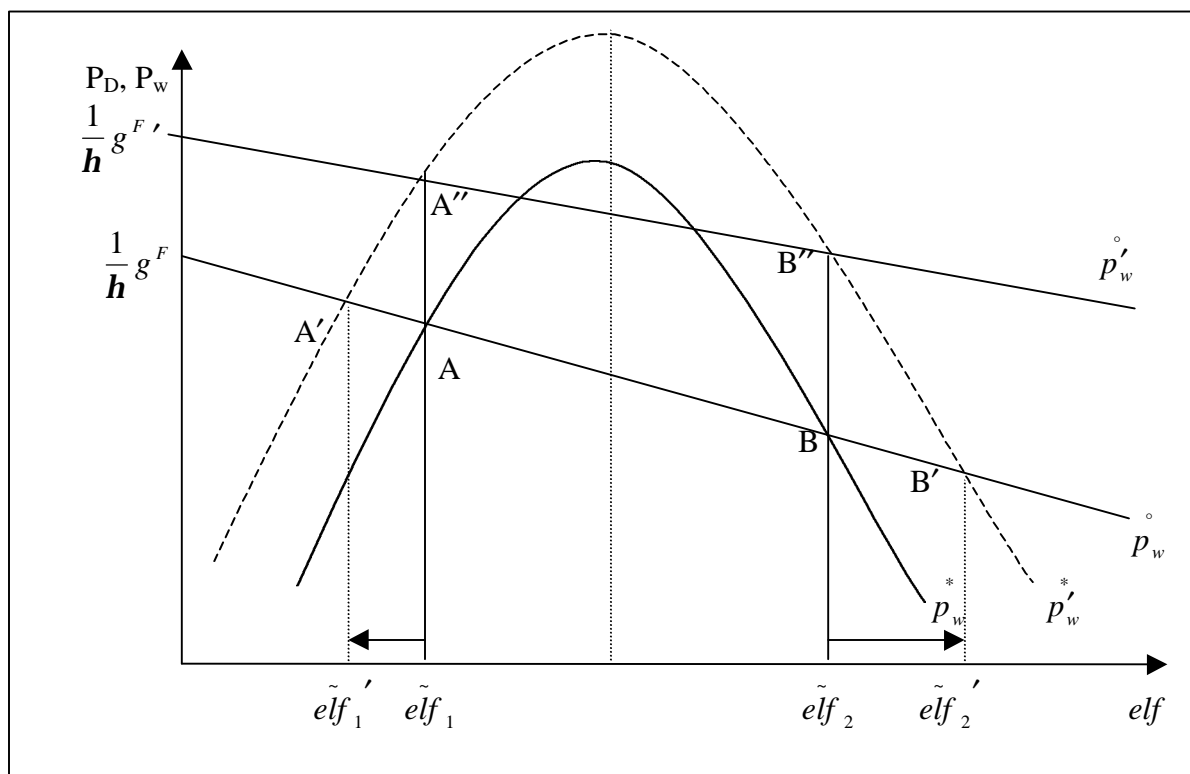
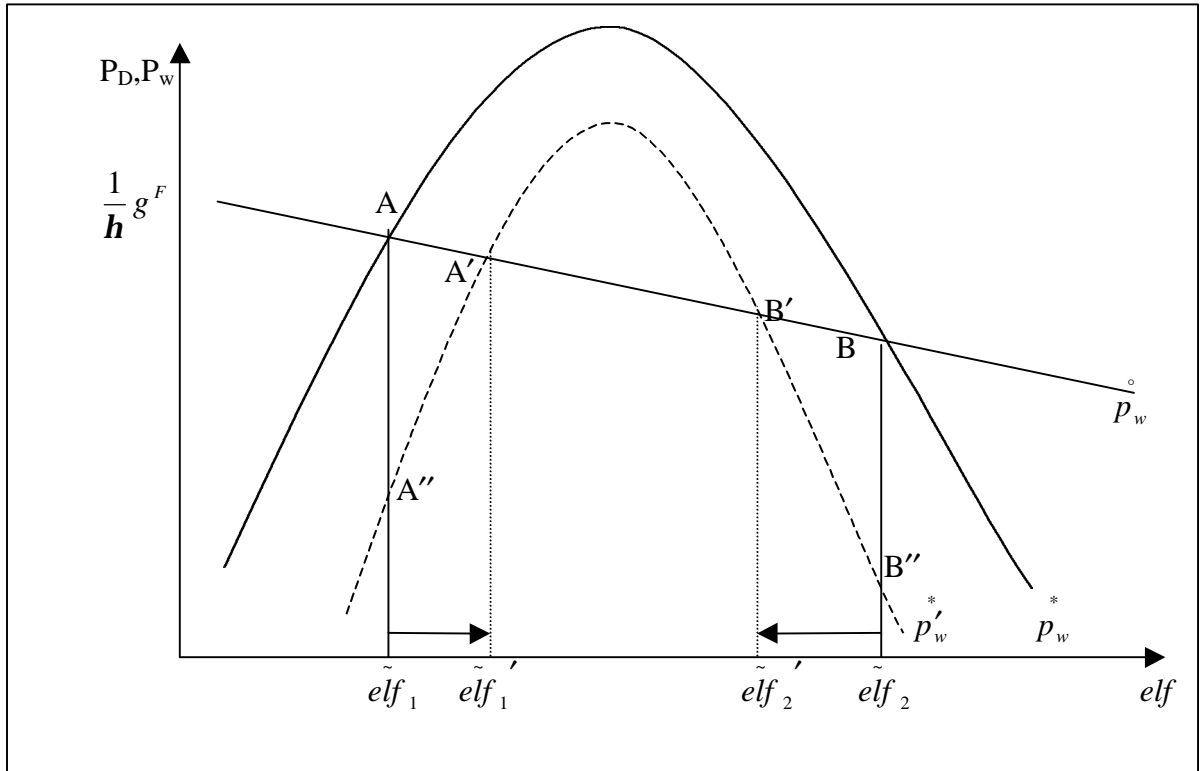


Figure 2.F: The effects of an “External Agency” for Conflict Resolution



### 3. A Strategy for the Empirical Analysis of Poverty and Risk of War

i. *The hazard of war (probability of a new conflict):* using recently constructed data on "external intervention" in addition to existing and newly developed data on incidence of civil wars (see below), a hazard function of occurrence of war could be estimated (ala Collier and his research associates) using equation (4). However, we must extend Collier's framework to account for "external intervention". The latter could be measured as "net" intervention in favor of the rebel movements (which also accounts for external support for the government would), or it could be measured in a more disaggregated form: by target (government or rebels) or mode (economic, military or mixed) (Regan, 1999: chapter 2). This allows computing the probability estimator  $\hat{p}_w$ , which enters in the estimation of the growth and poverty equations (see iii and iv below).

ii. *The probability of duration (persistence) of war (equation 21)*: again estimation of equation (21) could be based on the probability of duration approach of Collier and Hoeffler, using the same data set developed by the two authors or more recent data developed by Regan (1999). Two extensions, however, are required. First, as in the case of the hazard of war analysis we must account for "external intervention". Second, we need to construct the indicator function reflecting the extent to which political and individual rights worsens beyond a certain threshold (*rights*<sup>⊕</sup>).

iii. *Estimation of the growth parameters*: this requires estimating equation (22) to obtain estimates for  $\mathbf{h}$  and  $g^F$ . Again Collier's work on the consequences of civil wars (e.g. Collier, 1999) provides a basis for this analysis. However, to estimate  $g^F$ , Collier empirical growth model must be extended to include other standard policy-based growth fundamentals.

iv. *Estimation of the poverty parameters*: estimates of  $(\mathbf{e}, \mathbf{s}, \mathbf{q}, \mathbf{n}, \mathbf{n}_0)$ , the elasticities from (25) and (26) along with the data on poverty, could be obtained from recent empirical research (Ali and Elbadawi, 1999)<sup>8</sup>. This leaves  $\mathbf{I}$ , the last remaining parameter, which could be estimated by regressing  $\dot{P} - (\hat{\mathbf{a}}\hat{\mathbf{h}} \hat{p}_w - \hat{\mathbf{a}} \hat{g}^F)$  on  $t \text{ elf} * \text{rights}$ . I follow Rodrik (1998) by constructing the measure of external shock in the initial period as the standard deviation of the first log-difference of the terms of trade multiplied by the average share of total trade in GDP in the initial period. This is meant to capture the unexpected component of the volatility of the streams of income associated with foreign trade<sup>9</sup>.

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<sup>8</sup> See also Ali (1998), Ravallion (1998), Chen, Datt and Ravallion (1994), among others.

<sup>9</sup> Assuming that the terms of trade follow a random walk (possibly with a drift) Rodrik (1998a) shows that this measure is the theoretically appropriate measure of external volatility. Moreover, Rodrik (1998) argues that the fact that this measure treats positive terms-of-trade shocks identically as negative shocks is justified, since positive income shocks could also trigger the same kind of distributional conflicts that obtain under negative shocks.

v. *Quantifying the comparative static experiments:* with the estimates of the above parameters, levels of elf consistent with equilibrium could be estimated as well as the predicted levels of poverty and probability of persistence of civil wars at various levels of elf. This allows testing the predictive power of the model by comparing actual to predicted outcome for groupings of countries with ethnically homogeneous, diverse, or polarized societies. The empirical analysis allows simulating the comparative static effects of "external interventions"; and the extent to which they could be ameliorated by improved national economic performance (higher growth), or national political reforms (improved political rights). The analysis could also obviate the limitations of these *unilateral* and essentially *national* measures, which could be addressed if an "external agency" is involved as well. The effect of the latter could be simulated by setting the indicator function (*rights*<sup>⊕</sup>) to zero.

Data Issues and Some Stylized Facts about Conflicts and External Interventions:

1. *Civil wars and external interventions:* Regan (1999) develops a new data set that contains internally consistent indexes for intra-state conflicts as well as for external interventions. This data set, which extends up to 1944, is obviously the most appropriate for the kind of empirical analysis proposed by this paper. Unlike most well known definitions of conflicts that requires 1000 casualties for a conflict to qualify as a civil war (e.g. Singer and Small, 1994), Regan defines intra-state conflict as "armed, sustained combat between groups within state boundaries in which there are at least 200 fatalities." Regan argues that by lowering the threshold to less than a thousand this definition captures the seriousness of the conflict, yet the threshold is high enough to exclude events such as "bloodless" coups, riots and demonstrations.

Regan's index of external intervention is a binary indicator on whether or not interventions have taken place in a given conflict. However, the index is rich enough to

account for modes of interventions (military, economic, mixed) and target of interventions (government, opposition). In addition, this index disaggregates intervening third parties by country, and by whether the intervention is unilateral or of multilateral nature.

Some of the sources that Regan used to develop his data set are among the well known databases in this literature: Correlates of Civil War database (Singer and Small, 1994), the Annual Yearbook of the Stockholm International Peace Research Institute (SIPRI), Keesings Contemporary Archives , The New York Times , and the Minorities at Risk Project. In addition he cites Herbert Tillema (1991), Person and Baumann (1993) and a host of case-specific historical documents as sources for the construction of the "external interventions" indexes.

2. *Some Stylized facts:* (see Figures 3.A-3.D, Sources: Tables and text material of Regan, 1999)

*Figure 3.A:*

- the 1960s represent a beginning of a new regime of increased intra-state conflicts, following independence of many states in the developing world, especially in Sub-Saharan Africa;
- in the 1990s the frequency of civil wars over the 1960s –8s remains the same, with new wars caused by the collapse of the former Soviet Union.

*Figure 3.B:*

- Africa and Asia are the most conflict-ridden regions of the world, with Europe being the least affected and the Middle East and the Americas in the middle.

*Figure 3.C:*

- Out of 138 intra-state conflicts since 1944, 89 attracted external interventions by at least one external third party;
- Within the 89 cases, if repeated interventions were taken into account the total number of interventions amounts to 190, of which 76 were accounted for by major powers;
- The countries with the dubious distinction in terms of the highest number of interventions are: USA (35), Former USSR/Russia (16), France (10), UK (9), China (6) and Cuba (5);
- Out of the 190 interventions, only 57 of which have led to stoppage of fighting.

*Figure 3.D:*

- Subject to some qualifications, external interventions appear to lead to lengthening of duration of conflicts: mean duration of all conflicts is about 16 years; those conflicts with external interventions, which were eventually resolved have a mean duration of nine years; while those conflicts, which were eventually resolved, but without external interventions have a mean duration of only 1.5 years.
- The main qualification is that, a definitive statement, requires accounting for the possibility that external interventions may usually happen in conflicts which also tend to have longer duration.

Figure 3.A: No. of conflicts Per Period

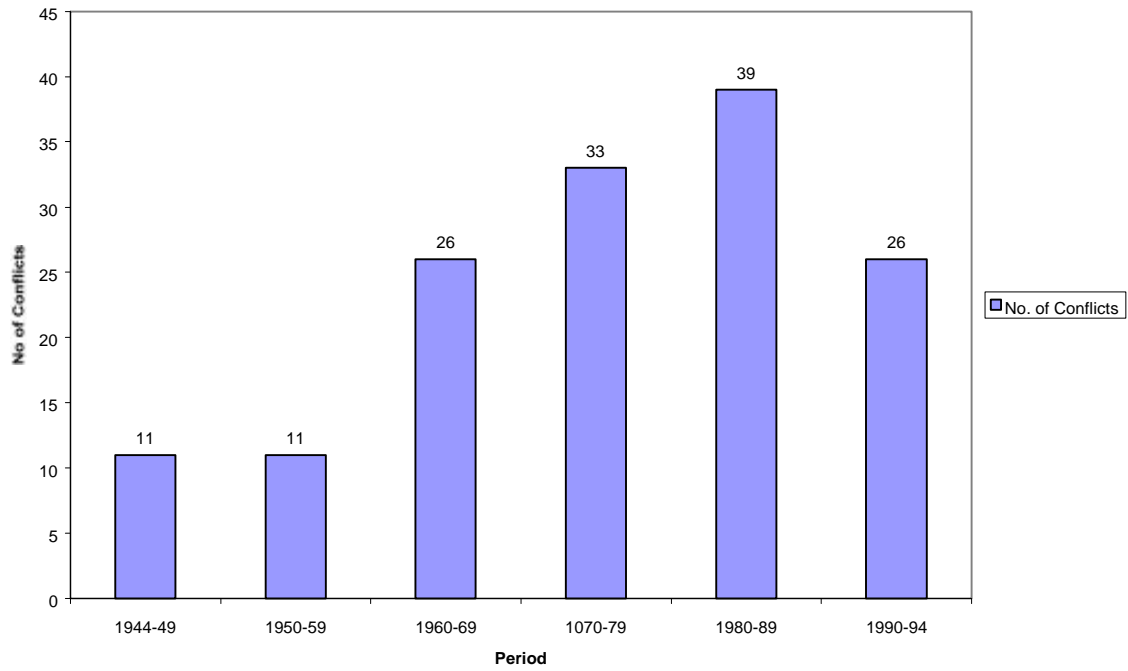


Figure 3.B: Frequency of Intra-State Conflicts by Region

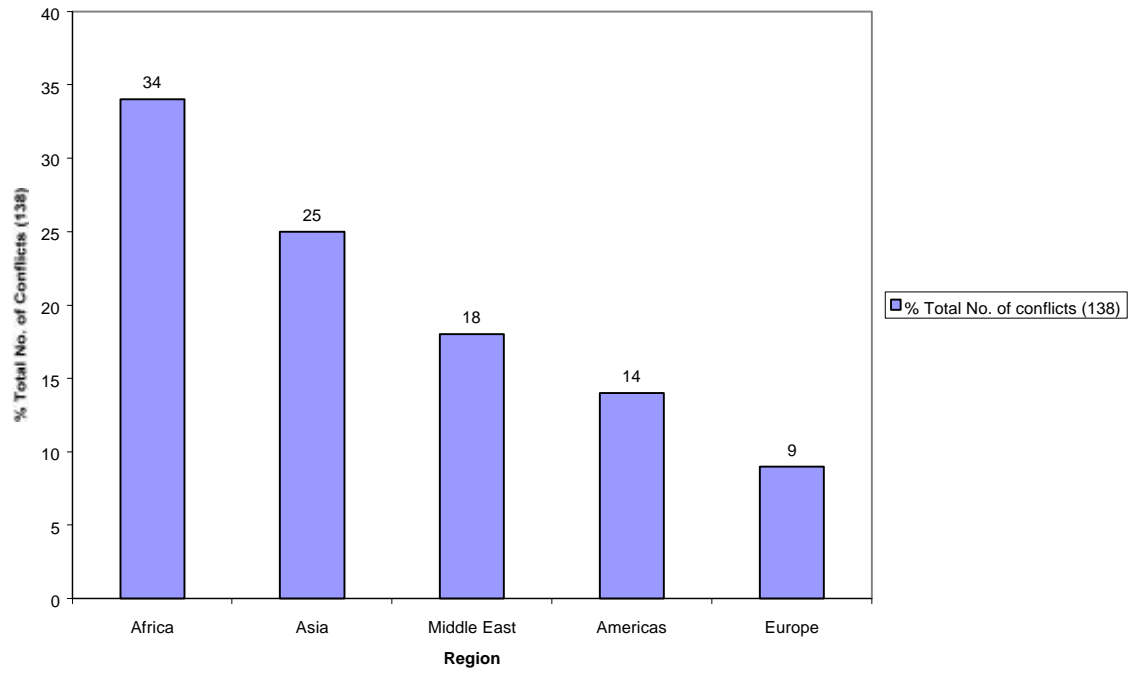


Figure 3.C: Intra-state Conflicts and Interventions

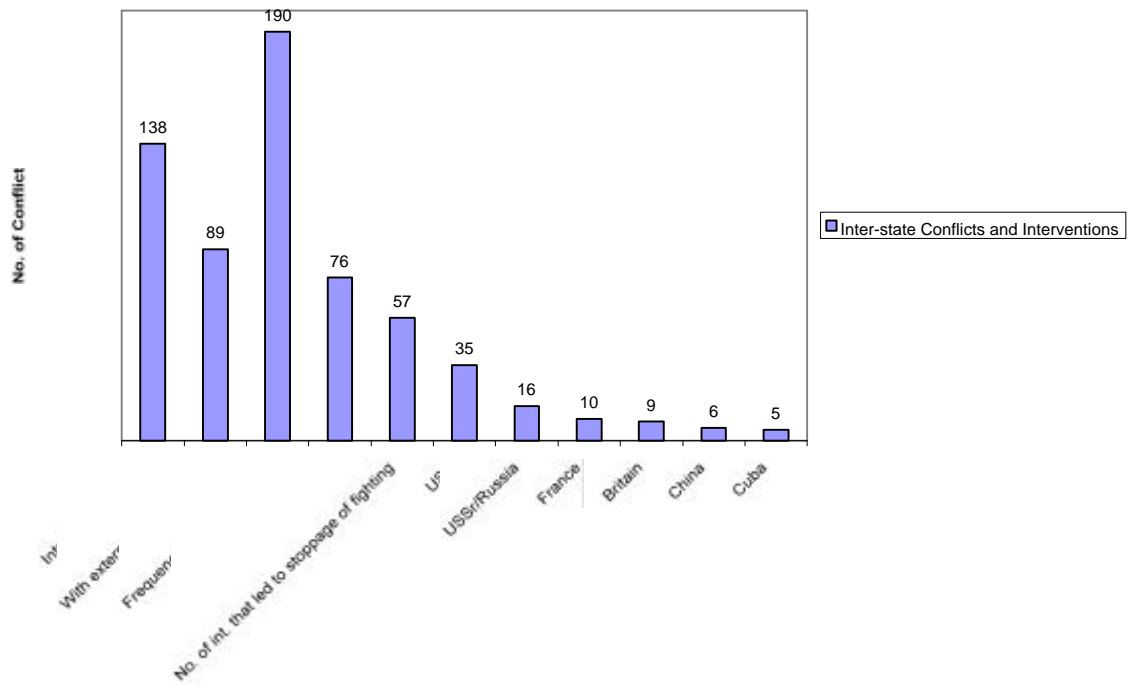
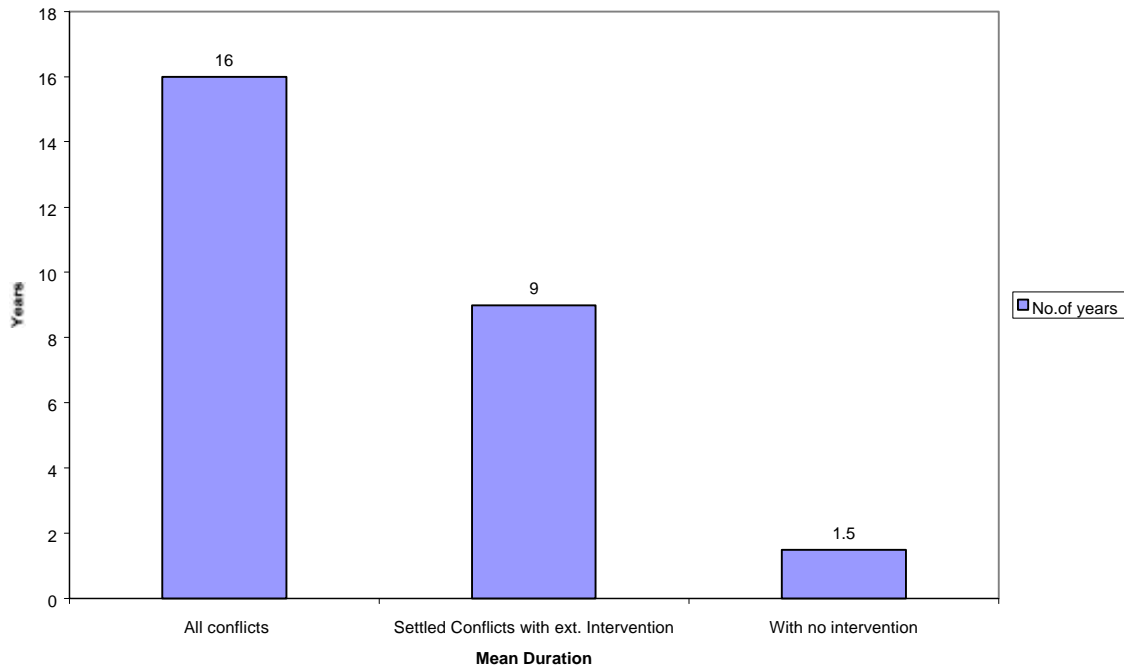


Figure 3.D: Interventions and Duration



#### 4. Conclusions

The moral of this paper's analysis, including the comparative static experiments, is that: countries with less than almost perfectly ethnically homogeneous or ethnically diverse societies, which have so far escaped incidence of civil wars, should seriously mind their Ps (political rights and poverty standards) if they want to avoid the prospects of future civil wars. Moreover, they should be even more concerned about the prospects of future civil wars if potential rebel movements are likely to enjoy external support. Finally, to the extent that they are effective and willing, supra-national agencies could play an important role in reducing the likelihood of prolonged civil wars and in enhancing serious national programs for reducing poverty.



