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Ethnic conflicts with informed agents: A cheap talk game with multiple audiences☆

Pathikrit Basu [a,1], Souvik Dutta [b,*,2], Suraj Shekhar [c,3]

[a] California Institute of Technology, United States of America
[b] Indian Institute of Management Bangalore, India
[c] University of Cape Town, South Africa

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ABSTRACT

We consider a society on the brink of ethnic conflict due to misinformation. An 'informed agent' is a player who has information which may prevent conflict. Can the informed agent achieve peace by communicating privately with the players? The issue is that if the informed agent is known to favour her own ethnicity, she is unable to communicate credibly with the other ethnicity. Despite this, we show that peace can be achieved in equilibrium. Our paper contributes to the literature on cheap talk games with multiple audiences with the novel addition of private signals along with payoff externalities.

1. Introduction

Ethnic conflicts[4] are often precipitated by misinformation. We study the role of information in preventing conflict. Consider a society on the verge of conflict between two ethnicities due to misinformation about the state of the world. There is an informed agent who knows the true state and can send private messages to all players. However, she is known to favour her own ethnicity and hence cannot communicate credibly with the other ethnicity. Despite this, we show that there exists an equilibrium where peace prevails in the presence of the informed agent but is otherwise not attainable.

There are two key ideas. One, since the informed agent's preferences are aligned with the preferences of players from her own ethnicity, she is able to communicate credibly with them (and this is common knowledge). While the opposite ethnicity players receive uninformative signals from the informed agent, the presence of the informed agent allows them to evaluate their action choices with the knowledge that the players of the informed agent's ethnicity will condition their action on the true state. Without the informed agent, the ethnicities are symmetric and neither group can condition their action on the state. Two, the informed agent is only partially biased against the opposite ethnicity — in one state, the informed agent wants the outcome (winning the conflict) which only benefits her own ethnicity, but in the other state the informed agent's preferred outcome (peace) favours both ethnicities. These two ideas allow us to define an equilibrium in which players of the opposite ethnicity realize that their lack of information does not allow them to launch a coordinated attack while the other ethnicity is fully coordinated. This reduces their chance of winning the conflict (and therefore their payoff from fighting), and they find it optimal

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* Corresponding author.
E-mail addresses: pathkrtb@caltech.edu (P. Basu), souvik@iimb.ac.in (S. Dutta), suraj.shekhar@ashoka.edu.in (S. Shekhar).

1 202, Annenberg Building, Pasadena, CA - 91125, USA.

2 E-001 Indian Institute of Management Bangalore Bannerghatta Road, Karnataka, India - 560076.

3 African Institute of Financial Markets and Risk Management (AIFMRM), University of Cape Town. Address - 622 Leslie Commerce building, Upper Campus, University of Cape Town, Rondebosch, Cape Town, South Africa. Present address - 343/2, AC02 Building, Department of Economics, Ashoka University, India.

4 All conflicts based on ascriptive group identities (race, language, religion, tribe, or caste) can be called ethnic (Horowitz, 1985).

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to not fight, and hope that the state is one where the informed agent implements peace.

Our article contributes to the literature on cheap talk games with multiple audiences with the novel addition of payoff externalities along with private signals. Allowing for private signals distinguishes our paper from those concerned with cheap talk games and public signals like Levy and Razin (2004) and Baliga and Sjöström (2012). Private signals are important to study in light of the success of new organizations which have come up to prevent conflict by dispelling rumours through Whatsapp/text messages.[5] Theoretically, a key difference between public and private signals is that unlike private signals, a public signal allows the informed agent to communicate effectively with the opposite ethnicity because the informed agent cannot lie to the opposite side without also lying to her own ethnicity. This paper differs from the literature which allows for private signals but does not have payoff externalities (Farrell and Gibbons, 1989; Goltsman and Pavlov, 2011). Payoff externalities are key to the analysis of conflict since one side's actions may have severe repercussions for the other side. Our paper differs from the mediation literature (Kydd, 2003, 2006) because, in our model, the mediator's preferences are dependent upon her information (state-dependent preferences), and she can achieve peace *without* being truthful to one ethnicity.

2. Model

There are a continuum of players and each player belongs to one of two ethnicities - $\{E_1, E_2\}$. Each ethnicity has the same mass of players.[6] The ethnicity of each player is common knowledge. Additionally, every player can be one of two types - *Good* (G) or *Bad* (B). G type players are strategic and can choose to take one of two actions — fight (f) or not fight (nf), while B type players always fight. The type is privately known to the player.

Let A_i be the fraction of E_i ethnicity players who choose to fight. A conflict occurs if and only if at least one group has $A_i > c$ where $c \in (0, 1)$ is an exogenously given threshold which is common knowledge. If a conflict occurs, the probability of winning for group E_i is given by $A_i/(A_i + A_j)$.

We represent uncertainty about the state in the following way. Let ${n^y}_l$ be the fraction of y ethnicity players who are l type. For simplicity, we assume that there are only two possible type distributions.[7] With probability ω, the type distribution is $({n^{E_1}}_G, {n^{E_2}}_G) = (q, q)$, and with probability $(1 - \omega)$ it is $({n^{E_1}}_G, {n^{E_2}}_G) = (r, r)$, where $(1 - q) < c < (1 - r)$. Thus, conflict always happens if (r, r) is the true distribution of G types[8] (bad state of the world). Conflict may not happen if the distribution of G types is (q, q) (good state of the world), and if a large enough fraction of G types choose not to fight. Here on, unless otherwise stated, everything is described for a G type player because a B type player is not strategic.

The payoffs to any player i of type G are summarized in Table 1 where $\alpha, \beta, \gamma, \delta, \varepsilon > 0$. *CW* refers to the event where conflict happens and i's ethnicity wins, *CL* - conflict happens and his ethnicity loses, and *NC* means conflict does not occur. The entire payoff matrix is common knowledge. We assume that $\varepsilon < \alpha + \beta$ to ensure that the payoff from fighting and winning is better than the payoff from fighting and losing. Only two aspects of the payoff matrix are important for our results. We assume that war is never more desirable than peace ($\alpha + \delta > \alpha$). Second, the payoffs are such that it always pays to fight when conflict is inevitable. This can be because of a 'warm glow' a player might experience by participating in the conflict with players from their own ethnicity (Egorov and Sonin, 2014) or because players who do not fight are ostracized/punished by their communities. If a player chooses to fight and conflict does not happen, we assume the payoff is negative (think of this as the cost of being arrested for unruly behaviour).

Table 1
Payoffs.

	CW	*CL*	*NC*
f	α	$-\beta + \varepsilon$	$-\gamma$
nf	$-\beta$	$-\beta$	$\alpha + \delta$

There exists an 'informed agent'(b) who is perfectly informed about the state of the world. The informed agent sends private cheap talk messages to all players about the state of the world. Given a player i, she can send one of two messages - message with signal Q or a message with signal R. We assume that b is outside the population and does not herself participate in the conflict.[9] She belongs to one of the two ethnicities and without loss of generality, let b belong to E_1. This is common knowledge. Since b does not participate in the conflict, she only cares about three outcomes: conflict happens and E_1 wins - b gets α, conflict happens and E_1 loses - b gets $(-\beta)$, conflict does not happen - b gets $\alpha + \delta$. Thus, b wants peace. However, if conflict occurs, she would like her own ethnicity to win. We focus on strategies of the informed agent that are symmetric within ethnicity. $b's$ strategy is a function of the ethnicity of the receiving player and the true state of the world and is denoted by f_b. Thus, $f_b : \{E_1, E_2\} \times \{(q, q), (r, r)\} \to \Delta\{Q, R\}$. We assume that players play symmetric (within ethnicity) strategies. Let g^{E_i} denote the strategy of a player of ethnicity E_i. Then $g^{E_i} : \{Q, R\} \to \Delta\{f, nf\},\ i \in \{1, 2\}$.

The time line of events is: at time 0, players have priors about the state of the world. The informed agent sends a private message to every player and then they decide their action simultaneously. Players update beliefs in a Bayesian manner and choose actions which are optimal given their beliefs. Thus, our equilibrium concept is Perfect Bayesian Equilibrium.

3. Result

First, suppose that the informed agent does not exist. Then, it is easy to show that there exists an $\omega^*(= \frac{\alpha+\beta+\varepsilon}{\alpha+\beta+\varepsilon+2(\alpha+\delta+\gamma)})$ such that if $\omega < \omega^*$ (players are sufficiently pessimistic), then conflict is the unique equilibrium (formal proof is in the internet appendix available on surajshekhar.com). Next, consider the case when the informed agent exists. Since the informed agent is known to favour her own ethnicity, players from the opposite ethnicity (E_2) realize that the informed agent has incentives to lie to them. This makes effective communication with the opposite ethnicity very difficult. Proposition 1 shows that despite this limitation, we can obtain peace as an equilibrium outcome even when $\omega < \omega^*$.

In the equilibrium described below, the informed agent gives perfect information to her own ethnicity and no information to the opposite ethnicity. Furthermore, the informed agent is able to implement peace in the good state, and is able to prevent all (Good type) players of the opposite ethnicity from fighting in the bad state, thereby giving an advantage to her own ethnicity.

5 See https://www.unahakika.org/ (informed agent communicates via messages).

6 Our results hold even when the ethnicities are not symmetric in size.

7 This is for simplicity. All we need is that conflict is inevitable in some states and not in others.

8 Since $1 - r > c$.

9 This is just for simplicity. Including b amongst the players will have no impact on the equilibrium we describe later.

Players of the opposite ethnicity play pure strategy *not fight* along the equilibrium path because they realize that their lack of information does not allow them to launch a coordinated attack while the other ethnicity is fully coordinated (plays state-dependent actions). This reduces their chance of winning the conflict (and therefore their payoff from fighting), and they find it optimal to not fight, and hope that the state is good (where the informed agent implements peace).

Even though they do not receive any information in equilibrium, the presence of the informed agent allows the opposite ethnicity players to choose their action with the knowledge of the state dependent play of their rivals. They are able to do this because they know that the informed agent has the incentive to truthfully reveal the state to her own ethnicity. When there is no informed agent, the action choice of neither ethnicity players is state-dependent.

Proposition 1. *There exists $\underline{\omega}$ such that if $\omega \in (\underline{\omega}, \omega^*)$, then the following profile of strategies constitute an equilibrium:*

b′s strategy :

$f_b(E_1, (r, r)) = R$

$f_b(E_1, (q, q)) = Q$

$f_b(E_2, (r, r)) = Q$

$f_b(E_2, (q, q)) = Q$

Player′s strategies

E_1 ethnicity/Same ethnicity

$g^{E_1}(Q) = nf$

$g^{E_1}(R) = f$

E_2 ethnicity/Opposite ethnicity

$g^{E_2}(Q) = nf$

$g^{E_2}(R) = nf$

Proof. Consider a player $i \in E_1$. If he receives the signal R, he realizes that the state is (r, r) and therefore it is optimal for him to fight since conflict is inevitable. If he receives the signal Q, he knows that the state is good and there are not enough players playing f to start a conflict. Hence, i's optimal action is to play nf. b's objective is to avoid conflict in state (q, q) and to maximize E_1's probability of winning the conflict in state (r, r). Clearly, no deviation will make b better off, so her strategy is optimal. We now show optimality of strategy for the E_2 ethnicity players. Before going further, note that we assume that the opposite ethnicity players retain their prior beliefs in case they get the off equilibrium message of R.[10] Let h be a function from the belief about the state to the payoff space such that it represents the difference in payoffs for a E_2 ethnicity player from playing nf and f, when all players follow the equilibrium strategy prescribed above. Thus:

$h : [0, 1] \to \mathbb{R}$ *such that*

$$h(\omega) = [\omega(\alpha + \delta) + (1 - \omega)(-\beta)] - \omega(-\gamma) - (1 - \omega)$$
$$\times\ [\frac{(1 - r)}{r + 2(1 - r)}(\alpha) + \frac{1}{r + 2(1 - r)}(-\beta + \varepsilon)]$$

Clearly, h is monotonically increasing. It is easy to see that $\omega > \underline{\omega}(= \frac{(1-r)(\alpha+\beta)+\varepsilon}{(1-r)(\alpha+\beta)+\varepsilon+(\alpha+\delta+\gamma)(2-r)}) \Rightarrow h(\omega) > 0$. Also, $\varepsilon < \alpha + \beta \Rightarrow \underline{\omega} < \omega^*$. □

4. Conclusion

This paper adds to our understanding of the role of informed players in preventing conflicts. In the future, we would like to extend this model to a repeated environment where the informed agent learns about the state of the world every period and has reputation concerns.

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[10] Alternatively, we could have chosen b's strategy so that she sends the opposite ethnicity players either signal with the same probability in both states. The idea is simply to have no state relevant information conveyed in the signal.