



# Characterizing Conflict Forms

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## Abstract

This paper presents a model in which two groups in society are engaged in strategic interaction. Privileged members of society have the opportunity to allocate resources either to their own productive capacity, or to enhance the productive capacity of the disadvantaged. Redistribution to the disadvantaged can increase the productive capacity of society, but comes at the cost of rising political aspirations of the poor, which erodes the power of the rich. The paper derives conditions under which (a) the rich will redistribute to the point of equality with the poor; (b) conditions under which the disadvantaged face genocide; as well as (c) the range of intermediate redistributive activity likely to be employed by the privileged. Examination of empirical evidence suggests that the model generalizes across the experience of a panel of 102 countries, over the 1960-2000 period.

Keywords: conflict, human capital, productivity, South Africa, Sri Lanka.

JEL Codes: O43; O15; O11.

## 1 Introduction

Most theories of conflict posit that resource transfers from elites to the disadvantaged represent an attempt to purchase social stability by foregoing some of the benefits of privilege. This paper suggests that such resource transfers carry the reverse benefits: a gain in the productive resources available to the elite, but at the cost of a loss in political influence and hence control over societies' resources and direction.

The notion that resource transfers are a means of buying political peace by elites is relatively wide-spread in the literature.<sup>1</sup> That such transfers, specifically human capital provision to the disadvantaged, might be motivated by productivity gains aligned with the self-interest of elites, while rarer, can also be identified in the literature.<sup>2</sup> But that the productivity gains of human capital transfers to the disadvantaged will be bought at the expense of a loss of influence by the elite and that it may be rational to forego influence for the sake of productive gain, to the best of our knowledge does not find expression in the literature.

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<sup>1</sup>See for instance Acemoglu and Robinson (2000) and Bertocchi and Spagat (2004).

<sup>2</sup>See for instance Bourguignon and Verdier (2000a) and Galor and Moav (2004).

In this paper we are explicitly concerned with the characterization of conflict forms. Specifically, what might come to account for the very wide range of conflict that is empirically observable, often with surprising dynamic developments? Societies that begin under auspices that suggest cataclysm reach peaceful accommodation; others that should by all accounts bask in peace find themselves mired in long term blood-letting.

We begin by sketching our motivation in constructing the theoretical model of the paper by considering two contrasting case studies - South Africa and Sri Lanka. The two case studies are useful in suggesting the core features of our model - the heart of which is the trade-off between the productivity gains for society and rising political aspirations of the disadvantaged associated with human capital transfers to them by social elites. The model allows a wide range of feasible conflict forms, from complete accommodation to complete annihilation to emerge, and identifies the circumstances associated with each. The paper concludes by testing the central mechanisms of the model, as well as its core predictions against a large cross country panel data set.

## 1.1 Motivation

In 1985 South Africa appeared well on the way to political cataclysm. The then South African President delivered a speech in August renouncing the opportunity of reforming the Apartheid state. By 1986 South Africa was in a state of emergency, with state repression in the form of detentions without trial, extrajudicial killings, including other measures attempting to counter unprecedented levels of civil unrest in the schooling system, black residential areas, and in politically motivated industrial unrest.

Yet in October 1990, a new South African President released black political prisoners, unbanned black opposition parties that had been outlawed for 30 years, repealed Apartheid laws, and placed a moratorium on state repression. April 1994 saw the first fully democratic elections in South Africa, conducted essentially peacefully, leading to the inauguration of the first black President under one of the worlds' most liberal constitutions.

Unlike South Africa, Sri Lanka is currently mired in conflict.<sup>3</sup> The conflict waged in the North and East of the country is between the minority Tamils and majority Sinhalese. At first glance the hostilities between the two communities may be classed as an ethnic conflict. However, an important feature of Sri Lanka's conflict is the historical development of conflict *between* as well as *within* communities, giving birth to a twin civil war (Abeyratne 2004, Bardhan 1997, Stewart et. al. 2001, Stewart, and O'Sullivan 1999). Conflict is present not only between the Sinhalese and Tamils, but also within the Sinhalese community, culminating in an armed struggle in the 1980s. This conflict, which has been suppressed and is now non-violent, still exists.<sup>4</sup> The implication is that the current conflict is not simply rooted in differences in ethnicity.<sup>5</sup>

The South African case is a story of remarkable transformation - 'miraculous' in the eyes of many commentators - while the Sri Lankan case is just another example of a developing economy

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<sup>3</sup>For definitional issues surrounding the term "conflict" see Rule (1988).

<sup>4</sup>In 1971, there emerged an insurrection, organized by the youth of the Sinhala community to capture state power. The Sinhala community is the main ethnic group of the country accounting for nearly three-fourths of the total population. The Sinhala community is concentrated largely in the southern part of the country. The militant organization of the Sinhala youth, known as the JVP (Janatha Vimukthi Peramuna, or People's Liberation Front), after its first aborted attempt, dissolved temporarily. The JVP arose again by the early 1980s and made their second attempt launching an armed struggle from 1986 to 1989 to capture state power. The JVP continues as an important political force.

<sup>5</sup>Abeyratne (2004) suggests that "ethnicity could well be only a mobilization device rather than the root cause" of conflict. The intra- and inter-ethnic characteristics of conflict in Sri Lanka raises the question of how the elite is constituted in Sri Lanka. The elite in South Africa were (and to some extent still are) defined by race. In Sri Lanka it is not so simple to define the privileged. The privileged in Sri Lanka (post-independence) - were the aristocratic class - the so-called mandarins. This class of indigenous Sri Lankans occupied powerful positions in the administration under the colonial government - see Jayawardena (2002) and Abeyratne (2004).

struggling with violent political conflict.

Might one be able to explain why one country chose peace while the other chose war? If so, what are these factors that result in divergent political outcomes for countries along their developmental trajectory? Are there lessons to be learnt from the experiences of these countries?

## 1.2 The Tasks of this Paper

In this paper we present a new theoretical framework to provide a characterization of conflict which might shed light on the divergent cases of South Africa and Sri Lanka. The model explicitly rests on the expectation that the strategic interaction between social groups is characterized by a *tension* between antagonistic conflict over resources, and the possibility of increasing the size of the social pie through an productively optimal distribution of resources between privileged and disadvantaged. Required of the model is the ability to account for varying degrees of intensity of conflict, from potential eradication (suppression) to transfer of power, as in South Africa in 1994. Perpetual conflict at varying degrees of intensity (as experienced in Sri Lanka) is also rendered feasible.

As a mark of success in the modeling exercise, we are therefore looking for two distinct features to emerge:

- That conflict can cover a wide range of feasible intensities, from eradication to complete accommodation of opponents.
- That the strategic interaction between agents be characterized by a trade-off between an enhancement of productive capacity and rising political aspirations associated with resource transfers from the privileged to the disadvantaged.

The paper is structured as follows. Section 2 introduces the structural features of our model. Section 3 presents the core results, section 4 considers some robustness checks of the results, and section 5 presents empirical results that generalize our findings to two large panels of data. Section 6 provides some reflections on how our model compares with other models of conflict, and gives an indication of why our may fit the evidence more robustly, while section 7 concludes.

## 2 Foundations of the Model

Consider a society with two groups of individuals - the *privileged* ( $P$ ) and the *disadvantaged* ( $D$ ) where individuals belonging to a particular segment of society are assumed to be homogenous. Assuming no population growth, let the total population in the society be given by  $L = L^P + L^D$  where  $L^P$  and  $L^D$  denote the population of the privileged and disadvantaged segments of society, respectively.

Let  $\pi$  represent the ratio of the population of the disadvantaged to the privileged of society:

$$0 < \pi = \left( \frac{L^D}{L^P} \right) < \infty \quad (1)$$

It follows that the population shares of the privileged and the disadvantaged are then  $1/(1 + \pi)$  and  $\pi/(1 + \pi)$  respectively.

Segmentation of society (privileged versus disadvantaged) is based on the level of *per capita* human capital each section of society holds. Definitionally the privileged are endowed with more human capital *per capita* ( $\bar{h}^P$ ) than the disadvantaged segment ( $\bar{h}^D$ ) of society ( $\bar{h}^P > \bar{h}^D > 0$ ).

The privileged have the option to reallocate human capital between the two segments of society. This implies that the representative individual in the privileged segment of society may allocate (or expropriate) a proportion  $\delta$  of their human capital endowment  $\bar{h}^P$  to (from) the disadvantaged segment. After redistribution privileged individuals thus hold  $(1 - \delta)\bar{h}^P > 0$  human capital, disadvantaged individuals  $(\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P) > 0$ . The  $\delta$  constitutes a proportional tax *either* on the human capital

resources available to the privileged section of society ( $\delta > 0$ ) or on the disadvantaged segment of society ( $\delta < 0$ ). Redistribution can be thought of as policies increasing expenditure on schooling, training and reskilling of the disadvantaged; extraction as policies that tax the disadvantaged in order to allocate resources to the privileged.

Using the following definition of aggregate human capital for the entire country,  $H = H^P + H^D = [L^P(1 - \delta)h^P + L^D(h^D + \frac{\delta}{\pi}h^P)]$ , average per capita human capital ( $h$ ) for the entire society is given by:

$$0 < (\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P) < h = \frac{\bar{h}^P + \pi\bar{h}^D}{(1 + \pi)} < (1 - \delta)\bar{h}^P \quad (2)$$

Average per capital human capital for the entire society constitutes a poverty line that differentiates the "haves" from the "have nots" in terms of their respective holdings of human capital.

Given only that the privileged do not relinquish privilege (in the sense that they preclude  $\bar{h}^P < \bar{h}^D$ ):

$$-\pi \left( \frac{\bar{h}^D}{\bar{h}^P} \right) < \delta < \left( \frac{\pi}{1 + \pi} \right) \left( 1 - \frac{\bar{h}^D}{\bar{h}^P} \right) < 1 \quad (3)$$

The upper bound value of  $\delta$  is given by the point at which redistribution reaches a level which reverses the relative endowment of human capital (thereby reversing privileged status), while the lower bound value is given by "complete" extraction of resources by the privileged from the disadvantaged.

Crucial to the model is a concept of power. In one dimension the power of the privileged is absolute: they are sole arbiters of  $\delta$ , which is their core choice variable. But there is a further manifestation of power, which rests in the ability of the privileged to appropriate a proportion,  $\omega$ , of the total output produced by the society. This proportion, which for the remainder of the paper is what we refer to as the power of the privileged, is determined by the endowment of human capital held by the privileged *relative* to the social average, denoted  $r$ . Equally, however, the disadvantaged are not passive. Specifically, any given level of relative human capital endowment held by the disadvantaged relative to the privileged, denoted  $\phi$ , translates into an *aspiration* to exercise greater discretion over the allocation of resources in society. Aspirations might be thought of as disadvantaged individuals becoming more knowledgeable about rights of resistance to any prospective extraction, and being able to use their skills (human capital) to address collective action problems in resistance more effectively. In effect, the privileged are characterized by the fact that they exercise choice over the level of redistribution or extraction ( $\delta$ ). However in allocating more human capital to the disadvantaged, they awake aspirations in the disadvantaged to power. The implication of this conception of power is that the relative distribution of human capital between the two sections of society matters as it determines the intensity of distributional conflict between the two sections of society.

Formally, let  $\omega$  represent the privileged person's ability to claim a proportion of their own output (property rights) and their ability to acquire (extract) the output of the disadvantaged individual's output.<sup>6</sup> Then:

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<sup>6</sup>Symmetrically,  $(1 - \omega)$  represents the power held by a representative agent belonging to the disadvantaged segment of society.

$$\omega = r^\phi \quad (4)$$

$$\text{where } r = \frac{(1-\delta)H^P}{H} = \frac{(1-\delta)H^P}{(H^P + H^D)} = \frac{(1-\delta)\bar{h}^P}{(\bar{h}^P + \pi\bar{h}^D)} \quad (5)$$

$$\text{and } \phi = \frac{H^D}{H^P} = \left[ \frac{\pi\bar{h}^D + \delta\bar{h}^P}{(1-\delta)\bar{h}^P} \right] \quad (6)$$

Given that both  $r$  and  $\phi$  are defined by the relative holdings of human capital by privileged and disadvantaged, it follows that both the aspirations of the disadvantaged, as well as the power of the privileged depends on a *distance measure* between privileged and disadvantaged. It is worth noting that our measures of social distance have affinity with measures of distance used in poverty studies - most notably those of Sen - though such affinity is incomplete.<sup>7</sup>

Note further that power ( $\omega$ ) decreases with respect to rising aspirations ( $\phi$ ). The  $\phi$  parameter takes into account the relative number of human capital disadvantaged individuals and the extent of their poverty (relative endowment of human capital). It follows that  $\phi > 0$  and  $0 < \omega < 1$ ,  $\forall -\pi \left( \frac{\bar{h}^D}{\bar{h}^P} \right) < \delta < \left( \frac{\pi}{1+\pi} \right) \left( 1 - \frac{\bar{h}^D}{\bar{h}^P} \right)$ ,  $\pi > 0$  and  $\bar{h}^P > \bar{h}^D > 0$ .<sup>8</sup> Figures 1 and 2 illustrate variation in  $\omega$ ,  $\phi$ , as the ratio of the disadvantaged to privileged, and the ratio of privileged to disadvantaged per capita human capital changes respectively.

INSERT FIGURES 1 AND 2 ABOUT HERE.

For the decision problem of the privileged, we define the utility function for the representative privileged individual as:

$$U^P = \alpha \ln(c^P) + \beta \ln(c^D); \quad \alpha + \beta = 1 \quad (7)$$

where  $c^P, c^D$  denotes the privileged and disadvantaged per capita consumption respectively.

It remains to characterize the productive base of the economy. We distinguish between separable and interdependent production.<sup>9</sup> We associate the distinction with two forms of empirically observable production - which we term agrarian and industrial. Under agrarian production, production units are separable, and can effectively attain sufficiency independently of one another at the expense of specialization. Industrial production, by contrast, is defined as production under specialization, such that inputs into production are rendered complements, and reliant on trade with one another rather than self-sufficiency. A stylized example would be two villages, which

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<sup>7</sup>Formally the relation is easy to demonstrate. Equation (6) is a reparameterization of the inverse of Sen's Poverty Index. Sen's Poverty Index may be represented in two forms:  $PSen1 = H \times I$  or  $PSen2 = H \times [I + (1-I)G]$ , where  $H = \left( \frac{L^D}{L^D + L^P} \right) = \left( \frac{\pi}{1+\pi} \right)$ ,  $G$  is the Gini coefficient and  $I$  measures the income gap ratio - the average income gap of the poor from the poverty line,  $h = \frac{\bar{h}^P + \pi\bar{h}^D}{(1+\pi)}$ , taken as a ratio of  $h$ , such that  $I = \left( 1 - \frac{\bar{h}^D}{h} \right)$ . The latter measure of the income gap is used when the number of poor in the country is relatively large. It follows that there exists a reparameterization such that  $\phi = \left[ \frac{\pi\bar{h}^D + \delta\bar{h}^P}{(1-\delta)\bar{h}^P} \right] = \frac{\bar{H}^D}{\bar{H}^P} \approx \frac{1}{PSen1} \approx \frac{1}{PSen2}$ . However the affinity between our social distance measures and inequality measures should not be overstated. True inequality measures rely on full intradistributional comparisons (famously in the Gini coefficient for instance). A simple measure of distance between privileged and disadvantaged lacks full intradistributional information, and appropriately so. Since our concern is with the power of the elite of society and the level of aspirations of the disadvantaged, it is the social distance between the elite and disadvantaged that is the source of privilege and the strength of aspirations of the poor. While the distinction is of no great material importance in a theory that contains only two sections of the population, it is likely to be significant in any empirical realization of the model, since both elites and the disadvantaged are unlikely to constitute the entire population of a society.

<sup>8</sup>We also note that  $\partial\phi/\partial\bar{h}^P < 0$ ,  $\partial\phi/\partial\delta > 0$ ,  $\partial\phi/\partial\bar{h}^D > 0$  and  $\partial\phi/\partial\pi > 0$ . Symmetrically,  $\partial\omega/\partial\bar{h}^P > 0$ ,  $\partial\omega/\partial\delta < 0$ ,  $\partial\omega/\partial\bar{h}^D < 0$  and  $\partial\omega/\partial\pi < 0$ .

<sup>9</sup>Note that Hirschleifer (1995) employs only separable production, and ignores the possibility of interdependent production.

under agrarian production would produce both steel and corn, while under industrial production comparative advantage would dictate the specialization of each village into the production of one of the two goods, with trade generating the exchange required by both for survival.

## 2.1 Independent Production

We use a simple growth model with human capital as the only factor of production. Assume that the production of the privileged and disadvantaged societies are *not* interdependent. We obtain this feature by treating the production of the privileged and the disadvantaged as additively separable:

$$Y = A \left\{ L^P [(1 - \delta) \bar{h}^P]^\theta + L^D \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\theta \right\} \quad (8)$$

where  $Y$  denotes total output,  $A$  represents technology and  $\theta$  represents returns to human capital, such that:

$$\theta = \left\{ \begin{array}{l} > 1 \text{ represents increasing returns} \\ = 1 \text{ represents constant returns} \\ < 1 \text{ represents decreasing returns} \end{array} \right\} \quad (9)$$

Technology is symmetrical across the two groups. The groups differ only in their resource endowment, here human capital.

Let  $y^P$ ,  $y^D$  represent the per capita output of the privileged and disadvantaged sections of society respectively. Hence:

$$\begin{aligned} L^P y^P &= \omega Y \\ \implies y^P &= \omega A \left\{ [(1 - \delta) \bar{h}^P]^\theta + \pi \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\theta \right\} \end{aligned} \quad (10)$$

$$\begin{aligned} L^D y^D &= (1 - \omega) Y \\ \implies y^D &= (1 - \omega) A \left\{ \left( \frac{1}{\pi} \right) [(1 - \delta) \bar{h}^P]^\theta + \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\theta \right\} \end{aligned} \quad (11)$$

with average output of the entire economy of:

$$y = \frac{(y^P + \pi y^D)}{(1 + \pi)} \quad (12)$$

The privileged maximize utility as specified in equation (7). Assume for the sake of simplicity that  $\beta = 0$ , so that the privileged care only about themselves, and not about the disadvantaged in their objective function. We generalize this assumption in section 4. Under these conditions the problem facing the representative privileged agent is:

$$Max_{\delta} \ln(c^P) \quad (13)$$

subject to:

$$c^P = \omega A \left\{ [(1 - \delta) \bar{h}^P]^\theta + \pi \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\theta \right\} = y^P \quad (14)$$

with the first order condition:

$$A\theta (1 - \delta) \bar{h}^P \left\{ \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^{\theta-1} - [(1 - \delta) \bar{h}^P]^{\theta-1} \right\} = k \frac{y^P}{\omega} \quad (15)$$

where  $k = \phi + (1 + \phi) \ln \left[ \frac{(\bar{h}^P + \pi \bar{h}^D)}{(1-\delta)\bar{h}^P} \right] \geq 0$ .

## 2.2 Interdependent Production

Continuing to use a simple growth model with human capital as the only factor of production, we now assume that the privileged and disadvantaged are dependent on one another, represented by the interaction of their respective productions. We obtain this feature by using a Cobb-Douglas form of the production function for the entire society:

$$Y = A \left\{ L^P [(1 - \delta) \bar{h}^P]^\gamma \right\} \left\{ L^D \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\mu \right\} \quad (16)$$

where notation is defined as above and,  $\gamma$  and  $\mu$  represent the elasticity of output with respect to human capital in the privileged and disadvantaged segments of society, respectively. Immediately:

$$(\gamma + \mu) = \left\{ \begin{array}{l} > 1 \text{ represents increasing returns} \\ = 1 \text{ represents constant returns} \\ < 1 \text{ represents decreasing returns} \end{array} \right\} \quad (17)$$

Per capita output of the privileged and disadvantaged sections of society is now given by:<sup>10</sup>

$$y^P = \omega A \pi \left\{ [(1 - \delta) \bar{h}^P]^\gamma \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\mu \right\} \quad (18)$$

$$y^D = (1 - \omega) A \left\{ [(1 - \delta) \bar{h}^P]^\gamma \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\mu \right\} \quad (19)$$

The decision problem defined by (13) is constrained by:

$$c^P = \omega A \pi \left\{ [(1 - \delta) \bar{h}^P]^\gamma \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^\mu \right\} = y^P \quad (20)$$

with relevant first order condition:

$$(1 - \delta) \bar{h}^P \left\{ \left( \frac{\mu}{\pi} \right) \left[ \bar{h}^D + \frac{\delta}{\pi} \bar{h}^P \right]^{-1} - \gamma \left[ (1 - \delta) \bar{h}^P \right]^{-1} \right\} = k \quad (21)$$

where  $k$  is defined as for (15).

## 3 Three Core Results

We emphasize three results to emerge from our model, which shed light on the initial problem statement concerning the nature of conflict in different societies.

Specifically, we identify conditions that determine the intensity of conflict, the possibility of complete accommodation of the disadvantaged by the privileged, and finally a characterization of intermediate levels of conflict between obliteration and complete accommodation of the disadvantaged.

**Proposition 1 (Suppression)** *The privileged will eliminate the disadvantaged members of society provided that production is separable, and that constant or increasing returns to scale hold in production. suppression will not emerge under interdependent production, nor under separable production provided that returns to scale are decreasing.*

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<sup>10</sup>We normalize on  $L^P$ .



**Proof.** We begin by showing that suppression is necessary under separable production and constant or increasing returns to scale. Suppression occurs under  $\delta^G = -\pi\bar{h}^D/\bar{h}^P$ , since this fully extracts the resources of the disadvantaged. For  $\delta^G$ ,  $k\frac{y^P}{\omega} = 0$ . For  $\theta = 1$ ,  $[(\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P)]^{\theta-1} - [(1-\delta)\bar{h}^P]^{\theta-1} = 0$ , such that  $\delta^G$  is a solution to (15). For  $\theta > 1$ ,  $[(\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P)]^{\theta-1} - [(1-\delta)\bar{h}^P]^{\theta-1} < 0$ , such that (15) requires  $\delta < \delta^G$ , providing a corner solution.

It remains to show that suppression does not solve the decision problem under separable production and decreasing returns, or under interdependent production. For  $\theta < 1$ , under  $\delta = -\pi\bar{h}^D/\bar{h}^P$ ,  $[(\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P)]^{\theta-1} \rightarrow \infty$  as  $(\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P) \rightarrow 0$ , while  $k\frac{y^P}{\omega} = 0$ , such that  $\nexists \delta$  satisfying (15). Under (16), under  $[\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P] \rightarrow 0$ ,  $y^P \rightarrow 0$  and hence  $c^P \rightarrow 0$ . This eliminates suppression under interdependent production, regardless of returns to scale assumptions. ■

The intuition for the suppression proposition is straightforward. Under separable production, the only circumstances under which the privileged stand to gain from redistribution to the disadvantaged, is under decreasing returns to scale. Given constant or increasing returns, the privileged always gain from extracting additional resources from the disadvantaged, in order to allocate them to own production. By contrast, under decreasing returns to scale and separable production, there is a productivity loss that results from allocating resources from the disadvantaged to the privileged. Provided that the power loss that attends redistribution is not too great, the privileged stand to benefit from allocating productive resources to the disadvantaged, and recovering the loss through the extraction of resources from an increased level of production. By contrast, where production is interdependent, the privileged simply cannot drive the disadvantaged to extinction, since this would eliminate the possibility to produce for themselves also.

The significance of the suppression proposition lies in its implications for the distinction between agrarian and industrial societies, and the forms of conflict that are associated with each. In effect it speaks to the puzzle noted in the introduction - that the form of conflict that we witness both within and between current societies is different from that which we have witnessed in most of human history. Current sensibilities show a heightened awareness of the dangers of suppression - but attempts at the complete elimination of "enemy" societies are hardly unique in human history.<sup>11</sup>

To be sure, modern conflict is often associated with cataclysmic human loss, often far exceeding in absolute terms that of earlier conflict in its sheer scale. World War II resulted in up to 60 million deaths. But this is simply a function of the scale of the conflict that industrial society makes possible. In *proportional* terms, even conflicts that have popular reputations as resulting in untenable casualties, are mild (in relative terms, of course) by comparison with the examples cited above in the context of agrarian conflict. Thus in World War I military deaths as a percentage of total mobilized, of the total male populations aged 15-49, and of the total population, were 12%, 2.7% and 0.7% for the Allies, and 15.7%, 11.5% and 2.6% for the Central Powers.<sup>12</sup> Thus while the absolute numbers killed were (unprecedentedly) large, the intensity of conflict did not approach the devastation of a Genghis Kahn. Despite the scale of the human cost resulting from the increased deployment of technology, and the scale of modern nation states, the most dramatic of modern conflicts nevertheless was not aimed at the elimination of the enemy - but at the incorporation of the resources the enemy controlled instead.<sup>13</sup>

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<sup>11</sup>Cato's *delenda est Carthago* injunction, finally followed in the most literal manner is one illustration of many. To cite a few: Assyrian warfare in the eight and seventh centuries BC, which relied on the razing of cities, and the extermination or complete enslavement of their populations; the destruction of Troy and its defenders; Genghis Khan and Timur Lenk (Tamerlane) in their leadership of the Mongolian expansion; the destruction associated with the Crusades - on both sides, and often with disregard for the religious conviction of the vanquished; the persecution of the Huguenots in France, with the massacre of Saint Bartholomew (1572) and the revocation of the Edict of Nantes; the thirty years war in Germany, with its associated widespread and extensive destruction.

<sup>12</sup>See the discussion in Ferguson (1999).

<sup>13</sup>It is important to bear in mind that the present framework is a means of characterizing forms of conflict under different resource configurations, and under alternative technologies of production. It is not a theory of genocide. For

How to conceptualize this difference between agrarian and industrial conflict? The present model provides a means of accounting for the difference.

Agrarian societies with finite land resources face Malthusian conditions of decreasing returns to scale. Expansion of production of necessity requires the use of ever more marginal land, with associated decreasing returns to production. These conditions can be escaped only where there is geographical room for expansion - allowing for the reproduction of existing production in what is (for the expanding society) virgin territory, at the expense of incumbent occupants of the conquered land who must be eliminated in order to realize the constant returns to scale available to the victor.<sup>14</sup>

Our framework is able to capture this pattern. Under agrarian production, with separable production between two groups distinguished by their relative endowment of resources (human capital), the privileged society can postpone the realization of decreasing returns to scale (effectively mimic constant returns to scale) by the elimination of rival societies.<sup>15</sup> Under these conditions, the nature of conflict will be extreme in the sense that the object is the elimination of the rival society, though the technology of agrarian society may be such as to limit the scale at which the conflict can be conducted. Where there exist extensive geographic opportunities for expansion (the Eurasian steppes, the American west), conflict may be protracted and societies with inferior resources to the expansionary power may face extended periods of extreme destruction. However, as soon as the opportunity for unlimited geographical expansion is eliminated, diminishing returns become binding under agrarian production, and the incentive for the expansionary power is no longer the destruction of disadvantaged societies, but rather their incorporation in order to limit the impact of decreasing returns to scale.

By contrast, under industrial production with complementarity of factors of production, of workers (the relatively disadvantaged) and managers (the privileged), destruction of resources no longer falls within the bounds of rational choice. Conflict can be aimed only at the incorporation of additional resources, not at their destruction.

The implication of the present discussion therefore is that the declining intensity (as opposed to scale) of conflict in history, the shift from attempts to obliterate enemies to more restrained objectives is associated with one of two characteristics of the technology of production: either the move from constant to decreasing returns to scale under separable production, or the move from separable, to interdependent production.

**Proposition 2 (Equalization)** *The privileged will redistribute fully, ensuring equality of per capita human capital between the privileged and disadvantaged, provided that production is interdependent, and that  $\left(\frac{\mu}{\gamma}\right) \geq \phi$ .*

**Proof.** Full redistribution requires  $\delta \geq \left(\frac{\pi}{1+\pi}\right) \left(1 - \frac{\bar{h}^D}{\bar{h}^P}\right)$ .

Under separable production, the proof to proposition (1) shows that for  $\theta \geq 1$ ,  $\delta \leq \delta^G$ , precluding full redistribution. For  $\theta < 1$ , from (15), since  $[(\bar{h}^D + \frac{\delta}{\pi}\bar{h}^P)]^{\theta-1} - [(1-\delta)\bar{h}^P]^{\theta-1} = 0$  and  $k\frac{y^P}{\omega} > 0$ ,  $\nexists \delta$  satisfying (15).

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instance, pogroms and genocide aimed at Jews are arguably different. Antisemitism persists across time, technology and cultures, and lies outside of the framework presented here.

<sup>14</sup>Lamb writes of Genghis Khan that:

when he marched with his horde, it was over degrees of latitude and longitude instead of miles; cities in his path were often obliterated, and rivers diverted from their courses; deserts were peopled with the fleeing and dying, and when he had passed, wolves and ravens often were the sole living things in once populous lands. (Lamb, 1927:1)

<sup>15</sup>As long as the cost of fighting does not outweigh the loss due to redistribution.

For interdependent production, under  $\delta = \left(\frac{\pi}{1+\pi}\right) \left(1 - \frac{\bar{h}^D}{\bar{h}^P}\right)$ , for the (21) condition,  $\frac{\mu}{\pi} - \gamma = \pi + (1 + \pi) \ln [1 + \pi] > 0$ , is sufficient, and  $\frac{\mu}{\gamma} > \phi = \pi$  is necessary. ■

Intuition in this instance emerges from the trade-off between productivity gains to be realized from the redistribution of resources from the privileged to the disadvantaged, and the rising aspirations and associated power loss that result from the redistribution. What the present framework demonstrates is that where the relative productivity of the disadvantaged to the privileged ( $\mu/\gamma$ ) is sufficiently large relative to the level of aspirations in society ( $\phi$ ), the productive pay-off to the privileged in society may be sufficient to outweigh any loss in power resulting from the redistribution even to the point of equality in relative human capital.

The net result is that the privileged effectively trade away their relative power superiority in extracting final output, and share resources in society with the previously disadvantaged, in order to render society more productive. In effect, they extract a smaller proportion from a larger pool of resources realized through a human capital transfer to the disadvantaged. This then is the stylized South African case of incorporation of the disadvantaged into the elite.

**Proposition 3 (Intensity)** *The privileged maximize extraction (minimize redistribution) where (a.) the disadvantaged constitute either a small minority, or a large majority, and/or (b.) the ratio of the human capital of the privileged to the disadvantaged, is either low, or high.*

**Proof.** Numeric optimization provides the evidence presented in Figures 3 and 4.

INSERT FIGURES 3 AND 4 ABOUT HERE. ■

Here the trade-off between productive gain and aspirations binds. By contrast, where the disadvantaged constitute a very small minority, there is no real productive gain from redistributing resources to the disadvantaged. Where the disadvantaged constitute a sufficiently large majority, redistribution comes to represent a danger to the privileged, since rising aspirations of the disadvantaged erodes the power of the privileged. Only in an intermediate range of the population proportions, does the productivity gain sufficiently compensate for the growth in aspirations and the associated loss in power, to merit a strong redistributive impulse on the part of the privileged. Figure 5 illustrates in cross section for any given ratio of privileged to disadvantaged human capital, for the case of interdependent production.

INSERT FIGURE 5 ABOUT HERE.

The trade-off is also apparent in terms of the ratio of the human capital of the privileged, to that of the disadvantaged. Where the ratio is low, the privileged attempt to extract further resources from the disadvantaged for themselves, to realize the associated productive gains for themselves directly. Equally however, where the population-weighted ratio of privileged to disadvantaged human capital is sufficiently high, the disadvantaged constitute so marginalized a component of production, that the power of the privileged is virtually absolute, and they respond by extracting the maximum from the disadvantaged. In effect, the disadvantaged become the flotsam of society, with no aspirations at all,  $\phi \rightarrow 0$ , such that the extractive power of the privileged is virtually complete,  $\omega \rightarrow 1$ .

The three core results of our model that we have presented thus allow us to span a wide range of conflict intensities, from complete accommodation to complete elimination of opponents. Importantly, the models allow for the possibility that the elite of society will transfer resources to the disadvantaged in order to realize productive advantage, though there is a cost to be paid in the form of rising aspirations (hence conflict) of the disadvantaged under such transfers.

## 4 Robustness of Results to Alternative Objective Functions of the Privileged

We now consider the robustness of the propositions discussed above to two alternative conceptions of the objective function of the privileged members of society. The two relevant questions here are:

does it matter if the elite cares about the welfare of the disadvantaged (e.g. whether we have an "altruistic" elite); and does it matter whether we have a "cultured" elite, in the sense that the advantaged members of society care about the inherent benefits that derive from human capital, as well as the benefit from income *per se*?

First, using the utility function for the representative individual in either segment of society defined in equation (7) we assume  $\beta > 0$ , and  $\alpha > \beta$ . This implies simply, and reasonably, that the privileged care more about their own utility than the agent belonging to the disadvantaged society, though they do care about the disadvantaged to some extent. Checking for robustness of the propositions, we find the following:

- The Suppression Proposition (1) still holds (though it becomes less likely that suppression will occur);
- The Equalization Proposition (2) still holds but at a *higher* level of aspirations. This implies that the privileged are willing to lose more power. Thus the required productive pay-off to the privileged in society is less than when the privileged are indifferent ( $\beta = 0$ ).
- The Intensity Proposition (3) still holds.

Results are thus not sensitive to the presence of an "altruistic," rather than purely self-interested elite - though conditions are undoubtedly improved in the presence of an altruistic elite.

Second, we also allow for the possibility that the utility function for the representative individual belonging to the privileged segment of society is:

$$U^P = \alpha \ln(c^P) + (1 - \alpha) \ln((1 - \delta) \bar{h}^P) \quad (22)$$

The above utility function indicates that the privileged value human capital in its own right (being able to appreciate Shakespeare adds to the value of life), thus adding to their utility. Checking for robustness of the propositions, we find the following:

- The Suppression Proposition (1) still holds; However, suppression is now possible under decreasing returns to scale in human capital for the independent production function, as well as under constant and increasing returns;
- The Equalization Proposition (2) still holds but at a *lower* level of aspirations. This implies that the privileged are less willing to lose power.
- The Intensity Proposition (3) still holds.

The intuition is not difficult to understand here. A cultured elite needs more resources to allocate to cultural activity, and this comes at the cost of the disadvantaged. The moral of the story is that the disadvantaged of society should prefer an elite which is narrowly focussed on the maximization of monetary wealth - not one that appreciates theatre and opera. In short, the disadvantaged should strive for an altruistic but venal elite.

In our model, if we included different prices for goods sold to disadvantaged and privileged, then prices would also matter in determining the steady state reached and hence the degree and nature of redistribution of human capital. Our paper assumes that prices are the same between goods consumed in privileged and disadvantaged societies and the "effective" level of human capital is equal to the actual quantity of human capital. That is, our paper abstracts from efficiency of human capital held by the disadvantaged and privileged. If the privileged and disadvantaged used their human capital allocation with varying degrees of efficiency in the production process, this too would affect the degree and nature of redistribution of human capital.

However, in broad terms we note that the results of the paper are robust to the possibility that the privileged may care about the disadvantaged (though less than about themselves), and to the introduction of a cultured elite.

## 5 An Empirical Operationalization: Does the Model Generalize?

The model developed in this paper draws general conclusions on the likelihood, intensity, and pervasiveness of conflict, as well as underlying resource transfers from privileged to disadvantaged in the form of human capital. Yet the features of the model were derived on the basis of the specific experiences of South Africa and Sri Lanka. The obvious question therefore is whether the model generalizes? In this section we approach the question empirically, by exploring some core mechanisms and predictions to emerge from the theoretical formulations presented above, as well as drawing some inferences for likely patterns of conflict that might be predicted from the model:

1. The model has two core mechanisms:
  - (a) That political aspirations rise in the amount of human capital transferred to the disadvantaged.
  - (b) The privileged have an incentive to transfer human capital to the disadvantaged in order to raise the productivity of the disadvantaged, which in turn enhances the income and hence the consumption opportunities of the privileged. In turn they pay a cost in the form of a power loss in the amount of human capital transferred to the disadvantaged, which raises the aspirations of the disadvantaged, thereby lowering the proportion of total output that the privileged can appropriate for themselves.
2. The model has the core prediction that the transfer of human capital from privileged to disadvantaged ( $\delta$ ), should decline as the ratio of the disadvantaged to the privileged population in society ( $\pi$ ) rises - subject to a non-linearity, such that at very low or very high ratios of disadvantaged to advantaged populations the advantaged members of society may cease transferring human capital to the disadvantaged. Thus a measure for human capital transfers should be concave in a measure of the ratio of disadvantaged to privileged population.
3. It is possible to draw some inferences about the likely patterns of conflict that would be associated with the mechanisms of the model. Specifically:
  - (a) We conjecture that conflict should be concave in measures of aspirations ( $\phi$ ). At low levels of aspirations, the disadvantaged do not have the means of mounting strong opposition to the advantaged of society. Conversely, where the human capital endowment of the disadvantaged is sufficiently high, the reason for conflict has disappeared, since the human capital endowment of the disadvantaged begins to approach that of the privileged sufficiently to render conflict counter-productive.
  - (b) Since for our model, the primitives of aspirations are human capital transfers and the population ratios of disadvantaged to privileged, the non-linearity of conflict in aspirations should be observable in the relation to human capital transfers ( $\delta$ ) and population proportions ( $\pi$ ) also.

### 5.1 The Data Sets

We construct a panel of 102 countries, for the years 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, and 2000. Differential data availability renders the panel unbalanced.

We employ the World Income Inequality Database (WIID) in order to obtain the distribution of income by decile. Using this information we create the measures of aspiration ( $\phi$ ), power of privileged ( $\omega$ ) and the proportions of privileged and disadvantaged in society in order to calculate the  $\pi$ -ratio (the proportion of disadvantaged to privileged in society) of the paper. we also employ the directly reported Gini coefficients from the WIID database.

Human capital transfers are crucial to the mechanisms explored in this paper. For a measure of human capital transfers, we employ secondary school enrollment rates from the standard Barro-Lee database.<sup>16</sup> The measure is likely to proxy for human capital transfers from privileged to disadvantaged, since public schooling disproportionately benefits the disadvantaged rather than the privileged who have access to private schooling.

A measure of ethnolinguistic fractionalization is obtained from Roeder (2003). Measures of GDP were obtained from World Bank Development Indicators data set (2003). A measure of conflict in Africa is constructed using principal component analysis on measures of conflict from the Bates (2000) data set on Africa.<sup>17</sup> Finally, we also employ a rights measure from the Freedom House database, comprised of the linear combination of civil liberties and political rights.

## 5.2 Operationalizing the Concepts of the Paper: Power & Aspirations

The paper has introduced two fundamental concepts that require operationalization: power and aspirations. Purpose of this section is to develop corresponding empirical measures, and to examine whether their behaviour conforms to the predictions of our theory (not to test the predictions of the model).

The measure of power in the paper represents the ability of the privileged to extract the output produced by the economy, and rests on a measure of distance between the advantaged and disadvantaged in terms of human capital endowments as specified in equations (4) through (6). Considerable empirical evidence has confirmed that human capital endowments affect earnings, both at the microeconomic and macroeconomic<sup>18</sup> evidential bases. We thus proceed on the presumption that  $\bar{H}^P \approx GDP^P$  and  $\bar{H}^D \approx GDP^D$ , where  $GDP^P, GDP^D$ , denote the earnings of the privileged and disadvantaged of society respectively. Using aggregate GDP in US \$ PPP terms for each country, we compute  $GDP^P$  as the total income earned by all people who find themselves below 60% of median income<sup>19</sup> and  $GDP^D$  as the total income earned by all people who find themselves above 200% of the median.<sup>20</sup> A proxy for our measure of power is then:

$$\hat{\omega} = \hat{r}^{\hat{\phi}} = \left( \frac{GDP^P}{(GDP^P + GDP^D)} \right)^{\left( \frac{GDP^D}{GDP^P} \right)} \quad (23)$$

Our theory section noted that both our measure of aspirations and our measure of power are social distance measures, and hence have some, but also limited affinity with measures of inequality and poverty. We note immediately that this is confirmed empirically for our measures. For our set of 102 countries, the correlation between our measure of aspirations ( $\hat{\phi}$ ) and the inverse of the two alternative formulations of Sen's poverty index is 0.89. The correlation between our measure of power ( $\hat{\omega}$ ) and the Gini is 0.66, strong and persistent over time, but not perfect. The divergence

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<sup>16</sup>Primary school and to a lesser extent tertiary school enrollment does not demonstrate sufficient variation across developing countries to be empirically useful in estimation.

<sup>17</sup>We used principal component analysis on the dataset provided by Bates (2000). The variables used in the dataset are unrest, violence, regional war, guerrilla war, attempted coup, successful coup, government instability, existence of domestic armed groups, measure of fighting in the capital city, fighting in any other city and extra-judicial killing of civilians. Three principal components were found.

<sup>18</sup>See Bosworth and Collins (2003) and Sala-i-Martin et al (2004).

<sup>19</sup>This is the official poverty line proposed by the European Union for comparisons among member states (Eurostat, 2000). Further, decile shares are also commonly used to determine the poverty line. The Canberra Group (2001) argue that the three bottom deciles should be classified as the lower-income group. However, using this definition of poverty does not provide us with necessary heterogeneity of the  $\pi$ -ratio (the proportion of poor to rich in society) across countries.

<sup>20</sup>There does not exist a prescribed classification of the rich in society. We use the value of 200% above the median since, in most countries in the dataset, the income distribution is skewed to the right indicating that it is insufficient to classify the rich by including those individuals who earn 40 percentage points above the median (to mirror the calculation of the poverty line which is 40 percentage points below the median).

arises since distance is an obviously incomplete representation of inequality since it lacks the full intradistributional comparisons required of inequality measures.

It remains to establish whether our two measures behave as predicted by our model, viz. that rising aspirations should be negatively associated with the power of the privileged. The correlation coefficient between our two measures is  $-0.96$  - as illustrated by the trade-off depicted in Figure 6.<sup>21</sup>

INSERT FIGURE 6 ABOUT HERE.

Thus our measure constructs of aspirations and power behave as posited by our theory. While their construction always renders this likely, note that since  $GDP^P/GDP + GDP^D/GDP < 1$ , this is not guaranteed a priori.

### 5.3 Confirming the Fundamental Mechanisms of the Model

Our model posits two fundamental mechanisms that generate the final results. First that human capital transfers to the disadvantaged of society raise their political aspirations. Second, that human capital transfers to the disadvantaged while lowering the power of the privileged, also raises the consumption opportunities of the privileged, by raising the output of society. Since the link between human capital transfers and gains in productivity is a widely debated and researched question, we do not touch on the evidence here, but rather provide synoptic reference to the literature.<sup>22</sup> Instead, we focus on examining whether the aspirations measure can be linked to human capital transfers.

The basic mechanism posited by the paper is that the aspirations of the disadvantaged rise as the transfer of human capital to the disadvantaged increases. In Figure 7 we report the cross plot of the measure of aspiration ( $\hat{\phi}$ ) and the secondary school enrollment rates that we employ to proxy for  $\delta$  for the year 1995. The evidence clearly supports that our measure of aspirations rises as the intensity of schooling in a society increases - consistent with the predictions of our theory.<sup>23</sup> It is worth noting that the positive association is not a necessary consequence of the measurement of aspirations. Since aspirations is given by  $\phi = GDP^D/GDP^P$ , even where education is positively linked to earnings of the disadvantaged, there is no guarantee that the increased earnings of the poor will be such as to narrow the social distance they experience relative to the elite.

INSERT FIGURE 7 ABOUT HERE.

An obvious concern with the simple correlation implied by the plots of Figure 7 is that the rate of human capital transfer may be endogenous to the distance measure between privileged and disadvantaged income, which proxies for the relative human capital endowment of privileged and disadvantaged in our study. Specifically, as the income of the disadvantaged rises relative to that of the privileged, so they may be able to send an increased proportion of their children to school, raising the enrollment rate. To correct for this possibility, we estimated the association between aspirations and school enrollments rates under the GMM estimators of Arellano and Bond (1991) and Arellano and Bover (1995) and Blundell and Bond (1998) which employ higher order lags of levels and/or differences of regressors in the panel as instruments to test for the robustness of the simple correlation. In Table 1 we report GMM estimation results testing the association between the

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<sup>21</sup>In this case, since the  $r$  and the  $\phi$  components of the  $\omega$  measure of power are based on the same underlying primitives, the need to control for correlation between regressors and the error structure is immediate. We therefore also estimated under GMM estimators to test for the robustness of the simple correlation. As is standard, once endogeneity is controlled for, the strength of the correlation is lowered ( $-0.41$  vs  $-0.96$ ), but remains statistically significant. We also disaggregated the aspirations measure into its two constituent parts - the population proportions of the disadvantaged and privileged ( $\pi$ ), and the ratio of disadvantaged to privileged human capital, as proxied by their relative incomes. We find that our measure of power declines in both these ratios as required by our model.

<sup>22</sup>See the synthetic discussion of the literature and evidence in Bosworth and Collins (2003), while Sala-i-Martin et al (2004) provide a synthetic empirical estimation approach to the problem.

<sup>23</sup>The evidence is symmetrical for other years within our panel of data, and for the tertiary education enrollment rate.

aspirations measure and the secondary school enrollment rate. Diagnostics of the estimation confirm the appropriateness of the instruments, while the human capital endowment measure consistently reports a statistically significant impact on aspirations.

INSERT TABLE 1 ABOUT HERE.

Column (1) of Table 1 reports a positive, statistically significant relationship between school enrollment rates ( $\delta$ ) and our measure of aspirations. Since the association between aspirations and human capital transfers may be non-linear, in columns (3), (4) (7) and (8) we report specifications that allow for non-linearity in the association between human capital transfers and aspirations. The empirical results of columns (3), (4) (7) and (8) confirm concavity in all instances. However, once the population proportions of disadvantaged to privileged ( $\pi$ ) are controlled for, the non-linearity proves insignificant (see column 5), and the linear effect remains robustly positive and statistically significant throughout. The core mechanism of our theory thus finds confirmation.

Human capital transfers and aspirations may not be independent of the political dispensations and forms of social governance of countries, which may result in contemporaneous correlation between the human capital transfer measure and the error structure of our estimations. In particular, participative democratic political dispensations may have a higher propensity to generate human capital transfers as well as political aspirations. For this reason we control for the rights structure of the countries included in our panel, by means of the Freedom House rights measures in the form of a linear combination of the political rights and civil liberties indexes. Columns (2) through (10) include the rights measure. We note that the impact of the human capital transfer measure is confirmed once we control for the rights measure - in either linear or non-linear form.

A further concern with the reported results might be that the secondary school enrollment rate measure of human capital transfers may be serving as proxy for the level of socioeconomic development, thereby generating a spurious positive association. We therefore test for the robustness of results to the inclusion of a measure of per capita GDP. Columns (2), (4), (6), and (8) confirm that both the linear and non-linear association between human capital transfers and our measure of aspirations is robust in the statistical sense to the inclusion of the per capita GDP control, though the economic significance is diminished. The association between aspirations and human capital transfers is thus robust to a control for the level of economic development.

Finally, given the extensive engagement of the literature with the possibility that fractionation of societies materially affects the willingness of elites to engage in cooperative behaviour with the disadvantaged, which may affect the willingness of elites to transfer human capital, we also control for the impact of a measure of ethnolinguistic fractionation.<sup>24</sup> We note both that fractionation does impact on aspirations, with rising fractionation associated with lower measures of aspirations, such that rising ethnolinguistic fractionalization reduces aspirations at an increasing rate.<sup>25</sup> The inference is that fractionalized societies are able to maintain smaller social distance than homogenous societies. Importantly, however, the human capital transfer mechanism proves robust to the inclusion of a control for fractionalization of the society.

The association between our measure of aspirations and transfers of human capital is thus confirmed by the data.<sup>26</sup>

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<sup>24</sup>The classic reference here is Easterly and Levine (1997). But see also the discussion in Bates (2000) which emphasises that the impact of fractionalization may be non-linear, and the discussion of measurement issues in dynamic contexts in Fedderke, Luiz and De Kadt (2007).

<sup>25</sup>Controlling for the non-linear specification is due to Bates (2000).

<sup>26</sup>Note that the association between human capital transfers and aspirations is confirmed once we control for GDP per capita, the ratio of poor to rich, and fractionalization, either individually or jointly, and either in the presence or in the absence of the rights measure we employ, rendering our estimation results robust. Full results available from the authors on request.



## 5.4 The Outcomes Predicted by the Model

The inferences of our model are twofold. First, a direct prediction is of a nonlinearity of human capital transfers in the population ratio of the disadvantaged to privileged ( $\pi$ ). Second, from the model we conjecture that conflict is non-linear in aspirations, but also in human capital transfers as well as the ratio of disadvantaged to privileged in society.

### 5.4.1 The Association between Human Capital Transfers and Population Proportions

The model has the core prediction that the transfer of human capital from privileged to disadvantaged ( $\delta$ ), should decline as the ratio of the disadvantaged to the privileged population in society ( $\pi$ ) rises - subject to a potential non-linearity, such that at very low or very high ratios of disadvantaged to privileged populations the advantaged members of society may cease transferring human capital to the disadvantaged. Thus a measure for human capital transfers should be concave in a measure of the ratio of disadvantaged to privileged population.

We consider the association of our proxy for  $\delta$ , secondary school enrollment rates, and our proxy for  $\pi$  again by means of GMM estimation. Results are reported in Table 2.

INSERT TABLE 2 ABOUT HERE.

Column (1) of Table 2 confirms the concave association between our measure of human capital transfers ( $\delta$ ) and the ratio of disadvantaged to privileged populations in society ( $\pi$ ).

One concern with this finding is that both the level of human capital transfer, as well as the ratio of disadvantaged to privileged in society may be a function of the level of socioeconomic development of a society. Thus the association reported in Column (1) may be spurious, reflecting a common underlying latent variable. To control for this possibility we estimate the association while including a measure of socioeconomic development in the form of lagged real per capita GDP as a regressor. We find that concavity of human capital transfers to the ratio of disadvantaged to privileged in society is robust to a control for the level of per capita GDP as the measure of the level of economic development - see columns (2,4,6,8) of Table 2.

A second concern is that the estimated association between human capital transfers and the ratio of disadvantaged to privileged would be biased, since it does not control for the *extent* of the inequality between privileged and disadvantaged. We therefore also estimate while controlling for a direct measure of income inequality, given by a Gini index measure of income inequality (see columns (2) through (9)). The finding of the concavity between human capital transfers and the disadvantaged to privileged population proportions remains robust to the extent of income inequality. In addition, we also estimate while controlling for the ratio of disadvantaged to privileged per capita GDP, both with and without the control for the level of socioeconomic development. Again, the finding of the concavity between human capital transfers and the disadvantaged to privileged population proportions remains robust to the extent of income inequality between the two population proportions - see columns (3,4,7,8).

Finally, there is an extensive literature that posits a strong impact on distributional conflict in society from the degree of fractionalization of the society. Influentially, Easterly and Levine (1997) drew attention to the potentially important role of ethnic diversity in influencing economic growth, particularly in Africa, reporting a strong negative coefficient for ethnolinguistic diversity for long run economic development. The mechanism responsible for the negative impact has been attributed to both increased probability of conflict and hence uncertainty,<sup>27</sup> and to worse public goods provision and policy distortions.<sup>28</sup> However, a large diversity of abilities, experiences and cultures has also been argued to generate a productive, innovative and creative environment,<sup>29</sup> and greater population size is associated not only with diversity but also with standard benefits associated with economies of

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<sup>27</sup>See Annett (2001) and Rodrick (1999).

<sup>28</sup>See Alesina et al (2002), Easterly and Levine (1997) and La Porta et al (1999).

<sup>29</sup>See Alesina and La Ferrara (2005).

scale.<sup>30</sup> The net effect of ethnolinguistic fractionalization is thus either ambiguous, or perhaps non-linear.<sup>31</sup> The worry for the purposes of our model is that the ratio of disadvantaged to privileged may merely be proxying for the extent of ethnolinguistic fractionalization of society. To control for this possibility we estimate in the presence of the standard measure of ethnolinguistic fractionalization employed in the literature, utilizing the non-linear specification of Bates (2000).<sup>32</sup> Results are reported in columns (5,6,7,8) of Table 2, with the concavity in the association between human capital transfers and the ratio of disadvantaged to privileged in society proving robust to the inclusion of the measure for fractionalization along ethnolinguistic lines.

The first prediction of our model, that of a concavity between human capital transfers and the ratio of disadvantaged to privileged populations in a society thus finds confirmation, and proves robust to controlling for endogeneity (through GMM estimation), as well as controls for the level of socioeconomic development, the extent of inequality, and the level of ethnolinguistic fractionalization in society.<sup>33</sup>

#### 5.4.2 The Association between Conflict, Aspirations, Human Capital Transfers and the Ratio of disadvantaged to privileged

The starting point of this paper was to develop a model which affords an understanding of the dynamics surrounding conflict and its relation to human capital transfers between population groups. We have argued that it is possible to draw some inferences about the likely patterns of conflict that would be associated with the mechanisms of the model presented in this paper. Specifically we conjecture that conflict should be concave in our measure of aspirations ( $\phi$ ). At low levels of aspirations, the disadvantaged do not have the means of mounting strong opposition to the advantaged of society. Conversely, where the human capital endowment of the disadvantaged is sufficiently high, the reason for conflict has disappeared, since the human capital endowment of the disadvantaged begins to approach that of the privileged sufficiently to render conflict counter-productive. Since for our model, the primitives of aspirations are human capital transfers and the population ratios of disadvantaged to privileged, the non-linearity of conflict in aspirations conceivably might be observable in the relation to human capital transfers ( $\delta$ ) and population proportions ( $\pi$ ) also.

We explore these predictions on the Bates (2000) data set for conflict in Africa. Results for estimations under the GMM estimators are reported in Tables 3.

INSERT TABLE 3 ABOUT HERE

For conflict both the level of economic development as well as the degree of ethnolinguistic fractionalization are immediately relevant as additional controls.<sup>34</sup>

Column (1) of Table 3 confirms the concavity between the Bates conflict measure and our measure of aspirations. Column (1) of Table 3 confirms that the concavity between the Bates African conflict measure and our measure of aspirations is robust to controlling for the level of development (real per capita GDP) and the degree of societal fractionalization.

Once again, both human capital transfers and conflict may not be independent of political dispensations and forms of social governance of countries included in the panel data set, which may

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<sup>30</sup>See Alesina and Spolaore (2003) and Alesina and La Ferrara (2005).

<sup>31</sup>In Bates (2000) such a non-linearity is explicitly tested for, with ethnic groups providing political structures that solve collective action problems, promote human capital formation, but where excessive group dominance can generate a backlash by excluded groups.

<sup>32</sup>There are extensive issues surrounding both measurement of ethnolinguistic fractionalization and estimation of its impact. Space constraints preclude engagement of the issues here, but for a discussion of the measurement issues see Fedderke, Luiz and De Kadt (2008), and for estimation challenges see Fedderke and Luiz (2007, 2008a,b).

<sup>33</sup>Note that the association between ratio of poor to rich and human capital transfers is confirmed once we control for GDP per capita, the ratio of poor to rich per capita GDP, fractionalization, either individually or jointly, and either in the presence or in the absence of the Gini inequality measure, rendering our estimation results robust. Full results available from the authors on request.

<sup>34</sup>See the discussion surrounding Collier et al (2006), as well as the discussion in section 6.

result in contemporaneous correlation between the human capital transfer measure and the error structure of our estimations. In particular, participative democratic political dispensations may have a higher propensity to generate human capital transfers as well as lower the probability of political conflict. For this reason we control for the rights structure of the countries included in our panel, by means of the Freedom House rights measures in the form of a linear combination of the political rights and civil liberties indexes. Columns (2) through (11) include the rights measure. We note that the impact of the human capital transfer measure is confirmed once we control for the rights measure - in either linear or non-linear form, while political rights have a statistically significant negative impact on our measure of political conflict.

Symmetrical findings emerge where we control not for the composite aspirations measure ( $\phi$ ), but for its constituent variables, the human capital transfer ( $\delta$ , here secondary school enrollments) and disadvantaged to privileged population proportion ( $\pi$ ) measures. Results are reported in Table 3. In both columns (2) and (6) estimation confirms the concavity our model led us to conjecture. In both instances, again results prove robust to controlling for both the level of socioeconomic development (real per capita GDP) and ethnolinguistic fractionalization - see columns (3-5, 7-10).

The conjecture we inferred from our model, of concavity of conflict in the level of aspirations in society, or symmetrically in the level of human capital transfers and the population proportion of disadvantaged to privileged in society, thus finds confirmation from our evidence. Moreover, results are robust to controlling for the endogeneity of regressors (by means of GMM estimation), as well as the level of economic development and the degree of ethnolinguistic fractionalization of society.<sup>35</sup>

## 6 Reflections on Models of Conflict and Redistribution

This paper has presented a new model of conflict and redistribution motivated by the South African and Sri Lankan case studies, but which the cross country evidence suggests is generalizable to a wide range of international experience. In this final section we briefly ask how the new framework relates to the broader modern political economy literature. We identify at least five possible alternative approaches to answering the questions addressed by our paper, and assess their adequacy for our two benchmark case studies of South African and Sri Lanka.

The first locates political transitions in a long tradition which assigns the trigger for change to a moment of economic “crisis,” and due to an underlying “class” conflict.<sup>36</sup> In Acemoglu and Robinson (2001) (henceforth AR),<sup>37</sup> an elite and the disadvantaged of a society are engaged in a strategic interaction which can result in regime change. In nondemocratic regimes, the elite excludes the disadvantaged from political power, but face a revolutionary threat from the disadvantaged during economic downturns, since the cost of turmoil is lower during recession, while revolution offers the opportunity of moving to a democratic state in which the disadvantaged (as the majority) can enforce redistribution through the fiscus. The elite’s defence against the revolutionary threat by means of preemptive redistribution of resources to the disadvantaged effectively raises the cost of revolt. Democratic states enfranchise the disadvantaged, and engage in redistribution through the fiscus. They also face the threat of instability, in the form of coups mounted by the former elite, where the level of redistributive taxation becomes sufficiently punitive to render the cost of a coup no longer prohibitive to the elite. The crucial feature of the AR model is the degree of income inequality. Both nondemocracies and democracies can be consolidated only when inequality

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<sup>35</sup>Note that the association between human capital transfers and political conflict is confirmed once we control for GDP per capita, the ratio of poor to rich, fractionalization, aspirations either individually or jointly, and either in the presence or in the absence of the rights measure we employ, rendering our estimation results robust. Full results available from the authors on request.

<sup>36</sup>The hypothesis is venerable, but see for example Haggard and Kaufman (1995), Przeworski et al (1996), and Rustow (1970).

<sup>37</sup>Earlier contributions include Acemoglu and Robinson (2000).

is sufficiently moderate, such that conflict increases in the degree of inequality.<sup>38</sup>

In an extension of the original framework, Acemoglu and Robinson (2006a) draw explicit inferences for South African 1994 political transition, attributing it to declining income inequality after 1970, and rising costs of repression. The symmetric reasons for the rising conflict in Sri Lanka should be rising levels of inequality and declining costs of repression.

Unfortunately this is difficult to reconcile with the evidence. In Sri Lanka, inequality has been declining since the 1930s with the introduction of universal franchise in 1931 in Ceylon. Active redistribution in Sri Lanka developed along the lines of a welfare state. The transfer of human capital through the welfare system to the general populace thus occurred relatively early,<sup>39</sup> while the democratic political system of the country was instrumental in expanding the welfare state regardless of the fiscal deficit or the level of economic growth.<sup>40</sup>

The AR model is also not adequate to the South African case study. Evidence in favour of falling income inequality in South Africa is by no means clear post 1970, with improvements occurring at best only *after* the start of the process of political transition - see the discussion in Borat et al (2001). Furthermore, as both Hoogeveen and Özler (2003) and Leibbrandt et al (2005) show, the evidence in favour of falling inequality and poverty post-1994 is also mixed, with considerable evidence pointing toward *rising* inequality. What is more, the transfer of human capital to the black population in South Africa began relatively early under Apartheid, with a strong increase at the latest during the 1970's - see the evidence of Figure 9.

INSERT FIGURE 9 ABOUT HERE.

Under AR, the justification for the rising human capital transfer in South Africa would be as an attempt by the white elite to pacify black political ambition through redistribution. But this is difficult to reconcile with the evidence. First, note that the transfer of the human capital *precedes* the spike in activism for political transformation of the 1980's - see the political instability index reported in Figure 9. Tellingly, for South Africa empirical evidence suggests that causality runs *from* increasing black secondary schooling output *to* political instability, with a robust positive sign, consistent with an hypothesis of rising political aspirations under expanding education<sup>41</sup> - see the evidence reported in Fedderke and Luiz (2008b) and Wood (2000).

Our model can account for the case study evidence. Transfers of human capital to the disadvantaged are not consumption goods transfers to buy off the revolutionary potential of the disadvantaged. Instead the human capital transfer is a transfer of investment goods necessary for the productive needs of the economy.<sup>42</sup> The cost to the white elite was a steadily rising level of political aspirations under rising human capital endowments of the disadvantaged black majority with associated rising costs of repression, which eventually led to the political transformation of

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<sup>38</sup>Consistent with the empirical findings in Alesina and Perotti (1996) and Muller and Seligson (1987). Thus the model diverges from the modernization hypothesis of Lipset (1959), though it is consistent with the Acemoglu and Zilibotti (1997) suggestion that poor countries would have more volatile GDP and worse recessions.

<sup>39</sup>The transfer of human capital to the disadvantaged was manifested in free education from primary to university level (including free mid-day meals and milk at school, later free uniforms and textbooks) covering the entire country. This in turn is claimed to have resulted in a declining importance of class and ethnic identity formation (Hettige 1992).

<sup>40</sup>See Abeyratne (2004) and Wickramesinghe (1990). To a great extent, the political competition among political parties was instrumental in the initiation as well as the expansion of the welfare system (Alailima 1997).

<sup>41</sup>The link is widely touted in the political science literature. One author states this link as follows:

Social and economic change . . . extend political consciousness, multiply political demands, broaden political participation. These changes undermine traditional sources of political authority and traditional political institutions . . . The result is political instability and disorder. The primary problem of politics is a lag in the development of political institutions behind social and economic change (Huntington, 1968:5).

<sup>42</sup>See the evidence presented in Fedderke (2006).

1994 - though with an improved productive capacity of the economy under the improved efficiency of labour inputs into production.<sup>43</sup>

This *productivity-aspirations trade-off* is not captured in the AR framework.

An alternative approach of conceptualizing conflict is provided by the Hirshleifer (1995) model of anarchy (henceforth H).<sup>44</sup> Under H, agents are engaged in fight over a pool of resources, and each agent faces a choice of either allocating resources to the purpose of producing output, or to a fighting technology designed to extract resources from the other (equivalently: defend extraction). What is useful about the H model is that it serves to characterize conflict, and identifies conditions under which perpetual conflict can be a stable outcome, and can generate a range of intensity of conflict in the equilibrium solution. Conversely, there exist outcomes in which stable non-conflictual equilibria emerge, but under either the complete victory of one of the contesting agents, or as an explicit Hobbesian intervention by the state.<sup>45</sup>

The attraction of the framework lies in the fact that an obvious way of thinking of the South African and Sri Lankan cases might be of a protracted period of stable conflict between two sets of population groups (white vs. black, Sinhala vs. Tamil), with neither side bearing sufficiently decisive technology to ensure victory. While the stand-off has proved stable in the case of Sri Lanka, in South Africa the balance of power may have swung to the black majority either as their population preponderance grew over time,<sup>46</sup> or as whites lost the technological advantage in the contest - perhaps through the force of extensive international technological and financial sanctions.<sup>47</sup>

Unfortunately the H model fails for both South Africa and Sri Lanka, since it is entirely unable to account for the possibility that agents may choose to redistribute resources to their "opponents." Under AR, the privileged can do so in the form of welfare (not productivity enhancing) payments, but under the HA such active transfers are *never* feasible, since it would enhance their fighting capacity. By contrast, our model, which explains the human capital transfer in terms of a choice tension between social productivity gain and elite power loss, can account for an extensive variation in resource transfers of elite to disadvantaged population groups.

The third conceptual framework useful to the questions of this paper is provided by a sequence of models by Bourguignon and Verdier (2000a,b, 2005) (henceforth BV) which explore the political economy of education and development. In this framework the political elite has an incentive to transfer human capital to the disadvantaged determined through a productivity gain realized by the disadvantaged. Moreover, the transfer of human capital to the disadvantaged can result in their gaining access to political rights or representation.

While the emphasis on the transfer of investment goods to the disadvantaged gives the BV framework close analogies to our model, there is nevertheless a twofold and crucial divergence which becomes clear from the experience of our case studies.<sup>48</sup> First, in the BV the transfer of

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<sup>43</sup>Note that for Galor and Moav (2004), the complementarity between physical and human capital they suggest as crucial to the second phase of the industrial revolution, has rendered the need for human capital transfers to the poor as pervasive, with the consequence of eliminating or at least attenuating social conflict substantially.

<sup>44</sup>There are a number of extensions of the framework, collected in Hirshleifer (2001).

<sup>45</sup>In a framework that is reminiscent of H, Bates et al (2007) discuss equilibria in both state and stateless societies where coercion (violence) may be employed to defend against and for predation. The implication is that coercion, if efficiently organized may be socially productive and a source of increased welfare. The model endogenously determines whether the state is predatory or developmental.

<sup>46</sup>See the extensive discussion in Fedderke, Luiz and De Kadt (2008).

<sup>47</sup>See for instance the discussion in Welsh (2000).

<sup>48</sup>There are a number of additional divergences from our case study experience that are of secondary importance in the BV context. For instance in BV (2005), allows for a changing income share between the privileged and the disadvantaged over time, but not as a result of the human capital transfer, but due to a shift in relative prices between unskilled and skilled labour intensive manufactures that results from trade liberalization. But in the South African instance it is not possible to argue that the reallocation of human capital is one related to changing rates of return across sectors. Aron and Muellbauer (2007) confirm that the openness of the South African economy has varied substantially over the 1970 - 2000 period, but price cost margins both for the South African manufacturing sector

human capital typically leads to the political empowerment of the disadvantaged, since skills allow the exercise of voting rights. Yet in South Africa over the period where increasing human capital was being transferred to the black majority in South Africa (recall again Figure 9), political rights were increasingly *withdrawn* from the black majority - see the political rights index for South Africa reported in Figure 10.<sup>49</sup> The only means of reconciling this divergent evidence, is to argue that the BV realization of political rights should be thought of in terms of a lagged realization, with potentially significant intervening conflict. However, this would mean that a crucial aspect of the decision problem facing elites, viz. the intensity and cost of conflict is simply eliminated from their decision problem - a consequence that is difficult to rationalize.

INSERT FIGURE 10 ABOUT HERE.

However, perhaps the strongest divergence between our model and our case studies and the BV framework is that the human capital transfer in BV results in access to political representation by the disadvantaged. It does not explicitly result in the loss of political power by an elite, as it arguably did in South Africa. As such, while the model captures the gain of productive potential that our model incorporates also, it does not fully capture the choice tension in our model, of a trade-off between the productive potential of society and the loss of political power to dispense over the productive output of the society. BV perhaps accounts more accurately the experience of the US South, than the experience of developing countries such as South Africa.

A fundamental alternative to the AR-type model of class conflict is provided by Galor and Moav (2004) - henceforth GM. In the GM an elite transfers human capital to the working class due to complementarity between physical and human capital. The consequence is that the conflict between capitalists (the elite) and workers (the disadvantaged) that characterized the first phase of the industrial revolution in Europe is overcome in the industrial revolution's second phase, since the working class realizes productivity, hence wage gains that render industrial conflict redundant.

For the South African case the evidence does support the productivity pay-off to human capital, and hence the incentive to transfer human capital to the disadvantaged that the GM suggests. But as already pointed out above for the BV, the human capital transfer in South Africa led to rising political aspirations, hence conflict and ultimately the overthrow of the political system, rather than an abatement of political tension.

While the first four frameworks by which one might characterize the South African transition and the Sri Lankan failure to exit conflict are theoretical, the fifth is empirical. Collier et al (2006)<sup>50</sup> (henceforth CHR) undertake an empirical examination of a range of potential drivers of civil war. The approach balances feasibility<sup>51</sup> of against motivation<sup>52</sup> for conflict, finding that both feasibility and motivation matter. According to their estimations conflict is driven by: the level of per capita income, the presence of natural resources, population size, the degree of fractionalization, whether a country had been a French colony, the proportion of the population that is male and aged between 15 and 29, and the proportion of the country that is mountainous.

Again, however, the framework does not cover the South African and Sri Lankan experiences well.

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as a whole, as well as for individual sectors have remained essentially constant over this period - see the evidence in Aghion et al (2006). In Bourguignon and Verdier (2000a) inequality also plays a role - but we have already dismissed this as a feasible driver for our case studies. For Sri Lanka, some political analysts have argued that the civil war in Sri Lanka is mainly a product of the distributional consequences of trade liberalization (see Gunasinghe, 1984, Dunham and Jayasuriya, 2000, and Abeyratne, 2004), the continued strong performance of the Sri Lankan economy despite the civil war is arguably due to its trade reform - see Stewart and O'Sullivan (1999: 374).

<sup>49</sup>Similarly in Sri Lanka, formal political rights did not always issue into effective political rights, with increased restrictions on political participation as well as changes in the constitution to allow for a president with executive powers (in 1977).

<sup>50</sup>See also Collier and Hoeffler (2006).

<sup>51</sup>They cite the "Machiavelli Theorem" of Hirshleifer (2001): no profitable opportunity for violence will go unused. Feasibility includes financial (rebellion is expensive), military, and geographical dimensions.

<sup>52</sup>Which can include grievance, predation as well as insanity.

For both countries, of the factors that prove significant in CHR, only per capita income, population size, fractionalization and the proportion of young males in the population could plausibly account for the transitions from and to conflict: all other factors are fixed. Yet every one of these measures bar one in South Africa moved so as to *increase*, not decrease the likelihood of conflict: per capita income fell, population grew, young males grew more numerous - only fractionalization fell, and then only racial, and not linguistic or religious fractionalization. By contrast, in Sri Lanka changes favoured *decreased* not increased conflict: per capita income has been rising since 1977, ethnic fractionalization has remained relatively fixed, and only the proportion of young males (for both ethnic groups) in the population has increased (as in the case of South Africa). Unless we are therefore prepared to accept the uni-causal explanation in both instances, the CHR framework is also incomplete as an account of the South African and Sri Lankan experiences.

We conclude that our model, in capturing the trade-off between the gain in productive potential of society against the power loss of elites implicit in human capital transfers to the disadvantaged, captures the crucial mechanism implicit in the conflicts of our two case studies better than the alternative models of conflict discussed here. What is more, the empirical evidence of section 5 implies that the mechanism generalizes (it does not of course exclude the relevance of the alternative models in general).

## 7 Conclusion and Evaluation

This paper has presented a model in which two groups in society are engaged in strategic interaction.

Privileged members of society have the opportunity to allocate resources either to their own productive capacity, or to enhance the productive capacity of the disadvantaged.

Redistribution to the disadvantaged can increase the productive capacity of society, but comes at the cost of rising political aspirations of the disadvantaged, which erodes the power of the privileged. Results in the paper derive conditions under which the privileged will redistribute to the point of equality with the disadvantaged; conditions under which the disadvantaged face suppression; as well as the range of intermediate redistributive activity likely to be engaged by the privileged.

In doing so the paper presents a theoretically based diagnostic for the characterization of forms of conflict, in terms of likelihood, intensity, and pervasiveness.

Examination of empirical evidence suggests that the model generalizes across the experience of a panel drawn from a total sample of 204 countries, over the 1960-2000 period. We construct measures of aspirations and of power that rest on the theoretical constructs of our model, and rest on the distance between the privileged and the disadvantaged of society. In line with the predictions of the model, we find that aspirations are associated with human capital transfers as measured by secondary school enrollment rates, as well as the ratio of disadvantaged to privileged in society. Further, as predicted by the model, human capital transfers are concavely associated with the ratio of disadvantaged to privileged in society, and the conjecture suggested by the model that conflict is concave in aspirations and human capital transfers also finds support from conflict data in Africa. Results throughout are robust to controlling for endogeneity, controlling for the level of socioeconomic development, and for ethnolinguistic fractionalization. The question of whether the model of this paper generalizes empirically beyond the specific cases of South Africa and Sri Lanka has thus been answered in the affirmative.

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## 8 Figures and Tables

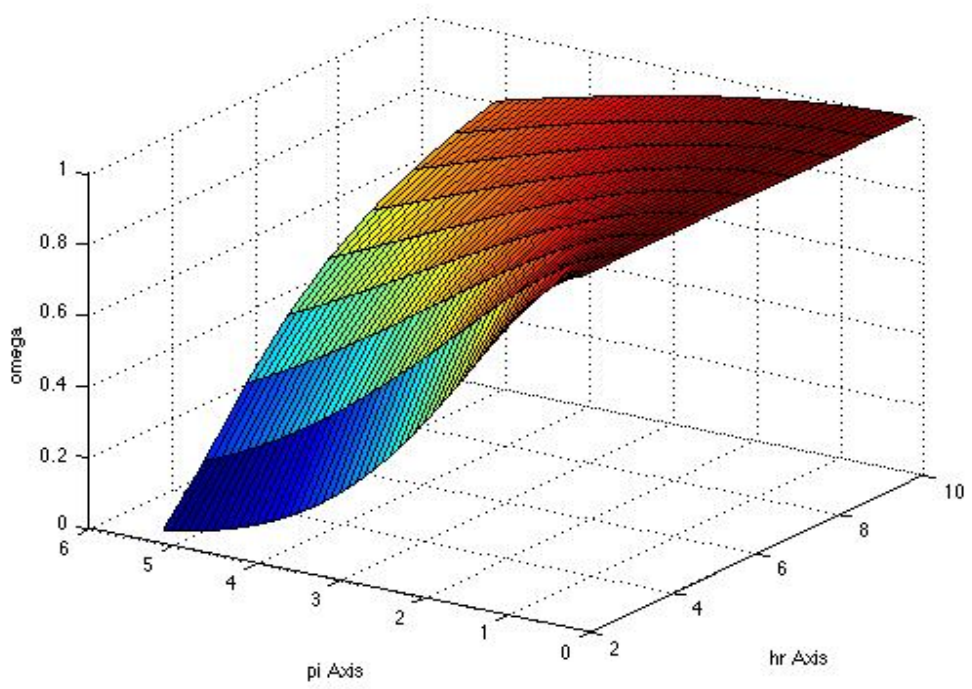


Figure 1: Power:  $\omega$

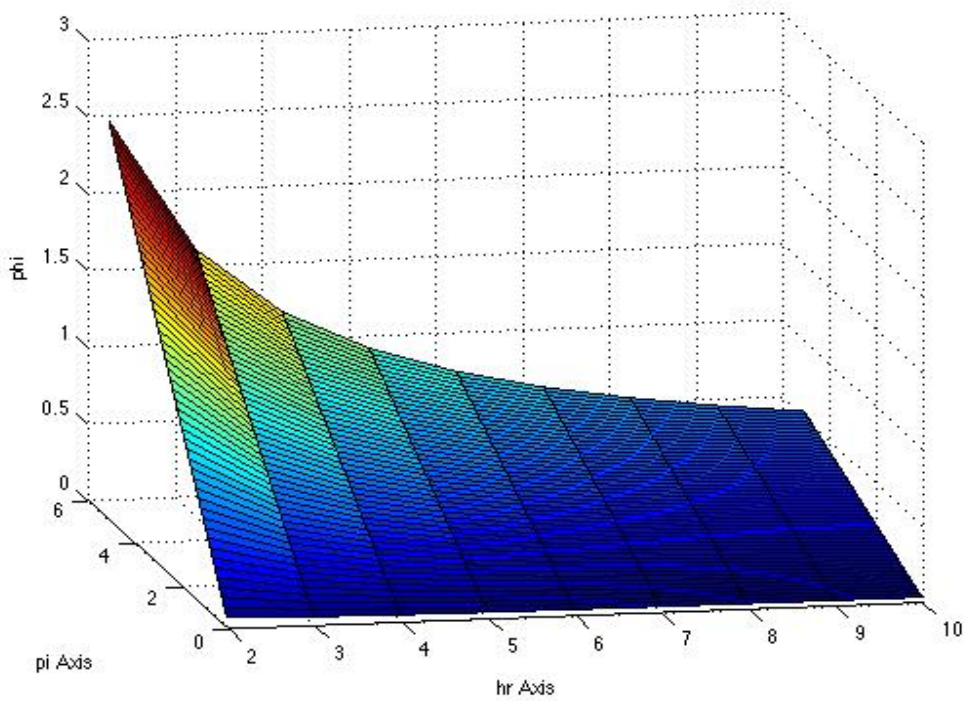


Figure 2: Aspirations  $\phi$

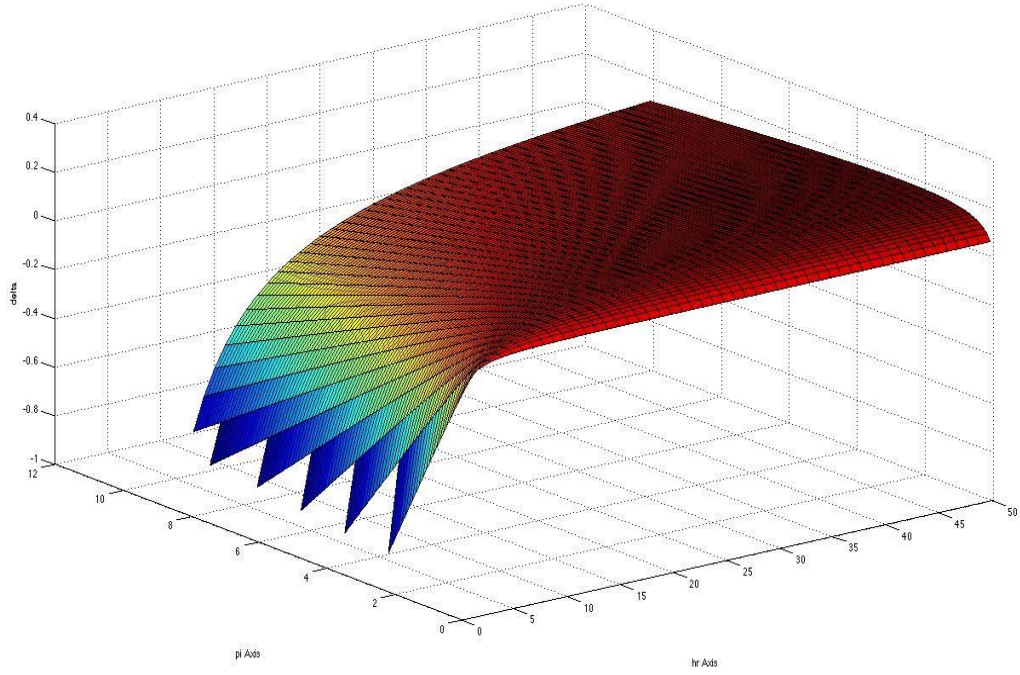


Figure 3: Separable Production,  $\theta = 0.5$ .

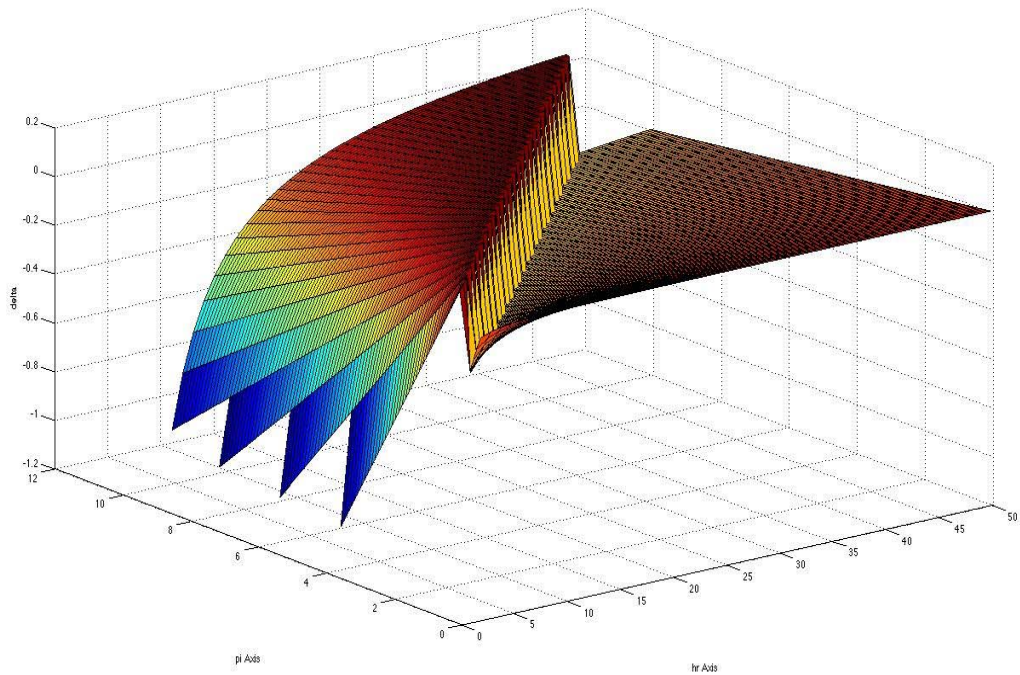


Figure 4: Interdependent Production,  $\gamma = 0.25, \mu = 0.25$ .



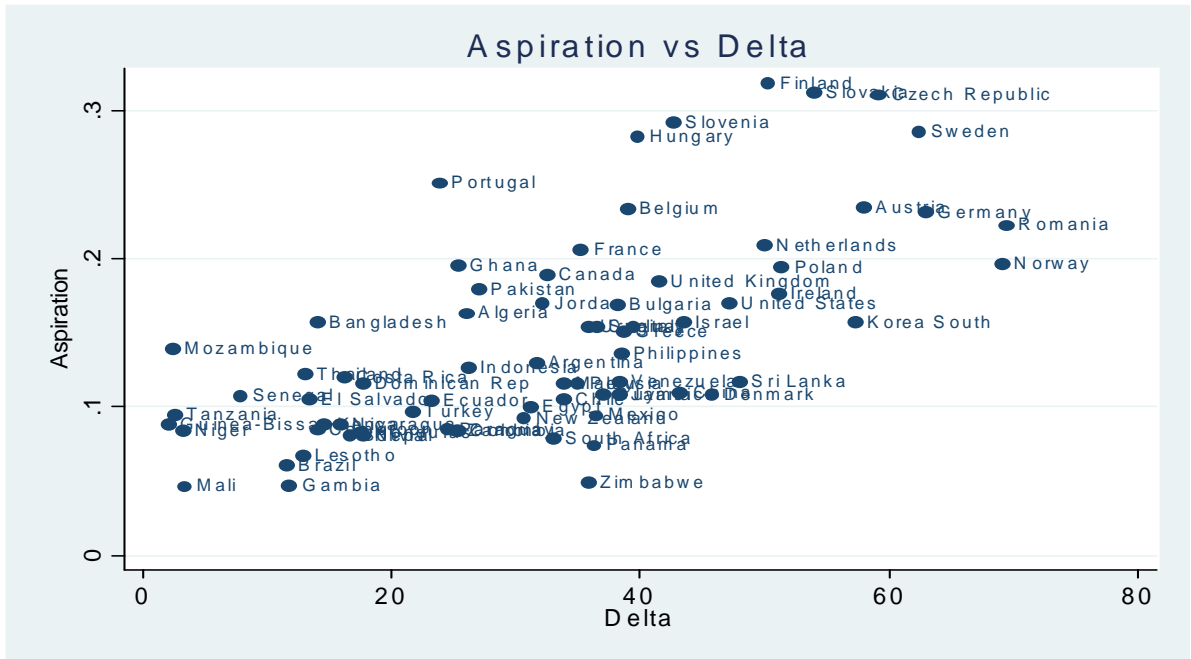


Figure 7: Aspirations vs delta. Delta measured by secondary school enrollment rate

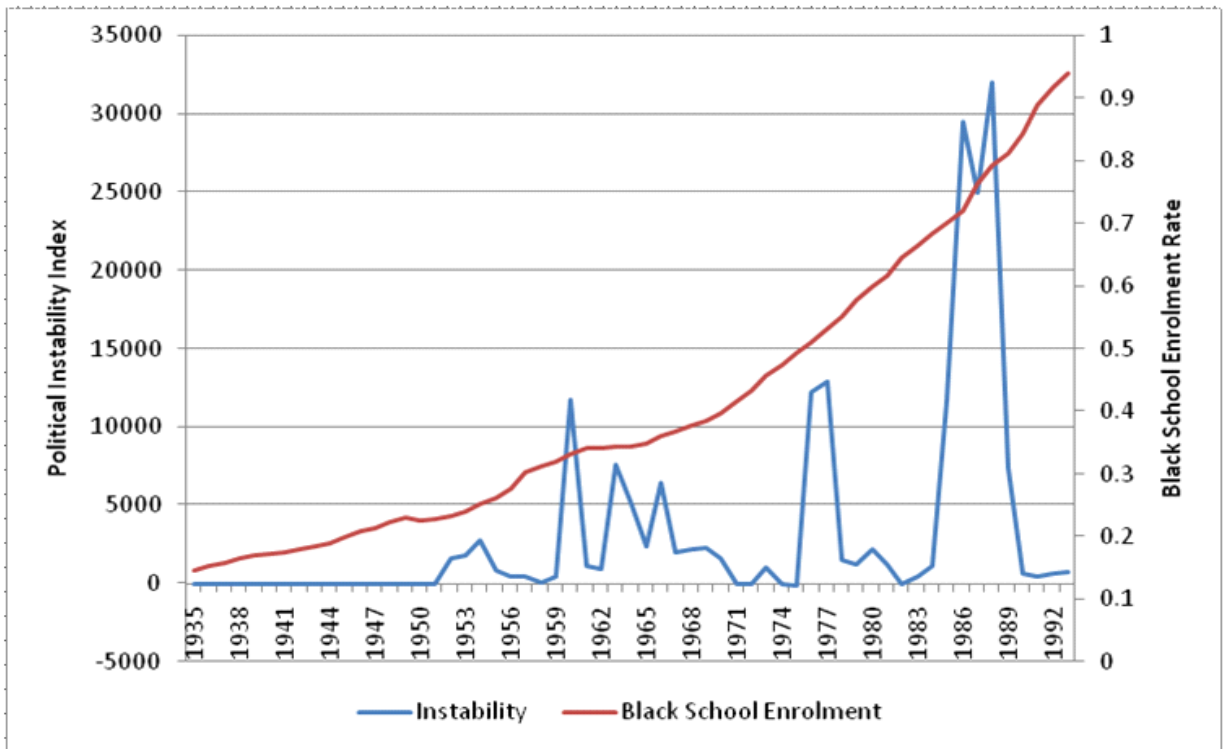


Figure 8: Political Instability Index for South Africa, Source: Fedderke et al (2001).

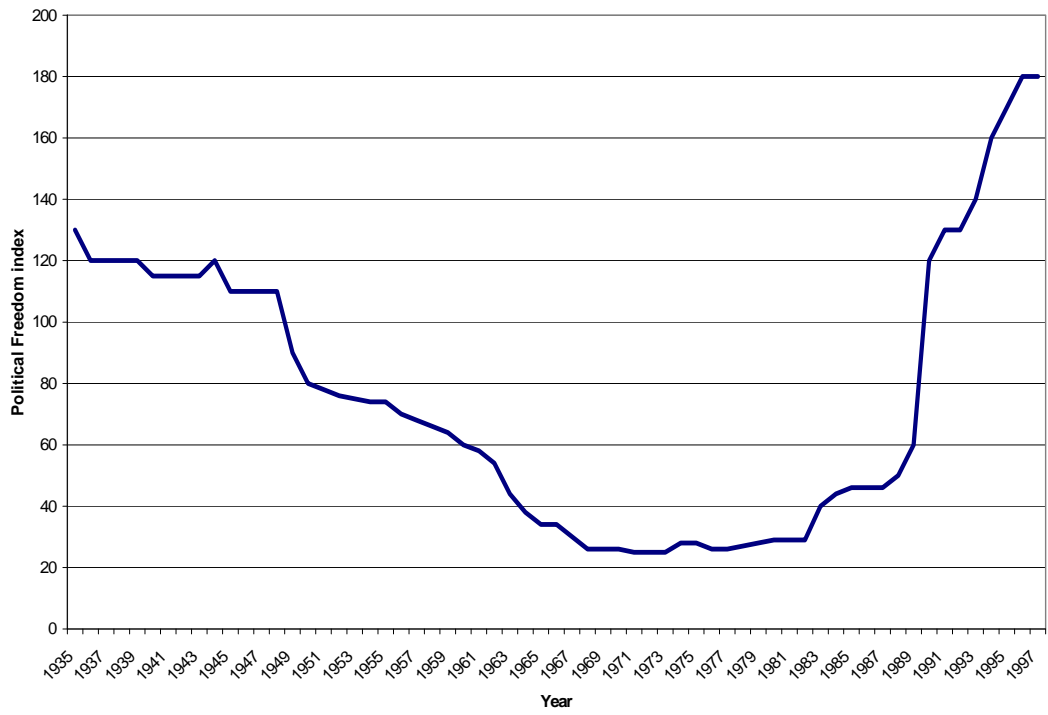


Figure 9: Political Freedom Index, Source: Fedderke et al (2001).

**Table 1: Association between Aspirations and Human Capital Transfers.**

Human capital transfers are measured as secondary school enrolment rates.

\* denotes significance at the 5% level, \*\* denotes significance at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	$\varphi$	$\varphi$	$\varphi$	$\varphi$	$\varphi$	$\varphi$	$\varphi$	$\varphi$	$\varphi$	$\Phi$
Human capital transfer ( $\delta$ )	0.004* (0.0002)	0.001* (3.75e-005)	0.001* (0.0001)	0.002* (0.0001)	0.001* (0.0004)	0.005* (0.001)	0.002* (1.54e-005)	0.002* (0.0001)	0.004* (0.001)	0.005* (0.0005)
Rights	-	0.002* (0.0003)	0.007* (0.002)	0.002* (0.0003)	0.007* (0.002)	0.001* (0.0003)	0.001* (6.18e-006)	0.0002* (0.0007)	0.001* (0.0001)	0.002* (0.001)
Human capital transfer squared ( $\delta^2$ )	-	-	-	-4.23e-006* (1.91e-006)	-4.51e-006* (7.38e-006)	-6.31e-005** (3.40e-005)	-	-	-3.61e-005* (8.02e-006)	-5.29e-005* (8.32e-006)
GDP per capita	-	-	1.92e-006* (5.97e-007)	-	1.83e-006* (8.58e-007)	2.33e-006 (1.65e-006)	-	1.39e-006* (1.47e-007)	-	2.75e-006* (2.20e-007)
Ratio of poor-to-rich ( $\pi$ )	-	-	-	-	-	7.29e-005* (1.73e-005)	-	-	-	-
Ratio of poor-to-rich squared ( $\pi^2$ )	-	-	-	-	-	0.0002* (4.39e-005)	-	-	-	-
Fractionalization (elf)	-	-	-	-	-	-	-0.005* (0.0004)	-0.005* (0.005)	-0.017* (0.001)	-0.009* (0.003)
Fractionalization squared (elf <sup>2</sup> )	-	-	-	-	-	-	0.007* (0.0002)	-0.001* (0.002)	-0.011* (0.001)	-0.004* (0.002)
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GMM Structure	(3,0)	(3,0,2)	(3,0,2,0)	(3,0,2,0)	(3,0,2,0,0)	(3,0,0,0,0)	(3,0,0,0,0)	(3,0,2,0,0,0)	(3,0,0,0,3,2)	(3,0,2,0,0,3,2)
Transform	None	None	None	None	None	None	None	None	None	None
N	35	35	35	35	35	35	21	21	21	21
R <sup>2</sup>	0.14	0.73	0.03	0.71	0.07	0.21	0.78	0.63	0.62	0.67
Wald (joint)	3.98e+006*	1.69e004*	2.35e005*	1.147e006*	6.15e005*	1.43e005*	1.31e008*	3.87e004*	2.61e007*	2.09e005*
Wald (dummies)	3.98e+006*	2.75e004*	1086.0*	4.717e004*	4.76e004*	2503.0*	1.30e006*	5914.0*	1246.0*	5.07e004*
Wald (time)	33.20*	10.01*	89.93*	6.660*	107.8*	63.35*	240.5*	3.717*	868.2*	137.2*
AR(1)	2.69*	2.07**	-0.86	2.580**	-3.54*	1.99**	1.372	1.17	2.64*	2.18*
AR(2)	2.04**	-0.22	-1.29	-0.4787	-1.26	1.45	-0.02	-1.12	-0.81	-1.15



**TABLE 2: Association between Human Capital Transfers and Population Proportions**

\* denotes significance at the 5% level, \*\* denotes significance at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\delta$	$\delta$	$\delta$	$\delta$	$\delta$	$\delta$	$\delta$	$\delta$	$\delta$
Ratio of poor-to-rich ( $\pi$ )	2.61* (0.47)	3.17* (0.37)	7.79* (0.14)	2.01* (0.52)	8.49* (0.05)	3.23* (0.39)	8.21* (0.19)	2.34* (0.51)	7.68* (0.20)
Ratio of poor-to-rich squared ( $\pi^2$ )	-2.04*** (1.14)	-1.44* (0.59)	-3.99 (3.15)	-1.41* (0.61)	-4.89* (0.34)	-2.06* (0.64)	8.66* (3.18)	-2.12* (0.64)	11.53* (2.96)
Gini	-	-2.89* (0.48)	-1.25 (0.87)	-2.89* (0.46)	-16.26* (0.31)	-0.88** (0.50)	-1.45 (1.44)	-0.63 (0.41)	-5.06* (1.69)
GDP per capita	-	-	0.002* (8.19e-005)	-	0.001* (1.36e-005)	-	0.001* (5.41e-005)	-	0.001* (4.41e-005)
Ratio of poor-to-rich per capita GDP (hP/hR)	-	-	-	4.46* (0.33)	17.53* (0.29)	-	-	3.10* (0.33)	6.38* (0.34)
Fractionalization (elf)	-	-	-	-	-	-2.00* (0.24)	1.55 (1.16)	-2.11* (0.25)	1.44* (0.74)
Fractionalization squared (elf <sup>2</sup> )	-	-	-	-	-	-1.14* (0.26)	-8.63* (2.29)	-1.29* (0.28)	-4.44* (1.03)
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GMM Structure	(2,1,1)	(2,0,0,0)	(0,0,0,0)	(1,0,0,0,0)	(0,0,0,0,0)	(1,0,0,0,0,0)	(0,0,0,0,0,0)	(1,0,0,0,0,0,0)	(1,1,1,0,0,0)
Transform	None	None	None	None	None	None	None	None	None
N	68	91	98	89	96	79	85	78	84
R <sup>2</sup>	0.43	0.89	0.19	0.87	0.50	0.91	0.28	0.90	0.04
Wald (joint)	9.75e+004*	3.95e004*	5.30e+005*	2.51e004*	1.08e+007*	3.61e004*	2.11e+005*	2.60e004*	6.63e+004*
Wald (dummies)	344.8*	3202.0*	6.19e+004*	1525.0*	1.95e+005*	1247.0*	5.47e+005*	1192.0*	4.14e+004*
Wald (time)	22.99*	64.37*	170.8*	33.17*	3939.0*	61.83*	1039.0*	57.03*	50.17*
AR(1)	-1.85***	-	4.26*	0.93	4.77*	-0.12	3.60*	-0.68	5.71*
AR(2)	0.09	0.30	2.48*	-0.26	3.52*	-0.57	2.19*	-0.87	0.40

**TABLE 3: Conflict, Human Capital, Aspirations and Population Proportions**

\* denotes significance at the 5% level, \*\* denotes significance at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa	Conflict in Africa
Human capital transfer ( $\delta$ )	-	-	0.027* (0.006)	0.055* (0.006)	0.031* (0.008)	0.067* (0.010)	0.065* (0.011)	0.059* (1.77e-010)	0.062* (0.004)	0.185* (3.36e-01)	0.015* (3.13e-010)
Human capital transfer squared ( $\delta^2$ )	-	-	-0.001* (0.0001)	-0.002* (0.0002)	-0.001* (0.0002)	-0.002* (0.0003)	-0.003* (0.0003)	-0.002* (7.43e-012)	-0.003* (0.0002)	-0.008* (1.41e-011)	-0.002* (7.01e-012)
Rights	-	-0.001* (5.48e-011)	-0.005* (0.002)	0.0004 (0.003)	-0.003** (0.002)	0.001 (0.002)	0.003 (0.002)	-0.004* (2.36e-011)	-0.0003 (0.003)	-0.010* (3.22e-011)	-0.012* (7.91e-011)
GDP per capita	-0.0002* (4.08e-006)	0.003* (2.39e-011)	-	-0.002* (0.0003)	-	-0.001* (0.0003)	-	-0.002* (2.75e-011)	0.0004** (0.0001)	-	-0.005* (1.17e-011)
Fractionalization (elf)	0.20* (0.02)	0.24* (7.37e-010)	-	-	0.237* (0.04)	0.086* (0.035)	-	-	-	0.335* (1.12e-009)	0.136* (1.20e-009)
Fractionalization squared (elf <sup>2</sup> )	0.07* (0.02)	0.05* (7.64e-010)	-	-	0.055 (0.041)	-0.096* (0.038)	-	-	-	0.191* (1.02e-009)	0.036* (1.22e-009)
Ratio of poor-to-rich ( $\pi$ )	-	-	-	-	-	-	0.092 (0.054)	0.141* (7.16e-010)	0.145* (0.027)	0.061* (4.21e-01)	0.030* (9.58e-010)
Ratio of poor-to-rich squared ( $\pi^2$ )	-	-	-	-	-	-	-0.026 (0.121)	0.099* (8.09e-010)	0.175* (0.032)	-0.078* (9.96e-01)	-0.100* (1.67e-009)
Aspirations ( $\varphi$ )	0.002* (0.001)	-0.08* (1.08e-009)	-	-	-	-	-	-	0.053* (0.007)	-	-
Aspirations squared ( $\varphi^2$ )	-0.01* (0.0001)	-0.03* (2.11e-010)	-	-	-	-	-	-	0.011* (0.001)	-	-
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GMM Structure	(1,0,0,0,0)	(1,0,2,0,0,0)	(1,0,0,0)	(1,0,0,0,1)	(0,0,0,0,0)	(0,0,0,0,0)	(1,0,0,0,0)	(3,0,0,3,0,0)	(1,0,0,0,0,0,0,0)	(2,0,0,0,0,0,0)	(1,0,0,0,1,0,0,0)
Transform	None	None	None	None	None	None	None	None	None	None	None
N	22	18	31	30	29	28	21	19	21	16	15
R <sup>2</sup>	0.19	0.48	0.42	0.20	0.07	0.17	0.40	0.59	0.40	0.76	0.81
Wald (joint)	1.72e+009*	4.91e+019*	261.1*	322.7*	108.7*	543.1*	5.35e004*	5.94e020*	1.43e006*	2.31e02*	2.66e+019*
Wald (dummies)	3.75e+009*	2.17e+02*	1.61e004*	2232.0*	9021.0*	5882.0*	3642.0*	4.54e019*	8.88e005*	1.88e02*	1.74e+019*
Wald (time)	2.61e+007*	1.44e+016*	29.43*	47.24*	11.31*	18.83*	10.10*	1.49e017*	79.75*	4.16e017*	1.79e+016*
AR(1)	-0.62	4.11*	-0.18	2.67*	2.88*	2.19*	-2.61*	-2.88*	-1.38	0.226	-0.45
AR(2)	0.03	-1.20	1.19	1.59	2.50*	1.89**	-1.28	1.90**	-1.31	-	4.21*