What Makes Democracies Credible? A New Approach to The Democratic Peace Hypothesis*

Gilat Levy† and Ronny Razin‡

Abstract

In this paper we provide an explanation to an empirical regularity in International Relations entitled the ‘democratic peace’. According to this hypothesis, two democracies rarely wage war against each other. Our explanation relies on how different regime types behave in conflicts in which incomplete information plays a major role. We find that democratic regimes are able to transmit information credibly to a rival side, as opposed to autocratic regimes. This allows democracies to mitigate information asymmetries and coordinate on peaceful resolutions. In addition to formally explaining the democratic peace hypothesis, we also show that a conflict between a democracy and an autocracy is more likely to be resolved peacefully than a conflict between two autocracies. This prediction was not analyzed in the literature.

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†Department of Economics, London School of Economics.
‡(Corresponding author): Department of Economics, New York University, 269 Mercer Street, New York, NY 10003. Tel: (212) 998-8904. e-mail: ronny.razin@nyu.edu.
1 Introduction

Empirical research in international relations suggests that democracies and non-democracies resolve international conflicts in sharply contrasting manners. The main observation made in the literature is that two democratic regimes rarely wage war against each other. This phenomenon is known as the ‘democratic peace’, and is described “as close as anything we have to an empirical law in international relations”.\(^1\) Non-democratic regimes, on the other hand, are observed to have a higher propensity to resolve conflicts by means of military confrontations. The ‘democratic peace’ phenomenon suggests that domestic political structure affects behavior in international conflicts. This paper provides a formal model of how institutional design may affect the means of resolving international conflicts.

Our approach is centered on what we view as the main difference between democracies and other regimes in the context of bilateral negotiations. We claim that the degree of centralization of decision making in a country affects the level and quality of information that crosses the borders between countries. This in turn has implications to the way countries with different regimes might interact in international disputes.

In democracies, the general public takes part in the process of decision making. This is obvious in referenda when the public is the actual decision maker. But even in representative democracies, the public still has a role to play in the decision making process, through the accountability of leaders seeking re-election. Because the

general public is involved, the information necessary for the decision making process must be transmitted via the public media, through debates, articles or politicians’ statements. When the decision concerns an international conflict, however, the rival country is equally able to observe this public transmission of information. In other words, any information that is transmitted to the decision maker - the public - is also recognized by the other country.

In a non-democratic regime, the effect of the general public on decision making is blurred. No specific rules govern the amount of attention and consideration leaders of a non-democratic regime give to public opinion. In an extreme autocracy, the autocrat is the ultimate decision maker. The information required for the decision making in the international arena may be dispersed in the polity and held by various agencies such as the army or the treasury. Still, the autocrat (or any small group of leaders) may accumulate this information secretly without the need for public media. As opposed to democratic regimes, an autocrat can abstain from transmitting the relevant information to the general public without compromising the efficiency of the decision making process. In the context of an international conflict, an autocrat can conceal information from the rival country and maintain a relative information advantage.

This fundamental difference between democratic and non-democratic regimes affects directly the credibility of messages exchanged during an international conflict. Leaders of both democratic and non-democratic regimes may attempt to manipulate the leaders of a rival country through false messages. But, in democracies, the incentive of politicians to deceive a rival side with false claims and threats is mitigated
by their incentive to inform their own public. This counter-incentive does not exist in non-democratic regimes, since an autocrat has no need to be truthful to his own public.

Put another way, leaders of a democracy play a cheap talk game with two audiences: their public and the rival side. The presence of the public as a second audience in democracies creates endogenous costs to cheap talk messages of politicians; different messages may affect the beliefs of the public. A change in the public beliefs, which becomes apparent in elections or referenda, affects the politician’s utility. We therefore find that the other country perceives the leader’s statements as credible.

The ability of democracies to transmit credible information over the border reduces information asymmetries with the rival side. As a consequence, there is a relatively low probability that a conflict will escalate into a military confrontation when a peaceful agreement is beneficial to both sides. An autocrat cannot credibly transmit information to the rival side. As a result, he may be able to extract information rents. But incomplete information also induces an inefficient resolution of conflicts. A military confrontation may arise even when a peaceful settlement is beneficial for both sides.

We find that a conflict between two democracies is more likely to be resolved peacefully than a conflict between two autocracies or a conflict between an autocracy and a democracy. Each leader in a conflict of two democracies knows that the rival government cannot deceive it. This increases the prospects for peaceful resolutions. Our result provides therefore a formal explanation to the observed phenomenon of
democratic peace.

Our model allows also for a comparative analysis of the outcomes of a conflict between two autocracies and a conflict between an autocracy and a democracy. We find that a conflict between mixed regimes is less likely to end in a military dispute than a conflict of two non-democratic regimes.\(^2\) This is so because the involvement of a democratic regime in an international conflict tends to reduce information asymmetries, even if the rival regime is non-democratic. This prediction can be tested empirically and awaits future research.

Scholars have put forward a variety of normative and institutional explanations to the democratic peace phenomenon; Dixon (1994) and Maoz and Russett (1993), among others, emphasize the role of democratic norms as favoring nonviolent conflict resolutions. Bueno de Mesquita and Lalman (1992) and Bueno de Mesquita et al. (1999) identify institutional constraints as the reason why political leaders prefer to settle disputes through negotiations rather than through force. Our work is more closely related to several studies focusing on asymmetric information and, in particular, on the ability of democracies to send credible messages. For example, Fearon (1994) assumes *exogenously* that democratic leaders face high “audience costs” when escalating a crisis and then backing down. But Fearon does not explain why this should be so. In our model, higher “audience costs” in democracies arise endogenously due to informational considerations. The messages of a democratic leader entail endogenous costs, because they may change the beliefs and conse-

\(^2\)This prediction also comes up in Bueno de Mesquita et al. (1999) through a different institutional explanation of the difference between democracies and dictatorships.
sequently the behavior of the public, whose actions affect the leader’s utility. More recently, Schultz (1998) claims that the presence of an informed opposition to a democratic government induces the transparency of information. We believe that our explanation rests on a more fundamental trait of democratic regimes, namely, the role of the public as the ultimate decision maker.

In the model, we analyze cheap talk games. The analysis of cheap talk games was pioneered by Crawford and Sobel (1982). We distinguish between a cheap talk game with one audience, applicable to a non-democratic regime, and a cheap talk game with two audiences, applicable to a democratic regime. For general analysis of cheap talk games with two audiences, see Farrell and Gibbons (1989). Our work also relates to the literature on delegation and control rights over decision making. One can interpret our main theoretical premise as the ability of democracies to commit to delegate decisions to an uninformed decision maker, whereas autocracies cannot commit to do so (for a recent contribution to this literature see Aghion, Dewatripont, and Rey (2000)).

The rest of the paper is organized as follows. In the next section, we construct the model. In section 3, we analyze the model under one-sided incomplete information. We therefore focus on one country and distinguish between an autocracy and a democracy. To prove the democratic peace hypothesis, section 4 analyzes the two-sided incomplete information model; we investigate the outcomes of conflicts between two democracies, two autocracies, and a conflict between mixed regimes. Section 5 concludes. All proofs that are not in the text are relegated to an appendix.
2 The Model

We view an international conflict as a situation in which two countries may potentially benefit from cooperation. What may preclude this cooperation is the possibility that one side may want to take advantage of the “good will” expressed by the other side.

Two countries, denoted by country 1 and country 2, are engaged in an international conflict that can be resolved by an agreement. The agreement may or may not hold the potential for mutual gains. The nature of the conflict is such that each country has possibly two actions; either to take costly measures that will enable an agreement between the two countries (such as withdrawing troops or offering a compromise by making concessions), which we term ‘soft’ (S), or to take measures that will make an agreement impossible (such as a military attack on the other country), which we term ‘tough’ (T). The conflict and the utilities that each side accrues can be illustrated in the following normal form game which we denote by C (for strictly positive $a$ and $M$):

\[
\begin{array}{c|cc}
\text{Country 2} & T & S \\
\hline
\text{Country 1} & T & 0,0 & M,-a \\
& S & -a,M & M + s_1,M + s_2 \\
\end{array}
\]

Figure 1: The game C

For any pair of actions other than (S,S), a peaceful agreement cannot be achieved.
When both play tough, which can describe a situation of an all-out-war, they each receive a low payoff normalized to 0. When one country plays tough and the other soft, which can describe a threat or actual use of force on behalf of one country only, the tough country gains a positive payoff of $M$ at the expense of the soft country who receives a negative payoff of $-a$. When both countries play soft, they reach an agreement. The payment for country $i$ from an agreement is given by $M + s_i$, where $s_i$ is a random variable uniformly distributed on $[-v, v]$. The variable $s_i$ captures the uncertainty of players about the benefit of an agreement for country $i$. We consider cases in which $v > M$.\(^3\)

In each country there are two players, the general uninformed public, $P_i$, and an informed citizen $K_i$. The informed citizen in country $i$, $K_i$, learns the true state $s_i$. Thus, in each country the informed citizen has information only about the preferences of his country towards an agreement. $K_i$ represents the small group of informed citizens in the polity. It is important for our analysis that the polity as a whole, $P_i$, is uninformed.

International conflicts are usually accompanied by several rounds of diplomatic negotiations, massive media coverage and mutual exchange of threats. In this model, we want to investigate this feature of conflicts in order to understand whether these threats - or sometimes dovish statements - tend to relax information asymmetries. We analyze situations in which it is possible for the informed citizens to transmit public messages prior to the play of the conflict game. Thus, we assume that in

\(^3\)This assumption implies the existence of states of the world in which an agreement may be inferior to other outcomes.
the first stage of the game, $K_1$ and $K_2$ engage in a message transmission stage. In this stage, each sends a message $m_i$ about his information $s_i$. The message space is restricted without loss of generality to $m_i \in M = [-v, v]$. The messages are sent simultaneously and are observed both by the home and the foreign audiences. The informed citizens do not bear any costs for sending messages and hence the latter are cheap talk.

Our main and novel assumption concerns the identity of the player who plays the conflict game on behalf of country $i$. The identity of this player, we assume, depends on the regime in that country, be it a democratic or an autocratic regime. If country $i$ is an autocracy, $K_i$ plays the conflict game. If country $i$ is a democracy, $P_i$ represents his country in the conflict game. We therefore analyze three different games.

Let us reconstruct the logic behind our main assumption. In a democracy, the public is the decision maker. However, it is technologically impossible to inform the public secretly about the correct decision. It is impossible to transmit information privately to each citizen (or to a majority of citizens). Information that the public as a whole receives from informed citizens, must be transmitted \textit{publicly}. This means that any such transmission, be it a report in the newspaper or a public statement of a politician on the television, can be observed by the rival country. Consequently, the public and the rival country have the same level of information. We model this by assuming that the (uninformed) public, $P_i$, is the player on behalf of country $i$.

On the other hand, in an autocracy, an autocrat is the decision maker. Even if information is dispersed in the country, it is relatively easy for a centralized authority
to secretly collect it, at least partially. We imagine in the background an information
transmission game between the autocrat and the informed $K_i$. Since they share the
same preferences, all information could be transmitted to the autocrat. The rival
country will not be able to observe most of this information. Hence, the rival
country perceives whoever plays against it in the conflict game as someone with
an information advantage. We can therefore model autocracy as an institution in
which the informed citizen, $K_i$, takes the final decision.

To recapitulate, the structure of the game is as follows:

**Stage 1:** $K_i$ sends a message $m_i$, observed by all.

**Stage 2:** If country $i$ is an autocracy, $K_i$ plays the game C and if country $i$ is a
democracy, $P_i$ plays the game C.

All players derive utility, as specified in the normal form game C, according to
the country they belong to.\footnote{The assumption of homogenous preferences within a country is a simplifying assumption.} We use the concept of a Bayesian Nash Equilibrium

When we analyze democratic regimes, our qualitative results hold even if we allow for heterogeneous preferences, i.e., when the preferences of the public are different than those of the informed leadership. When we analyze non-democratic regimes, however, an assumption of heterogeneous preferences creates a wedge between the informed citizen $K_i$ and the autocrat. The autocrat may not be initially as informed as $K_i$. If their preferences are not aligned, $K_i$ may not transmit all his information to the autocrat. As a result, we cannot identify $K_i$ and the autocrat. However, as long as their preferences are more congruent than the preferences of the autocrat and the rival side, $K_i$ will transmit some information to the autocrat. Thus, the information advantage of the autocrat over the rival side is maintained.
to characterize the outcome of the game. A Bayesian Nash equilibrium demands that for any $s_i$, $K_i$’s message $m_i$ is optimal given the continuation game $C$, that the players in $C$ play a Nash equilibrium given their beliefs, and that these beliefs are rational. Rational beliefs are derived from the strategies of $K_i$ and updated in a Bayesian manner upon the observation of the message $m_i$ whenever possible. In addition, we restrict the strategies of the players by excluding the use of weakly dominated strategies.

As a benchmark case, let us suppose that the information $s_1$ and $s_2$ is common knowledge. Stage 1 is therefore irrelevant and so is the identity of the player who plays on behalf of country $i$. The game boils down to stage 2, i.e., the game depicted in Figure 1. Lemma 1 characterizes the equilibria in this game (we omit the proof which is trivial).

**Lemma 1.** Let the values of $s_1$ and $s_2$ be common knowledge. If for some $i$, $s_i < 0$, the unique equilibrium in the conflict game is $(T,T)$. Otherwise the Pareto dominant equilibrium is $(S,S)$.

If $s_i < 0$, country $i$ has a dominant strategy to play tough. The only equilibrium is $(T,T)$. If $s_i > 0$ for both countries, an agreement becomes a possible equilibrium outcome. There exists also a mixed-strategy equilibrium in which both countries mix between playing tough or soft. This equilibrium is Pareto inferior to the $(S,S)$ equilibrium because $M + s_i$ is the best payoff each country can hope for, given $s_i > 0$.

We see that in the complete information case, agreement can be achieved only when both countries prefer agreements to taking advantage of a soft rival country.
An undesirable outcome \((T,T)\) can result even when both countries prefer to sign an agreement. For example, for negative values of \(s_i\) close to zero, an agreement yields a higher payoff than an all-out-war as \(M + s_i > 0\). Still, the countries are not able to cooperate as each fears that the other country will take advantage of its soft stance.

To distinguish between the two regime types, we analyze in the next section the case of one-sided incomplete information. This allows us to focus on one country and analyze the effect of regime type on the outcomes of conflicts.

### 3 One-sided incomplete information: What makes democracies credible?

In this section, we focus our analysis on one country (country 1) by assuming that \(s_2\) is common knowledge. Country 2 can then be analyzed as a single player because all its citizens are informed about their own preferences. Note that if \(s_2 \leq 0\), country 2 has a dominant strategy to play \(T\). The only equilibrium in this case is the pair of actions \((T,T)\). For the sake of interest, we focus on the case of \(s_2 > 0\).

In country 1, we still distinguish between the public \((P_1)\), who is uninformed about \(s_1\) and an informed citizen \((K_1)\), who knows \(s_1\). We investigate the equilibria of the game for the two possible regimes in country 1, an autocracy (in which \(K_1\) plays the conflict game against country 2) and a democracy (in which \(P_1\) plays against country 2). In each regime, we focus on Pareto dominant equilibria that yield the maximum probability of reaching a peaceful agreement.
3.1 Autocratic Regime

When country 1 is an autocracy, the informed agent, $K_1$, is also the agent who plays in the conflict game. Would this agent be able to send any informative signal to the rival country? If the informed citizen believes that an agreement is beneficial (i.e., if $s_1 > 0$) he has an incentive to reveal the truth to country 2 so that both countries would cooperate and take advantage of the gains from a mutual agreement. However, when the informed citizen $K_1$ believes that the agreement is not beneficial (i.e., if $s_1 < 0$), it is still in his best interest to convince the other country that he prefers an agreement. This would induce country 2 to take peace enhancing measures, which the autocrat could exploit by attacking a now vulnerable opponent. The incentive to mislead the other country may hamper the possibility of communication between the two countries.

The message that $K_1$ sends in the first stage of the game does not affect his utility and is therefore a cheap talk message. Crawford and Sobel (1982) have shown that in strategic interactions that entail a relatively high degree of conflict of interests, cheap talk may not be credible. As a result, messages will contain no informational value.

We say that an equilibrium is influential if its messages are informative and consequently change the behavior of the recipient in the conflict game. The following result refers to influential equilibria. We find that the conflict of interests is indeed strong enough, to exclude any credible communication.
Proposition 1 When country 1 is an autocracy, no influential equilibrium exists.

When country 1 is an autocracy, incomplete information persists. An autocrat is unable to credibly transmit information to a rival country. The intuition is straightforward given the above discussion. If an influential message transmission exists, then there must exist a message $m$ and a message $m'$, each indicating different information, such that country 2 changes its action upon receiving these two different messages. But, if there is some message $m$ that the autocrat can send, which would be interpreted by country 2 as convincing enough to encourage country 2 to play S, then the autocrat should send $m$ disregarding his signal. Thus, $m$ cannot be interpreted as representing some specific information. Not surprisingly, since incomplete information is an obstacle for peaceful resolution, the equilibrium outcomes that prevail in the game C after the redundant message stage may be inefficient, as stated below.

Proposition 2 If $s_2 \leq a$, the unique equilibrium in the game C is $(T,T)$. If $s_2 > a$, in the Pareto dominant equilibrium with the highest probability of agreement, country 2 plays $S$ and $K_1$ plays $S$ for $s_1 > 0$.\[5\]

When the autocrat has an information advantage, the prevailing equilibria depend on the parameters of the conflict. When $s_2 \leq a$, a ‘bad’ equilibrium uniquely arises. Information asymmetries are coupled with a relatively strong type of international conflict, i.e., a conflict in which country 2 has more to lose when ‘cheated’ than it

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5When $v > a$, there also exists a mixed strategy equilibrium, but we focus on the pure strategy one, which is not Pareto dominated by the mixed equilibrium and entails the greatest probability of a peaceful resolution under an autocratic regime.
has to gain from a peace agreement. Country 2’s fear of being exploited induces it to play tough. The autocrat has no choice but playing tough as well. Each receives utility of 0, independent of $s_1$ and $s_2$, although agreement yields $M + s_2 > 0$ for country 2 and $M + s_1 > 0$ for country 1, for $s_1 \in (-M, v]$. Thus, the countries cannot materialize gains from cooperation.

When $s_2 > a$, country 2’s prospects from a peace agreement are sufficiently high. This may induce country 2 to take the risk and play soft, anticipating that the autocrat will do so as well, when his information permits. The autocrat can then extract information rents from country 2 by making strategic use of his information; when he believes that a mutual agreement is beneficial, he takes measures to facilitate it, inducing utilities of $M + s_1 > 0$ and $M + s_2$ for countries 1 and 2 respectively. But when the autocrat believes otherwise, he takes advantage of a weakened opponent, inducing payoffs of $M$ and $-a$ for countries 1 and 2 respectively.

The equilibria specified in Proposition 2 indicate the costs and benefits of non-democratic regimes in the context of international conflicts. On the one hand, the lack of credibility in transmitting information to a rival side may prevent a mutual agreement even when such an agreement would be Pareto improving. On the other hand, for some parameters of the conflict, it is to the autocrat’s advantage to keep his private information to himself and not share it with the other country. Having an information advantage allows him to extract information rents. Sharing the information with country 2 would only harm the autocrat.
3.2 Democratic Regime

The second case that we analyze is that of a democratic regime. In this case, the informed citizen (player $K_1$) participates in the message stage, but the polity (player $P_1$), is the one who takes the final action in the conflict game. When the informed citizen transmits a message in the first stage, it is observed by two audiences, namely by his countrymen and by country 2. The message can affect not only the behavior of country 2 but also the behavior of the polity. Therefore, his messages, although cheap talk, may evoke endogenous costs. These costs may, in turn, render the messages credible in equilibrium. The following proposition establishes the existence of influential message equilibria in the game.

**Proposition 3** When country 1 is a democracy, there exist influential equilibria, with at most two messages. In the Pareto dominant equilibrium with the highest probability of agreement, $K_1$ sends $m$ when his signal $s_1$ is lower than some threshold $s^* < 0$ and $\bar{m}$ otherwise. Upon observing $m$, $P_1$ and country 2 play $T$. Upon observing $\bar{m}$, they both play $S$.

To understand the result, figure 2 depicts how the players $P_1$ and country 2 perceive the game C after some message $m$ has been sent.

<table>
<thead>
<tr>
<th></th>
<th>Country 1</th>
<th>Country 2</th>
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<tbody>
<tr>
<td>$T$</td>
<td>$M, -a$</td>
<td>$0, 0$</td>
</tr>
<tr>
<td>$S$</td>
<td>$-a, M$</td>
<td>$M + E(s_1</td>
</tr>
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Figure 2: The game C when country 1 is a democracy and a message $m$ was observed
First note that since the players $P_1$ and country 2 have the same information, they form the same beliefs. If both believe that $E(s_1|\bar{m}) > 0$ given some message $\bar{m}$, they can coordinate on $(S,S)$. If, on the other hand, both believe that $K_1$’s message $m$ means that $E(s_1|m) < 0$, they can only play $(T,T)$. We now have to check whether such beliefs are rational, i.e., consistent with a strategy for $K_1$. If the state is $s_1$, $K_1$ receives a continuation utility of $M + s_1$ if he sends a message $\bar{m}$ while his utility is 0 if he sends $m$. The threshold $s^*$ is defined by $M + s^* = 0$ so that for all $s_1 \geq s^*$, $K_1$ prefers to send $\bar{m}(m)$. As $E(s_1|s_1 \in [s^*, v]) > 0$ and $E(s_1|s_1 \in [-v, s^*]) < 0$ this rationalizes the beliefs of $P_1$ and country 2. The rest of the formal proof of Proposition 3 asserts that no more than two influential messages can be sent and discusses the Pareto dominated equilibria that may arise.

Our model endogenizes what has been termed “audience costs” in the International Relations literature. For example, Fearon (1994) assumes that democratic leaders, due to reputational considerations, have higher costs of escalating a crisis and then backing down, than do autocrats or dictators. However, he does not show why this should be so. We show that audience costs may be driven by informational considerations. In our model, a politician’s statement in favor of war may be costly to him since it affects the public’s behavior in a referendum or elections. If he encourages the public to escalate a crisis while his information indicates that the opposite should be done, it has negative bearing on his utility.

Credibility is achieved at a cost. The cost is imposed on democracies because the informed citizen and the electorate cannot coordinate their actions behind the scenes; in the equilibrium described in Proposition 3, for all signals above some
threshold \( s^* \), both countries may reach a mutual agreement. But, the equilibrium condition \( M + s^* = 0 \) demands that \( s^* = -M < 0 \). This means that for an interval of values of the signal, i.e., for \( s_1 \in [s^*, 0] \), an agreement is reached although it is not beneficial for country 1. The electorate’s best response given these values of \( s_1 \) would be to exploit the soft stance of country 2. Nevertheless, informed citizens cannot convince their countrymen to play tough without country 2 observing the message and deviating as well. Thus, as in the non-democratic regime, there are costs and benefits for being a democracy. Democracies coordinate on a peaceful agreement whenever it is beneficial. But, they may sometimes coordinate on a peaceful agreement when it is not beneficial.

We can now compare the outcomes under a democratic regime to that of the benchmark case, i.e., when \( s_1 \) and \( s_2 \) are common knowledge. In fact, both countries fare better when country 1 is a democracy than when all information is common knowledge. When country 1 is a democracy, a state of war emerges only when \( s_2 < 0 \) or \( s_1 < s^* < 0 \). In the benchmark case, a military conflict arises whenever one of the countries has a negative state. The presence of incomplete information and a democratic regime, Pareto dominates a situation in which information is fully observed by all countries.

Similarly, non-democratic regimes lead to a state of war whenever \( s_1 < 0 \) or \( s_2 < a \). Thus, in the one-sided incomplete information case we can conclude that the likelihood of a peaceful agreement is potentially greater under a democratic than an autocratic regime.

We now turn to analyze the two-sided incomplete information model.
4 Two-sided incomplete information: The democratic peace hypothesis

In most conflicts, informational issues are important. Both countries are involved in a dialogue. Each tries to figure out what is the true intention of the rival. We therefore analyze now the general model in which $s_1$ and $s_2$ are known only to $K_1$ and $K_2$ respectively. Analysis of the model under two-sided incomplete information can provide insights about which regimes are more likely to reach peaceful agreements and which are more likely to engage in military disputes.

The empirical literature on the democratic peace has shown that two democracies are less likely to engage in wars or military disputes with each other than any other pairing of regimes. This hypothesis contrasts conflicts between two democracies relative to all other types of conflicts, without distinguishing conflicts between two autocracies vis-à-vis conflicts between a democratic country and an autocracy. Our model allows the analysis of encounters of all types of regime pairings. Recall that in the first stage of the model, $K_1$ and $K_2$ send messages about $s_i$ (simultaneously). Given these messages, either $K_i$ or $P_i$ play the conflict game $C$ on behalf of country $i$. If country $i$ is a democracy, $P_i$ represents its country in the game, otherwise, it is $K_i$. This creates three different games that we solve; $K_i$ vs. $P_j$, $K_i$ vs. $K_j$ and $P_i$ vs. $P_j$ for $i \neq j$.

The democratic peace hypothesis relates to the probability that conflicts result in peaceful resolution. Hence, we analyze in each game, i.e., for each pair of regimes, the existence of equilibria in which a peaceful agreement arises as an equilibrium
outcome. We compare the equilibria that yield the largest probability of reaching a peaceful agreement among the Pareto dominating equilibria. The following proposition summarizes our findings.

**Proposition 4** When two autocracies are involved, no influential message equilibria exist and if agreement occurs with positive probability it occurs when \( s_i > \bar{s} > 0 \) for each country. When an autocracy faces a democracy, influential messages are sent only by the democracy and agreement occurs when the autocrat’s state is larger than 0 and the democracy’s state is larger than \( \bar{s} \), for \( \bar{s} < \bar{s} \). When two democracies are in a conflict, both send influential messages and a peaceful agreement occurs when for each country \( s_i > \hat{s} \), for \( \hat{s} < \min\{0, \bar{s}\} \).

The intuition for this result is as follows. For the same reasoning as in the previous section, autocracies are unable to send influential messages prior to entering the conflict game. Thus, when two autocracies are in a conflict, a peaceful agreement occurs only if both voluntarily play S for some values of \( s \). Because the prospects for playing S increase with \( s \), both play S when \( s \) is above some threshold \( \bar{s} \). Now consider an autocrat in a conflict with a democracy. The autocrat knows that the democracy cannot deceive him. The informed citizen cannot coordinate the public’s actions without the rival autocrat observing it. The autocrat is therefore willing to play S more often relative to the case in which he faces another autocrat (whose information is hidden and consequently his actions are uncertain). But, if the autocrat plays S more often, the democracy facing him is willing to do so as well. The more likely it is that the rival side plays S, the smaller are the risks and the
greater are the prospects from playing S. Therefore, the probabilities with which each country plays S are strategic complementarities. The lower is the threshold of the values of s above which S is played in one country, the lower should be the threshold in the other. This induces threshold levels which are lower than in the two autocracies case and thus a greater probability of playing (S,S). However, the threshold levels are subject to a constraint; the autocrat who is fully informed, never plays S for $s_i < 0$. The threshold levels are therefore 0 for the autocracy and $\tilde{s} < \bar{s}$ for the democracy.

Let us consider now a conflict involving two democracies. Both know that the other cannot deceive it. Each of them is willing to play S more often, relative to the two autocracies case. Moreover, since one country is willing to play S more often, due to strategic complementarities, it induces the other country to play S more often and so on until convergence. These thresholds are not bounded by 0 as they are in non-democracies. Therefore, the convergence process allows the strategic complementarities to ‘manifest’ themselves. The result is a threshold level $\hat{s}$ which is lower than that of any of the countries in a mixed regime. The monotonous relation among these different thresholds for different conflicts, yields the main result of the paper.

**Corollary 1** The probability of a peaceful agreement is the greatest when the two countries are democracies. It is the smallest when the two countries are autocracies. When mixed regimes are involved, the probability of a peace agreement is between these two extremes.
Proof of Corollary 1: If a country is playing \( S \) given that its signal \( s \) is greater than a threshold level \( s' \), then the probability with which it plays \( S \) is \( \frac{v - s'}{2v} \). The probability that a peaceful agreement is achieved is the probability that both countries play \( S \). Hence, the probability of a peaceful agreement when two democracies are involved is \( (\frac{v - \hat{s}}{2v})^2 \) which is the probability of a peaceful agreement in a mixed regime. Moreover, \( 5(\frac{v - \tilde{s}}{2v}) > (\frac{v - \bar{s}}{2v})^2 \) which is the probability of agreement under two autocracies.

The result not only corroborates the empirical observation about the democratic peace, but enhances the mediating power of democracies. The corollary shows that when a non-democracy faces a democracy, it is also the case that the prospects for a peaceful resolution are greater relative to a clash of two tyrannies. Democracies tend to relax information problems between the countries in conflict disregarding the regime type of their opponent.

There are more implications to be derived from Proposition 4. When both sides are autocracies, an agreement is reached only if it is mutually preferred to any other outcome. Moreover, there are situations in which an agreement is preferred to both sides but is not reached. In a mixed regime, when an autocrat is facing a democracy, he reaches an agreement only when he wishes to. Conversely, when both sides are democracies, an agreement is reached always when both countries prefer an agreement to all other outcomes and may be reached although both sides would have preferred not to.

It is also easy to see that no matter what is the regime of the home country, it
prefers the foreign country to adopt a democratic regime. But, as the final result shows, this does not hold the other way around. Namely, when facing a rival, countries may not necessarily prefer to adopt a democratic decision making procedure.

**Proposition 5** When the regime of the home country is fixed, it prefers to be in a conflict with a foreign democracy. When the regime of the foreign country is fixed, the home country prefers to be a democracy for some parameters and an autocracy for others.

The conclusion that we draw is that countries who foresee international conflicts in their horizon, may choose a centralized decision making process. Depending on the parameters of conflicts, this regime may fare better, although at the expense of the other country. The indeterminacy of a dominant regime hinges on the same intuition derived in the one-sided incomplete information case, i.e., the trade-off between extracting information rents and facilitating gains from cooperation.

5 **Concluding Remarks**

Our model provides an institutional explanation for the democratic peace phenomenon. We argue that incomplete information is the main obstacle for peaceful resolution of international conflicts, and that democratic regimes are able to reduce information asymmetries. Others, such as Fearon (1994) and Schultz (1998), pointed to the ability of democratic regimes to transmit credible information. Our model goes beyond these studies, by offering an endogenous link between the credibility of democratic regimes and one of their fundamental traits - the de-centralization of
the decision making process.

The underlying premise of our model is that the public, the body of citizens, is involved in decision making in democratic regimes. Arguably, the involvement of the public in decision making varies between different democratic regimes and is contingent on specific circumstances. In general, however, democratic regimes do offer the public institutional means of exerting control over their country’s international policy. A recent example was the American military threat against Iraq in February 1998. Opinion polls, as well as televised debates, revealed widespread public objection to military actions. The American - as well as the Iraqi - leadership could observe the preferences of the American public. As the information became transparent, any further military threats were rendered non-credible.

A democratic leadership might be tempted to reduce public involvement in the decision making process, in order to reduce information leaks. One such mechanism may be closed-doors negotiations which is widely practiced. Contrary to the pioneering work of Putnam (1988), we claim that a democratic leader does not gain leverage power during closed-door negotiations. Putnam argues that democratic leaders may cite domestic popular objection in order to reject a compromise during such negotiations. Our model suggests the opposite. First, such a claim is credible only if it is made publicly. Second, if it is made publicly, it may be self-fulfilling, by affecting the public’s beliefs. This bargaining strategy is therefore costly and may prove too risky.

To conclude, we would like to emphasize that, in our model, a conflict between mixed regimes is more likely to be resolved peacefully than a conflict of two non-
democratic regimes. This result suggests a normative superiority of democratic institutions. It is true that, under certain circumstances, non-democratic regimes may perform better during an international conflict by extracting information rents. From a moral point of view, however, we may judge regimes only by their propensity to engage in a military confrontation. If human lives, which are the essential cost of wars, cannot be measured then this analysis provides another normative justification to the establishment of democratic institutions.
References


Appendix

**Proposition 1** When country 1 is an autocracy, no influential equilibrium exists.

**Proposition 2** If $s_2 \leq a$, the unique equilibrium in the game $C$ is $(T,T)$. If $s_2 > a$, in the Pareto dominant equilibrium with the highest probability of agreement, country 2 plays $S$ and $K_1$ plays $S$ for $s_1 > 0$.\(^6\)

**Proof of Propositions 1 and 2:** We first characterize the possible equilibria in the second stage of the game when $K_1$ knows $s_1$ and country 2 knows that $s_1 \in [s, \bar{s}]$. In any equilibrium, country 2 can either play $T$, $S$, or $T$ with some probability. Let us consider each of these possibilities and see which action can be sustained in equilibrium.

(i) If country 2 plays $T$, then $K_1$, understanding this in equilibrium, responds with $T$ for any signal. $(T,T)$ can be an equilibrium for any beliefs of country 2 about $s_1$.

(ii) If country 2 plays $S$, then $K_1$’s best response is to play $S$ if $s_1 > 0$ and play $T$ if $s_1 \leq 0$. Anticipating this behavior, country 2 is willing to play $S$ if its expected utility from playing $S$ is higher than that from playing $T$, i.e., if:

$$\text{prob}(K_1 \text{ plays } S)(M + s_2) + \text{prob}(K_1 \text{ plays } T)(-a) > \text{prob}(K_1 \text{ plays } S)M + \text{prob}(K_1 \text{ plays } T)0,$$

\(^6\)When $v > a$, there also exists a mixed strategy equilibrium, but we focus on the pure strategy one, which is not Pareto dominated by the mixed equilibrium and entails the greatest probability of a peaceful resolution under dictatorial regime.
where \( \text{prob}(K_1 \text{ plays } S) = \text{prob}(s_1 > 0 | s_1 \in [s, \bar{s}]) \). This condition reduces to:

\[
\frac{s_2}{a} > \frac{\text{prob}(s_1 \leq 0 | s_1 \in [s, \bar{s}])}{\text{prob}(s_1 > 0 | s_1 \in [s, \bar{s}])}
\]  

(1)

If condition (1) is satisfied, then country 2 playing S and \( K_1 \) playing S if \( s_1 > 0 \) is an equilibrium. For example, if \( s = -v \) and \( \bar{s} = v \), such an equilibrium is sustained if \( s_2 > a \).

(iii) If country 2 mixes between playing S and T, then the best response of \( K_1 \) is to play S for high enough \( s_1 \). Let country 2 play T with probability \( \alpha \). Then there is a type \( s' \) of player \( K_1 \) that is indifferent between playing S and playing T. This type is defined by the following condition:

\[
\alpha a = (1 - \alpha)s'
\]  

(2)

For country 2 to be willing to mix between S and T, the following condition must be satisfied (we reach this condition by similar manipulations that lead to condition (1)):

\[
\frac{s_2}{a} = \frac{\text{prob}(s_1 \leq s' | s_1 \in [s, \bar{s}])}{\text{prob}(s_1 > s' | s_1 \in [s, \bar{s}])}
\]  

(3)

If conditions (2) and (3) are satisfied for some \( s' \in (-v, v) \) and \( \alpha \in (0, 1) \), then there exists an equilibrium in which country 2 mixes between playing S and T and \( K_1 \) plays S if and only if \( s_1 > s' \). For example, if \( s = -v \) and \( \bar{s} = v \), such an equilibrium is sustained if \( s_2 > a \), \( s' = \frac{v(s_2 - a)}{s_2 + a} \) and country 2 plays T with probability

\[
\frac{v(s_2 - a)}{v(s_2 - a) + u(a + s_2)}.
\]

The utility levels that country 1 achieves in these equilibria can be ranked. For any \( s_1 \), the equilibrium described in part (i) yields the lowest utility and the one
described in (ii) yields the highest utility, in fact the highest possible payoff in this game. The equilibrium described in (iii) yields an intermediate utility.

We can now analyze possible equilibria of the first stage of the game. The equilibrium strategy of $K_1$ partitions the message space $[0,1]$ to intervals, such that each message $m$ indicates to country 2 that $s_1$ belongs to some interval $[s, \bar{s}]$. In an influential equilibrium, there exist at least two meaningful messages, $m$ and $m'$, each indicating that $s_1$ belongs to some interval, inducing country 2 to behave differently. Moreover, there exists a type $s^*$ that is indifferent between sending each of the two messages, as in Crawford and Sobel (1982). If there is no influential equilibrium, then all messages indicate that $s_1 \in [-v,v]$.

We are now ready to prove that there is no influential equilibrium in the game. Assume to the contrary that there is an influential equilibrium. Since the three possible continuation equilibria are ranked in terms of utility for each $s_1$, no $s^*$ can ever be indifferent between the two messages, $m$ and $m'$, if each induces a different equilibrium as specified in parts (i), (ii), and (iii). Could it be that each message induces a different mixed-strategy equilibrium? If so, country 2 must believe, given $m$, that $s_1 \in [s, s^*]$ for some $s$, and given $m'$, that $s_1 \in [s^*, \bar{s}]$ for some $\bar{s}$. If $s^*$ sends a message $m$, country 2 plays $T$ with probability $\alpha$ and $s^*$ plays $S$ in equilibrium. The expected utility of $s^*$ must be higher than $(1-\alpha)M$, which is his expected utility if he plays $T$. If $s^*$ sends $m'$, country 2 plays $T$ with probability $\alpha'$ and $s^*$ must play $T$ in this equilibrium. His expected utility in this case is $(1-\alpha')M$. Using condition (2), we can see that $\alpha < \alpha'$. The expected utility of $s^*$ from sending $m$ is therefore higher than from sending $m'$. We conclude that no $s^*$ can be indifferent.
between these two messages.

Since there is no influential equilibrium, the equilibrium outcomes of the game are the equilibrium outcomes of the second stage when country 2 knows only that \( s_1 \in [-v, v] \), as described above. We focus on the pure-strategy equilibrium in (ii) and not on the mixed strategy equilibrium of (iii) because the equilibrium of (ii) yields a higher probability of playing \((S,S)\). Thus, to prove that autocracies are worse than democracies are in achieving peaceful resolutions, we have to choose the more peaceful equilibrium in autocracies. Among the two pure-strategy equilibria that exist when \( s_2 > a \), the equilibrium in which country 2 plays \( S \) Pareto dominates and thus we assume that both countries can coordinate on it. ■

**Proposition 3** *When country 1 is a democracy, there exist influential equilibria, with at most two messages. In the Pareto dominant equilibrium with the highest probability of agreement, \( K_1 \) sends \( m \) when his signal \( s_1 \) is lower than some threshold \( s^* < 0 \) and \( \bar{m} \) otherwise. Upon observing \( m \), \( P_1 \) and country 2 play \( T \). Upon observing \( \bar{m} \), they both play \( S \).*

**Proof of Proposition 3:** Let us consider the equilibria of the second stage of the game, assuming some message \( m \) has been sent in the first stage. The game \( C \) played by \( P_1 \) and country 2 is perceived as depicted in figure 2 in the text. Both players update their beliefs in the same manner after observing the message \( m \). For any \( m \), \((T,T)\) is an equilibrium in the second stage of the game. If \( E(s_1|m) < 0 \), then \((T,T)\) is the unique equilibrium. When \( E(s_1|m) > 0 \), \((S,S)\) is an equilibrium as well, which Pareto dominates \((T,T)\). In this case there is also a mixed-strategy
equilibrium that is ranked between (T,T) and (S,S) utility-wise. In this mixed-strategy equilibrium, \( P_1 \) plays T with probability \( \beta \) and country 2 plays T with probability \( \alpha \). For the mixed-strategy equilibrium to exist, the following equations, determining the indifference conditions for \( P_1 \) and country 2 respectively, must hold:

\[
\alpha a = (1 - \alpha)E(s_1|m) \tag{4}
\]

\[
\beta a = (1 - \beta)s_2 \tag{5}
\]

We can now analyze the equilibria of the first stage. Obviously, there is an equilibrium in which \( P_1 \) and country 2 disregard the messages of \( K_1 \) and always play T. However, there are also two types of influential equilibria. We will first show that there exist a pure-strategy and a mixed-strategy equilibria involving two messages. We focus on the pure-strategy equilibrium in the Proposition because it Pareto dominates the mixed strategy one. Then, we will show that these are the only influential equilibria.

Assume that when \( m \) is sent, \( P_1 \) and country 2 play T, and that when \( \bar{m} \) is sent, both play S. To sustain this behavior in equilibrium, we must find a type \( s^* \) of \( K_1 \) who is indifferent between sending \( m \) and sending \( \bar{m} \). This type is defined by the following equation:

\[
M + s^* = 0 \tag{6}
\]

If \( s^* \) satisfies equation (6), then he is indifferent between the outcomes (S,S) and (T,T). Similarly, for the equilibrium in which both \( P_1 \) and country 2 mix when \( \bar{m} \) is sent, we have to find a type \( s^* \) that is indifferent between (T,T) and an equilibrium in which \( P_1 \) plays T with probability \( \beta \) and country 2 plays T with probability \( \alpha \).
This type is defined in the following equation:

$$\alpha(1 - \beta)(-a) + (1 - \alpha)M + (1 - \beta)(1 - \alpha)s^* = 0$$  \hspace{1cm} (7)$$

where $\alpha$ and $\beta$ satisfy equations (4) and (5).

Both equations (6) and (7) are satisfied in our model, for some $s^* < 0$.\footnote{Each equation is satisfied for a different value of $s$. For the sake of brevity we use the same symbol in both cases.} Moreover, these two equations imply that all types with $s_1 > s^*$ prefer to send $\bar{m}$ and all types with $s_1 \leq s^*$ prefer to send $m$. The beliefs of $P_1$ and country 2 prove to be correct, so, influential equilibria can exist. It is also easy to see that the pure-strategy influential equilibrium dominates the mixed equilibrium for both countries.

To understand why there can be only two messages that elicit different behavior in equilibrium, note that each message $m$ that indicates that $E(s_1|m) < 0$ induces a play of (T,T) in the second stage. Thus, if there are more than two influential messages in equilibrium, e.g., three messages, then at least two of them, $m$ and $m'$, must indicate that $E(s_1|m) > 0$ and $E(s_1|m') > 0$. A type $s'$ who is indifferent between each of these messages must have $s' > 0$. This type cannot be indifferent between sending each of these messages if one message induces the countries to play one type of equilibrium (pure or mixed) and the other message induces them to play another type of equilibrium, since these equilibria are ranked utility-wise for positive expectation about $s_1$. Moreover, $s'$ cannot be indifferent if both $m$ and $m'$ induce the countries to mix. In two different mixed equilibria, only $\alpha$ changes in response to a message, since $\beta$ does not depend on expectations about $s_1$ (see equation (5)).

Any type with $s' > 0$ would prefer the mixed equilibrium in which country 2 plays $S$.\footnote{Each equation is satisfied for a different value of $s$. For the sake of brevity we use the same symbol in both cases.}
with a higher probability and therefore no $s'$ can be indifferent. Thus, an influential equilibrium can contain only two messages.\[\blacksquare\]

**Proposition 4** When two autocracies are involved, no influential message equilibria exist and if agreement occurs with positive probability it occurs when $s_i > \bar{s} > 0$ for each country. When an autocracy faces a democracy, influential messages are sent only by the democracy and agreement occurs when the autocrat’s state is larger than 0 and the democracy’s state is larger than $\tilde{s}$, for $\tilde{s} < \bar{s}$. When two democracies are in a conflict, both send influential messages and a peaceful agreement occurs when for each country $s_i > \Check{s}$, for $\Check{s} < \text{min}\{0, \tilde{s}\}$.  

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Proof of Proposition 4: Suppose that two autocracies are involved. As in Proposition 1, no influential messages can be transmitted. If a peaceful agreement is reached, it must be that each country plays S with a positive probability. Since the incentive of player $K_i$ to play S increases with $s_i$, it must be that both countries play S for $s_i$ greater than some threshold. A type $s_2$ of country 2 plays S if and only if

$$\text{prob}(K_1 \text{ plays } S)s_2 > \text{prob}(K_1 \text{ plays } T)a$$

This suggests that, in the eyes of country 1, country 2 plays T if $s_2$ is smaller than some threshold that satisfies the above condition with equality.

The equilibrium is symmetric. It exists only if $v^2 - 6av + a^2 > 0$ and $v > a$. When it exists, both countries play S when $s_i > \bar{s}$, which satisfies

$$\bar{s} = \frac{\bar{s} + v}{v - \bar{s}}a$$

Assume now that country 1 is a democracy and country 2 is a non-democracy. Country 2 does not transmit any information. What if country 1 does not transmit any influential messages? In this case, $P_1$ plays either S or T. If $P_1$ plays T, then $K_2$ plays T as well and no agreement arises. Can $P_1$ plays S? if it plays S it receives $M$ or $-a$, depending on whether $K_2$ plays S or T respectively, whereas if it plays S it receives $M$ or 0 respectively, inducing T to be a weakly dominant strategy. Thus, no agreement can occur if no information is transmitted. Assume now that some information is transmitted. By the same reasoning as in Proposition 3, there can be at most two messages sent in equilibrium, that change the behavior of $P_1$ from T to S. It is easy to see that the behavior of $K_2$ specified in the Proposition
is a best response so he plays S only if \( P_1 \) plays S and whenever \( s_2 > 0 \). We now have to consider the incentive of \( K_1 \) to send this messages. It must be that at some threshold, \( K_1 \) is indifferent between these two messages whenever \( s \) satisfies:

\[
M + \bar{s} = a
\]

Note that \( \bar{s} = a - M < a \frac{v+\delta}{v-\delta} = \bar{s}, \) and therefore \( \bar{s} < \bar{s} \).

Finally, consider two democracies. If neither of them sends information, then each plays the weakly dominant strategy T. If one of them sends information, the one that does not must play the weakly dominant strategy T and the other one must follow and thus no agreements are possible. Thus, for an agreement to occur, it must be that both countries send influential messages and as above, not more than two messages can be sustained in equilibrium. Whenever \( P_i \) knows that an agreement is not worthwhile (i.e., the message of \( K_i \) indicates low values of \( s_i \)), it must be that \( P_i \) plays T. Observing these messages, it must be that \( P_j \) follows and plays T as well. Thus, both will play S and agreement is achieved only if both messages, one on behalf of each country, indicate that the value of \( s_i \) is above some threshold and the expected value of \( s_i \) is positive for all \( i \). For \( K_i \) in each country to be indifferent between two messages that indicating high or low values of \( s_i \), it must be that the thresholds \( \hat{s}_1 \) and \( \hat{s}_2 \) satisfies:

\[
\frac{v-\hat{s}_i}{2v}(M + \hat{s}_j) = 0, \ i \neq j \text{ and } i, j \in \{1, 2\}
\]

The Solution is \( \hat{s}_i = \hat{s} = -M < 0 \). Obviously, \( \hat{s} < \bar{s} = a - M < \bar{s} \).

**Proposition 5** When the regime of the home country is fixed, it prefers to be in
a conflict with a foreign democracy. When the regime of the foreign country is fixed, the home country prefers to be a democracy for some parameters and an autocracy for others.

**Proof of Proposition 5:** The first part of the Proposition is trivial, because when facing a democracy, there is no risk of being exploited. To see the second part, assume that the foreign country is a democracy. Then the home country faces the choice of being a democracy, which ex ante yields an expected utility of

\[
EU^{dem}(\frac{v-\hat{s}}{2v}) \int_{\hat{s}}^{v} \frac{1}{2v} (M + s) ds = (\frac{v+M}{2v})^2 (M + \frac{v^2-M^2}{4v})
\]

On the other hand, if the home country adopts an autocratic regime, then it yields an ex ante expected utility of:

\[
EU^{aut} = (\frac{v-\hat{s}}{2v})(M + \frac{v^2}{4v}) = (\frac{v+M-a}{2v})(M + \frac{v^2}{4v})
\]

We find that each regime dominates for different parameter values. Similarly, when the foreign country is a non-democracy, we get an analogous calculation.■

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