

Characterizing Conflict Forms*

J. Fedderke[†] and C. Kularatne[‡]

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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. Results in the paper derives conditions under which the rich will redistribute to the point of equality with the poor; conditions under which the disadvantaged face genocide; as well as 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 1960-200 period.

1 Introduction

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, and 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President released black political prisoners, unbanned black opposition parties that had been outlawed for 30 years, repealed Apartheid laws, and placed a moratorium on state repression.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.

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[†]University of Cape Town and Economic Research Southern Africa, johannes.fedderke@uct.ac.za

[‡]University of Cape Town, chandana.kularatne@uct.ac.za

Unlike South Africa, Sri Lanka is currently mired in conflict.¹ 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, erupting into an armed struggle in the 1980s. This conflict, which has been suppressed and is now non-violent, still exists.² The implication is that the current conflict is not simply rooted in differences in ethnicity. for instance, Abeyratne (2004) suggests that "ethnicity could well be only a mobilization device rather than the root cause."³

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 struggling with the pressures of attaining higher levels of economic growth heading towards political conflict.

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

The modern political economy literature suggests at least four possible approaches to answering these questions.

The first locates political transitions in a long tradition which assigns the trigger for change to a moment of economic "crisis."⁴ The approach receives full formal treatment in Acemoglu and Robinson (2001),⁵ in which an elite and the poor of a society are engaged in a strategic interaction which can result in regime change. In nondemocratic regimes,

¹The term 'conflict' refers to either active or potential use of collective violence, including civil war – the deliberate destruction of persons and property by people acting together–in order to achieve specified political objectives (Rule 1988).

²In 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-fourth 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, which means People's Liberation Front), after its first aborted attempt, dissolved temporally. The JVP arose again by the early 1980s and made their second attempt launching an armed struggle since 1986 to capture state power. The large-scale violence spread over the Southern parts of the country and lasted for a period of four years till 1989. But the JVP has continued to remain as an important force in the political scene.

³The 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 soem 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 indigenious Sri Lankans who occupied powerful positions in the administration under the colonial government (Jayawardena 2002). As the colonial government nurtured the class structure in order to rule the country, these individuals rose to prominence under colonial rule by loyal service to the British Empire - see Abeyratne (2004). It explains the rise to prominence of certain families such as the Bandaranaike family who were high caste (goigama) Sri Lankans who provided loyal service to the colonial government.

⁴The hypothesis is venerable, but see for example Haggard and Kaufman (1995), Przeworski et al (1996), and Rustow (1970).

⁵Earlier contributions include Acemoglu and Robinson (2000),

the elite excludes the poor from political power, but face a revolutionary threat from the poor 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 poor can enforce redistribution through the fiscus. The elite's defence against the revolutionary threat by means of preemptive redistribution of resources to the poor effectively raises the cost of revolt. Democratic states enfranchise the poor, 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 Acemoglu and Robinson (henceforth ARM) model is the degree of income inequality. Both nondemocracies and democracies can be consolidated only when inequality is sufficiently moderate, such that political instability increases in the degree of inequality.⁶ Further, redistribution is greatest neither for very high nor under low degrees of inequality, but at intermediate levels of inequality.

While the original framework aimed at comparing the relative stability of European and Latin American democracies, Acemoglu and Robinson (2006a) contains an explicit application to the South African transition. The inference drawn is that the South African transition is attributable to declining income inequality after 1970, while the maximum costs of repression consistent with repression was falling. Based on the ARM framework, the reason for conflict in Sri Lanka should similarly be rising levels of inequality and declining costs of repression. ARM claim that the elite will engage in a preemptive redistribution of resources to the poor in order to avoid revolutionary threat by the poor. This will effectively raise the cost of revolt.

Attractions of the ARM framework is the explicit behavioural treatment of the strategic interaction between the social groups in a full dynamic setting, which captures the potential for both stability and instability of democratic and nondemocratic regimes alike, in effect an "endogenous" emergence of institutions and their degree of persistence.

However, 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 occurred post-independence and thus relatively early.⁷ The youth who were brought up within an extensive welfare system and they ceased to rely on their birth status as a source of identity (Hettige 1992). This implies that (on the basis of the ARM model) conflict should have been avoided. Figure 1 and Table 1 illustrate the case

INSERT FIGURE 1 ABOUT HERE.

INSERT TABLE 1 ABOUT HERE.

It is also not apparent that the ARM is adequate to the South African case study, for two reasons. First, as Figure 2 illustrates, evidence in favour of falling income inequality in

⁶Consistent 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.

⁷The transfer of human capital to the disadvantaged manifested in free education from primary to university level (including free mid-day meal and milk at school, later free uniforms and textbooks) covering the entire country.

South Africa is by no means clear post 1970,⁸ and with evidence in improvements occurring only *after* the process of political transition having begun.⁹ Second, and crucially, 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 3.

INSERT FIGURE 2 ABOUT HERE.

INSERT FIGURE 3 ABOUT HERE.

Under the ARM, 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 4. One interpretation of this evidence is that expanding educational opportunity led to rising, and ultimately uncontrollable political aspirations by the disadvantaged exposed to new ideas. 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).

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 - see the evidence reported in Fedderke and Luiz (2006) and reproduced in Table 2.¹⁰

INSERT FIGURE 4 ABOUT HERE.

INSERT TABLE 2 ABOUT HERE.

A symmetrical case can be made for Sri Lanka - see Abeyratne (2004) and Wickramasinghe (1990). The the democratic political system of the country was instrumental in expanding the welfare state regardless of the position of the state coffers or the level of economic growth (Abeyratne, 2004).¹¹ This welfare transfer had the unintended consequence of increasing the productivity of the disadvantaged segment of Sri Lankan society.¹² But as neither the Sinhala nor the Tamil were homogeneous communities in terms of political, social, cultural and economic factors, there was a conflict in interests between different segments

⁸Of course, the persistent difference in relative incomes is consistent with a rising share of total output attaching to the disadvantaged majority, who constitute arising proportion of the total population.

⁹As Hoogeveen and Özler (2003) show, the evidence in faovur of falling inequality and poverty post-1994 is also mixed, with considerable evidence pointing toward *rising* inequality.

¹⁰Consistent with the argument in Wood (2000).

¹¹To 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).

¹²The Singaporean Prime Minister at the time - Lee Kuan Yew - was full of praise for the welfare state that Sri Lanka had embarked on and was advocating for Singapore to employ the Sri Lankan model of development.

in each community (Abeyratne 1998, Kloos 1993). Abeyratne (2004) claims that there was increasing demand by the youth for economic resources and opportunities for their "upward social mobility." The inadequate expansion of economic prosperity for the newly educated youth (from both communities) in the 1950s led to them becoming increasingly disillusioned with the established traditional (aristocratic) political structure. The process culminated in 1956 with the change of government, labelled 'the fall of the mandarins' in the literature.¹³ See Figure 1 above.

What might account for the human capital transfer in the face of evidence that this was inconsistent with repressive and non-participatory political structures in South Africa? One answer lies in the fact that the human capital transfer was necessary for the productive needs of the economy - see the evidence presented in Fedderke (2006). The white elite transferred human capital in the face of a choice tension - rising political aspirations under rising human capital endowments of the disadvantaged black majority with associated rising costs of repression, against the improved productive capacity of the economy under the improved efficiency of labour inputs into production.

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

An alternative approach of conceptualizing conflict is provided by the Hirshleifer (1995) model of anarchy (henceforth HAM).¹⁴ Under the HAM, 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, to a fighting technology designed to extract resources from the other (equivalently: prevent extraction by the other agent). What is useful about the HAM is that it serves to characterize conflict, and identifies conditions under which perpetual conflict can be a stable outcome (essentially low efficiency of fighting technology), and can generate a range of intensity of conflict in the equilibrium solution (as the efficiency of fighting technology varies). By inference, there exist alternative outcomes in which stable non-conflictual equilibria emerge, but only under either the complete victory of one of the contesting agents, or as an explicit Hobbesian intervention by the state:

the realization of freedom presupposes a history, and one full of struggle and conflict. And we can consider it providential that men are not inclined by nature to harmony, but are marked by antagonism, by 'unsocial sociability.' For this is what goads them ever onward towards the only stable solution possible for human society, a law-governed social order. Meanwhile, as we look over the span of centuries, we can see men driven ever by their own conflicts and tensions towards their own destinies (Taylor, 1985:336).

The attraction of the framework lies in the fact that an obvious way of thinking of the South African transition might be of a protracted period of stable conflict between black and white, while neither side had decisive technology to ensure victory. However, steadily

¹³'The fall of the mandarins' is a literal translation given by writer Tissa Abeysekera in an article in Martin Wickremasinghe Centenary Commemoration Volume (1990). The article 'The Fall of the Mandarins' was written by Martin Wickremasinghe in 1956 to the Sinhala monthly magazine 'Rasavahini' - a Times of Ceylon publication. It was written in Sinhala and titled '*Bamunu kulaya bindavatima*' which translates to 'The crumbling of the aristocratic class'.

¹⁴There are a number of extensions of the framework, collected in Hirshleifer (2001).

the balance of power might have swung to the black majority, either as their population preponderance grew over time (see for instance the racial fractionalization index for South Africa reported in Figure 5), or as whites lost the technological advantage in the contest - perhaps through the force of extensive international technological and financial sanctions.¹⁵

INSERT FIGURE 5 ABOUT HERE.

Similarly, the HAM methodology also appears attractive in defining the protracted Sinhala-Tamil conflict in arguing that no conclusion has been reached as neither side has the sufficient advantage over fighting technology. Based on the HAM theory, one may even argue that for the cessation of conflict to occur a military embargo on either or both sides would result in an end to hostilities. The methodology may also explain why the Sinhala youth rebellion of the 1980s was effectively suppressed, with the latter having insufficient military technology to engage in an armed struggle.

Arguably, however, HAM is also not satisfactory in capturing the South African case study experience. First, it is entirely unable to account for the possibility that agents may choose to redistribute resources to their "opponents." Under the ARM, the privileged can do so in the form of welfare (not productivity enhancing) payments, but under the HAM such active transfers are *never* feasible.¹⁶ Likewise, for Sri Lanka, the welfare transfer to the disadvantaged majority by the aristocratic elite is not explained by the HAM model. Second, the political transition did not eliminate conflict - while political instability has fallen off dramatically, crime as a social pathology remains high, and financial markets show evidence of continued high risk premia attaching to South African financial instruments - see Figure 6 for a new measure of uncertainty, and Figure 7 for a comparison with the political instability measure of Figure 4. In Sri Lanka as well, the suppression of the Sinhala militant uprising has also not eliminated conflict completely. Only the description of conflict has undergone a metamorphosis into one of 'gunless' protests. The JVP are still vociferous in their demands for a more equitable share of the country's output among its citizens using the trade unions and political marches to express their dissatisfaction with the status quo. Thus political instability amongst the Sinhalese community has not abated.

Thus the transition is less a case of complete hegemony of one group over another, and more one of a continuation of history by other means.¹⁷

INSERT FIGURE 6 ABOUT HERE.

INSERT FIGURE 7 ABOUT HERE.

The third conceptual framework useful to our question is provided by a model by Bourguignon and Verdier (2005)¹⁸ (henceforth BVM) which explores the political economy of education and development. In this framework the political elite does have an incentive to transfer human capital to the disadvantaged determined through a productivity gain re-

¹⁵See for instance the discussion in Welsh (2000).

¹⁶Unless one counts low defences against predation by one's opponent as an effective transfer.

¹⁷In a framework that is reminiscent of the HAM, 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. While a suggestive extension, the model has incomplete purchase on the South African transition experience, since the state, through its coercion hindered transformation, rather than fostering it.

¹⁸The paper draws on a number of earlier contributions by the same authors, Bourguignon and Verdier (2000a,b).

alised by the poor. This fits the depiction of the human capital transfers of Figure 3, and the development of the Sri Lankan welfare state. Moreover, the transfer of human capital to the disadvantaged can result in the disadvantaged who obtain the additional human capital gaining access to political power. A particular concern in the BVM framework, is the impact of trade liberalization and the integration of international factor markets on the incentive of the privileged to transfer human capital to the poor - with liberalization introducing a non-monotonicity in the transfer of human capital by diminishing the incentive in the short run, raising it in the long run.

There is nevertheless a twofold and crucial divergence from the South African experience in the BVM. First, in the BVM the transfer of human capital typically leads to the political empowerment of the poor, 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 3), political rights were increasingly *withdrawn* from the black majority. Figure 8 reports a political rights index for South Africa, which shows that rights only began improving in South Africa well into the 1980s, after a few decades of human capital transfers. The human capital transfers did not issue in the realization of political rights - they led to increased *aspirations* for such rights, with the continued denial of the rights leading to the sporadic political upheaval detailed in Figure 4 above.

INSERT FIGURE 8 ABOUT HERE.

INSERT FIGURE 9 ABOUT HERE.

The continuous welfare transfers post-independence in Sri Lanka (especially human capital transfers via subsidization of education) along with universal franchise have led to increasing peoples' aspirations for increased political rights as indicated in the BVM model. However, as in South Africa, these aspirations did not translate into effective political rights. Instead, as with South Africa, increased restrictions on political participation were introduced and measures such as the change in the constitution to allow for a president with executive powers was introduced in 1977. See the evidence of Figure 10, which reports the Freedom House and Polity standardized measures of rights.

INSERT FIGURE 10 ABOUT HERE.

Second, the BVM framework is useful in that it allows for a changing income share between the rich and the poor over time. But the driver for this in the BVM model is not the human capital transfer, but in the final instance a shift in relative prices between unskilled labour intensive manufactures, and skilled labour intensive manufactures that results from the process of trade liberalization.¹⁹ It is the relative price change which leads to a reallocation of human capital. 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. Figure 9 confirms that the openness of the South African economy has varied substantially over the 1970 - 2000 period,²⁰ but nevertheless, price cost margins both for the South African manufacturing sector as a whole, as well as for individual sectors has remained essentially constant over this period - see the evidence in Aghion et al (2006).

As indicated earlier, political pressure and not the relative price change was the cause

¹⁹In Bourguignon and Verdier (2000a) inequality also plays a role - but for the South African context we have already dismissed this as a feasible driver.

²⁰The index is due to Aron and Muellbauer (2007).

of the reallocation of human capital through the welfare system in Sri Lanka. The country has remained relatively closed from 1956-1977 with import substitution policies along with the continuation of a welfare state (begun post-independence) being strictly adhered to. Thus changes in relative prices resulting from trade liberalization could not be the cause of changing income shares between the ‘mandarins’ and the rest of the Sri Lanka populace. Moreover, political tension in Sri Lanka, which had roots deep into the contradictions in the development process of the country, escalated into the twin civil war a few years after the introduction of the liberalized trade regime in 1977 (Abeyratne, 2004). Although some political analysts²¹ have argued that the civil war in Sri Lanka is mainly a product of trade liberalization, they fail by overlooking the fundamental policy errors throughout the post independence era, which set the groundwork for the civil war.

In addition, one may argue that it was trade liberalization that led to the decline in the welfare system and effectively diminished the incentive to transfer to the disadvantaged individuals in society, as claimed by the BVM model. However, the generation of employment and income for the rural sector with the expansion of labour-intensive industry has been much greater than that in the pre-1977 stagnant economy, where people were compelled to share poverty (Abeyratne, 2004). Thus, in hindsight, if Sri Lanka initiated its trade reforms earlier she could have perhaps avoided civil war. Interestingly, Sri Lanka has maintained its growth and distributive performance in the midst of a civil war.²² One of the critical factors attributed to the stellar performance of the Sri Lankan economy in the midst of war is the trade liberalization reforms commenced before the out break of civil war.²³

While the first three possible frameworks by which one might characterize the South African transition are theoretical, the fourth is empirical. Collier et al (2006)²⁴ (henceforth CHRM) undertakes an empirical examination of a range of potential drivers of civil war. Drawing on a variant of the HAM, the approach balances feasibility²⁵ against motivation.²⁶ The findings are that both feasibility and motivation do indeed 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. For both countries, of the factors that prove significant in CHRM, only per capita income, population size, fractionalization and the proportion of young males in the population could plausibly account for the political transition: 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

²¹See Gunasinghe (1984) and Dunham and Jayasuriya (2000) who claim that trade liberalization adversely affected Tamil farmers while simultaneously dismantling social welfare and widening inequality.

²²See Stewart and O’Sullivan (1999: 374)

²³See Abeyratne (2004)

²⁴See also Collier and Hoeffler (2006).

²⁵They 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.

²⁶Which can include grievance, predation as well as insanity.

fractionalization. Unless we are therefore prepared to accept the uni-causal explanation, that it was the rising proportion of the black population that drove the transition, the CHRM framework is also incomplete as an account of South Africa's experience. In the case of Sri Lanka, income per capita has been rising post 1977 and thus the conflict should be subsiding and not escalating. The relative population sizes between the two groups has also remained relatively constant implying ethnic fractionalization has remained relatively fixed. Moreover, from 1956, with the introduction of Sinhala in education and administration, all Sri Lankans were compelled to learn Sinhalese.²⁷ This implies that linguistic fractionalization has declined reducing the probability of conflict in Sri Lanka according to the CHRM model. However, the proportion of young males (for both ethnic groups) in the population has increased (as in the case of South Africa). Despite the fact that for both countries only one variable changed over time, and in the same direction (increased young male proportions), in one instance we have the emergence of conflict in the one instance, and peace in the other. What might explain this contradiction in political outcomes?

In this paper we therefore 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 optimal distribution of resources between rich and poor. Required of the model is the ability to account for varying degrees of intensity of conflict, from potential eradication (genocide) to transfer of power, as in South Africa in 1994. Perpetual conflict (as experienced in Sri Lanka) is also rendered feasible.

As a mark of success in the modeling exercise, we therefore are 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 very briefly considers some robustness checks of the results while 6 concludes.

2 Foundations of the Model

Consider a society with two groups of individuals - the *privileged* (R) and the *disadvantaged* (P) 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 equal

²⁷In addition, the Sri Lankan government in the 1960s introduced a District quota system which reduced the number of Tamil students entering the universities. This was because the Northern Tamils had an undue advantage over the majority Sinhala students in the South on account of the number of good English schools set up by the American and British missionaries in the 19th century resulting in the admissions to universities, especially in the fields of medicine, engineering and natural sciences. This is similar to the affirmative action policy currently implemented by the South African government.

$L = L^R + L^P$ where L^R and L^P equals the population of the privileged and disadvantaged segments of society, respectively.

Let π represent the ratio of the population of the disadvantaged to privileged segment of society:

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

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}^R) than the disadvantaged segment (\bar{h}^P) of society ($\bar{h}^R > \bar{h}^P > 0$).

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 from) a proportion, δ of their human capital endowment \bar{h}^R to the disadvantaged segment. After redistribution privileged individuals thus hold $(1-\delta)\bar{h}^R > 0$ human capital, disadvantaged individuals $(\bar{h}^P + \frac{\delta}{\pi}\bar{h}^R) > 0$. The δ 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 poor in order to allocate the resources to the privileged.

Average per capita human capital for the entire society is given by:²⁸

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

Average per capital human capital for the entire society (h) 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:

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

The upper bound value 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 poor. The upper and lower bounds of δ are illustrated in Figure 11, for alternative values of π , \bar{h}^R/\bar{h}^P .

INSERT FIGURE 11 ABOUT HERE.

Crucial to the model is a concept of power. Power is held only by the privileged. Power is expressed by the ability to determine δ . It is determined by the *relative* endowment of human capital held by the rich, relative to the social average, denoted (r). However, the poor are not passive. Specifically, any given level of relative human capital endowment held by the poor relative to the rich, denoted (ϕ), translates into *aspiration* to exercise greater discretion over the allocation of resources in society. Aspirations might be thought

²⁸Using the following definition of aggregate human capital for the entire country:

$$H = H^R + H^P = [L^R(1 - \delta)h^R + L^P(h^P + \frac{\delta}{\pi}h^R)]$$

of as disadvantaged individuals becoming more knowledgeable about rights of resistance to any prospective extraction, are able to use their skills (human capital) to address collective action problems more effectively and . In effect, the privileged are characterized by the fact that they exercise choice over the level of redistribution or extraction (δ). However in allocating more human capital to the poor, they awake aspirations in the poor to power. The implication of this conception of power is that inequality in the relative distribution of human capital between the two sections of society matters as it results in distributional conflict between the two societies.

Formally, let ω 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.²⁹ Then:

$$\omega = r^\phi \tag{4}$$

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

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

Note that power (ω) decreases with respect to rising aspirations (ϕ). The ϕ parameter takes into account the relative number of human capital disadvantaged individuals and the extent of their poverty (relative endowment of human capital). We note that $\phi > 0$ and $0 < \omega < 1$, $\forall -\pi \left(\frac{\bar{h}^P}{\bar{h}^R} \right) < \delta < \left(\frac{\pi}{1+\pi} \right) \left(1 - \frac{\bar{h}^P}{\bar{h}^R} \right)$, $\pi > 0$ and $\bar{h}^R > \bar{h}^P > 0$.³⁰ Figures 12 and 13 illustrate variation in ω , ϕ , as the ratio of the poor to rich, and the ratio of rich to poor per capita human capital changes respectively.

INSERT FIGURES 12 AND 13 ABOUT HERE.

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

$$U^R = \alpha \ln(c^R) + \beta \ln(c^P); \alpha + \beta = 1 \tag{7}$$

where c^R, c^P 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.³¹ We associate the distinction with two forms of empirically observable production - agrarian and industrial. Under agrarian production, production units are separable, and can effectively attain sufficiency independently of one another. 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-sufficient. A stylized example would be two villages, which under

²⁹Symmetrically, $1 - \omega$ represents the power held by a representative agent belonging to the disadvantaged segment of society.

³⁰We also note that $\partial\phi/\partial\bar{h}^R < 0$, $\partial\phi/\partial\delta > 0$, $\partial\phi/\partial\bar{h}^P > 0$ and $\partial\phi/\partial\pi > 0$. Symmetrically, $\partial\omega/\partial\bar{h}^R > 0$, $\partial\omega/\partial\delta < 0$, $\partial\omega/\partial\bar{h}^P < 0$ and $\partial\omega/\partial\pi < 0$.

³¹Note that Hirschleifer (1995) employs only separable production, and ignores the possibility of interdependent production.

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 two societies production of the privileged and disadvantaged societies are *not* interdependent. We obtain this feature by treating the production of the rich and the poor as additively separable:

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

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

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

For the sake of simplicity technology is common to the advantaged and disadvantaged.

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

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

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

with average output of the entire economy of:

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

The privileged maximize utility (7). Assume for the sake of simplicity that $\beta = 0$, so that the privileged care only about themselves, and not about the poor in their objective function. Under these conditions the problem facing the representative privileged agent is:

$$Max \ln(c^R) \quad (13)$$

subject to:

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

with first order condition:

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

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

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 their respective production interacting with one another. We obtain this feature by using a Cobb-Douglas form of the production function for the entire society:

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

where notation is defined as above and, γ and μ 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:³²

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

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

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

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

with relevant first order condition:

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

where k is defined as for (15).

³²We normalize on L^R . Thus the L^R is set to 1 in (19).

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 (Genocide) *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. Genocide will not emerge under interdependent production, nor under separable production provided that returns to scale are decreasing.*

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

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

The intuition for the genocide proposition is straightforward. Under separable production, the only circumstances under which the rich stand to gain from redistribution to the poor, is under decreasing returns to scale. Given constant or increasing returns, the rich always gain from extracting additional resources from the poor, 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 poor to the rich. Provided that the power loss that attends the redistribution is not too great, the rich stand to benefit from allocating productive resources to the poor, and recovering the loss through the power to extract. By contrast, where production is interdependent, the rich simply cannot drive the poor to extinction, since this would eliminate the possibility to produce for themselves also.

The significance of the genocide proposition lies in its implications for the distinction between agrarian and industrial societies, and the forms of conflict that 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 genocide - but attempts at the complete elimination of "enemy" societies are hardly unique in human history. 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.

To be sure, modern conflict is often associated with cataclysmic human loss, often far exceeding that of earlier genocidal conflict in its sheer scale. World War II resulted in up to 60 million deaths. But 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 the incorporation of the resources the enemy controlled instead.³³

How to conceptualize this difference? 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.³⁴

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.³⁵ 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 poorer societies, but rather their incorporation in order to limit the impact of decreasing

³³It 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 instance, pogroms and genocide aimed at the Jews is arguably different. Antisemitism persists across time, technology and cultures, and thus lies outside of the framework presented here.

³⁴Lamb 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)

³⁵As long as the cost of fighting does not outweigh the loss due to redistribution

returns to scale.

Note that 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 at the incorporation of additional resources, not at their destruction.

The implication of the present discussion therefore is that the declining intensity of conflict, 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 $\delta \geq \left(\frac{\pi}{1+\pi}\right) \left(1 - \frac{\bar{h}^P}{\bar{h}^R}\right)$.

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 $[(\bar{h}^P + \frac{\delta}{\pi}\bar{h}^R)]^{\theta-1} - [(1-\delta)\bar{h}^R]^{\theta-1} = 0$ and $k\frac{y^R}{\omega} > 0$, $\nexists \delta$ satisfying (15).

For interdependent production, under $\delta = \left(\frac{\pi}{1+\pi}\right) \left(1 - \frac{\bar{h}^P}{\bar{h}^R}\right)$, 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 (μ/γ) is sufficiently large relative to the level of aspirations in society (ϕ), 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, and share resources in society with the previously disadvantaged, in order to render society more productive.

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 rich to the poor, is either low, or high.*

Proof. Numeric optimization provides the evidence presented in Figures 14 and 15.

INSERT FIGURES 14 AND 15 ABOUT HERE. ■

Here the trade-off between productive gain and aspirations binds. Where the disadvantaged constitute a very small minority, there is no real productive gain from redistributing resources to the poor. Where the disadvantaged constitute a sufficiently large majority, redistribution comes to represent a danger to the privileged, since rising aspirations of the poor erodes the power of the rich. 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 16 provides the account visually, in cross section for any given ratio of privileged to disadvantaged human capital, for the case of interdependent production.

INSERT FIGURE 16 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 poor for themselves, to realize the associated productive gains. 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 power of the privileged is virtually complete, $\omega \rightarrow 1$.

The BVM model states that “if the educated skilled workers are numerous enough, they will then be able to impose the redistribution of period 1’s income in their favour” through a tax on capital. The difference in our paper is that the rich may decide to redistribute such that equality holds under interdependent production and under a very special case. In the BVM model complete redistribution is also possible under a very special case, i.e., if the tax on capital is not too high and if the net return on capital is large enough.

One may think of the tax on capital enforced by the newly skilled workers in the BVM model as the power parameter for the disadvantaged. If the disadvantaged have enough power (or the rich have too little power) the productivity gain from redistribution of human capital is lost by the rich to the poor due to (in our paper) rising aspirations. In the BVM model however, the level of tax is not endogenously determined. The only thing that determines whether a tax is imposed or not is the number of unskilled the capitalists decide to educate. In our paper, aspirations (tax on the privileged) rises with the relative number of poor people but there is always a tax on the rich as a result of a rising number of poor individuals as aspirations rise with π .

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 rich members of society. We consider two relevant issues: does it matter if the elite cares about the welfare of the poor (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 (7) we assume $\beta > 0$. We also assume that $\alpha > \beta$.³⁶ This implies simply, and reasonably, that the privileged care more about their own utility than the agent belonging to the disadvantaged society. Checking for robustness of the propositions, we find

³⁶Recall that we assumed earlier that $\alpha + \beta = 1$.

the following:³⁷

- The Genocide Proposition (1) still holds;
- The Equalization Proposition (2) still holds but at a *higher* level of aspirations. This implies that the privileged are willing to loose 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.

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

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

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:³⁸

- The Genocide Proposition (1) still holds; However, genocide 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 loose power.
- The Intensity Proposition (3) still holds.

The moral of the story of a cultured elite is that the disadvantaged of society should prefer an elite which is narrowly focussed on the maximization of its monetary wealth - not an elite that appreciates theatre and opera in its own right.

In our model, if we included different prices for goods sold to poor and rich, 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 rich and poor 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 poor and rich. If the rich and poor used their human capital allocation with varying degrees of efficiency in the production process, then 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 rich may care about the poor (though less than about themselves), and to the introduction of a cultured elite.

³⁷Numeric optimization provides the evidence presented.

³⁸Numeric optimization provides the evidence presented.

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. Yet the features of the model were derived on the basis of the specific experiences of two concrete countries, South Africa and Sri Lanka. The obvious question therefore is whether the model generalizes to the experience of other countries? In this section we approach the question empirically, by exploring three core predictions to emerge from the theoretical formulations presented above:

1. The most fundamental mechanism posited by the paper is that political aspirations rise in the amount of human capital transferred to the disadvantaged.
2. While the advantaged have an incentive to transfer human capital to the poor in order to raise their productivity, they pay a cost in the form of a power loss in the amount of human capital transferred to the disadvantaged.
3. That the transfer of human capital from rich to poor (δ), declines as the ratio of the poor to the rich population in society (π) rises - subject to a potential non-linearity, such that at very low ratios of disadvantaged to advantaged populations the advantaged members of society may cease transferring human capital to the poor. Thus a measure for human capital transfers should decline in a measure of the ratio of poor to rich.
4. Finally, consider the implications of our results for conflict. We draw four distinct inferences from the theoretical results of the paper:
 - (a) Conflict should be concave in measures of aspirations. At low levels of aspirations, the poor do not have the means of mounting strong opposition to the advantaged of society. Conversely, where the human capital endowment of the poor is sufficiently high, the reason for conflict has disappeared, since the human capital endowment of the poor begins to approach that of the rich sufficiently to render conflict counter-productive.
 - (b) A similar concavity should apply for measures of human capital transfers (δ). Since it is the human capital endowments of the poor relative to the rich that drives aspirations in our model, the reasoning is symmetrical to that for conflict and aspirations.
 - (c) Finally, concavity should also apply to the relation between conflict and the ratio of the poor to the rich population.

5.1 The Data Sets

We construct a panel of 206 countries, for the years 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, and 2000, though differential data availability across the data measures reduces the effective sample to 102 countries and renders the panel unbalanced.

We employ the World Income Inequality Database (WIID) in order to obtain measures of inequality and the proportions of rich and poor in society. Use of the Gini coefficient and Sen poverty indexes are crucial in the measurement of both power, and in the π -ratio of the paper - the proportion of poor to rich in society. We denote this variable LP_LR .

Human capital endowments and transfers are crucial to the mechanisms explored in this paper. The human capital endowment of the disadvantaged are approximated by standard measures of years of schooling, obtained from the standard Barro-Lee database posted on the World Bank website. For a measure of human capital transfers, we employ school and tertiary enrollment rates from the same Barro-Lee source.³⁹

5.2 Operationalizing the Concepts of the Paper: Power & Aspirations

The paper has introduced two fundamental concepts that require operationalization: power and aspirations.

The measure of power of the paper represents the ability of the rich to extract the output produced by the economy. By inference, it is an expression of the *distribution* of resources in the economy. Specifically:

$$\omega = r^\phi \tag{23}$$

$$\text{where } r = \frac{(1 - \delta) \bar{h}^R}{(\bar{h}^R + \pi \bar{h}^P)} = \frac{(1 - \delta) \bar{H}^R}{(\bar{H}^R + \bar{H}^P)} \tag{24}$$

$$\text{and } \phi = \left[\frac{\pi \bar{h}^P + \delta \bar{h}^R}{(1 - \delta) \bar{h}^R} \right] = \frac{\bar{H}^P}{\bar{H}^R} \tag{25}$$

Using the aggregate GDP in US \$ PPP terms for each country, we are able to calculate GDP^R and GDP^P , on the assumption that $\bar{H}^R \approx GDP^R$ and $\bar{H}^P \approx GDP^P$, where GDP^P is defined by the total income earned by all people who find themselves below 60% of the median⁴⁰ and GDP^R is as defined by the total income earned by all people who find themselves above 200% of the median.⁴¹ A proxy for our measure of power is then:

$$\hat{\omega} = \hat{r}^{\hat{\phi}} \tag{26}$$

$$\text{where } \hat{r} = \frac{GDP^R}{(GDP^R + GDP^P)} \tag{27}$$

$$\text{and } \hat{\phi} = \frac{GDP^P}{GDP^R} \tag{28}$$

Given the definition of the measure of aspirations (ϕ), we note that this is a measure of social distance between the richest and poorest of society as defined above. Correlation

³⁹Primary school enrolment does not demonstrate sufficient variation across countries to be empirically useful in estimation.

⁴⁰This 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 (2000) 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 π -ratio (the proportion of poor to rich in society) across countries.

⁴¹There 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).

coefficients between $\hat{\phi}$ and the inverse of Sen's poverty measures indicate a strong positive correlation between the variables - see Table 3.⁴²

INSERT TABLE 3 ABOUT HERE.

Likewise, the ratio (r) is also a measure of social distance. Thus the power variable of the paper is a representation of the social distance. The greater the social distance of the rich from the poor in society, greater the power of the rich and thus $\omega \rightarrow 1$.⁴³

5.3 Confirming the Fundamental Mechanisms of the Model

The model posits two fundamental mechanisms that generate the final results. First that human capital transfers to the poor of society raise their political aspirations. Second, that rising aspirations of the poor serve to lower the power of the rich. We begin by examining whether the presence of these mechanisms is supported by the evidence.

5.3.1 The Association between Aspirations and Human Capital

Recall that the basic mechanism posited by the paper is that the aspirations of the poor rise as the transfer of human capital to the poor increases. In Figures 17 and 18 we report the cross plots of the measure of aspiration ($\hat{\phi}$) and the school and tertiary enrollment rates that we employ to proxy for δ for the year 1995. Thus our measures of aspirations rise as the intensity of schooling in a society increases - consistent with the predictions of our theory.

INSERT FIGURES 17 THROUGH 18 ABOUT HERE.

The positive association predicted by our theory is clearly supported by the data, regardless of which time point is considered. In Table 4 we report GMM estimation results testing the association between the aspirations measure and the secondary school enrollment rate. Expectations of agents may reflect the aspirations associated with the human capital endowment of today into the future, once again ensuring correlation between the lagged human capital measure and the error term of the estimation. To correct for this possibility, we estimate under the GMM estimator of Arrelano and Bond (1991) and Arrelano 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. Diagnostics of the estimation confirm the appropriateness of the instruments, while the human capital endowment measure continues

⁴²Consider Equation (25), and note that this measure is a reparametrization of the inverse of Sen's Poverty Index. Sen's Poverty Index may be represented in two forms: $PSen1 = HI$ or $PSen2 = H[I + (1 - I)G]$, where $H = \left(\frac{L^P}{L^P + L^R}\right) = \left(\frac{\pi}{1 + \pi}\right)$, G is the Gini coefficient and I measures the income gap ratio - the average income gap of the poor from the poverty line, $\bar{h} = \frac{\bar{h}^R + \pi \bar{h}^P}{(1 + \pi)}$, taken as a ratio of \bar{h} , such that $I = \left(1 - \frac{\bar{h}^P}{\bar{h}}\right)$. 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 reparamaterization such that $\phi = \left[\frac{\pi \bar{h}^P + \delta \bar{h}^R}{(1 - \delta) \bar{h}^R}\right] = \frac{\bar{H}^P}{\bar{H}^R} \approx \frac{1}{PSen1} \approx \frac{1}{PSen2}$.

⁴³The measure of social distance provides another definition of inequality of resource distribution. A natural question is whether standard inequality measures map into the power variable. An obvious candidate is the Gini (G) coefficient measure of statistical dispersion most prominently used as a measure of inequality of income distribution or inequality of wealth distribution. The conceptual similarities between our power proxy and the Gini coefficient, suggests that the Gini may provide an immediate indirect measure of the inequality of power distribution. Statistically, it certainly appears as if the correlation between our $\hat{\omega}$ and the Gini is both strong, and persistent over time. For our set of 205 countries, we find that the correlation coefficient between the Gini and our constructed measure or "power" ($\hat{\omega}$), is 0.66.

to report a positive and statistically significant impact on aspirations.⁴⁴

Column (1) reports a positive, statistically significant relationship between school enrollment rates (δ) and our measure of aspirations. Further, this linear effect is robust to controlling for potential non-linearity in the association. The estimation results indicate that the school enrollments rates rise at a decreasing rate as argued by the theory - rising aspirations decrease the willingness of the rich to allocate δ to the poor. We also find that rising ethnolinguistic fractionalization reduces aspirations at an increasing rate. The increasing costs of coordination with rising fractionalization may reduce aspirations exponentially. These results are robust to the inclusion of GDP per capita as a control variable.⁴⁵

INSERT TABLE 4 ABOUT HERE.

5.3.2 The Association between Aspirations and Power

Rising aspirations should be negatively associated with power of the rich. In fact the correlation coefficient between aspirations and power of the rich is -0.96 . Figure 19 illustrates that our measure of aspirations rises at the expense of our measure of the power of the rich.

INSERT FIGURE 19 ABOUT HERE.

The model argues that while the rich have an incentive to transfer human capital to the poor in order to raise their productivity, they pay a cost in the form of a loss in power. This notion is displayed in Table 5 where column (1) displays a loss of power with rising aspirations. Given the fact our measure of aspirations is a reparametrization of the inverse of Sen's poverty index, this result holds when we use Sen's measure. Recall that our measure of aspirations approximates the social distance between two groups in society which is an indication of the degree of poverty of one group vis-à-vis the other.

Disaggregating aspirations into the ratio of per capita human capital of the poor-to-rich and the ratio of the poor to the rich population in society (π), we find that power declines in both these ratios as posited by our theory. This indicates that there is a cost to the rich as the poor gain relatively more resources and/or if the population of the poor rises relative to that of the rich.

INSERT TABLE 5 ABOUT HERE

5.3.3 The Association between Human Capital, Productivity and Power

The total output available for consumption for the rich is:

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

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

⁴⁴We note that the estimations are carried out using the pooled OLS, GLS and maximum likelihood estimator. The results are consistent with findings using the GMM estimator with the added caveat that when we do not fully correct for endogeneity, we have lower absolute impacts and larger standard errors. For the rest of the estimations we use GMM estimator.

⁴⁵Here we use the lagged value of GDP per capita.

From (29) and (29), the measure of productivity of the rich is given by:

$$Prody^R = A\pi \left\{ [(1 - \delta) \bar{h}^R]^\gamma \left[\bar{h}^P + \frac{\delta}{\pi} \bar{h}^R \right]^\mu \right\} \quad (29)$$

$$Prody^R = A \left\{ [(1 - \delta) \bar{h}^R]^\theta + \pi \left[\bar{h}^P + \frac{\delta}{\pi} \bar{h}^R \right]^\theta \right\} \quad (30)$$

Theory states that while the rich stand to gain productivity advantages in production by transferring human capital to the poor, they pay the cost of losing power in the process. Figures 20-22 show the relationship between δ , ω and $Prody^R$ with the elimination of extreme outliers.⁴⁶ The scatter plots eliminate outliers where productivity is less than 1000 in (30) and less than 1000000 in (29).

INSERT FIGURES 20-22

These figures indicate the presence of a negative relationship between δ and power while a positive relationship is visible between δ and productivity.

Table 6 portrays the estimation results of the relationship between consumption of the rich as defined by (29) and human capital transfers, power and payoff to the rich as defined by (29). We find that the consumption of the rich rises with human capital transfers subject to potential non-linearity.⁴⁷ This is argued in the model to be because rising human capital transfers increase the productivity of the rich while simultaneously reducing the power of the rich due to rising aspirations of the poor. Increases in power therefore result in a rise in consumption available to the poor as indicated in columns (2) and (4) while increases in the payoff (or productivity) of the rich from such transfers also increases consumption. This is depicted in columns (3) and (4).

INSERT TABLE 6 ABOUT HERE

5.4 The Outcomes Predicted by the Model

The fundamental results predicted by our model are twofold. First, the prediction is that human capital transfers of the rich to the poor are non-linear - with transfers subject to concavity, low transfers occurring where the poor are either a very small, or very large proportion of the total population. Second the model predicts a non-linearity between measures of conflict and our measure of aspirations (ϕ), human capital transfers (δ) and the ratio of poor to rich (π).

5.4.1 The Association between Human Capital Transfers and Population Proportions

We consider the association of our proxy for δ , secondary school enrollment rates, and our proxy for π , the LP_LR variable described above. Results for secondary school enrollment rates are reported in Table 7. There is a positive relationship between our π measure and the human capital transfer measure even when controlling for potential non-linearity in the

⁴⁶The calculation of productivity is $Pr\ ody^R = \left(\frac{GDP^R + GDP^P}{L^R} \right)$ for (29) and $Pr\ ody^R = \left(\frac{GDP^R * GDP^P}{L^R} \right)$ for (30) while δ represents secondary school enrollment rates. The secondary school enrollment rate represents δ .

⁴⁷See columns (1)-(4) in Table 6.

association. The negative coefficient for the π^2 measure demonstrates that the existence of a concave relationship between δ and π may indeed be present. We find this result to hold when controlling for the ratio of per capita GDP between the poor and rich communities, with the latter rising with rising school enrollment rates.⁴⁸ This again indicates a decline in the social distance between the two groups. Rising levels of fractionalization are found to have a positive impact on human capital transfers at a decreasing rate. This is because the rich feel less threatened by transferring human capital if the society is more fragmented.

INSERT TABLE 7 ABOUT HERE.

5.4.2 The Association between Conflict, Aspirations, Human Capital Transfers and the Ratio of Poor to Rich

The salient aim of the model is to develop an understanding of the dynamics surrounding conflict and its relation to human capital transfers aspirations for countries. The paper argues that human capital transfers affect aspirations along with the ratio of poor to rich. It is therefore argued that rising human capital transfers should increase the level of conflict. This is demonstrated in Table 8. Furthermore, rising human capital transfers affect conflict at a decreasing rate. The potential nonlinearity is robust to per capita GDP, fractionalization and our measure of π . Furthermore, columns (6)-(8) depict the rising proportion of poor-to-rich in society (π) increasing the level of conflict. This is once again due to the rising aggregate level of aspiration in society with rising π . The potential non-linearity in this result is also displayed.

The literature finds conflicting results on the impact of fractionalization on the level of conflict. Bates (2000) finds a non-linear relationship in the proportion of majority groups in society. We also find a non-linear relationship with respect to ethnolinguistic fractionalization in column (8) with rising levels of fractionalization increasing the level of conflict. This result is however not robust. The result is only robust, once we control for the proportion of poor-to-rich in society (π). This may be the omitted variable in many studies estimating the level of conflict using fractionalization indices.

INSERT TABLE 8 ABOUT HERE

6 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 poor, which erodes the power of the rich. Results in the paper derives conditions under which the rich will redistribute to the point of equality with the poor; conditions under which the disadvantaged face genocide; 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 expe-

⁴⁸We use the lagged value of ratio of per capita GDP of the poor-to-rich.

rience of a panel of 102 countries, over the 1960-2000 period. Our question of whether the model of this paper generalizes empirically beyond the specific cases of South Africa and Sri Lanka thus appears to have been answered in the affirmative. Not only does our aspirations measure respond positively to the human capital endowment measure we employ - robustly so to correcting for endogeneity. Also as predicted by our model, the measures of human capital transfers we employ respond negatively to the proportion of the population that is poor - and again the finding is robust to correcting for endogeneity bias.

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7 Figures and Tables

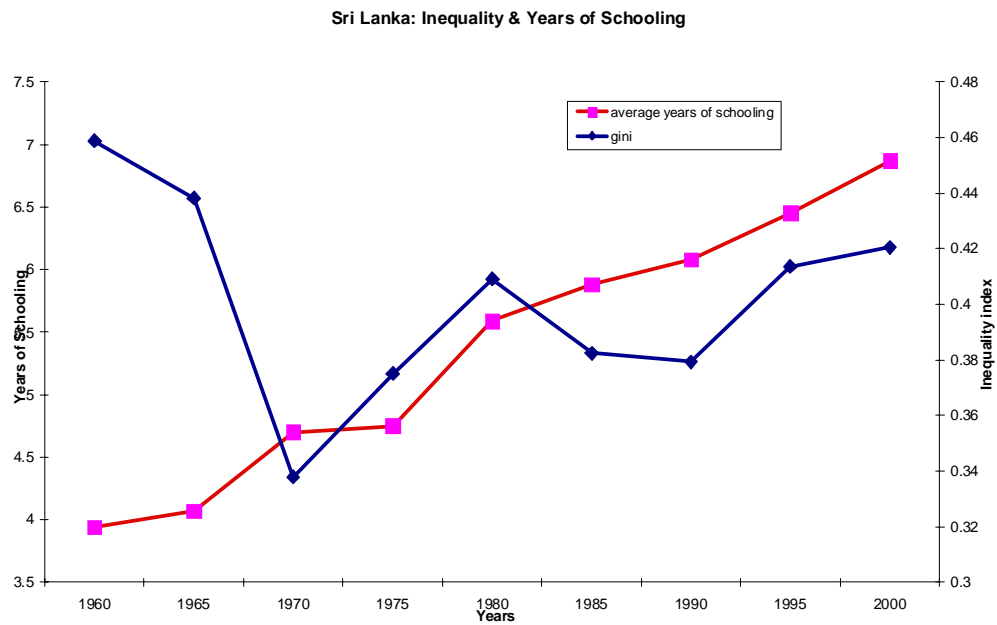


Figure 1: Sri Lankan Average years of Schooling and Gini Coefficient.
Source: World Income Inequality Database and Barro-Lee.

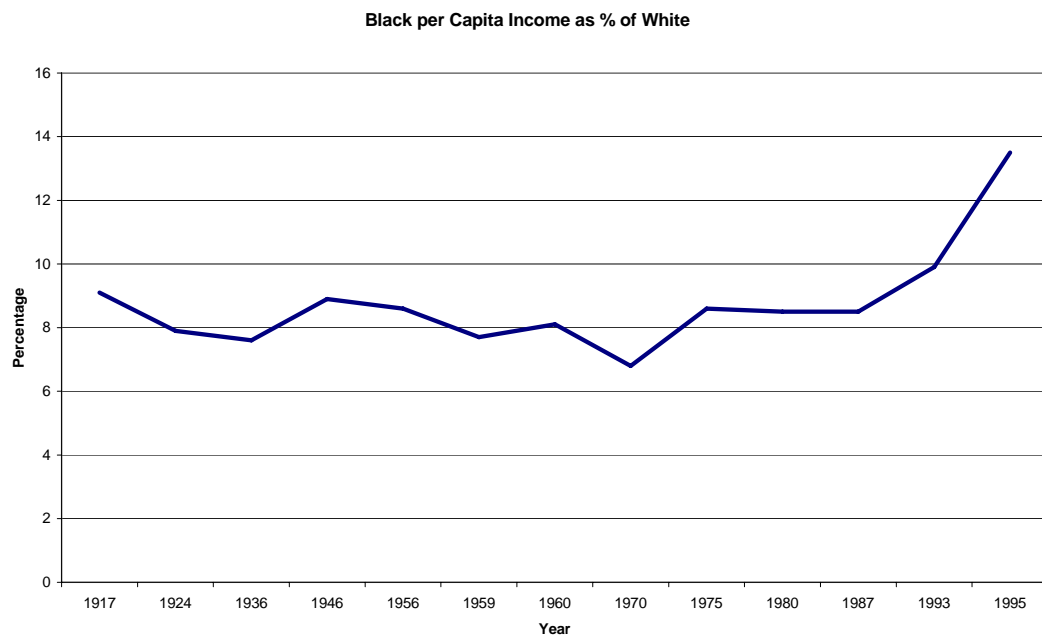


Figure 1: South African Black Per Capita Income as % of White,
Source: Borat et al (2001: 2).

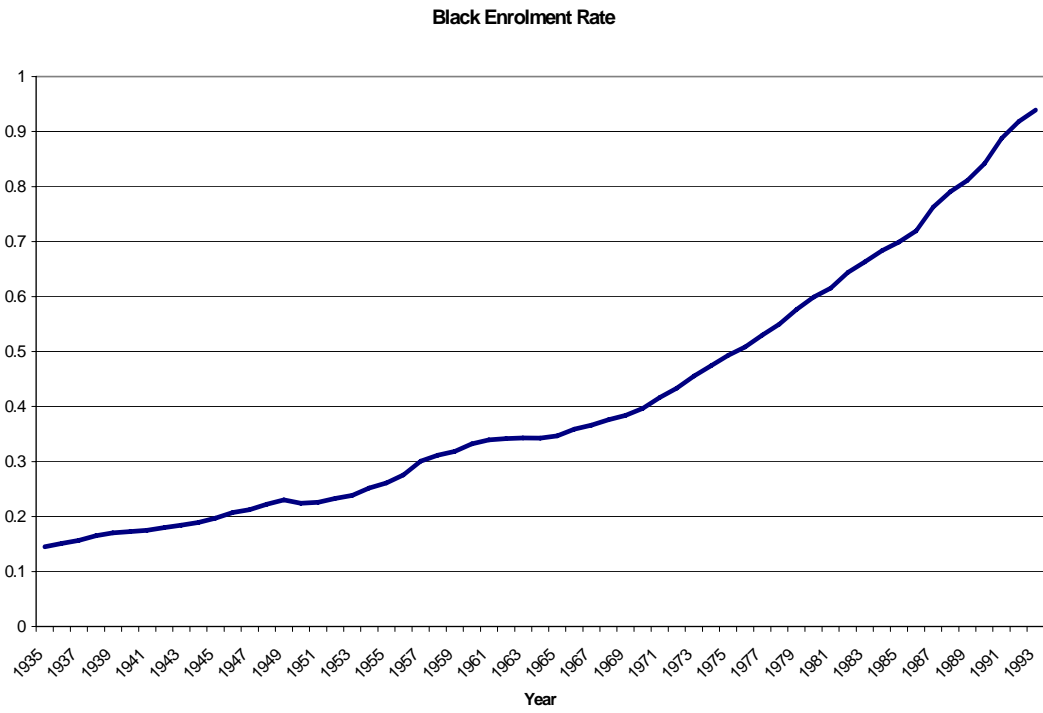


Figure 3: Black School Enrolment Rate, Source: Fedderke and Luiz (2002).

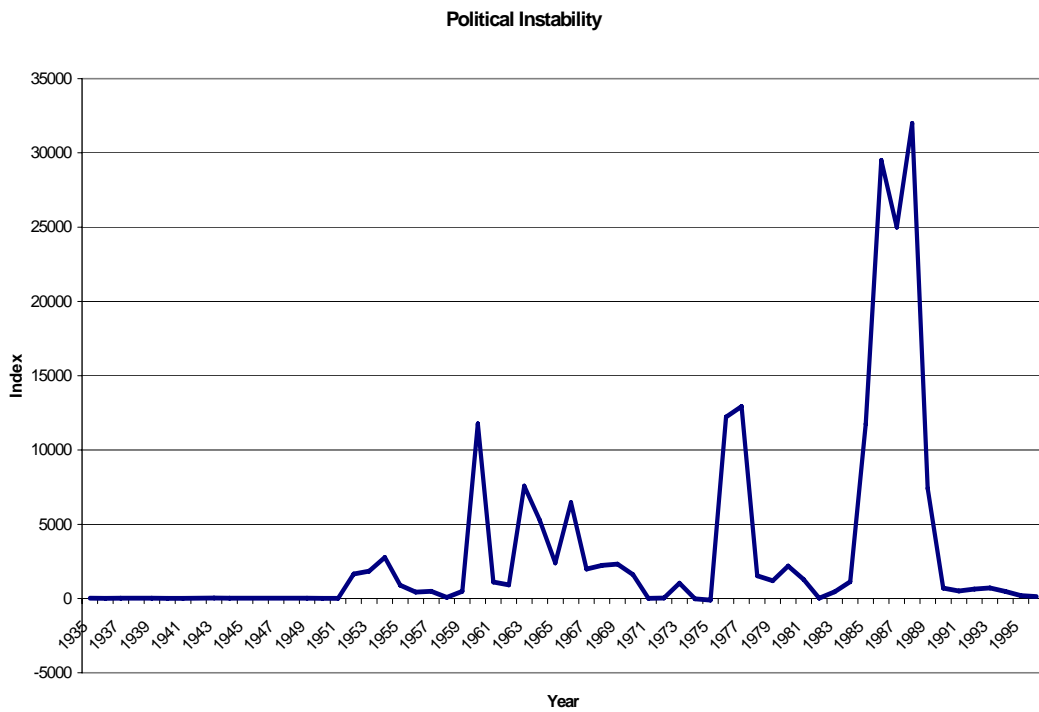


Figure 4: Political Instability Index for South Africa, Source: Fedderke et al (2001).

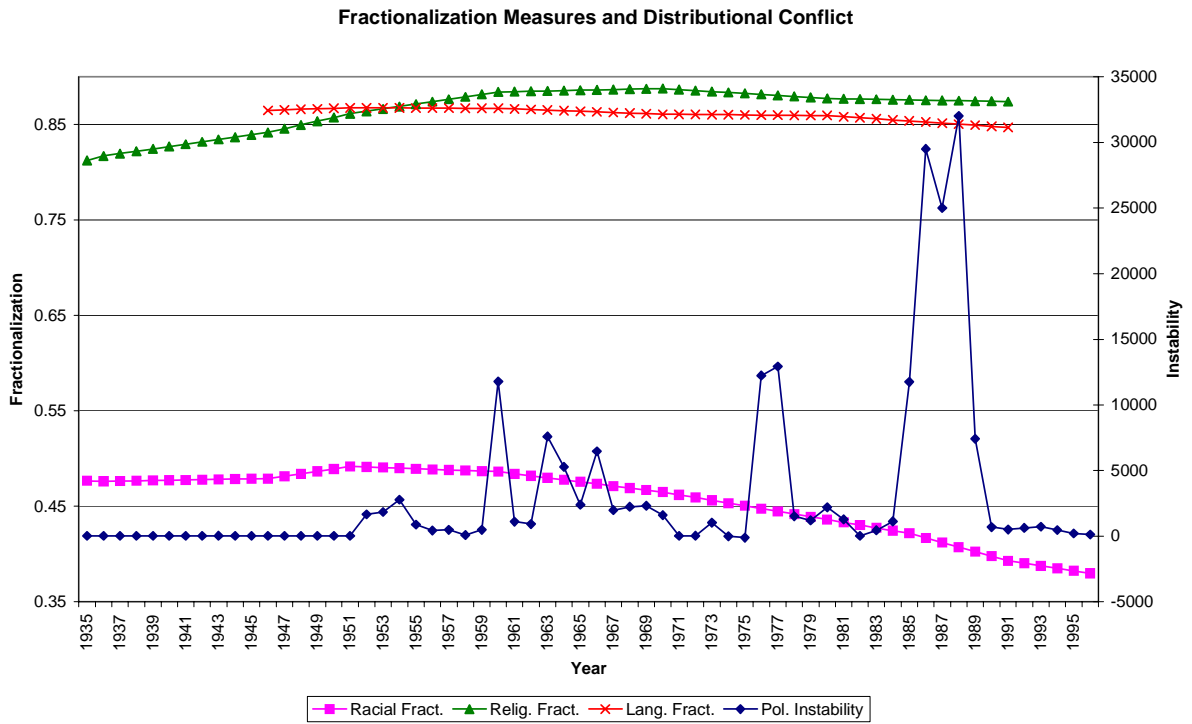


Figure 5: Fractionalization in South Africa, Source: Fedderke, De Kadt and Luiz (2007).

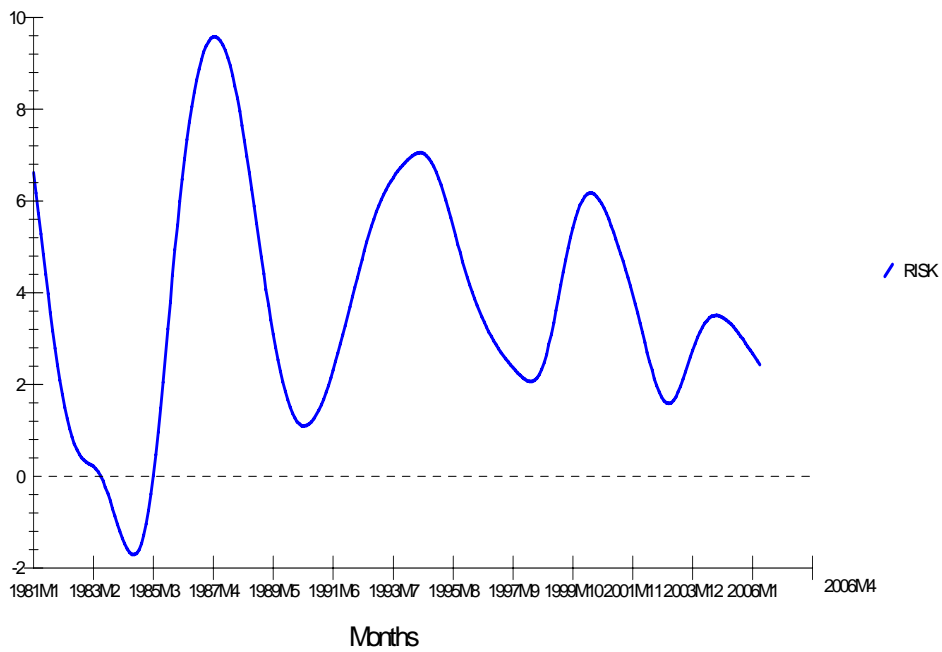


Figure 6: Theoretically Consistent Measure of Risk, Source: Fedderke and Pillay (2007).

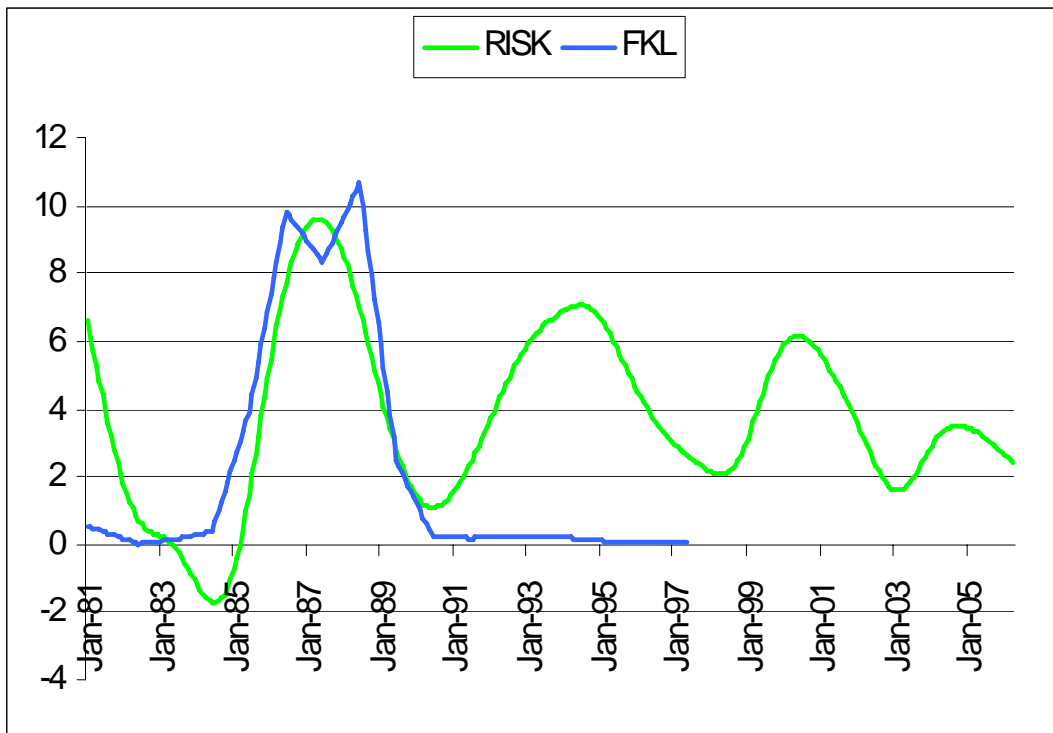


Figure 7: Comparing Risk Measures, Source: Fedderke and Pillay (2007).

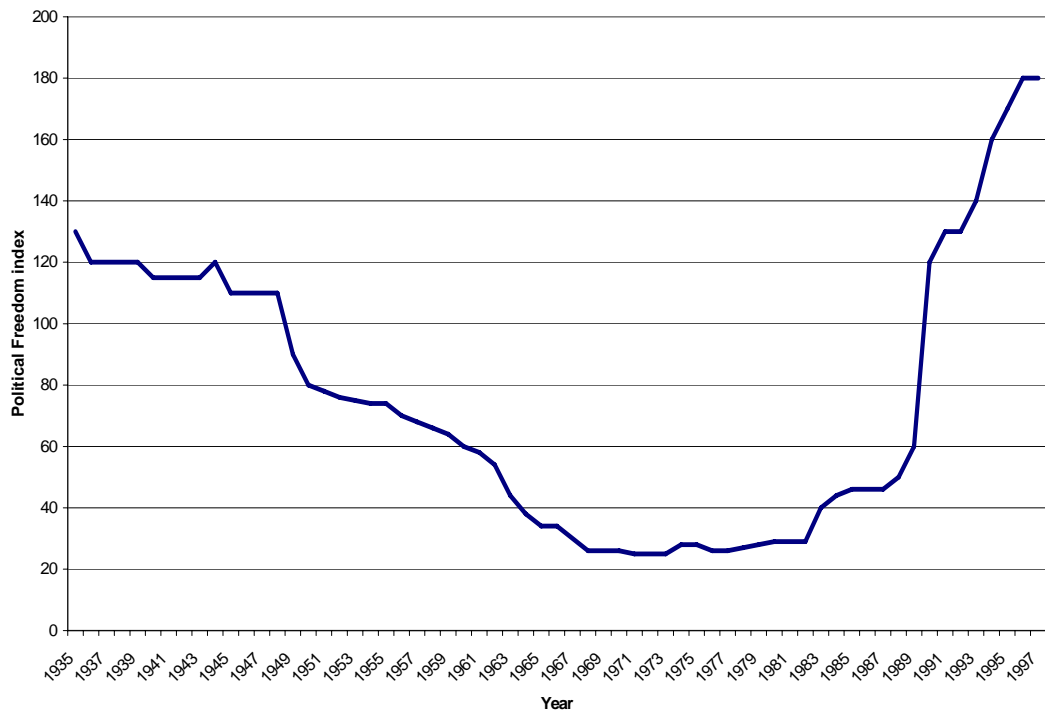


Figure 8: Political Freedom Index, Source: Fedderke et al (2001).

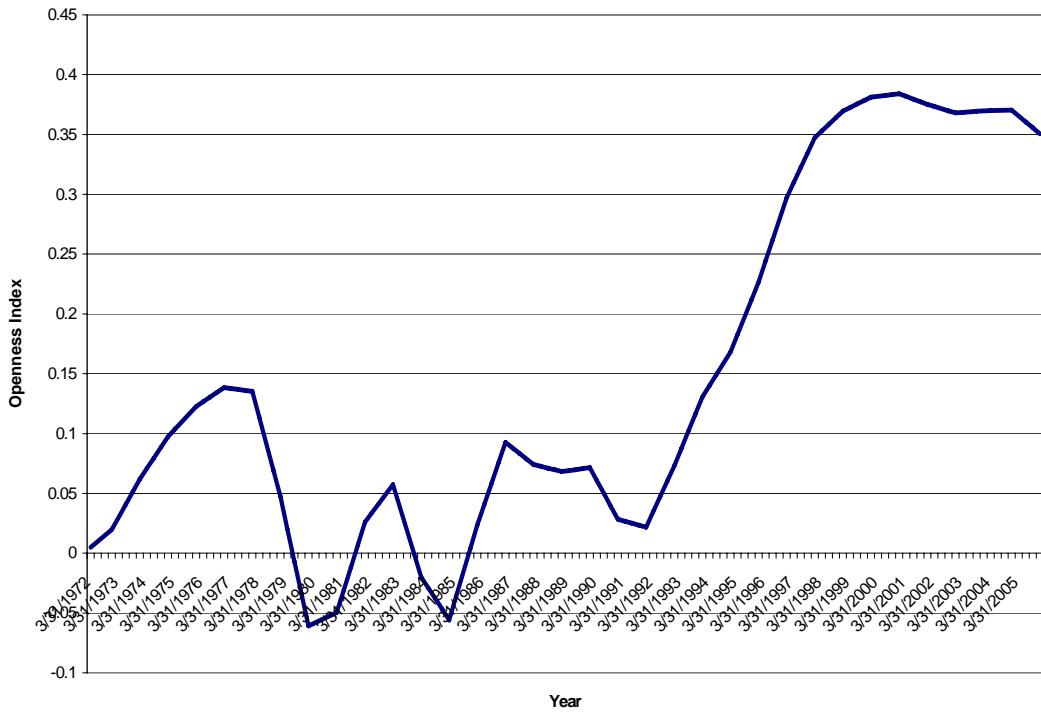


Figure 9: Openness Index for South Africa, Source: Aron and Muellbauer, (2007).



Figure 10: Rights in Sri Lanka - Freedom House and Polity Standardized Scales.

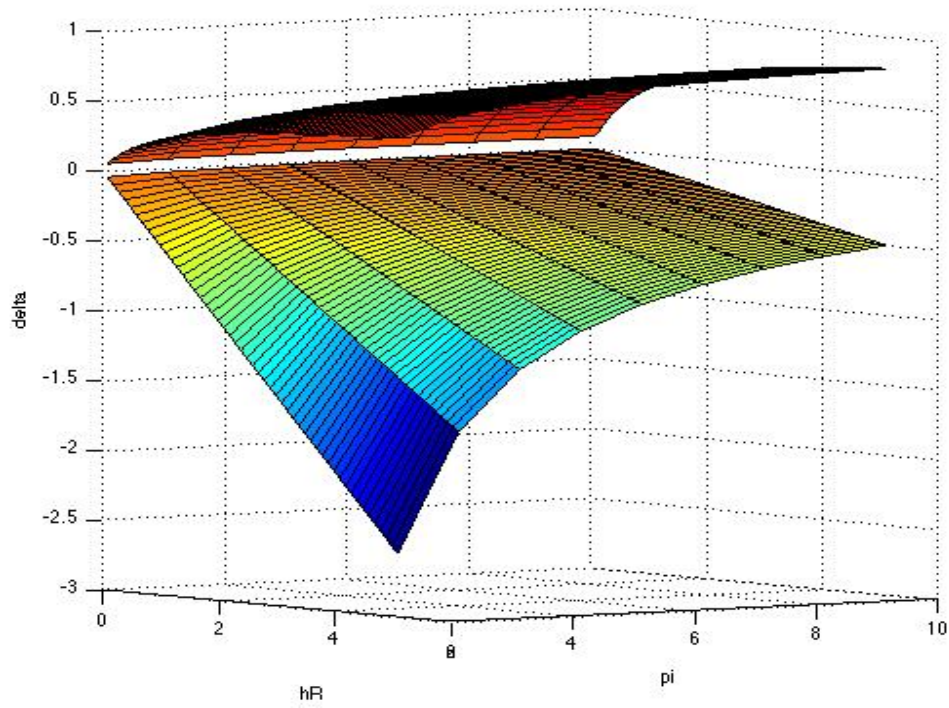


Figure 11: Upper and Lower bounds of δ .

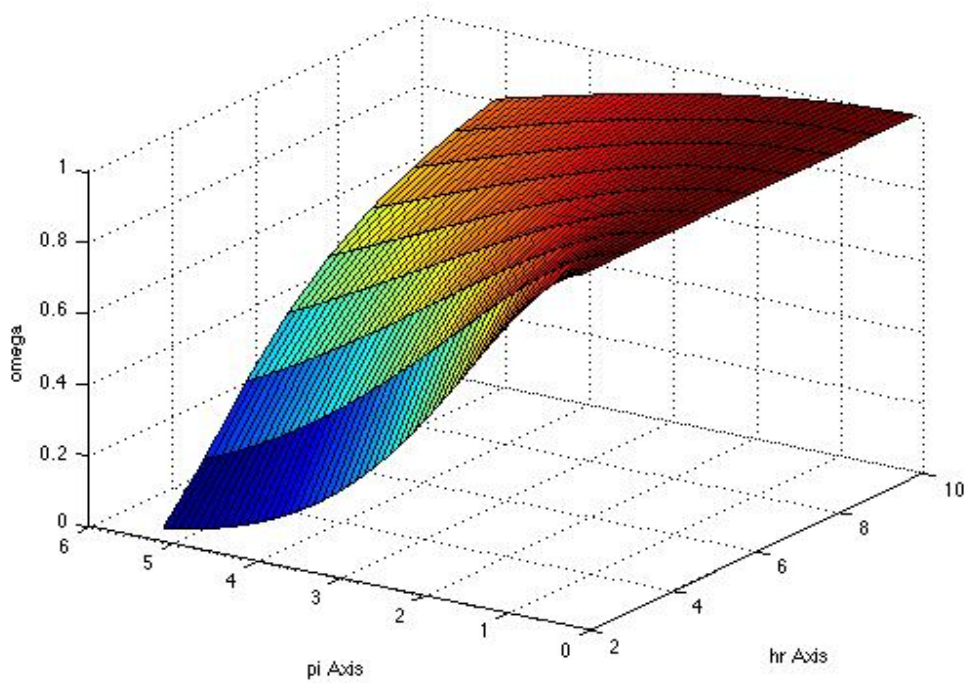


Figure 12: Power: ω

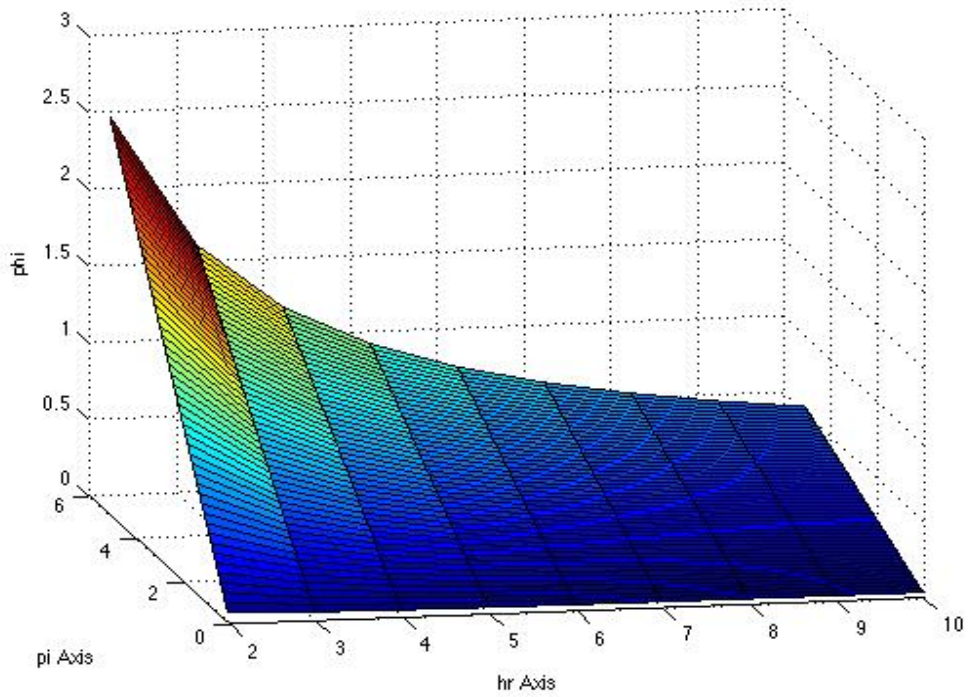


Figure 13: Aspirations ϕ

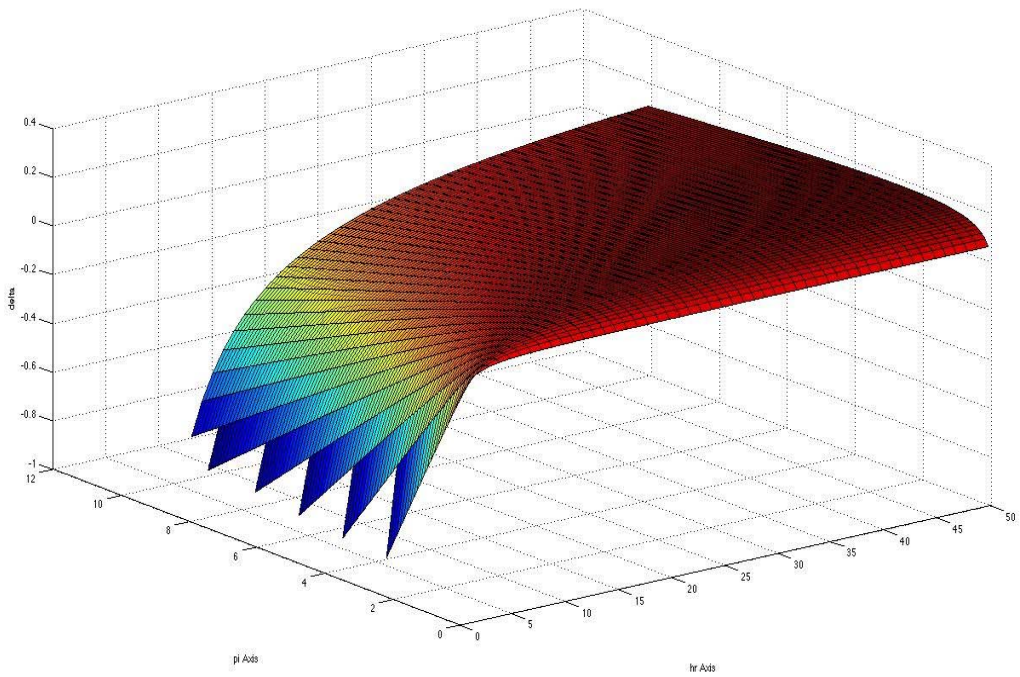


Figure 14: Separable Production, $\theta = 0.5$.

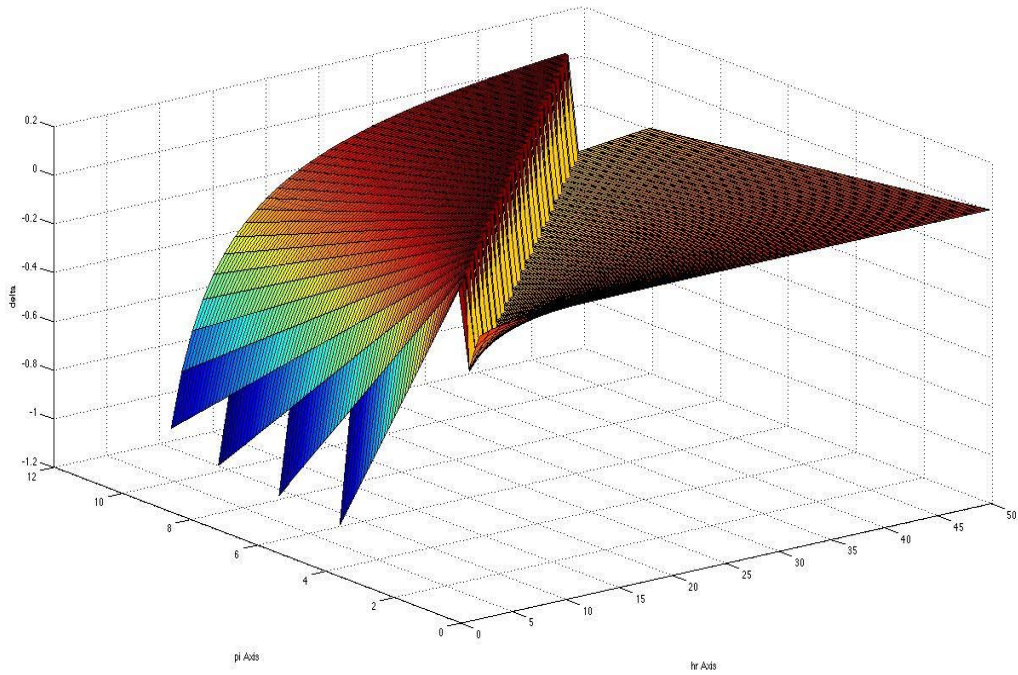


Figure 15: Interdependent Production, $\gamma = 0.25, \mu = 0.25$.

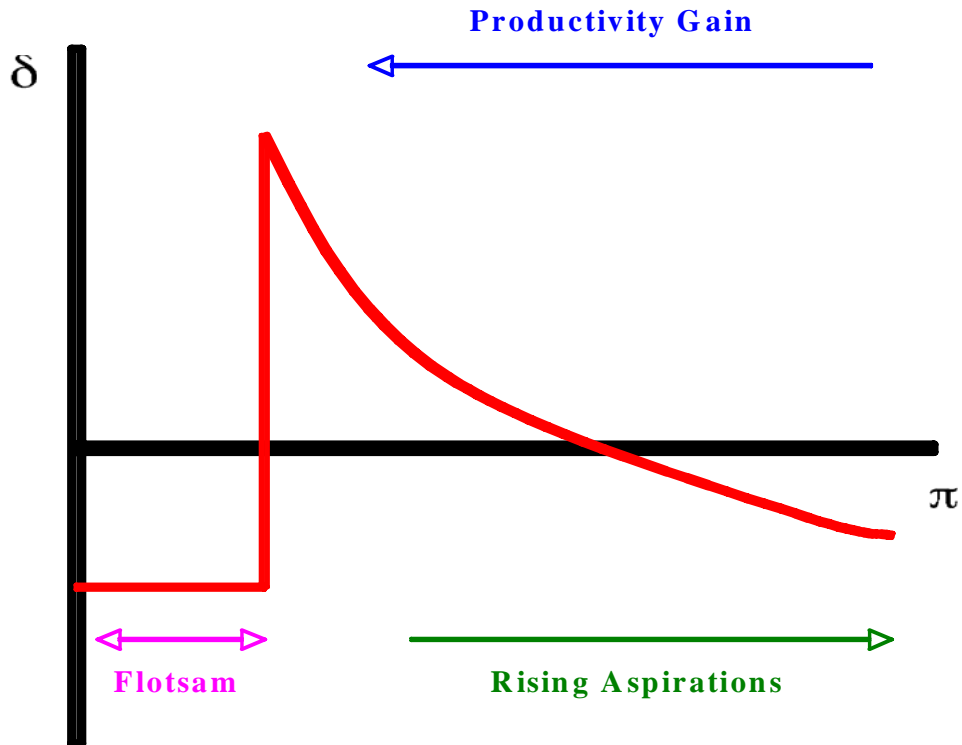


Figure 16: The Trade-off between Aspirations and Productivity Gain.

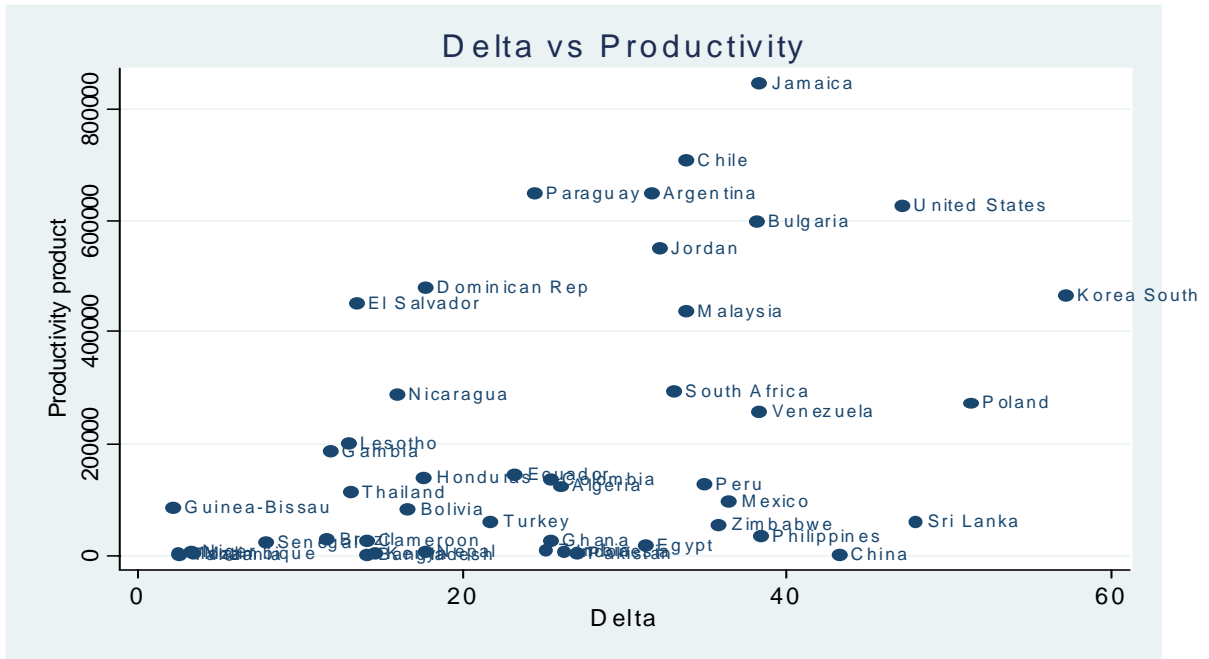


Figure 21: Delta vs Productivity where $Pr\ ody^R = A\pi \left\{ [(1 - \delta) \bar{h}^R]^\gamma \left[\bar{h}^P + \frac{\delta}{\pi} \bar{h}^R \right]^\mu \right\}$

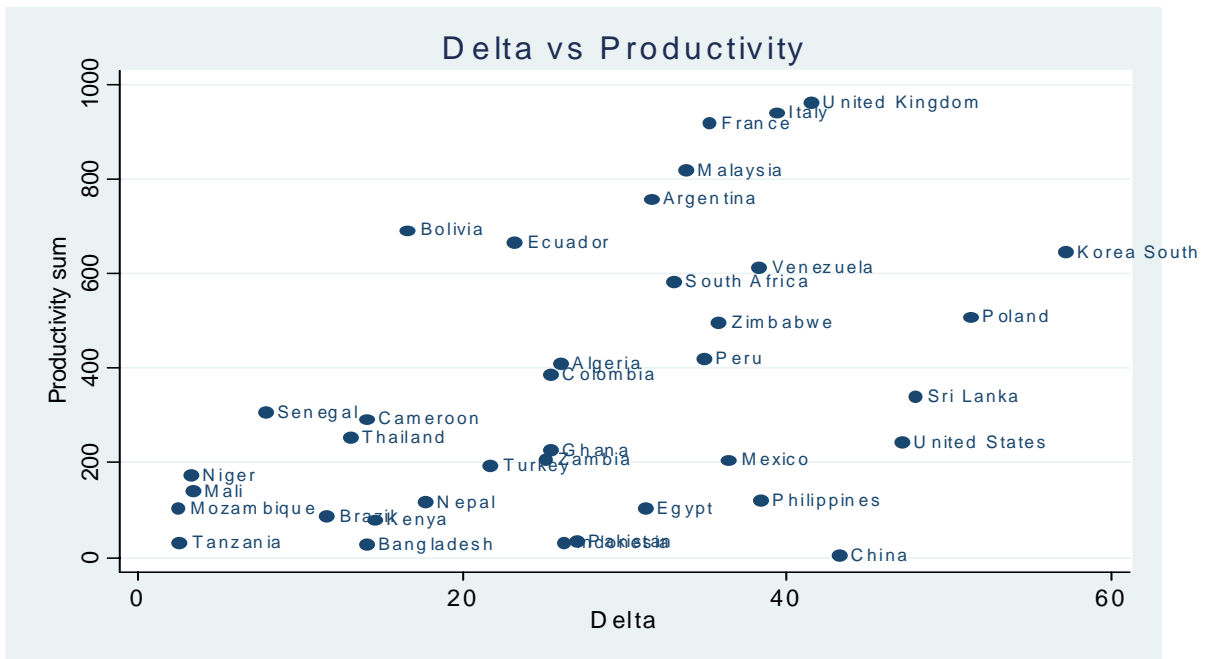


Figure 22: Delta vs Productivity where $Pr\ ody^R = A \left\{ [(1 - \delta) \bar{h}^R]^\theta + \pi \left[\bar{h}^P + \frac{\delta}{\pi} \bar{h}^R \right]^\theta \right\}$

Human Development Record of Sri Lanka

| Category | 1960 | 1998 |
|----------------------------------|------|------|
| Infant mortality rate (per 1000) | 71 | 16 |
| Life expectancy at birth (years) | 62 | 74 |
| Primary school enrolment (%) | 95 | 100 |
| Adult literacy rate (%) | 75 | 91 |
| Human development index | 0.48 | 0.73 |

Source: World Bank, World Development Report (annual issues) and UNDP, Human Development Report (annual issues)

Table 1: Sri Lankan Educational Attainment
Source: Abeyratne (2004).

| | (1) | | (2) | | | (3) | | | (4) | | |
|-------------------|-----------------|-----------------|-----------------|-------|-------|-----------------|-------|-------|----------------|-------|-------|
| | CV1 | CV2 | CV1 | CV2 | CV3 | CV1 | CV2 | CV3 | CV1 | CV2 | CV3 |
| LYPC | 0.00 | 1.00 | 0.00 | 1.00 | 1.03 | 0.00 | 1.00 | 0.08 | 0.00 | 1.00 | -9.25 |
| INSTAB | 1.00 | 0.00 | 1.00 | 0.00 | 1.21 | 1.00 | 0.00 | 2.69 | 1.00 | 0.00 | 0.60 |
| NESPR | 1.09 (0.95) | -0.46 (0.11) | 0.54 | -0.40 | 1.00 | 0.32 | -0.39 | 1.00 | 0.94 | -0.43 | 1.00 |
| TENROL | -0.68 (0.15) | 0.05 (0.02) | -0.35 | 0.04 | -0.60 | -0.22 | 0.04 | -0.66 | -0.67 | 0.05 | -0.70 |
| INPT | - | - | 3.43 | 14.03 | 12.72 | 0.00 | 13.97 | 0.00 | - | - | - |
| TREND | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.33 |
| Chi-Square (2) | | | 0.001 [0.98] | | | 0.012 [0.91] | | | 3.94 [0.14] | | |

Table 2: The Impact of Human Capital on Instability and Growth,
Source Fedderke and Luiz (2006).

| | $\hat{\phi}$ | $\frac{1}{PSen1}$ | $\frac{1}{PSen2}$ |
|-------------------|--------------|-------------------|-------------------|
| $\hat{\phi}$ | 1 | | |
| $\frac{1}{PSen1}$ | 0.887 | 1 | |
| $\frac{1}{PSen2}$ | 0.887 | 0.999 | 1 |

Table 3: Correlation of Aspiration measures

Table 4

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|----------------------------|-------------------------------|--------------------------------|--------------------------------|----------------------------|-------------------------------|--------------------------------|--------------------------------|
| | φ | φ | φ | φ | φ | φ | φ | φ |
| δ | 0.00361520* (0.0001622) | 0.00163797* (3.623e-005) | 0.00702471* (0.0003073) | 0.00329699* (0.0002632) | 0.00407802* (0.0001574) | 0.00193197* (0.0001160) | 0.00964204* (0.0003293) | 0.00546852* (0.0002428) |
| δ^2 | - | - | -5.79143e-005* (3.394e-006) | -2.01647e-005* (4.179e-006) | - | - | -8.69712e-005* (5.946e-006) | -4.56043e-005* (4.022e-006) |
| GDP per capita (t-1) | - | 2.11989e-006* (7.391e-008) | - | 1.86277e-006* (2.137e-007) | - | 1.31130e-006* (1.633e-007) | - | 2.03117e-006* (1.853e-007) |
| Fractionalization (elf) | - | - | - | - | -0.0196070* (0.002754) | -0.00171996 (0.001751) | -0.0541345* (0.003589) | -0.0258198* (0.002842) |
| Fractionalization squared (elf ²) | - | - | - | - | -0.0189713* (0.0009395) | 0.00213093 (0.001159) | -0.0301767* (0.002628) | -0.0158915* (0.001926) |
| Country Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Time Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| GMM Structure | (3,0) | (3,0,0) | (3,0,0) | (3,0,0,0) | (3,0,0,0) | (3,0,0,0,0) | (3,0,0,0,0) | (3,0,0,0,0,0) |
| Transform | None | None | None | None | None | None | None | None |
| N | 35 | 35 | 35 | 35 | 23 | 23 | 23 | 23 |
| R ² | 0.14 | 0.29 | 0.24 | 0.50 | 0.23 | 0.73 | 0.47 | 0.65 |
| Wald (joint) | 3.982e+006* | 2.551e+006* | 1.012e+007* | 1.350e+005* | 6.262e+005* | 2.810e+004* | 5.772e+005* | 9.496e+005* |
| Wald (dummies) | 3.982e+006* | 5.332e+005* | 7.612e+004* | 1.068e+005* | 6.262e+005* | 3.604e+004* | 1395.0* | 1.250e+006* |
| Wald (time) | 33.20* | 5.332e+005* | 18.60* | 4.299 | 19.64* | 518.6* | 298.1* | 506.0* |
| AR(1) | 2.690* | 2.086** | 2.585** | 1.896*** | 2.427** | 2.199** | 2.273** | 2.499** |
| AR(2) | 2.037** | 1.339 | 1.596 | 1.235 | 1.144 | -0.4893 | -0.8562 | -0.2693 |

Table 5

| | (1) | (2) | (3) | (4) |
|---|-------------------------|-------------------------|--------------------------|--------------------------|
| | ω | ω | ω | ω |
| Aspirations (φ) | -0.408353* (0.04251) | - | - | - |
| Ratio of rich-to-poor per capita GDP (hP/hR) | - | -0.237918* (0.06498) | - | -0.258174* (0.04291) |
| Ratio of poor-to-rich (π) | - | - | -0.0780664* (0.01823) | -0.0898853* (0.01955) |
| Country Effects | Yes | Yes | Yes | Yes |
| Time Effects | Yes | Yes | Yes | Yes |
| GMM Structure | (1,1) | (1,1) | (1,1) | (1,1,1) |
| Transform | None | None | None | None |
| N | 90 | 77 | 90 | 77 |
| R ² | 0.97 | 0.69 | 0.84 | 0.90 |
| Wald (joint) | 5.123e+005* | 2.755e+004* | 6.857e+004* | 2.031e+005* |
| Wald (dummies) | 3662.0* | 293.4* | 850.1* | 1516.0* |
| Wald (time) | 7.901* | 3.252* | 17.06* | 7.385* |
| AR(1) | -2.598* | -1.710*** | -2.642* | -2.053** |
| AR(2) | -1.301 | -1.470 | -1.725*** | -1.004 |

TABLE 6

| | (1) | (2) | (3) | (4) |
|-----------------------|------------------------------|-------------------------------|------------------------------|--------------------------------|
| | Consumption of rich | Consumption of rich | Consumption of rich | Consumption of rich |
| δ | 0.0721767* (0.01238) | 0.0260851* (0.009277) | 0.0204814* (0.006017) | 0.00817016* (0.002144) |
| δ^2 | -0.000769958* (0.0001393) | -0.000215641* (9.024e-005) | -0.000321101* (0.0001165) | -9.76745e-005* (1.895e-005) |
| Power (ω) | - | 0.105850* (0.002141) | - | 0.706421* (0.01565) |
| Payoff to rich person | - | - | 0.431165* (0.03126) | 0.0294309* (0.004856) |
| Country Effects | Yes | Yes | Yes | Yes |
| Time Effects | Yes | Yes | Yes | Yes |
| GMM structure | (1,3,3) | (1,2,2,1) | (2,1,1,1) | (2,0,1,1) |
| Transform | None | None | None | None |
| N | 60 | 60 | 39 | 39 |
| R ² | 0.96 | 0.98 | 0.99 | 0.99 |
| Wald (joint) | 1.181e+007* | 4.149e+008 | 1.947e+009 | 8.302e+008* |
| Wald (dummies) | 4.782e+006* | 2.426e+007 | 1.275e+006 | 3.246e+009* |
| Wald (time) | 1162.0* | 8.222e+004 | 2.799e+004 | 218.5* |
| AR(1) | 3.390* | 0.1087 | -0.9875 | -2.501** |
| AR(2) | 2.739** | 0.3523 | -0.3741 | -0.9833 |

TABLE 7

| | (1) | (2) | (3) | (4) |
|---|------------------------|------------------------|-----------------------|------------------------|
| | δ | δ | δ | δ |
| Ratio of poor-to-rich (π) | 2.60889* (0.4721) | 1.29226* (0.2250) | 1.89361* (0.3281) | 1.36092* (0.2391) |
| Ratio of poor-to-rich squared (π^2) | -2.03558*** (1.141) | -2.32625** (0.8957) | -2.18718** (1.136) | -2.17761** (1.121) |
| Ratio of poor-to-rich per capita GDP (hP/hR) (t-1) | - | 0.761607* (0.08265) | - | 0.452972* (0.1243) |
| Fractionalization (elf) | - | - | 0.545723 (0.4238) | 1.04854** (0.5173) |
| Fractionalization squared (elf ²) | - | - | -1.18187* (0.1767) | -0.675047* (0.2247) |
| Country Effects | Yes | Yes | Yes | Yes |
| Time Effects | Yes | Yes | Yes | Yes |
| GMM Structure | (2,1,1) | (2,1,1,0) | (2,1,1,0,0) | (2,1,1,0,0,0) |
| Transform | None | None | None | None |
| N | 68 | 68 | 53 | 53 |
| R ² | 0.43 | 0.34 | 0.73 | 0.70 |
| Wald (joint) | 9.746e+004* | 2.381e+005* | 1.517e+005* | 1.222e+005* |
| Wald (dummies) | 344.8* | 334.1* | 547.8* | 1971.0* |
| Wald (time) | 22.99* | 63.06* | 26.08* | 28.60* |
| AR(1) | -1.850*** | -2.029* | -1.960*** | -1.971* |
| AR(2) | 0.09389 | -1.044 | -1.294 | -1.399 |

TABLE 8

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|
| | Conflict in Africa | Conflict in Africa | Conflict in Africa | Conflict in Africa | Conflict in Africa | Conflict in Africa | Conflict in Africa | Conflict in Africa |
| δ | 0.0475971** (0.02252) | 0.0596803** (0.02638) | 0.0441662* (0.008428) | 0.0567494* (0.01027) | 0.0823146** (0.02799) | 0.0501198* (9.644e-005) | 0.109211* (0.0001072) | 0.0170987* (1.730e-011) |
| δ^2 | -0.00134312* (0.0004289) | -0.00208150* (0.0006204) | -0.00137675* (0.0002752) | -0.00269120* (0.0002501) | -0.00311628* (0.0007848) | -0.00229951* (1.929e-006) | -0.00398585* (3.138e-006) | -0.00183830* (5.742e-013) |
| GDP per capita | - | -0.00183543* (0.0005304) | - | -0.000511418 (0.0004622) | - | -0.00488658* (9.567e-006) | - | -0.00580521* (5.465e-012) |
| Fractionalization (elf) | - | - | 0.109274* (0.02881) | 0.0512416* (0.02249) | - | - | -0.114784* (0.0003778) | 0.0164832* (5.802e-011) |
| Fractionalization squared (elf ²) | - | - | 0.0463271 (0.03844) | -0.0267194 (0.03591) | - | - | -0.241977* (0.0004211) | -0.0471150* (1.012e-010) |
| Ratio of poor-to-rich (π) | - | - | - | - | -0.00395485 (0.08248) | 0.00274821* (0.0001335) | 0.0611498* (0.0002057) | 0.0418417* (4.568e-011) |
| Ratio of poor-to-rich squared (π^2) | - | - | - | - | -0.193624 (0.1693) | -0.234365* (0.0002875) | -0.106539* (0.0003880) | -0.0746219* (1.229e-010) |
| Country Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Time Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| GMM Structure | (3,0,0) | (3,0,0,1) | (2,0,0,0,0) | (3,0,0,1,1,1) | (1,0,0,0,0) | (2,0,0,3,0,0) | (1,0,0,0,0,0,0) | (1,0,0,2,0,0,0) |
| Transform | None | None | None | None | None | None | None | None |
| N | 31 | 30 | 29 | 28 | 21 | 19 | 16 | 15 |
| R ² | 0.28 | 0.32 | 0.27 | 0.24 | 0.56 | 0.65 | 0.62 | 0.73 |
| Wald (joint) | 2.252e+004* | 5.060e+004* | 398.5* | 8.355e+004* | 182.3* | 4.865e+007* | 1.707e+007* | 2.332e+022* |
| Wald (dummies) | 1.315e+004* | 7100.0* | 1.014e+004 | 1.932e+004* | 363.9* | 7.654e+008* | 1.900e+007* | 7.859e+020* |
| Wald (time) | 15.05* | 7.238** | 5.913 | 335.6* | 9.840** | 6.812e+005* | 1.048e+006* | 9.792e+017* |
| AR(1) | 2.670* | 1.943*** | 2.047** | 1.934*** | -2.061** | -2.615* | -1.670*** | -4.127* |
| AR(2) | 0.3877 | 0.1315 | 0.02673 | -0.5793 | -1.384 | -1.607 | -1.288 | - |