

(Non)intervention in intra-state conflicts

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Abstract

There are two factions in a conflict. A third party may choose to intervene by supporting one of the factions. We consider a third party maximizing a weighted sum of the welfare of the warring factions and the non-combatant population. The third party's intervention decision is influenced by the nature of the conflict success function, the difference in ability between the combatants, his belief of how protracted the conflict will be in the absence of intervention, the weight he places on the welfare of the combatants relative to the rest of the population, and whether he can intervene militarily or non-militarily. Under certain conditions, the third party intervenes for sufficiently extreme values of the weight placed on the warring factions but does not intervene for intermediate values.

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1. Introduction

Third parties sometimes intervene in conflicts and sometimes do not. When they do intervene, they may be impartial, but they usually take sides. For example, using data from the International Crisis Behavior project, [Carment and Harvey \(2000\)](#) show that 140 out of 213 interventions into intra-state conflicts over the period 1918–1994 were clearly biased.¹ Indeed, some authors argue that biased interventions may be desirable ([Betts, 1996](#); [Zartman and Touval, 1996](#); [Watkins and Winters, 1997](#)).

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¹ [Regan \(2000\)](#) also finds that interventions are sometimes biased.

Carment and Rowlands (2004, p. 12) note that “[t]here are few attempts to derive testable propositions from formal models of third party intervention, and none that we know of deal explicitly with bias”.² In this paper, we present a model to examine biased intervention by a third party. We model conflict as a contest between two factions over the right to rule or govern a country. Success in the contest comes with a prize. Conflict situations have been modeled as contests, among others, by Bester and Konrad (2005), Genicot and Skaperdas (2002), Grossman and Kim (1995), Garfinkel and Skarpedas (2000), Hirshleifer (1995), Skaperdas (1992, 1998) and Warneryd (2003).

Carment and Rowlands (1998, 2004) and Siqueira (2003) also study third party intervention in conflicts. There are differences between our formal models and the models in these papers. First, we consider a more general objective function for the intervener, which includes the minimization of the aggregate cost of conflict as a special case. Second, we consider both imperfectly discriminating and perfectly discriminating (all-pay auction) contest success functions. Finally, we examine military and non-military forms of intervention.³

We consider a third party who maximizes a weighted sum of the welfare of the warring factions and the non-combatant population. We label the warring factions as factions 1 and 2. Non-military intervention takes the form of a subsidy by the third party to one of the combatants. In this case, the third party is not directly involved in the conflict. Under non-military intervention, one of the combatants (i.e., 1 or 2) will necessarily be victorious, which enables him to appropriate some of the country’s resources (output). In contrast, military intervention requires the direct involvement of the third party in the conflict, where he fights both warring factions. An advantage of military intervention is that, when the third party is victorious in the conflict, then neither faction 1 nor 2 is able to appropriate the country’s resources (output).

We find that the third party’s intervention decision is influenced by the nature of the conflict success function, the difference in ability between the combatants, his belief of how protracted the conflict will be in the absence of intervention, the weight he places on the welfare of the combatants relative to the rest of the population, and whether he can intervene militarily or non-militarily.

The paper is organized as follows. Section 2 presents a basic model of a conflict with third party intervention. Section 3 focuses on this model when the goal of the third party is the minimization of a weighted sum of the cost of conflict. This section yields a non-intervention result. Some assumptions of the model are relaxed in subsections of Section 3 and in Sections 4 and 5 to check the robustness of the non-intervention result. Section 6 concludes the paper.

2. A model of conflict with non-military intervention

Consider two risk-neutral factions, 1 and 2, who are fighting over the right to govern or control a country in a *one-time* conflict. Let faction 1 be the ruling government with valuation, V_1 , of winning the contest, and let faction 2 be a rebel group with valuation, V_2 , with $V_1 > V_2$.

Let e_i be the effort of the i -th faction, $i=1, 2$. Let P_i be the success probability of the i -th faction. For simplicity, we use Tullock’s (1980) contest success function, where $P_1 = e_1 / (e_1 + e_2)$,

² There is a wide literature on third party interventions in conflicts in political science and international relations but very little in economics.

³ We also considered the case of incomplete information. Readers interested in this case may contact the authors.

and $P_2 = e_2 / e_1 + e_2$.⁴ Each faction has a success probability of 0.5, if both factions exert zero efforts. This is a widely used contest success function (see, for example, Garfinkel and Skarpedas, 2000; Genicot and Skarpedas, 2002).

There is a third party who can choose to intervene in the conflict or not. In our model, this third party acts like a benevolent social planner. Intervention can take several forms: sanctions, military intervention, dialogue and diplomacy. For now, we assume that the third party intervenes by subsidizing the cost of effort of one of the factions. Indeed, Mason et al. (1999, p. 252) argue that biased interveners are “subsidizing the beneficiary’s capacity to absorb the additional costs of conflict and to inflict damage on its rival”.

Let $c(e_i)$ be the cost of effort in the conflict to party i , $i = 1, 2$. So if the third party decides to help party i , we assume that he will reimburse a proportion $(1 - \alpha)$ of the cost of effort, so that party i ’s cost of effort is $\alpha c(e_i)$, where $0 \leq \alpha \leq 1$. The subsidy is given to this combatant independent of success or failure in the conflict. The subsidy changes the costs and benefits of fighting to the combatants. As Regan (1996, p. 341) notes “[t]he key to any intervention strategy is to alter the calculations by which the antagonists arrive at particular outcomes... the goal is to make it too costly for the combatants to continue fighting.” However, the aggregate cost of the conflict can be reduced by subsidizing one party, thereby increasing his valuation in the contest, which might reduce the fighting effort of the other party.

To simplify the analysis, we assume that the third party knows V_1 and V_2 . We assume that the third party cares about the non-combatant population of the country and the warring factions. We define θ as the resources or output of the country in the absence of war, where $\theta > V_1 > V_2$. Given fighting, θ is reduced by the aggregate cost of efforts in the conflict, $c(e_1) + c(e_2)$. Therefore, we assume that $\theta - \sigma(c(e_1) + c(e_2))$ is the country net resource or output after the war, where $\sigma > 0$ is a positive constant. Notice that we have in mind two kinds of cost. One is the destruction of the country’s resource or output due to conflict. The other is the direct cost of the conflict to the combatants (e.g., time, training, fighting, etc). While these latter costs can also reduce the country’s output, our goal is to capture the idea that the cost of the conflict will generally fall in two categories: (i) costs borne by the non-combatant population, and (ii) costs borne by only the combatants. We recognize, though, that there is a fine line between the costs borne by these segments of society. But for analytical purposes, it is helpful to keep them separate.

We assume that if faction i wins the conflict, it can appropriate V_i of the net resources (output), $i = 1, 2$. Hence, the rest of the population receives $\theta - V_i - \sigma(c(e_1) + c(e_2))$, if faction i is successful, $i = 1, 2$.⁵ Suppose β is the weight that the third party places on the welfare of the population and $(1 - \beta)$ is the weight on the welfare of each combatant, where $0 \leq \beta \leq 1$. Then, these assumptions imply that the third party’s objective function, if he helps faction i , is

$$\Omega_i = \beta \{P_i[\theta - V_i - \sigma c(e_i) - \sigma c(e_j)] + P_j[\theta - V_j - \sigma c(e_i) - \sigma c(e_j)]\} + (1 - \beta) \{[P_i V_i - \alpha c(e_i)] + [P_j V_j - c(e_j)]\} - (1 - \alpha) c(e_i) \quad (1)$$

$i, j = 1$ or $2, i \neq j$. Note that given the formulation in Eq. (1), $(1 - \beta) \leq 1$ implies that, ceteris paribus, the third party would rather keep a dollar than give it to one of the combatants, since he puts a weight of

⁴ Alternatively, the contest need not be winner-take-all. These probabilities can be reinterpreted as the share of resources acquired by the warring factions. In any case, our implicit assumption that there will necessarily be a winner does not take into account how long it will take for the winner to emerge. Our static model cannot address this question. We realize that the real-world is much more complicated because there can be protracted conflicts. We briefly consider an infinitely repeated contest in Section 3.4.

⁵ The third party could be a beneficiary of the country’s net resources. However, for the sake of exposition and analysis, we do not follow this interpretation.

$1-\beta$ on a dollar consumed by the faction and a weight of 1 on a dollar consumed by himself. Therefore, transfers to any of the warring factions are costly to the third party.

Without any loss of generality, we set $\sigma=1$. Then Eq. (1) can be simplified to obtain

$$\Omega_i = \beta\theta + (1-2\beta)(P_iV_i + P_jV_j) - \gamma c(e_i) - c(e_j) \quad (1a)$$

where $i, j=1$ or 2 , $i \neq j$ and $\gamma \equiv 1 + \beta(1-\alpha) > 1$.

Since a war necessarily involves the loss of human lives, the relative sizes of the non-combatant population and the warring factions will be affected by the cost of the conflict. Endogenous relative size could affect the weight that the third party places on the welfare of these groups. In what follows, we ignore this complication by treating the welfare weight β as exogenous.

The sequence of actions is as follows: in stage 1, the third party announces which faction he will assist and the magnitude of the assistance (i.e., α). In stage 2, the combatants choose their effort levels taking into account the third party's reimbursement policy. After the conflict, the third party reimburses the cost of effort of one of the combatants. We solve this game by backward induction. We look for the equilibrium in stage 2 and then work backwards to stage 1.

Before we continue, we wish to point out that the third party can achieve the first-best outcome of zero effort by both combatants by using the following transfer policy. The third party transfers V_i to faction i , if $e_i=0$, and nothing, if $e_i>0$, $i=1, 2$. It is then a dominant strategy for each faction to exert zero effort.⁶ However, implementing this mechanism hinges on the assumption that the warring factions can *commit* to no fighting after receiving the transfer. We assume that this kind of commitment is not possible. We assume that only the third party can commit to its policies.

Indeed, wars or costly conflicts typically arise precisely because the warring factions cannot *commit* to peace or laying down their arms. This also explains why *cease-fire* agreements are eventually broken. It is therefore not unreasonable for us to rule out the ability of the warring factions to commit to peace or zero effort. Were this commitment on the part of the warring factions possible, there would even be no need for third party intervention in the first place. Both factions could share the resources of the land by reaching a peaceful solution without the help of a third party. Except in the infinitely repeated case, we obtain equilibria where, at least, one faction exerts a positive effort and a peaceful outcome is achieved only after conflict has actually taken place and one party has been subdued. Notice also that we have not taken into account the cost of transfers to the third party. Recall that the third party put a weight of $1-\beta$ on a dollar consumed by a warring faction and weight of 1, if he consumes the dollar himself. Therefore, taking into account this costly transfer only strengthens our argument.

3. Minimization of a weighted sum of the cost of conflict (i.e., $\beta=0.5$)

If $\beta=0.5$, then $\Omega_i=0.5\theta - \gamma c(e_i) - c(e_j)$, if the third party helps faction i , where $\gamma \equiv 1 + 0.5(1-\alpha) > 1$. Hence the third party's objective is to simply minimize a weighted sum of faction's cost of conflict. As Carment and Rowlands (1998, p. 574) observe "[t]he principal objective of third-party intervention is to reduce and eliminate armed violence. There can be no settlement and resolution of other issues in the presence of ongoing violence." We do not model the settlement and resolution of other issues.

It is important to note if the third party does not intervene, when its goal is simply to minimize aggregate efforts, then it will also not intervene if its goal is to minimize the weighted sum of

⁶ We thank a referee for this point.

efforts indicated above. To see this, note that if $\beta=0.5$ and the third party puts the same weight, $1-\beta$, on the transfer of a dollar to the combatants and keeping it himself, then he would minimize aggregate efforts.⁷ In this case, the third party is indifferent between keeping a dollar and transferring it to one of the combatants. Minimizing aggregate efforts therefore arises when $\beta=0.5$ and transfers to the warring factions are not costly to the third party (i.e., pure transfers). Therefore, if the third party was not willing to intervene when transfers were not costly, then non-intervention will still be optimal when transfers are costly. In view of this, we sometimes prove results for the costly transfer case (i.e., $\gamma > 1$) by exploiting results based on the costless transfer case (i.e., minimization of aggregate efforts).

In the following, we consider only linear cost functions (i.e., $c(e_i)=e_i$ for i).⁸

3.1. An imperfectly discriminating contest

Case (a): third party helps faction 1

Faction 1’s expected payoff is

$$\pi_1^c = P_1 V_1 - \alpha e_1 \tag{2}$$

Note that we can re-write faction 1’s payoff as $\pi_1^c = \alpha [P_1(V_1/\alpha) - e_1]$. Therefore, the subsidy is analytically equivalent to an increase in the valuation of the recipient of the subsidy. In this case, the subsidy increases faction 1’s valuation from V_1 to V_1/α , if $0 < \alpha \leq 1$. Given α , any e_1 which maximizes $P_1 V_1 - \alpha e_1$ also maximizes $[P_1(V_1/\alpha) - e_1]$ and vice versa. Indeed, in any contest, a faction with a higher valuation is analytically equivalent to a faction with lower cost of exerting effort. High-valuation factions are high-ability factions (see, for example, Clark and Riis, 1998).

Faction 2’s expected payoff is

$$\pi_2^c = P_2 V_2 - e_2 \tag{3}$$

For $0 < \alpha \leq 1$, the unique equilibrium Nash efforts are $e_{1m}^* = \frac{(V_1/\alpha)^2 V_2}{(V_2 + V_1/\alpha)^2}$ and $e_2^* = \frac{V_2^2 (V_1/\alpha)}{(V_2 + V_1/\alpha)^2}$. Aggregate effort is $E_1^* \equiv e_{1m}^* + e_2^* = \frac{(V_1/\alpha) V_2}{(V_2 + V_1/\alpha)} < V_2$. Equilibrium probabilities are $P_{1m}^* = \frac{V_1/\alpha}{V_2 + V_1/\alpha}$ and $P_2^* = \frac{V_2}{V_2 + V_1/\alpha}$. Note that this is the equilibrium in a model where the factions have the same cost of linear effort and valuations V_2 and V_1/α . Assuming that $V_1 = V_2$, it follows that $e_2^* = \alpha e_{1m}^*$. Therefore, *all things being equal*, the faction that is helped exerts a greater effort, given that $\alpha \in (0, 1)$ when one faction is helped.⁹

For $\alpha = 0$, we obtain $P_{1m}^* = 1$, $e_{1m}^* = V_2$, and $e_2^* = 0$. This is a Nash equilibrium since the cost of faction 1’s effort is fully reimbursed¹⁰ and faction 2’s best-response function can be shown to be $e_2(V_2) = \sqrt{e_1 V_2} - e_1$,¹¹ where faction 2’s optimal effort is zero, if this expression is non-positive.

Note that if the third party were directly involved in a contest with faction 2, it will be harder to commit to a bid of V_2 , given that faction 2’s optimal response is zero. Hence the equilibrium above could be seen as one in which the third party commits to V_2 by delegating decision-making

⁷ This is shown in an earlier version of this paper. Details are available on request.

⁸ In an earlier version of this paper we considered a non-linear cost function. There was no change in the results.

⁹ The analysis that follows also shows that this conclusion holds for $\alpha = 0$.

¹⁰ Cohen and Sela (2005) find a similar result in a contest where the *winner*’s cost of effort is fully reimbursed. With two factions, there are equilibria where faction i exerts zero effort, if faction j bids more than V_i . This is because any positive bid by faction i yields a negative payoff, given that faction j bids more than V_i . A difference in our model is that the reimbursement is independent of success or failure in the contest.

¹¹ This is his best-response function for all α .

authority to faction 1.¹² Indeed, in our model, the third party commits to reimburse faction *i*'s cost of effort for any $\alpha \in [0,1]$, $i = 1, 2$. Of course, given that a faction has already incurred this cost of effort, the third party has the incentive to renege on his promise to reimburse the cost for any $\alpha \in [0,1]$. We assume that for reasons such as maintaining credibility and a good reputation in the international community, the third party honors its promise.

Note that since faction 1's cost of effort is fully reimbursed, he does not have a unique effort choice. He could also choose some $e_1 > V_2$. Unless otherwise indicated, we assume that a faction whose cost of effort is fully reimbursed does not choose more than the maximum valuation of his opponent.

Case (b): *third party helps faction 2*

For $0 < \alpha \leq 1$, the equilibrium Nash efforts are $e_{2m}^* = \frac{V_2^2 V_1}{(\alpha V_1 + V_2)^2}$ and $e_1^* = \frac{\alpha V_1^2 V_2}{(\alpha V_1 + V_2)^2}$. Aggregate effort is $E_2^* = \frac{V_1 V_2}{(\alpha V_1 + V_2)} < V_1$. Equilibrium probabilities are $P_{2m}^* = \frac{V_2}{\alpha V_1 + V_2}$ and $P_1^* = \frac{\alpha V_1}{\alpha V_1 + V_2}$. For $\alpha = 0$, we obtain $P_{2m}^* = 1$, $e_1^* = 0$ and $e_{2m}^* = V_1$.

Notice that $\partial e_{1m}^* / \partial \alpha < 0$, $\partial e_2^* / \partial \alpha > 0$, and $\partial E_1^* / \partial \alpha < 0$, given $V_1 > V_2$, $i = 1, 2$. Therefore, when the third party helps the stronger faction, the weaker faction decreases his effort and the stronger faction increases his effort.

Given $\partial e_{1m}^* / \partial \alpha < 0$, $\partial e_2^* / \partial \alpha > 0$, $\partial E_1^* / \partial \alpha < 0$, $\partial \gamma / \partial \alpha < 0$, and $\gamma = 1 + 0.5(1 - \alpha) > 1$, it follows that

$$\frac{\partial \Omega_1^*}{\partial \alpha} = - \left(\frac{\partial \gamma}{\partial \alpha} e_{1m}^* + \gamma \frac{\partial e_{1m}^*}{\partial \alpha} + \frac{\partial e_2^*}{\partial \alpha} \right) = - \left(\frac{\partial E_1^*}{\partial \alpha} + (\gamma - 1) \frac{\partial e_{1m}^*}{\partial \alpha} \right) > 0. \tag{4}$$

Therefore, the third party's objective function is maximized when $\alpha = 1$. Consequently, the third party should not help the stronger faction.

The non-intervention result is interesting. To see the intuition behind this result, consider the following argument. If the third party helps the stronger party, he makes the battlefield more uneven which reduces aggregate efforts (call this the inequality effect).¹³ But this also increases the valuation of the stronger faction, which has the effect of increasing his effort (call this the valuation effect). The non-intervention result is optimal, if the valuation effect dominates the inequality effect. However, given that these two effects move in opposing directions, the optimality of non-intervention is not a general result, since it depends on the relative magnitudes of these two effects. Regan (1996) finds that intervention on behalf of an incumbent government instead of a rebel group tends to lead to more successful outcomes. To the extent that incumbent governments are stronger than rebel groups, we can obtain Regan's (1996) result in a model where the inequality effect dominates the valuation effect.

While we can also formally show that the third party should not help the weaker party, we shall instead present an intuitive proof. Note that by helping the weaker faction, the third party increases his (i.e., weaker faction) valuation. This leads him to exert more effort. This help also makes the battlefield less uneven, which increases aggregate effort. So the valuation effect and the inequality effect move in the *same* direction (i.e., an increase in aggregate effort). Therefore, it is not optimal to help the weaker faction, if the third party's goal is to minimize aggregate effort.

¹² There is a literature on commitment via delegation. See, for example, Fershtman and Kalai (1997), Bester (1995) and Melumad and Mookherjee (1989)). On the specific case of commitment via delegation in contests, see Baik and Kim (1997) and Konrad et al. (2004).

¹³ It is a generally known result that the more unequal are the factions in a contest, the lower are aggregate efforts (see, for example, Hillman and Riley, 1989; Che and Gale, 1998). An exception is the infinitely repeated contest in Section 3.3.

Now suppose the third party's objective is the minimization of the weighted sum of efforts. If the stronger faction increases his effort when the third party helps the weaker faction, then we know that aggregate effort unambiguously increases, since both factions would have increased their efforts in response to the third party's help. On the other hand, if the stronger faction decreases his effort, then we know that the fall in his effort is less than the increase in the weaker faction's effort, given that aggregate effort rises when the third party helps the weaker faction (i.e., $\partial \bar{E}_2^* / \partial \alpha < 0$). Given that the weight, γ , on $c(e_2)$ is greater than the weight (of unity) on $c(e_1)$, it follows that it is not optimal to help the weaker faction, if the third party's objective function is the weighted sum of efforts, Ω_2 .

As argued above, non-intervention is optimal because, when the third party helps the stronger faction, the valuation effect dominates the inequality effect. In what follows, we shall relax some assumptions of the above model, one at a time, to check the robustness of the non-intervention result. These assumptions are the Tullock (1980) contest success function, non-military intervention, and $\beta=0.5$.

Since it is obvious that it does not make sense for the third party to help the weaker faction, we only focus on whether the third party should help the stronger faction unless otherwise indicated.

3.2. A perfectly discriminating contest success function

So far, we have used Tullock's (1980) contest success function where the faction making the higher effort does not necessarily win the contest. This is the case when influences other than effort (e.g., luck) influence the outcome of the contest. This could be a contest where offensive weapons are not extremely effective. Consider instead a contest where the success function is extremely sensitive to effort. In particular, suppose

$$P_1 = \begin{cases} 1 & \text{if } e_1 > e_2 \\ 1/2 & \text{if } e_1 = e_2 \\ 0 & \text{if } e_1 < e_2 \end{cases} \quad (5)$$

and $P_2 = (1 - P_1)$. The contest is now an all-pay auction. It is a well-known result that there is no equilibrium in pure-strategies in an all-pay auction under complete information and with factions who face no budget constraints. However, there exists an equilibrium in mixed strategies, which is summarized in the following result:

Lemma. Consider two factions 1 and 2 with valuations V_1 and V_2 competing in a complete-information all-pay auction for a unique prize, where $0 < V_2 \leq V_1$ and each faction has a linear cost of effort (i.e., $c(e) = e$). In the unique Nash equilibrium both factions randomize on the interval $[0, V_2]$. Faction 1's effort is uniformly distributed, while faction 2's effort is distributed according to the cumulative distribution function $G_2(e_2) = (V_1 - V_2) / V_1 + e_2 / V_1$. Given these mixed strategies, faction 1's winning probability is $P_1 = 1 - V_2 / 2V_1$. Faction 1's expected effort is $V_2 / 2$, and faction 2's expected effort is $(V_2)^2 / 2V_1$. The respective payoffs are $u_1 = V_1 - V_2 \geq 0$ and $u_2 = 0$.

Proof. See Hillman and Riley (1989), and Baye et al. (1996).

Let us begin by assuming that the third party wants to minimize aggregate effort. Using Tullock's (1980) contest success function, we found that the optimal response by the third party is non-intervention. Suppose we maintain all the above assumptions but change the contest success

function such that the contest is now an all-pay auction. We shall show that it is now optimal for the third party to intervene by helping the stronger faction.

Given the lemma above and $V_1 > V_2$, if the third party does not help any of the factions, then aggregate expected effort is $\frac{V_2}{2} \left(1 + \frac{V_2}{V_1}\right)$. Clearly, aggregate effort is decreasing in the valuation of the stronger faction but increasing in the valuation of the weaker faction. Recall that when the third party helps the stronger faction, his valuation increases from V_1 to V_1/α where $0 < \alpha < 1$. Thus if the third party helps the stronger faction, aggregate effort is $\hat{E}_1 = \frac{V_2}{2} \left(1 + \frac{V_2}{V_1/\alpha}\right)$, if $\alpha \in (0, 1]$. Note that $V_2/2$ is the limit of \hat{E}_1 as $\alpha \rightarrow 0$.

If the third party helps faction 1 by choosing $\alpha = 0$, there will be multiple equilibria. For our purposes, we focus on the following class of equilibria. Suppose player 1 randomizes his effort on $[0, \bar{V}]$ according to the distribution function $H(e_1) = \tau + (1 - \tau)e_1/\bar{V}$, where $\bar{V} > 0$ and $\tau \in [0, 1]$. That is, player 1 puts a probability mass of τ on $e_1 = 0$ and distributes the remainder uniformly on $(0, \bar{V}]$. Then it is easy to show that $e_2 = 0$ is a Nash response to player 1's strategy if $\bar{V} \geq (1 - \tau)V_2$. Consider the special case where $\tau = 0$ and $\bar{V} = V_2$.¹⁴ Then the expected aggregate effort is $V_2/2$, which is the limit of \hat{E} as $\alpha \rightarrow 0$. Since $\partial \hat{E} / \partial \alpha > 0$ for $\alpha \in (0, 1]$, it follows that the third party will intervene by choosing $\alpha = 0$.

Now suppose that $\tau = 0$ but $\bar{V} > V_2$. Then the expected aggregate effort is greater than $V_2/2$. In this case, the expected aggregate effort function has a discontinuity at $\alpha = 0$. The optimal α is positive but very small. However, there is no unique value of α that maximizes the third party's objective function. Therefore, whether $\alpha = 0$ is optimal depends on which of the multiple equilibria is chosen.

Now suppose the third party's objective function is the weighted sum of efforts, $\Theta_1 = \gamma \frac{V_2}{2} + \frac{(V_2)^2}{(V_1/\alpha)}$, where $\gamma = 1 + 0.5(1 - \alpha)$, $\alpha > 0$. Then the third party's goal is to choose α to minimize Θ_1 . Given $\alpha = 0$ (i.e., $\gamma = 1.5$), $\tau = 0$, $\bar{V} = V_2$, $e_2 = 0$, and player 1 randomizing on $[0, \bar{V}]$, we get the weighted sum of aggregate efforts to be $1.5(V_2/2)$, which is the limit of Θ_1 as α approaches zero. Then $\alpha = 0$ is optimal if $\frac{\partial \Theta_1}{\partial \alpha} = V_2(V_2/V_1 - 0.25) > 0$ or if $4V_2 > V_1$.

However, intervention is no longer optimal if $\frac{\partial \Theta_1}{\partial \alpha} = V_2(V_2/V_1 - 0.25) < 0$. This occurs if $V_1 > 4V_2$. The intuition is very simple. If $V_1 > 4V_2$, then faction 1 is extremely stronger than faction 2. Therefore, the playing field is extremely uneven which makes the aggregate efforts very low. Hence, intervention by the third party will not significantly decrease already-low aggregate efforts or the weighted sum of efforts to make *costly* investment in intervention worthwhile. On the other hand, if the difference in abilities is sufficiently small (i.e., $4V_2 > V_1$), then the gains of intervention warrant the costs, so the third party intervenes.

The analysis in this section shows that if success in the conflict is extremely sensitive to effort, the third party will intervene by helping the stronger combatant. Our previous analysis shows that if success in the conflict is not very sensitive to effort, then the third party may not intervene. Therefore, the nature of the conflict as captured by the contest success function influences a third party's decision to intervene. The third party is likely to intervene because the cost of non-intervention may be very high, if success in the conflict is extremely sensitive to effort and the factions are sufficiently close in ability.

It is important to note that while the third party's goal is to minimize a weighted sum of efforts, the intervention guarantees victory for faction 1 in the process. Therefore, the third party's objective function encompasses cases where intervention is undertaken to increase the chances of victory for one faction.

¹⁴ We thank a referee for suggesting this equilibrium and for drawing our attention to the multiplicity of equilibria.

Baye et al. (1993) find that in an all-pay auction a corrupt politician can maximize his aggregate income from bribery by excluding some high-valuation contestants. This exclusion makes the battlefield more even which increases aggregate efforts (bribes). Our result uses the same logic but in the reverse direction. Helping the faction with the higher valuation makes the battlefield more uneven, which reduces aggregate effort.

3.3. An infinitely repeated conflict

In this section, we go back to the basic model in Section 3.1 but consider an infinitely repeated conflict,¹⁵ where there is a contestable prize in each period valued at V_1 and V_2 by the combatants. This will be a series of battles fought in a perpetual conflict, where the players repeatedly interchange roles as winners and losers. To examine this issue, we use the following result:

Lemma 2. Consider an infinitely repeated contest between two players, 1 and 2, where there is a contestable prize in each period and the players have a common discount factor of $0 < \delta < 1$. Player 1 values the prize at $V_1 \equiv V + k$ and player 2 values the prize at $V_2 \equiv V - k$, where $k \in [0, \bar{k})$ and $\bar{k} \equiv V\sqrt{2} - V < V$. Then there exists a collusive subgame perfect equilibrium in which each player exerts zero effort in each period, if $\delta \geq \underline{\delta}_1$, where $\underline{\delta}_1 \equiv 2V^2 / (3V^2 - 2Vk - k^2) < 1$.

Proof. Available on request.¹⁶

Notice that the higher is k , the more unequal are the players. That is, player 1 is much stronger than player 2, the higher is k . Notice that since $\underline{\delta}_1$ is increasing in k , collusion is easier to sustain when k is small than when k is large. This is because the gains from non-co-operation are sufficiently small to the stronger player (i.e., faction 1), if the difference between his ability and the weaker faction's ability is sufficiently small. Hence, the stronger faction will co-operate if k is sufficiently small. It is easy to show that if it is optimal for the stronger faction to co-operate, then it is also optimal for the weaker faction to co-operate.¹⁷ Therefore, co-operation is easier to sustain, if k is sufficiently small.

Indeed, the result that collusion can be sustained in this prisoner–dilemma-type environment is not surprising. What is interesting is that collusion is easier to sustain when the factions are more equally matched. This is consistent with the deterrence effect of mutually assured destruction (MAD) during the USA–Soviet Union cold war. This was based on the idea that if factions to a conflict are sufficiently and almost equally strong, then each will be deterred from initiating a conflict.

We now apply this result to the intervention decision of a third party. Given that the Nash equilibrium of the static game is the subgame perfect equilibrium in each period when collusion is not sustainable and the collusive outcome gives zero individual aggregate expenditures, it follows that any weighted sum of efforts is higher when the players are less equal. Therefore, if the third party wishes to minimize the cost of conflict or some weighted sum thereof, it may be optimal to help the weaker faction in order to make the combatants more equally matched.¹⁸ Hence, the non-intervention result may cease to hold in an infinitely repeated setting. Therefore, whether the third

¹⁵ Notice that an infinitely repeated game could be reinterpreted as a repeated game that ends after a random number of repetitions.

¹⁶ Also available at http://www.uoguelph.ca/~jamegash/conflict_intervention_appendices.pdf.

¹⁷ The proof is available on request or at the URL indicated in the Previous footnote.

¹⁸ This help could occur in each period or it could be a one-time assistance, which makes the weaker faction permanently stronger.

party intervenes will be determined by his belief of how protracted the conflict could be in the absence of intervention.

To elaborate on this result, suppose the third party decides to help the weaker faction such that both factions become equally matched. This requires $V_1 = V_2/\alpha$, which implies $k=0$ in Lemma 2, where $0 < \alpha < 1$. Notice that since in a collusive equilibrium, either faction exerts zero effort, the third party does not have to actually give any transfers to faction 2. What is required is that the third party credibly promises that should there be active combat between the factions, he will help faction 2, by choosing $\alpha = V_2/V_1 < 1$. Hence in equilibrium the third party is able to achieve a peaceful outcome without any actual transfers, so long as his threat is credible. Therefore, the third party is able to end violence in this case. Notice that in the previous cases, there was still some violence in equilibrium.

4. The third party’s intervention decision when $\beta \neq 0.5$

Consider the basic model in Section 3.1 but now suppose the third party’s goal is not only the minimization of the aggregate cost of conflict or a weighted sum thereof (i.e., $\beta \neq 0.5$).

Let $0 < \alpha \leq 1$. Then if the third party helps the stronger faction, his payoff is

$$\Omega_{1m}^*(\alpha) = \beta\theta + (1-2\beta)(P_{1m}^*V_1 + P_2^*V_2) - \gamma e_{1m}^* - e_2^* \tag{6}$$

Suppose $\beta=0$ and $V_1 > 2V_2$. Then $\frac{\partial \Omega_{1m}^*}{\partial \alpha} = \frac{V_1V_2(2V_2-V_1)}{(V_1+\alpha V_2)^2} < 0$. Note that $\Omega_{1m}^* = \Omega_1^*$ when $\beta=0.5$. It follows, from Section 3.1, that when $\beta=0.5$, then $\partial \Omega_{1m}^*/\partial \alpha > 0$. We can show that $\partial \Omega_{1m}^*/\partial \alpha$ is monotonically increasing in β . So by continuity, there exists a $\hat{\beta} \in (0, 0.5)$ such that this derivative is zero when $\beta = \hat{\beta} < 0.5$ and $V_1 > 2V_2$. Therefore, if $V_1 > 2V_2$, any $\beta \in [0, \hat{\beta})$ gives $\partial \Omega_{1m}^*/\partial \alpha < 0$.

Given $\alpha=0$, we know that $P_{1m}^*=1$, $e_{1m}^*=V_2$, and $e_2^*=0$. As argued in Section 3.1, this is a Nash equilibrium. We can show that $\Omega_{1m}^*|_{\alpha=0} - \Omega_{1m}^*|_{0 < \alpha \leq 1} > 0$, if $V_1 > 2V_2$ and $\beta \in [0, \hat{\beta})$. Therefore, if the third party decides to help the stronger party, he will do so by setting $\alpha=0$, if $V_1 > 2V_2$ and $\beta \in [0, \hat{\beta})$. And this case, the intervention guarantees victory for faction 1.

Our result implies that the third party will intervene and help the stronger faction, if he puts a sufficiently high weight, $1-\beta$, on the welfare of the successful combatant. This is intuitive because if the third party puts a sufficiently high weight on the welfare of a successful warring faction, then he will prefer the faction that can extract a bigger rent from the population. And the gains to faction 1 extracting the rents instead of faction 2 doing so are much higher, if faction 1 has a sufficiently higher valuation than faction 2 (i.e., $V_1 > 2V_2$).

5. Military intervention in a one-time conflict

In this section, we revert to our assumption of a one-time conflict.

When powerful nations like the U.S. or organizations like the United Nations are asked to intervene in internal conflict, it is usually because people believe that (a) such nations have the moral obligation to do so and (b) they have the military might to over power the warring factions.

In this section, we shall consider military intervention by the third party. In this case, we assume that the third party does not take sides. A military intervention is different from the intervention considered in the previous sections because it involves a direct deadweight loss. A military intervention does not involve a transfer from the third party to one of the combatants.

Let e_3 be the effort of the third party when he intervenes militarily in the conflict. We assume that when the third party wins the contest, then none of the losers can appropriate any of the

country’s resources or output. This is the advantage of military intervention to the third party. This output goes to the non-combatant population but as indicated earlier the third party could also be a beneficiary.

In our model, the third party fights against both factions. One may argue that this is not realistic because third parties either take sides or only play a peace-keeping role. Our response to this argument is that there is really a fine line between peace-keeping and active combat. In certain situations, peace-keepers are compelled to fight. Indeed, without any significant military might, a peace-keeping role is neither credible nor effective. And during peace-keeping, one cannot assume that the warring factions will permanently lay down their arms, even if they are currently doing so. Indeed, third parties sometimes intervene when there is no truce between the warring factions. The intervention of the United Nations Protection Force Operation in Bosnia (UNPROFOR) is an example.¹⁹ Carment and Rowlands (1998, p. 594) note that “[d]uring the interval in which the UNPROFOR was reinforced... The civil war continued...” Furthermore, we find in our analysis, an equilibrium in which one of the factions lays down its arms (i.e., zero effort), if the third party intervenes militarily. Hence, in this case only faction (i.e., the stronger faction) decides to fight the third party.

We revert to Tullock’s (1980) contest success function. Let the success probabilities of faction 1, faction 2, and the third party be $\rho_1 = e_1 / (e_1 + e_2 + e_3)$, $\rho_2 = e_2 / (e_1 + e_2 + e_3)$, and $\rho_3 = e_3 / (e_1 + e_2 + e_3)$, respectively. Each party has a success probability of 1/3 if $e_1 = e_2 = e_3 = 0$.

We may write the third party’s objective function as

$$\begin{aligned} \Phi = & \rho_1[\beta(\theta - \sum_{i=1}^3 e_i - V_1) + (1-\beta)(V_1 - e_1) - (1-\beta) \sum_{i \in \{2,3\}} e_i] + \rho_2[\beta(\theta - \sum_{i=1}^3 e_i - V_2) \\ & + (1-\beta)(V_2 - e_2) - (1-\beta) \sum_{i \in \{1,3\}} e_i] + \rho_3[\beta(\theta - \sum_{i=1}^3 e_i) - (1-\beta) \sum_{i=1}^3 e_i] \end{aligned} \tag{7}$$

Eq. (7) can be simplified to obtain

$$\Phi = \beta\theta + (1-2\beta)(\rho_1 V_1 + \rho_2 V_2) - \sum_{i=1}^3 e_i \tag{7a}$$

Note that $\partial \rho_i / \partial e_3 < 0$ and $\partial^2 \rho_i / \partial e_3^2 > 0$, $i = 1, 2$. It follows that

$$\frac{\partial \Phi}{\partial e_3} = (1-2\beta) \left(V_1 \frac{\partial \rho_1}{\partial e_3} + V_2 \frac{\partial \rho_2}{\partial e_3} \right) - 1 < 0, \tag{8}$$

if $\beta \leq 0.5$. This gives the obvious result that the third party will not intervene militarily if he places a sufficiently small weight on the welfare of the rest of the population.

Since $\partial^2 \rho_i / \partial e_3^2 > 0$, $i = 1, 2$, it follows that the third party’s objective function is strictly concave in e_3 , if $\beta > 0.5$. That is,

$$\frac{\partial^2 \Phi}{\partial e_3^2} = (1-2\beta) \left(V_1 \frac{\partial^2 \rho_1}{\partial e_3^2} + V_2 \frac{\partial^2 \rho_2}{\partial e_3^2} \right) < 0, \tag{9}$$

¹⁹ Recent interventions in Sierra Leone and Liberia may also fit this scenario. In these cases, the third party intervenes to control the country and facilitate the transition of power to a legitimately elected government.

if $\beta > 0.5$. It is easy to show that the objective functions of factions 1 and 2 are also strictly concave. Note that $e_1 = e_2 = e_3 = 0$ cannot be an equilibrium, since a faction's payoff rises discontinuously if he expends a very small but positive effort. Also, there is no equilibrium in which one faction expends a positive effort and each of the other two factions expend a zero effort. Hence an equilibrium must involve, at least, two factions exerting a positive effort. Finally, there is no equilibrium where $e_3 = 0$ and each of the other two factions exerts positive efforts, if β is sufficiently high. Since each faction's objective function is continuous (above zero) and strictly concave, there exists a unique positive solution to the best-response functions of, at least, two factions (given the above arguments). If β is sufficiently high, the third party will be one of these two factions. It follows that the third party will intervene militarily, if β is sufficiently high.²⁰

As an example, suppose $\beta = 1$ and $V_1 \geq 2V_2$. It is easy to show that if $e_2 = 0$, the optimal effort of factions 1 and 3 is $\hat{e}_1 = \hat{e}_3 = V_1/4$ and given $\hat{e}_1 = \hat{e}_3 = V_1/4$, it is also easy to show that the optimal response of faction 2 is zero, if $V_1 \geq 2V_2$.²¹ Indeed, the unique Nash equilibrium is $\hat{e}_1 = \hat{e}_3 = V_1/4$ and $\hat{e}_2 = 0$. Hence when the third party intervenes militarily, only the stronger faction will fight if he (i.e., the stronger faction) is sufficiently strong and the third party cares sufficiently about the non-combatant population. The intuition behind this result is as follows. If V_1 is very large, then faction 1, if successful, will extract a high proportion of the country's output leaving very little for the non-combatant population. Since the third party cares strongly about the non-combatant population (i.e., $\beta = 1$ in the example above), her valuation in the contest is very large. This is because victory in the contest prevents faction 1 from appropriating the country's resource, which saves the non-combatant population a large amount, V_1 , of output. This means that if V_1 is very large, then the third party and faction 1 have very high valuations in the contest, which cause them to exert very high efforts. This makes it impossible for the weaker faction to compete.

For our purposes, the main result is that the third party might intervene militarily. Although, military intervention has a deadweight loss, the third party may choose this option since success in the conflict implies that none of the other combatants can appropriate any of the country's resources or output. In Section 4, we found that when β is sufficiently high, the third party will not intervene. Since military intervention has an advantage and a disadvantage compared to non-military intervention, the result in this section is not necessarily a general result.

Recall that the third party does not intervene militarily if $\beta = 0.5$. We can also show that the third party intervenes militarily if and only if $\beta \geq \hat{\beta} > 0.5$.²² Also, given $V_1 > 2V_2$, we know, from Section 4, that the third party intervenes in a non-military manner if and only if $\beta < \hat{\beta} < 0.5$. Thus, if $V_1 > 2V_2$, we can state the following interesting result: (i) if $\beta \in [0, \hat{\beta})$, the third party intervenes in a non-military manner, (ii) if $\beta \in [\hat{\beta}, \hat{\beta})$, the third party does not intervene, and (iii) if $\beta \in [\hat{\beta}, 1]$, the third party intervenes militarily.²³ Hence the third party intervenes for sufficiently extreme values of β but does not intervene for intermediate values of β .

It is important to note that the third party may not want to intervene militarily because he may lack the legitimacy of governing even if he is successful in the conflict. He may be accused of being an occupier with hegemonic intentions. However, the third party can get around this problem by transferring power to members of the non-combatant population and helping them to form a government.²⁴

²⁰ The proof is available on request or at http://www.uoguelph.ca/~jamegash/conflict_intervention_appendices.pdf.

²¹ It can also be shown that if $V_1 < 2V_2$, then faction 2 will also exert a positive effort.

²² The proof is available at http://www.uoguelph.ca/~jamegash/conflict_intervention_appendices.pdf.

²³ The condition $V_1 > 2V_2$ is not required for military intervention.

²⁴ Another disadvantage of military intervention is that it may induce the weaker faction to join forces with the stronger faction with the goal of fighting the third party. The third party may be considered a common enemy who needs to be defeated.

6. Conclusion

When third parties do not intervene in conflicts, there is condemnation of such inaction after the true cost of the conflict is known. In the case of a non-military intervention, this paper shows that non-intervention is optimal if the potential intervener places no weight on the warring factions or places an equal weight on the warring factions. All things being equal, we find that it is not optimal for the third party to help the weaker faction. Helping the weaker faction increases his valuation and also makes the contest less uneven. These two effects unambiguously increase the aggregate cost of conflict.

We also find that a third party is likely to intervene and help the stronger faction, if success in the conflict is very sensitive to effort. In this case, we find that the third party intervenes by helping the stronger faction if the warring factions are sufficiently close in ability. The gains from making the playing field unequal are high enough to warrant the cost of intervention. If the stronger faction is sufficiently stronger than the weaker faction, then the gains of intervention are not high enough to warrant intervention.

We also find that the non-intervention result does not hold if the conflict is infinitely repeated. But in this case, he might help the weaker faction. Hence a third party's intervention decision regarding which faction to help is influenced by how protracted he expects the conflict to be in the absence of intervention and how sensitive success in the conflict is to effort.

In the case of military intervention, we find that the third party will intervene if he cares sufficiently about the non-combatant population. An advantage of military intervention is that the other warring factions may not be able to appropriate the country's resources (output) if the third party is successful. Indeed, there are situations where the third party chooses military intervention over non-military intervention and vice versa. Interestingly, we find that, under certain conditions, the third party does not intervene, if the weight he places on the welfare of the non-combatant population is within an intermediate range. He only intervenes for extreme values of this parameter. We also find that the weaker faction may lay down his arms, if the third party intervenes militarily.

We hope that this paper has shed some light on third party intervention in conflicts. Hopefully, further work will be undertaken to explore this issue.

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