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**Fighting against the odds**

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# MEMORANDUM

No 03/2005

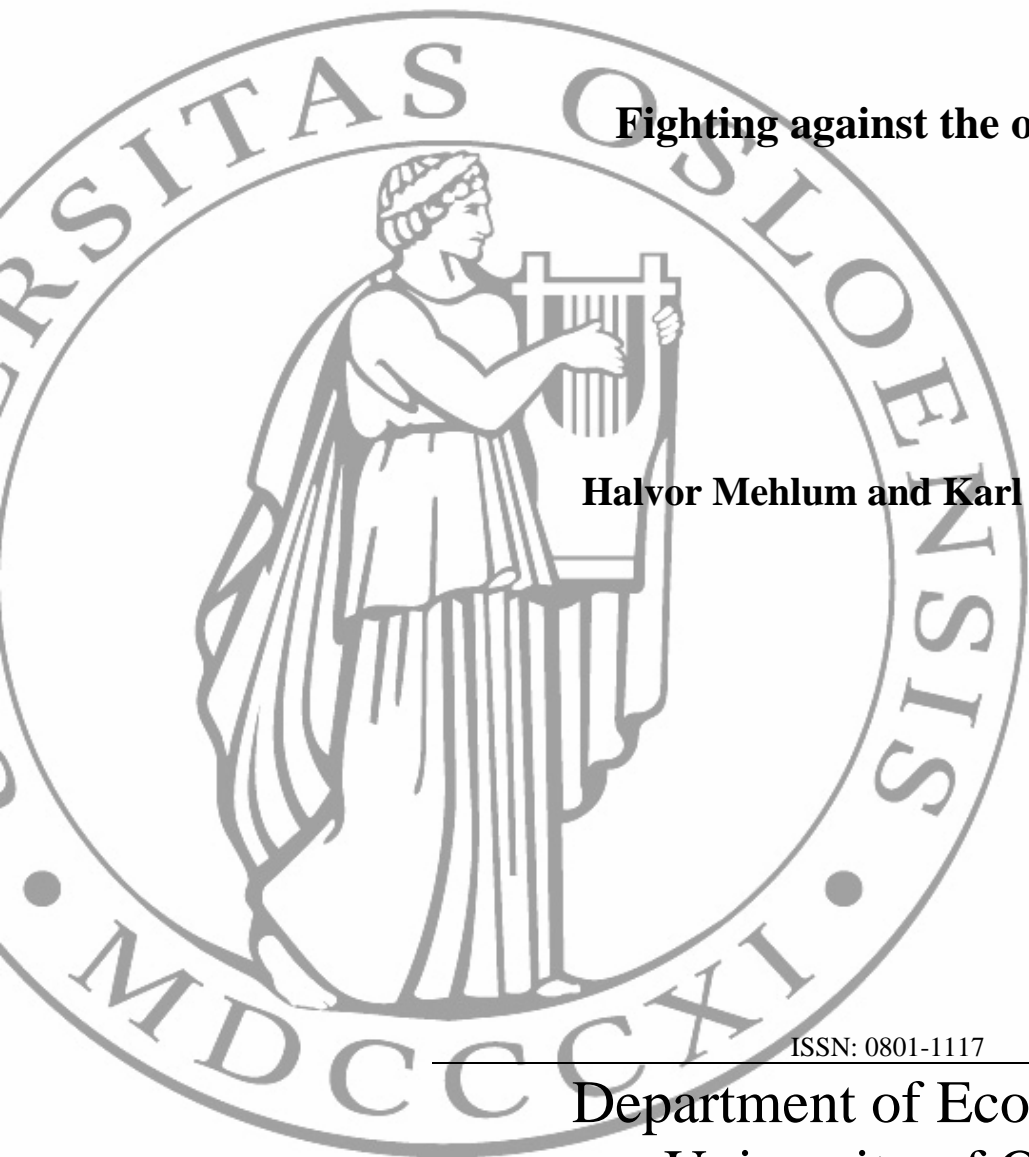
**Fighting against the odds**

**Halvor Mehlum and Karl Moene**

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# Fighting against the odds

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January 2005

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### **Abstract**

The fight for power is not only over immediate rents, but also over advantageous positions in future power struggles. When incumbency yields an extra fighting edge, current struggles involve high stakes as a victory today may guarantee the victory also tomorrow. Such an incumbency edge may stem from the control of the army, the police and other instruments reserved for the government. The conclusions drawn from static conflict models are turned on their head when the fight is also over the incumbency edge. A sharper incumbency edge increases the implicit prizes of winning. The fighting intensity may therefore rise when the strength of each side becomes more unequal. Unbalanced fights can last long and become particularly severe. This is in contrast to the standard result that equal strengths give the most intense fighting.

## 1 Introduction

When civil wars involve a challenger fighting an incumbent, one might think that a rational challenger should give up when winning is hard. We should therefore expect that strong incumbents in conflict areas do not face much rebellion activities. But they do. In many cases challengers fight hard for a long time against the odds.

For instance, during the fights in Angola in 1975-2000 the odds in favor of the MPLA government was overwhelming. Yet the challenger (UNITA) continued to fight. The long duration of the Angolan war is not exceptional. Many countries are trapped in a circle of war, peace, and relapse into war (Collier et al. 2003). James Fearon (2004) estimates the average duration of 128 civil wars between 1945 and 1999 to be 11.1 years. The average duration has steadily increased since 1969. These averages conceal a lot of variation across regions and between types of conflicts.

In the period 1945-99 the average duration of civil wars was 17.5 years in Asia, 13.1 years in Sub-Sahara Africa and 9.6 years in Latin America (Fearon 2004). According to Fearon's classification: civil wars related to coups and revolutions do not last for long, yet ten per cent of them lasted more than ten years; anti-colonial wars also tend to be brief, yet twenty per cent of them lasted for more than ten years; civil wars over valuable contraband last longer, forty per cent of them lasted for more than twenty years.

Clearly, not all of these long lasting civil wars are over state power. Yet the number demonstrates that lasting conflicts can go together with a low turnover of incumbents. High regime stability may be explained by the military strengths and other advantages that incumbency entail. But if the power of incumbents is so strong, why do rebels continue to fight so long to overthrow them?

There may be many reasons why challengers fight against the odds. Here we focus on an explanation that follows from the dynamics of contested power, as the fight for power is not only over immediate rents but also over advantageous positions in future power struggles. Such an incumbency advantage may stem from the control of the army, the police, and other instruments reserved for the government.

Our approach builds on a more general theory of power contests (Mehlum and Moene 2004). One of the general features of the theory is this: When power is easy to hold it is particularly important to get. Strong incumbents are therefore more intensively challenged when the challenger, in the case of victory, inherits the incumbency strength. As a consequence a strong incumbency power can magnify rather than mitigate fighting. Since regime stability is high when incumbents are strong, intensive fighting and a low turnover of incumbents are likely to appear simultaneously. Thus our basic claim is that the circumstances that raise regime stability in conflict areas are also likely to raise the intensity of fighting if conflicts become violent. Improved regime stability can thus increase violent fighting.

In our dynamic framework of contested power some of the conclusions from static conflict models are turned on their heads. For a review of the standard results from static

models see for example Nitzan 1994 and Mehlum and Moene 2003. In our approach a sharper incumbency edge increases the effective prizes of winning. The fighting intensity may therefore rise when the strength of each side becomes more unequal. This is in contrast to the standard result that equal strengths give the most intense fighting. These results have implications for the prospects of peace settlements and for international interventions in conflict areas.

The main novelty of our approach is the "King of the hill"-structure of repeated fighting. When a challenger wins he becomes the king and takes over the advantageous position on the hilltop. In this respect our approach is distinct from the contributions of Skaperdas and Syropoulos 1996 and 2000. In their approach future conflicts affect today's incentives to trade and fight while in our case it is the present fights that effect future conflicts. The social mobility of contenders also make our approach different from other papers discussing multi battle contests, for instance the "first price all pay auction"-like conflicts discussed by Konrad (2002 and 2003) and of the multi prize approach of Clark and Riis (1998).

## 2 A model of conflicts with incumbency edge

The model we present is a simplified symmetric case of a more general theory of contested incumbency power that we explore in Mehlum and Moene (2004). In the present version of the model there are two equivalent groups. One starts out as the incumbent  $I$  and the other as challenger  $C$ . In each period the groups compete for power. The probability of the incumbent to remain in office is  $\rho_I$ , while the probability that the challenger takes over the incumbency is  $\rho_C$ , where obviously  $\rho_I + \rho_C = 1$ . The incumbent receives a rent  $G$  in each period in power while the challenger receives nothing. The rent  $G$  includes for example the value of natural resource extractions under government control and the inflow of governmental aid and loans from abroad. In addition the incumbent may use the army and police to fence off challengers, or use any other state controlled resources to enhance its chance of keeping the incumbency.

The expected pay-off to group  $j$  is

$$v_j = \rho_j(G + \Delta) + \delta \tilde{v}_j - \alpha_j y_j \quad \text{for } j = C, I \quad (1)$$

The first term  $\rho_j(G + \Delta)$  is the chance of winning the fight times the prize. Here  $\Delta$  is the excess return of starting the next fight as the incumbent rather than as the challenger. This excess return is derived explicitly as we proceed. The second term  $\delta \tilde{v}_j$  is the discounted value of the continuation pay-off in case of loss in the fight. Finally, the cost of group  $j$ 's chosen fighting capacity is  $\alpha_j y_j$ , where  $\alpha_j$  is the cost of providing one unit of fighting capacity. The presence of an incumbency edge means that the incumbent has a cost advantage  $\alpha_I < \alpha_C$ .

The probability of winning  $\rho_j$  depends on each group's fighting capacities relative to

the total fighting capacity brought to the battlefield

$$\rho_j = \frac{y_j}{y_C + y_I} \quad \text{for } j = C, I \quad (2)$$

Each group maximizes its  $v_j$  with respect to its  $y_j$ . The first order conditions

$$\frac{\partial v_I}{\partial y_I} = \frac{y_C}{(y_C + y_I)^2} (G + \Delta) - \alpha_I = 0 \quad (3)$$

$$\frac{\partial v_C}{\partial y_C} = \frac{y_I}{(y_C + y_I)^2} (G + \Delta) - \alpha_C = 0 \quad (4)$$

define the Nash-equilibrium of the game and the equations simply say that marginal gains equal marginal costs for each group. By using (2) the first order conditions can also be stated as

$$(1 - \rho_I) \rho_I (G + \Delta) = \alpha_j y_j \quad \text{for } j = C, I \quad (5)$$

Equation (5) says that each group  $j$  invests an amount in the fight equal to the fraction  $(1 - \rho_I) \rho_I$  of the prize  $G + \Delta$ . These investments in the struggle are resources wasted due to the conflict between the groups. The social waste reflects the opportunity costs of fighting, while the extent of the fight itself can be defined as the sum of fighting effort,  $y_C + y_I$ . The social waste ratio  $\omega$  is total resources wasted ( $\alpha_C y_C + \alpha_I y_I$ ) in proportion to the rent per period,  $G$ :

$$\omega = 2(1 - \rho_I) \rho_I (G + \Delta) / G \quad (6)$$

From the first order conditions (3) and (4) in combination with (2) we find the equilibrium probabilities of winning

$$\rho_I = \frac{\alpha_C}{\alpha_C + \alpha_I} \quad \text{and} \quad \rho_C = \frac{\alpha_I}{\alpha_C + \alpha_I} \quad (7)$$

Due to the homogeneity of the underlying contest success functions the winning probabilities are independent of the prize of winning  $G + \Delta$  and of the discount factor  $\delta$ . Note also that when there is an incumbency cost advantage,  $\alpha_I / \alpha_C < 1$ , the probability that the incumbent stays in power is larger than 50 percent,  $\rho_I > 1/2$ . We see from (7) that a reduction in the incumbency cost advantage  $\alpha_I / \alpha_C$ , implying a sharper incumbency edge, increasing  $\rho_I$ . Hence, the incumbency advantage generates regime stability and we let  $\rho_I$  be a measure of regime stability.<sup>1</sup> The higher the cost advantage of the incumbent, the higher the stakes. The incumbent therefore fights harder to avoid starting the next

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<sup>1</sup>An alternative measure of regime stability is the expected duration of a regime. Let  $EX$  be the expected duration of a regime. The probability that a regime remains in power in exactly  $X$  periods is equal to  $(\rho_I)^{X-1} (1 - \rho_I)$  implying that  $EX = 1 / (1 - \rho_I)$ . Uneven powers make for longer duration of each regime.



period as the challenger.

Inserting for (5) in (1) gives us the equilibrium payoffs

$$v_j = \rho_j^2(G + \Delta) + \delta \tilde{v}_j \quad j = C, I \quad (8)$$

With an inheritable edge the continuation pay-off  $\tilde{v}_j$  is the same for both groups. It is simply given by the pay-off to a challenger  $v_C$ . The excess return of being the incumbent in the next period,  $\Delta$ , is accordingly equal to the difference between the pay-off when starting as the incumbent and the pay-off when starting as the challenger. Hence, with an inheritable edge we have that

$$\Delta = \delta(v_I - v_C) \quad \text{and} \quad \tilde{v}_I = \tilde{v}_C = v_C \quad (9)$$

By combining (8) and (9) we find that the effective prize of winning with an inheritable edge is equal to

$$G + \Delta = \frac{G}{1 - \delta(2\rho_I - 1)} \quad (10)$$

This expression shows that for a given regime stability  $\rho_I$  the effective prize of winning is higher the higher the discount factor  $\delta$ . Hence, patient contenders have more to fight for and will therefore fight harder.

How hard the contenders fight can be expressed by the total fighting effort,  $y_C + y_I \equiv Y$ , which we call the extent of the fight. From (5), (7), and (10) we have that the extent of the fight can be expressed as

$$Y = \frac{G}{\alpha_C + \alpha_I - \delta(\alpha_C - \alpha_I)} \quad (11)$$

This expression demonstrates that a higher discount factor increases fighting. When the prize of winning includes an incumbency edge, fighting today is like an investment to obtain a future cost advantage ( $\alpha_C - \alpha_I$ ). The more patient the contenders, the higher they value future gains, and the more they will invest today in the form of fighting effort.

Equation (11) also demonstrates that a lower value of  $\alpha_I$  intensifies the fighting. This is even the case when the unit costs of fighting  $\alpha_C$  and  $\alpha_I$  move in opposite directions in a mean preserving way. Hence, a more uneven distribution of power ( $\alpha_I/\alpha_C$  down for a given mean  $(\alpha_C + \alpha_I)/2$ ) raises the extent of the fight. As we know from (7) a sharper incumbency edge also increases regime stability  $\rho_I$ . Thus, we have the following proposition:

**Proposition 1** *In countries where the edge of the incumbent is inheritable a more uneven distribution of power between the incumbent and the challenger increases both regime stability and the extent of the fight.*

The proposition says that a dominant incumbent is willing to secure a high degree of

regime stability at a cost of excessive confrontations. A more uneven distribution of power can simultaneously increase dominance and violence. Since regime stability is higher, the relative fighting effort  $y_I/y_C$  must go up. As long as a more uneven distribution of power is mean-preserving in the cost of fighting the challengers fight less. Yet total fighting goes up as the incumbent fights so much more than the challenger.

Proposition 1 states one reason why it is wrong to insist on the general relevance of "The Paradox of Power" (Hirschleifer, 1991). The paradox says that "the initially disadvantaged group is typically rationally motivated to fight harder" implying that "poorer or weaker contenders often gain from conflict, at the expense of richer or stronger opponents". As Proposition 1 states the reverse is true when the power of the stronger stems from the control of the state. Hirschleifer's paradox only holds under rather special assumptions as we discuss in more detail below.

With an incumbency edge conflicts between a strong and secure incumbent and a weak opposition can be particularly hard and particularly unbalanced. Conditions that make winning hard for the challenger invite harder fighting.

We now turn to the waste of resources in conflicts. By combining (10) and (6) we get the equilibrium waste ratio in the case of an inheritable edge  $\omega_{ie}$  as

$$\omega_{ie} = \frac{2(1 - \rho_I)\rho_I}{1 - \delta(2\rho_I - 1)} \quad (12)$$

The amount of resources wasted may be even larger than this expression indicates. Equation (6) is derived on the premise that the two groups bear all costs. This leads in most cases to a conservative estimate. First, depending on the severity of the actual fight there will be third party sufferings. Second, in the event that the lower unit cost of fighting for the incumbent is a result of the power to tax the rest of the population, the social cost is also higher.

Equation (12) defines a non monotone relationship between regime stability and social waste: The waste first increases and then decreases as regime stability  $\rho_I$  goes from  $1/2$  to 1. The waste ratio  $\omega_{ie}$  has a maximum for

$$\rho_I^* = \frac{\sqrt{1 + \delta}}{\sqrt{1 + \delta} + \sqrt{1 - \delta}} \in \langle 1/2, 1 \rangle \quad (13)$$

which (by using (7)) corresponds to an incumbency cost advantage of

$$\left(\frac{\alpha_I}{\alpha_C}\right)^* = \frac{\sqrt{1 - \delta}}{\sqrt{1 + \delta}} \quad (14)$$

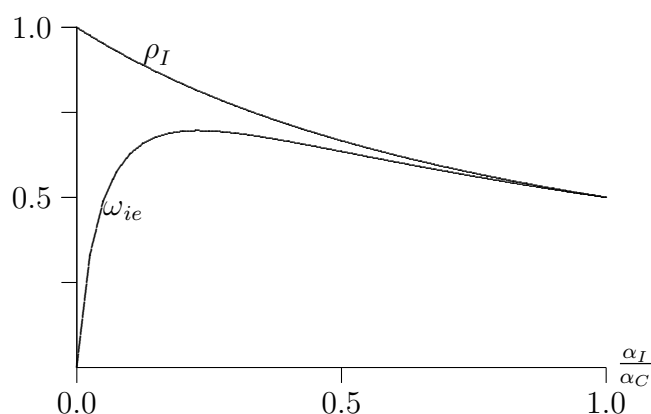
Hence, we have the following proposition:

**Proposition 2** *In countries where the edge of the incumbent is inheritable the relation-*

ship between regime stability and social waste is hump-shaped. As the incumbent's cost advantage gets sharper,  $\alpha_I/\alpha_C$  down, and regime stability consequently rises, social waste first increases and then decreases.

The severity of conflicts with an incumbency edge can be illustrated by some numbers: If a period is a year and if  $\rho_I = .9$ , the incumbent regime would have an expected duration of 10 years. With a discount factor equal to  $\delta = .8$  the waste ratio becomes  $\omega_{ie} = 1/2$ , implying that in each of the 10 years half of the yearly rent  $G$  is wasted in the conflict. The hump-shaped relationship between incumbent's advantage and social waste is illustrated by the  $\omega_{ie}$ -line in Figure 1. The  $\rho_I$ -line illustrates that regime stability increases as the

Figure 1: Stability and waste with inheritable edge



incumbent's cost advantage gets sharper.

A corollary to Proposition 2 follows from (5) and (6): Each group is responsible for fifty percent of the waste. Hence, if  $\alpha_I$  is reduced for a given  $\alpha_C$  the fighting effort of the challenger,  $y_C$ , first increases and then decreases. As long as  $\alpha_I/\alpha_C$  is higher than  $(\alpha_I/\alpha_C)^*$  a reduction in the incumbents cost raises the fighting of the challenger. The reason for the rising effort is that the "higher stakes"-effect dominates the effect of a worsening of the power balance. Efforts to stabilize a violent conflict by recognition and military assistance to the incumbent group may prove counterproductive. If such recognition and assistance is expected it will make it even more important to become the incumbent.

### 3 Conflicts with and without an edge.

The results above are in contrast to those that can be derived from the ordinary models of static contests as developed by Haavelmo (1954), Tullock (1980), Hirshleifer (1991), Skaperdas (1992), and Grossman (1994). In the static models group heterogeneity implies both lower social waste and as we show below higher regime stability.

Within our framework we can get the ordinary rent seeking case by minor adjustments to the model. First, we let  $C$  and  $I$  stand for distinct group names, *Cowboys* and *Indians*, rather than standing for the inheritable positions (Challenger and Incumbent). As before we let  $I$  be the strongest group  $\alpha_I \leq \alpha_C$ . Second, there are no advantages of winning a battle beyond the access to the rents  $G$ . The cost advantage follows from group endowments that are given independently of who was the winner in the last round of fighting.

We call the ordinary rent-seeking case *collapsed states* as it may fit for conflicts in countries without an operative state apparatus. In countries with a collapsed state the power of the contesting groups in the next round of fighting does not depend on who were the winner of the last battle. The fights are about the rent  $G$  and nothing more.

These changes do not affect equations (1) to (8). Equation (10), however, is no longer valid. First, in a collapsed state  $\Delta$  is zero as there are no excess rents of becoming the incumbent. Second, in a collapsed state the continuation payoffs are  $v_C$  for group  $C$  and  $v_I$  for group  $I$ . Hence, in a collapsed state we have

$$\Delta = 0 \quad \text{with} \quad \tilde{v}_C = v_C \quad \text{and} \quad \tilde{v}_I = v_I \quad (15)$$

By combining (15) and (6) we can derive the equilibrium social waste ratio in the collapsed state  $\omega_{cs}$  as

$$\omega_{cs} = 2(1 - \rho_I)\rho_I \quad (16)$$

The average regime stability,  $\mu_{cs}$  (the average probability that the present regime stays in power) is the probability that group  $I$  is in power,  $\rho_I$ , times the probability that it remains in power  $\rho_I$  plus the probability that group  $C$  is in power,  $\rho_C$ , times the probability that groups  $C$  remains in power  $\rho_C$ . Formally:

$$\mu_{cs} = \rho_I\rho_I + \rho_C\rho_C = \rho_I^2 + (1 - \rho_I)^2 = 1 - \omega_{cs} \quad (17)$$

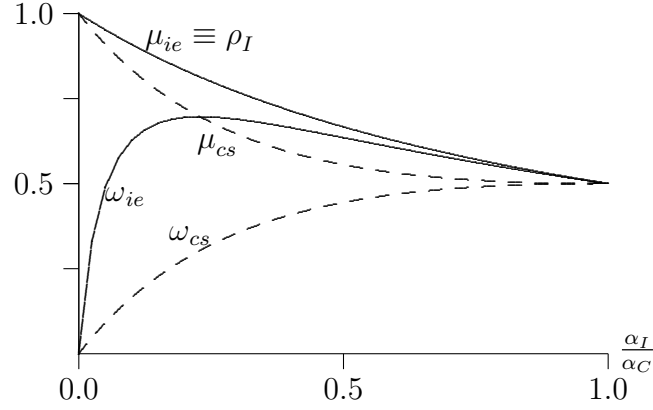
The last equality follows by applying equation (16). From (17) we have the following proposition

**Proposition 3** *In countries where there is no inheritable incumbency advantage (a collapsed state) regime stability and social waste are inversely related. As group  $I$ 's cost advantage gets sharper relative to group  $C$ 's,  $\alpha_I/\alpha_C$  down from 1, regime stability goes up and social waste declines.*

The case is illustrated by the dashed lines in Figure 2. When the two groups are equal,  $\alpha_I/\alpha_C = 1$ , the waste is  $1/2$  and regime stability is  $1/2$ . When the cost for the superior group declines regime stability,  $\mu_{cs}$ , rises and waste,  $\omega_{cs}$ , falls. In the limit where the superior group has zero cost  $\alpha_I = 0$ , stability is complete and waste is zero.

Thus in collapsed states a more unequal power distribution implies that less resources are wasted in the struggle. When one group obtains lower costs of fighting it becomes

Figure 2: Stability and waste with/without inheritable edge



relatively stronger than its challenger. Faced with a stronger opposition, the other group reduces its conflict spending. When a high-cost group spends less, it is optimal also for the low cost groups to reduce its resource use. Total waste declines with higher group differences. While efficiency requires one dominant group, equality among groups produces the maximum level of social waste and political instability. In other words, with no inheritable incumbency edge unstable regimes are more wasteful than stable regimes.

The average frequency of each group  $I$  and  $C$  being the winner is of course equal to  $\rho_I$  and  $1 - \rho_I$ . Thus on average the group with the lowest costs of fighting is most likely to be the winner and therefore the "incumbent". If the cost of fighting for one particular group approaches zero, while the cost of the other remain fixed, the group that can fight for free will be the winner for ever and no challenger is willing to take up the fight. If we, in the case of a collapsed state, associate the unit costs of fighting with the opportunity costs in production, we get Hirschleifer's Paradox of Power. As we have seen, however, the paradox must be qualified once we account for the dynamics of power contests in a environment where incumbency entails cost advantages in fighting.

We are now ready to derive further implications of the incumbency edge as compared to the situation in collapsed states (the ordinary static rent seeking contest)

**Proposition 4** *When going from a situation where the edge is not inheritable (a collapsed state) to the situation where the edge of the incumbent is inheritable, the extent of the fight, the regime stability, and social waste all go up.*

**Proof.** When  $\rho_I \in \langle 1/2, 1 \rangle$  we see immediately that regime stability in a collapsed state,  $\mu_{cs} \equiv \rho_I^2 + (1 - \rho_I)^2$ , is lower than regime stability with an inheritable edge,  $\rho_I$ . To see that social waste goes up, we combine (16) and (12) to get

$$\omega_{ie} = \frac{1}{1 - \delta(2\rho_I - 1)} \omega_{cs} > \omega_{cs} \quad (18)$$

Knowing that the  $\alpha$ -s and the  $\rho$ -s have the same values in the two cases, it follows from (5) that fighting effort goes up for both groups. ■

The basic insight of the proposition is that power is more important to get when it is easy to keep. Each side fights harder because the stakes are higher. As a consequence, strong incumbents are more intensively challenged by challengers who can take over the incumbency strength than by challengers who cannot. Regime stability also goes up when the incumbency power can be inherited. The reason is that the cost advantage in that case benefits any incumbent while it benefits only one side when it is not inheritable.

Compared to the case with an inheritable incumbency edge a collapsed state implies lower social waste and a higher turnover of winners. Consider Figure 2. For all  $\alpha_I/\alpha_C$  the regime stability with an inheritable edge,  $\mu_{ie} \equiv \rho_I$ , is higher than in the case with a collapsed state,  $\mu_{cs}$ . The difference between the  $\omega_{cs}$  and  $\omega_{ie}$  curves in Figure 2 also illustrates that increasing the strength of the incumbent relative to the opposition does not necessarily reduce the fighting. Starting in a situation with complete equality between the two sides, waste increases the sharper the incumbent's edge.

Let us return to our simple illustration, with values of  $\rho_I = .9$  and  $\delta = .8$ . With an inheritable edge we saw that the waste ratio in this case becomes  $\omega_{ie} = .5$ . In the case of a collapsed state, with the same unequal power division, the waste ratio becomes  $\omega_{cs} = .18$ , one third of the level with an inheritable edge.

The main difference between situations with and without an inheritable incumbency edge disappears as the discount factor  $\delta$  goes to zero. The reason is simple enough. The difference between the cases is due to how fights today affect the future. With a discount factor equal to zero the future does not matter in any case. The impact of varying the discount factor from zero to one can be summed up as follows:

**Proposition 5** *With an inheritable edge the fighting of each group goes up with the value of the discount factor  $\delta$ . For  $\delta = 0$  the fighting effort of each group is at the same level as in a collapsed state and the waste ratio equals  $\omega_{cs}$ . As  $\delta$  approaches 1 fighting goes up and the waste ratio approaches the level of regime stability  $\rho_I$ .*

**Proof.** Since regime stability  $\rho_I$  is independent both of the prize  $G + \Delta$  and of the discount factor  $\delta$ , the proposition is immediate from the expressions (12) and (18). ■

The proposition shows that patience combined with a strong incumbency power make for particularly high waste. In the limit (where  $\delta$  and  $\rho_I$  both approach unity) the entire rent is wasted in the fighting.

The value of the discount factor can reflect beliefs about whether fighting will continue or not: The more certain the contenders are that the fighting will continue, the higher is  $\delta$ . Thus strong beliefs that the fighting will continue beyond the present period induce hard fighting by each group in the present period to avoid starting the next battle as the challenger. Such strong beliefs can easily become self enforcing if hard fighting today leads to retaliation motives in the population that make peace difficult.

## 4 Intervention, aid, and peace

The dynamics of contested power has implications for how the international community can help prevent excessive confrontations in conflict areas.

*Interventions.* One may think that foreign support, improving the efficiency of the state apparatus, would reduce the conflict level. Such improvements would reduce the unit costs of fighting for the incumbent (a lower  $\alpha_I$ ) and clearly benefit the incumbent regime. As we have seen, however, making the incumbent more efficient makes incumbency more attractive, giving the challenger more to fight for and the incumbent more to defend. Hence we have the following proposition:

**Proposition 6** *Policies that aim at stabilizing incumbency power may at the same time induce more fighting.*

With an inheritable edge regime stability goes together with a low level of social waste only when regime stability is already at a high level.

If the sole aim is to increase political stability, one should not make the foreign support inheritable for new incumbents. Instead one should commit to channeling the support to one group only irrespective of whether that group is the incumbent or not. As a policy advice, however, this is not of much relevance today, as such single-aim-pragmatism is illegitimate after the end of the cold war.

If one wants to reduce the extent of the fight, the costs of fighting for both groups need to go up (an increase in both  $\alpha_I$  and  $\alpha_C$ ). This can be achieved by general policies such as debt relief and traditional foreign assistance to improve infrastructure, health care and education. The main point is to improve economic opportunities for all sections of society in a non-discriminatory way regarding ethnic, religious, social and geographical dimensions.

*Sharing the peace dividend.* Getting an end to a conflict would imply the realization of a substantial peace dividend. In spite of potential gains to both sides, however, an incumbency edge may make peace fragile. To see under what conditions a peace treaty is most likely to be sustainable we need to compare the pay-offs from continued conflict to the pay-offs from a lasting peace. Using (8) and (9) it follows that the expected pay-offs under conflict are

$$v_I = \frac{\rho_I^2 + \delta - 2\rho_I\delta}{1 - \delta} \frac{G}{1 - \delta(2\rho_I - 1)} \quad (19)$$

$$v_C = \frac{(1 - \rho_I)^2}{1 - \delta} \frac{G}{1 - \delta(2\rho_I - 1)} \quad (20)$$

These pay-offs are related to the waste ratio (12) in the following way

$$\frac{v_I + v_C}{G/(1 - \delta)} = 1 - \omega_{ie} \quad (21)$$

The sum of the pay-offs  $v_I + v_C$  in proportion to the present value of the rent  $G/(1 - \delta)$  equals the fraction of rents not wasted in the fight. Hence, the present value of the peace dividend,  $P$ , is equal to

$$P = \frac{\omega_{ie}G}{1 - \delta} = \frac{G}{1 - \delta} - (v_I + v_C) \quad (22)$$

When  $P$  is large there is a scope for a peaceful sharing of the rents that would give a substantial gain for both groups. As long as the incumbent is given a share that is larger than  $v_I$  and the challenger is given a share larger than  $v_C$  both parties should be satisfied.

Is it so simple? The calculation of the peace dividend  $P$  in (22) is based on an assumption of a lasting peace. A treaty assuring lasting peace may, however, be difficult to achieve. If a break of the treaty is tempting, the peace is fragile. Consider the case where a break of the peace treaty implies that the violent conflict restarts and lasts for all future periods. In that case the total cost for both parties of breaking the treaty is high. It may nevertheless be worthwhile for the party, who got the worst deal in the treaty to restart the fight. By a surprise attack this group can obtain the incumbency position and hence the pay-off equal to  $v_I$ . A break of the treaty like this is unattractive for both side only if the peace treaty's sharing of the rent  $G/(1 - \delta)$  guarantees both groups at least  $v_I$ . Thus the peace treaty can only be sustainable if the treaty assures each group a pay-off equal to  $v_I$ . Since  $v_I$  is higher than  $v_C$  the condition for peace implies that the peace dividend  $P$  is sufficiently large to fill the gap between the pay-off to incumbent and the challenger, i.e. that  $v_I - v_C < P$ . From (19) and (22) this requirement is equivalent to

$$\delta > \frac{2\rho_I^2 - 1}{2\rho_I - 1} \quad (23)$$

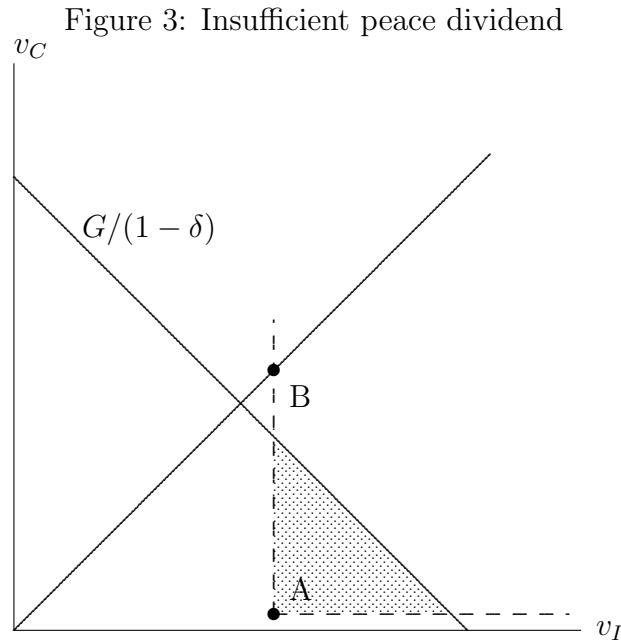
(23) defines combinations of incumbency dominance  $\rho_I$  and patience  $\delta$  that make a sustainable peace possible. The inequality holds when incumbency dominance is low and patience high. First, a low  $\rho_I$  means that the incumbency advantage is low and therefore that  $v_I$  is low. Second, a high  $\delta$  leads to more fighting and therefore to a higher gain from peace. At the same time a high  $\delta$  lowers the difference between  $v_I$  and  $v_C$  as the shared uncertain future gets more weight. Both effects imply that the peace condition  $v_I - v_C < P$  is more likely to hold. Hence, we have the following proposition:

**Proposition 7** *A lasting peace may require an overcompensation of the challenger as both sides must obtain at least  $v_I$  in the peace treaty. Such a peaceful sharing of the rents is only possible if the incumbent's dominance  $\rho_I$  is not too high and if patience  $\delta$  is not too low.*

A case where the peace condition (23) does not hold is illustrated in Figure 3.

Our argument about the difficult peace is one example where the shadow of the future harms cooperation (Skaperdas and Syropoulos 1996 and 2000). A sharing of the peace





dividend is not enough to guarantee peace. This presents a serious challenge for peace brokers and it may be necessary to add some extra resources to bolster the treaty for the temptation to carry out a surprise attack.

## 5 Concluding remarks

Poor societies are more conflict prone than richer societies. In poor societies the average productivity is low, the opportunity cost of fighting is thus also low and the extent of fighting is therefore high. The impact of group inequality is different in societies with and without a clear state authority. In collapsed states, increasing group inequality in opportunity cost of fighting reduces the social waste, but has no impact on the extent of the fight. With a clear state authority, however, increasing inequality between the ruler and the opposition increases both the intensity of the conflict and the social waste. The control of the state apparatus makes the incumbent stronger, but a stronger incumbent makes the control of the state apparatus more valuable. As a result the struggle for state control can become more intense - as challengers fight against the odds.

Our focus is on repeated conflicts. We consider how disparity of power affects fighting in the case where the advantage of the incumbent is inherited by the challenger if he overthrows the incumbent. We have utilized the simplifying assumption of symmetry between contestants. When the challenger wins, the incumbent and the challenger just switch positions and power. Thus the advantage of the incumbent relative to the challenger is the same whoever is the incumbent and irrespective of how long they have been fighting.

The symmetry assumption simplifies the analysis considerably compared to the many

asymmetric cases. For instance, in some cases defeating the incumbent can simply require that his military edge (f. ex. determined by history) is destroyed forever. Logically this case constitutes a combination of the two models we have discussed. The incumbent has an edge as long as he is not overthrown, but the fighting takes the form of a collapsed state conflict as soon as the initial incumbent is defeated. One may wonder whether a sharper edge of the initial incumbent also in this case can generate more fighting.

Yes, it can. To see why we can analytically start from the symmetric situation of a collapsed state with no extra edge of the incumbent. If the incumbent gets a cost advantage, that remains only as long as he is not defeated, both get more to fight for. The pay-off to the incumbent goes up as fighting for him becomes less expensive and his position therefore becomes more secure. Hence, the cost of losing becomes higher for the incumbent and he fights harder to keep his privileged situation. The pay-off to the challenger, however, becomes lower after the introduction of the incumbency edge. The challenger becomes worse off than he would be in the situation with a collapsed state conflict. Hence, his gain of winning goes up and he fights harder to achieve the expected gain. In sum both contenders have more to fight for and fighting goes up as regime stability rises. This is an example of asymmetric incumbency advantages, further discussed in Mehlum and Moene (2004).

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