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You may cite this version as:

Levy, G. and Razin, R. (2004). It takes two : an explanation of the democratic peace [online]. London: LSE Research Online.

Available at: <http://eprints.lse.ac.uk/archive/00000539>

This is an electronic version of an Article published in Journal of the European Economic Association, 2 (1). pp. 1-29 © 2004 MIT Press.

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It Takes Two: An Explanation of the Democratic Peace

Gilat Levy*and Ronny Razin†

Abstract

In this paper, we provide an explanation of the democratic peace hypothesis, i.e., the observation that democracies rarely fight one another. We show that in the presence of information asymmetries and strategic complements, the strategic interaction between two democracies differs from any other dyad. In our model, two democracies induce the highest probability of peaceful resolution of conflicts. But it takes two for peace; one democracy involved in a conflict does not necessarily increase the probability of a peaceful resolution compared to a conflict between two non-democratic regimes.

“It takes two to get peace out of an armistice”

Bartholomew, Charles L., *Minneapolis Journal* (April 12, 1898)

1 Introduction

A well established empirical observation in the International relations literature is that democratic regimes rarely wage war against each other. Conflicts that involve non-democratic regimes on the other hand, whether faced with democratic or autocratic rivals, are observed to have a higher propensity to be resolved by means of military confrontations.¹ This phenomenon is known as the ‘Democratic Peace Hypothesis’, which is described “as close as anything we have to an empirical law in international relations”.²

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¹Moreover, some have suggested that conflicts between countries with different regimes are more prone to result in use of military force than conflicts that involve only autocratic regimes. This evidence is not conclusive and is part of a big debate in the literature. For a survey of the theoretical and empirical literature on the democratic peace hypothesis see Russett (1993) and Brown *et al* (1996).

²See Levy, J. S. (1989), “The Causes of War: A Review of Theories and Evidence”, Philip E. Tetlock (ed.), *Behavior Society, and National War*, Oxford University Press, Oxford, England, p. 270.

Since its inception, the democratic peace hypothesis has posed a difficult theoretical puzzle. The crux of the matter lies in explaining why is it that democracies would behave in dramatically different ways when confronted with democratic compared to non-democratic rivals. In this paper we provide a theoretical explanation for this phenomenon in a model of conflict between two countries. In particular, we show that the strategic interaction between two democracies is indeed different from the strategic interaction of any other dyad and in particular with respect to facilitating peaceful resolution of conflicts.

The explanation that we suggest relies on asymmetric information, which is widely recognized as an important obstacle for peaceful resolution of conflicts.³ Countries are often uncertain about the “true” preferences of rival countries. This information is important when calculating the future benefits of making costly concessions. Moreover, even within a country, information about preferences may be unevenly distributed. Some citizens, such as political leaders, may know more than the general public about the desirability of a peaceful versus a military resolution of a dispute.

We make the following assumptions about the institutional structure, the distribution of information and the technology of communication within and across countries. First, we assume that in a democracy, the public is involved in the decision making process whereas in a non-democratic regime there is a small number of decision makers. Second, we assume that the general public is uninformed about the particulars of the conflict whereas its leaders are relatively more informed. Finally, we assume that any communication with the public must be made publicly in the sense that there is a reasonable chance that the rival country might observe this communication.

We incorporate these features in the following model. We assume that both countries are engaged in a conflict in which each can make concessions. Concessions are costly, but each country may find it worthwhile to concede if the other country does so as well, i.e., the benefits from concessions exhibit strategic complementarities and positive externalities. We assume that the probability of a peaceful resolution of a dispute increases in concessions.

The uncertainty in the model is about the country’s cost-benefit ratio from making concessions. The leaders possess information about their own country’s cost-benefit ratio, whereas the general public in each country is uninformed. In the first stage we allow the informed leaders of the countries to communicate with their rival and their own public.⁴ In the second stage, the decision makers in each country choose simultaneously whether to make concessions. In particular, the public makes decisions about concessions in a democracy, whereas in a non-democratic regime, the informed leader decides whether and when to concede.⁵

³See Downs and Rocke (1995).

⁴We assume that the message of the leader in this stage has no direct effect on his utility and is therefore cheap talk (see Crawford and Sobel (1982)).

⁵Our model relates to the literature on delegation and control rights. We assume that democracies are

Our main result establishes the “Democratic Peace Hypothesis”. We show that two democracies induce the highest probability of a peaceful resolution compared to any other dyad when the conflict exhibits a high degree of strategic complementarities. We highlight two effects through which the presence of a democracy on both sides of the conflict mitigates war. First, the fact that the decision makers are uninformed may make them more willing to make concessions. When two democracies are involved, they can then ‘coordinate’ on mutual concessions. This induces the highest probability of a peaceful resolution. A non-democratic leader, on the other hand, is fully informed, and never makes concessions when he learns that these do not entail enough benefits. Thus, no other dyad can induce the maximum probability of peaceful resolution as two democracies do.

The Second, and the more interesting effect, involves the incentives of leaders to transmit information within the country and across the borders. There is a marked difference in the incentives of leaders to share information between the two regimes. We prove that autocratic leaders are unable to credibly share information with other countries. Such leaders always have an incentive to fool the rival side. On the other hand, we show that democratic leaders may be able to influence outcomes by communicating with rivals. Although leaders in democracies may wish to manipulate the actions of other countries, they may also wish to influence the decisions of their own public. The presence of these two audiences implies an increased incentive to transmit credible information.⁶

We therefore endogenize what is often termed “audience costs” in the literature. For example, Fearon (1994) assumes that democratic leaders face high “audience costs” when escalating a crisis and then backing down. 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 consequently the behavior of the public, whose actions affect the leader’s utility.⁷⁸

Credible information transmission implies that when two democracies are confronted, the public in each country is informed about both its own and its rival’s preferences. The two democracies can then coordinate on making concessions when it is beneficial for both able to commit to delegate decisions to an uninformed decision maker, whereas non-democracies cannot commit to do so.

⁶This is an application of the idea of cheap talk with two audiences that was introduced in Farrell and Gibbons (1989).

⁷One famous example of the ability of leaders to change the beliefs held by their public in a democracy is the effect that President Nixon had on the American public when he travelled to China. Before his trip, mutual ties with China were considered out of the question.

⁸Schultz (1998) also analyzes the transparency of democracies. He assumes the existence of an opposition that has an incentives to inform the public. Both Schultz (1998) and Fearon (1994) do not provide an analysis of dyads, and as a result do not explain why a democracy behaves differently when confronting a regime of its kind and when confronting an autocratic regime.

- even when the cost of doing so is high - since concessions are strategic complements and each public can trust the other to reciprocate. On the other hand, when the public in a democracy faces an autocracy, the autocratic leader does not credibly transmit his private information and maintains an information advantage. This deters the democratic public from making concessions. Even if the public is informed about its own preferences, it is not willing to concede since it cannot be sure of the autocrat's response.⁹

Thus, we explicitly show that a democratic country behaves differently when it faces a democracy and when it faces a non-democratic regime. In particular, when concessions involve relatively high costs they are possible only when two democracies confront each other. Our model provides a theoretical explanation for the importance of the presence of democracies on both sides of the conflict.

The existing literature on the Democratic Peace is mainly divided into two paradigms.¹⁰ The normative approach, e.g., Dixon (1993) and Maoz and Russett (1993), emphasizes the role of democratic norms as favoring nonviolent conflict resolutions. This literature argues that the values of democracies are applied only when democracies face other democracies and are abandoned otherwise. This assumption (trivially) solves the theoretical puzzle, but doesn't provide us with any understanding of why and when these norms arise.

Our paper falls within the structural and institutional approach to the Democratic Peace. These explanations highlight the fact that democratic countries are constrained in decision making by the presence of mechanisms like checks and balances, the division of power and the need for public debate to create widespread public support. In this view, one would expect democratic decision making to be slow, sluggish and transparent. These mechanisms may therefore affect the way countries behave in conflicts.

Papers that have tried to formalize the above intuition, have mostly relied on ad hoc assumptions regarding the difference between institutions. Tangeras (2003) provides an analysis of dyads but imposes different preferences for democracies and autocracies; in particular, since a war is viewed as a lottery, the likelihood of war is lower in democracies if their degree of relative risk aversion is larger. The explanation in Leeds (1999) hinges on exogenous audience costs and different decision making flexibility in autocracies and democracies.

Finally, the analysis of Bueno de Mesquita *et al* (1999) relies on the assumption that the economic burden of a war is divided between a larger group of citizens in democracies whereas in autocracies only the ruling elite carries the full burden of military costs. Moreover, the benefits of war are distributed to the whole polity in both regimes. These assumption are debatable, since it is likely that autocrats would force the general public to

⁹A similar effect occurs when two non-democracies are involved.

¹⁰See Brown *et al* (1996) for a survey of this literature.

finance wars while reaping the benefits themselves.

In contrast to the above papers, our approach connects the Democratic Peace to fundamental differences between institutions. Democracies and autocracies differ in our model only in relation to the identity and number of people involved in decision making. We show that it is the presence of asymmetric information and the strategic complementarities in making peace, that allow democracies to induce peaceful resolutions. Moreover, we highlight the importance of the presence of democratic regimes on both sides of the conflict.

In addition, the literature on the democratic peace has traditionally focused on positive analysis. Our analysis allows us to ask what regimes or what procedures countries would want to adopt in dealing with international conflicts. In particular, another result in the paper implies a novel rationale for the use of referendum or other democratic measures during conflicts that exhibit high costs of concessions. The use of a referendum may relax information asymmetries between countries, and allows them to coordinate on outcomes that are mutually beneficial but otherwise unattainable. Moreover, a referendum in a country is more beneficial when the rival country uses this procedure as well.

The rest of the paper is organized as follows. In the next section we lay down the model. In Section 3, we present the democratic peace result. In Section 4, we analyze optimal choices of institutions. Section 5 discusses some of our assumptions whereas section 6 concludes. All proofs are relegated to an appendix.

2 The Model

Our model consists of a two stage game. The first stage, which we term the “communication game”, is an information transmission game. In the second stage, we model the strategic interaction between the decision makers in two countries.¹¹ We term the second stage the “conflict game”. We start with the presentation of the second stage.

The conflict game:

An important feature of international negotiation is that it exhibits a trade-off between making costly concessions and waiting for the rival side to concede. Concessions tend to increase the probability of resolution of conflicts albeit at a cost of a less favorable deal. For example, a country may give up land upon its rival’s demand, and lose valuable resources therein. Or, a country may make concessions by disarming, at the cost of losing deterrence.

We model this trade-off as a 2×2 normal form game.¹² In the game, each country can

¹¹As the enforcement of agreements in the international arena is questionable, we assume that the two countries are unable to write and enforce contracts on concessions. Indeed a vast literature in international relations focuses on the issue of compliance and its importance in international disputes. See, for example, Underdal (1998).

¹²For a recent derivation of this trade-off in a dynamic bargaining model, see Smith and Stacchetti (2002).

take one of two actions, a_l and a_h .¹³ Any such action entails costs and benefits; in particular, we interpret the action a_h as a (costly) concession towards the other country. A benefit function $f(\cdot, \cdot)$ represents the future impact of concessions on the resolution of the conflict. The parameters s_1 and s_2 represent the cost-benefit ratio for each country. The structure of the payoffs is summarized in the following game, denoted by Γ . For simplicity of exposition, assume that no indifference arises between different payoffs in the matrix.¹⁴

$1 \backslash 2$	a_l	a_h
a_l	$s_1 f(a_l, a_l), \quad s_2 f(a_l, a_l)$	$s_1 f(a_l, a_h), \quad s_2 f(a_h, a_l) - c$
a_h	$s_1 f(a_h, a_l) - c, \quad s_2 f(a_l, a_h)$	$s_1 f(a_h, a_h) - c, \quad s_2 f(a_h, a_h) - c$

Figure 1: the conflict game Γ

We assume that concessions are beneficial, i.e., that $f(a_h, \cdot) > f(a_l, \cdot)$ and $f(\cdot, a_h) > f(\cdot, a_l)$. Furthermore, we assume that concessions are viewed as strategic complements since the marginal benefit of a joint concession is higher than that of a unilateral concession:

$$f(a_h, a_h) - f(a_l, a_h) > f(a_h, a_l) - f(a_l, a_l).$$

Let us define γ as the degree of strategic complements, i.e.,

$$\gamma = \frac{f(a_h, a_h) - f(a_l, a_h)}{f(a_h, a_l) - f(a_l, a_l)}.$$

Conflicts can be therefore characterized by their degree of strategic complements, γ .¹⁵

The cost-benefit ratio for each country, s_i , can take a high or a low value, that is, $s_1, s_2 \in \{s_l, s_h\}$.¹⁶ Thus, it is either the case that a country puts a high value on the benefits from

¹³The game can be extended to more than two actions. See discussion in section 5.

¹⁴This assumption guarantees that the number of equilibria is finite.

¹⁵In Levy and Razin (2002a), we provide a similar analysis to the case of strategic substitutes in the context of other conflicts. For the purpose of analyzing games of concessions however, strategic complements is the more reasonable assumption. See the discussion in section 5.

¹⁶The restriction to a binary set of states of the world is not important (see Levy and Razin (2002b) for a version of the game with continuous variables).

concession (when $s_i = s_h$), or that it perceives a concession as too costly (when $s_i = s_l$). In our analysis, we allow for asymmetric information about the cost-benefit parameters of both countries. Prior to analyzing the case of asymmetric information though, we have to fix the equilibria in the game when there is common knowledge about the parameters of the model.

When there is common knowledge about s_1 and s_2 , we restrict our analysis to the following situation. When a country knows that its rival does not make concessions, then it never finds it optimal to concede alone, in order not to be exploited in any future agreement. Thus, it is always an equilibrium for both countries not to concede, i.e., for both to play a_l in a ‘no concession equilibrium’. It is also a unique equilibrium whenever $s_1 = s_l$ or $s_2 = s_l$. Thus, we assume the following:

$$s_h f(a_h, a_l) - c < s_h f(a_l, a_l) \text{ and } s_l f(a_h, a_h) - c < s_l f(a_l, a_h).^{17}$$

On the other hand, if concessions are perceived as beneficial enough, then a country may be willing to concede if it knows that it will meet a reciprocal response from its rival. In other words, under common knowledge, if $s_1 = s_h$ and $s_2 = s_h$, then the game becomes a coordination game and the full concession outcome, (a_h, a_h) , arises as an equilibrium as well. Moreover, it Pareto dominates the ‘no concession equilibrium’. This is ensured by:

$$s_h f(a_h, a_h) - c > s_h f(a_l, a_h).$$

Figure 2 describes the equilibria in the game for these parameters, whereas for all other parameters, (a_l, a_l) is the unique equilibrium outcome.

¹⁷The first condition implies that (a_l, a_l) is an equilibrium for all parameters, and the second condition implies that it is the unique equilibrium whenever one country has s_l as its cost-benefit ratio. Thus, the conditions also imply that a_l is a dominant action for a country when its cost-benefit ratio is s_l .

$1 \backslash 2$	a_l	a_h
a_l	$s_{hj}(a_l, a_l), s_{hj}(a_l, a_l)$	$s_{hj}(a_l, a_h), s_{hj}(a_h, a_l)-c$
a_h	$s_{hj}(a_h, a_l)-c, s_{hj}(a_l, a_h)$	$s_{hj}(a_h, a_h)-c, s_{hj}(a_h, a_h)-c$

Figure 2: equilibria when it is common knowledge that $s_1 = s_h$ and $s_2 = s_h$.

In the context of strategic complements, the above assumptions insure that indeed an interesting strategic interaction arises between the two countries. Otherwise, at least one country would have a fixed dominant action for all parameters; we would not be able to detect then a difference between autocratic and democratic regimes.

In the game that we analyze, a peaceful resolution is more likely when each side makes concessions, but countries may sometimes prefer to employ a tough stance. For some parameters, mutual concessions may be profitable for both sides. But, as is often in international relations, countries may have gains from such coordination but do not necessarily realize them. In our model there is also asymmetric information about s_i which may even further complicate the coordination problem, as we explain below.

Information, players, and regimes:

We focus on the situation in which the cost-benefit ratio s_i is uncertain. We assume that these parameters are independent across countries and that each state has equal prior probability for each value in $\{s_l, s_h\}$.

In each country i , there are two players; the general public, P_i , and the leader L_i . It is reasonable to assume that the general public is relatively uninformed about s_i , whereas information about the relative benefits of concessions is available only to a small group of citizens. We therefore assume that P_i is uninformed about s_i and only knows its prior distribution, whereas the leader L_i knows s_i . The assumption that it is the leader who is fully informed is for simplicity, and our results are the same if we assume that there is some small group of citizens who knows the true state (we further discuss this possibility after describing the structure of the game).

We differentiate between the two regimes, a democratic and a non-democratic, in the following way. A democratic regime implies that the public P_i plays the conflict game against the other country. An autocratic regime implies that the leader L_i plays the conflict game against the other country; such a leader does not have to incorporate the public and has the power to take decisions by himself. The assumption that the public is the ultimate decision maker in a democracy is a simplification. It may represent the extreme case of a direct democracy; more realistically, it represents the situations in which the public makes decisions via referendum, or closely scrutinizes its accountable leaders, in a representative democracy.

The fact that the public in a democracy is initially uninformed, does not mean that when it is time to play the conflict game, it remains uninformed. Similarly, when a country faces an autocracy, it does not necessarily mean that it has an information disadvantage when it plays the conflict game. Leaders may share their information with others, in what we call the communication stage. We next describe this stage.

The communication stage:

International conflicts are usually accompanied by several rounds of diplomatic negotiations, media coverage and mutual exchanges of threats. In this model, we want to investigate this feature of conflicts in order to understand whether these statements tend to relax information asymmetries. We analyze situations in which it is possible for a leader to transmit public messages prior to the play of the conflict game. Thus, we assume that in the first stage of the game, the two leaders engage in a simultaneous message transmission stage. In this stage, each leader L_i sends a message $m_i \in M_i$ about his information s_i .¹⁸ The message space is restricted without loss of generality to $M = \{m_l, m_h\}$. The message is observed both by the home and the foreign audiences. The leaders do not bear any costs for sending messages, i.e., the latter are cheap talk.

Timing, strategies, and equilibria

The structure of the model is as follows:

Stage 1: L_i learns the state s_i and sends a message, $m_i \in \{m_l, m_h\}$, observed by all.

Stage 2: If country i is an autocracy, L_i plays the game Γ and if country i is a democracy, P_i plays the conflict game.

Finally, we assume that all players derive utility as specified in the normal form game Γ , according to the country they belong to.¹⁹ We use the concept of a Bayesian Nash Equilibrium to characterize the outcome of the game. A Bayesian Nash equilibrium demands that for any i , L_i 's message is optimal given the continuation game Γ , that the players in Γ play a Nash equilibrium given their beliefs, and that these beliefs are rational. Rational

¹⁸The results do not change if messages are sent sequentially.

¹⁹We discuss the case of heterogenous preferences in section 5.

beliefs are derived from the strategy of L_i and updated in a Bayesian manner upon the observation of the message m_i , whenever possible. For clarity of exposition, we focus on pure-strategy equilibria in the conflict game, which always exist.²⁰

To clarify, note that our main assumption relates to the information in the hands of players in a democratic regime. We essentially assume that in a democracy, no secret communication can take place between the leader and his public; it is technologically impossible to transmit information privately to each citizen (or to a majority of citizens). This means that any such transmission, be it a report in the newspaper or a public statement of a politician on television, can be observed by the rival country. Consequently, the decision maker (the public) and the rival country have the same level of information. This differs from an autocracy, in which the informed leader has the decision making power.

The information in the country does not necessarily have to be acquired by the leader himself. It may be held by journalists, scientists, intelligence agents and the like. An equivalent alternative to our assumptions is the following model. Assume that any informed citizen may participate in the information transmission stage. In an autocratic regime, the informed citizen can secretly transmit his information to the leader, who then takes a decision. In a democratic regime, because of technological constraints, the information sent to the public as a whole can also be observed by the rival country.

3 Domestic regimes and the resolution of international disputes

We now analyze the three possible dyads of regimes that could be involved in an international dispute; a democracy versus an autocracy, two democracies and two autocracies. We compare the three dyads in terms of the probability that they will yield a peaceful resolution. For the comparison, we assume that the probability of a peaceful resolution increases in the number of countries who make concessions. We start though by characterizing how the leaders behave in the communication game, that is, whether leaders can transmit credible information.

3.1 The communication stage: domestic regimes and information flows

In this section, we show that the presence of a democracy implies the possibility of information flows across countries. On the other hand we show that autocratic regimes are unable to transmit credible information across the border:

Proposition 1 *In all equilibria, only democratic countries transmit credible information that influences a rival country's actions. No message from an autocratic leader can change the behavior of the rival country.*

²⁰The qualitative results are the same when we incorporate mixed-strategy equilibria as well.

To understand the intuition for the result, consider first an autocratic leader. The message that he sends in the first stage of the game does not affect his utility and is therefore a cheap talk message. But due to positive externalities, such a leader is tempted to use the same message in any state. In particular, if one of his messages induces the other country to make concessions with a higher probability, he would always use this message. This implies that his messages are not informative and should not be believed by the other country.

Democratic regimes, on the other hand, are able to credibly transmit information to a rival country. The democratic leader plays a cheap talk game with two distinct audiences, his own public and the rival country's player. Although the democratic leader, similarly to his autocratic counterpart, may have an incentive to misrepresent his information, the presence of his home audience creates an endogenous cost for any such bluffing. The messages sent by the informed leader affect the electorate's behavior which in turn affects the leader's utility. Credibility is achieved because the leader and the electorate cannot coordinate their actions behind the scenes.

3.2 Dyads in conflict and peaceful resolutions

The previous section identifies one difference between democracies and autocracies, namely, the ability to transmit credible information to the rival side. More generally, our modelling assumptions imply that whenever two democracies are involved in a dispute, the players in the dispute - the public in each country - have correlated information. They may have no information at all, if their leaders do not disclose it, or full information about both countries' preferences, if their leaders reveal it in equilibrium. This will turn out to be a crucial feature for deriving the main result.

We compare the equilibria in the conflict game for the different dyads. In particular, we compare the probability of peaceful resolution that each dyad induces in equilibrium (recall that the probability of a peaceful resolution increases in the number of countries who make concessions). We focus on equilibria on the Pareto frontier. Whenever a dyad induces more than one Pareto efficient equilibrium we select the equilibrium with the highest probability of a peaceful resolution:²¹

Proposition 2 (the democratic peace): *(i) If the degree of strategic complements is large enough, i.e., if $\gamma > \frac{s_h}{s_l}$, then the highest probability of a peaceful resolution is achieved between two democracies. (ii) When the degree of strategic complements is relatively small, i.e., if $\gamma < \frac{s_h}{s_l}$, two democracies still induce the highest probability of peaceful resolution if the cost of concession c is small enough or large enough. For intermediate values of c , two autocracies yield the highest probability of a peaceful resolution.*

²¹See remark 1 for a discussion of the issue of equilibrium selection.

Our result relies on two forces through which the presence of two democracies leads to more peaceful resolution of conflicts. We now discuss these two forces, each of them applying to a different range of parameters.

The first channel is the ability of democracies to transmit information. This enables countries to coordinate on outcomes that are mutually desirable to both sides and increase the prospects of a peaceful resolution. Moreover, the inability of autocracies to credibly reveal information, lowers the probability of a peaceful resolution.

To see why information matters, let us consider then the case of relatively high costs. In particular, when

$$c > \frac{s_h}{2}(f(a_h, a_h) - f(a_l, a_h) + f(a_h, a_l) - f(a_l, a_l)),$$

a decision maker is willing to make concessions only if he is certain in a reciprocal response. But this cannot happen when this decision maker is facing an autocracy. An autocrat has full control of his information. He will not make concessions when his country's cost-benefit ratio is s_l , and any promises to the contrary are not credible. This means that anyone who faces an autocracy, will not make concessions. As a consequence, two autocracies or a mixed dyad in dispute are "stuck" in a "no-concession equilibrium". Therefore, the presence of one democracy as part of a dyad is not enough to guarantee a high probability of a peaceful resolution compared to two autocracies.

High costs of concession do not deter however two democracies from making mutual concessions, due to the possibility of both countries being fully informed. In particular, there exists an equilibrium in which both democratic leaders reveal their information truthfully, and the two countries make concessions if and only if both have the high state ($s_i = s_h$). This equilibrium has a higher probability of a peaceful resolution, compared to any other dyad, when the cost of concession is high.

It is actually the high cost of concessions that allows democratic leaders to be credible. A leader can be credible only if he is truthful in the low state of the world. If he is, then both countries will not make concessions. If he deviates and announces that the state is high, he may induce both sides to coordinate on making concessions. When

$$c > s_l(f(a_h, a_h) - f(a_l, a_l)),$$

the leader is indeed dissuaded from deviating. Thus, credible information flows between democracies allow them to coordinate on the mutual concessions outcome particularly when both countries find it optimal. Two democracies, then, yield a higher probability of a peaceful resolution for large enough values of c .

The second channel that we highlight is the possible *lack of information* in the hands of decision makers in democracies. If the leader in a democracy does not transmit information,

it implies that the player in the conflict game - the public - is uninformed. The potential rivals of a democracy realize that the public cannot adversely use his information and are more inclined to make concessions.

In particular, assume now that c is relatively small. In this case an uninformed agent may decide to make a concession even if he thinks that there is some chance that the other side will not comply, as long as there is some positive probability for mutual concessions. This implies that when two democracies face each other, the willingness of each country to make concessions may reinforce each other. If

$$c < \frac{s_l + s_h}{2}(f(a_h, a_h) - f(a_l, a_h)),$$

then there is an equilibrium in which no information is transmitted and each country (the public) makes concessions. This equilibrium leads to the largest possible probability of a peaceful resolution. This level of peaceful resolution cannot be achieved whenever an autocracy is involved in an international dispute, since the leader of the autocracy is informed and never makes concessions when his country's cost-benefit ratio is s_l .

We have shown that democracies yield the highest probability of peaceful resolutions for low and for high values of c . The condition in the Proposition, i.e., that $\gamma > \frac{s_h}{s_l}$, implies that these intervals overlap. In this case, two democracies achieve the highest probability of a peaceful resolution for all parameters of the model.

If the condition in the Proposition does not hold, i.e., if $\gamma < \frac{s_h}{s_l}$, then democracies still dominate for low values of c and for high values of c . But there exists an interval of intermediate values of c , for which the costs may be high enough so that a public who is uninformed is not willing to make concessions even if it knows that the other country will make a concession for sure, but low enough so that credible information transmission between democracies is impossible as well. Thus, the two democracies may be stuck in a no concessions equilibrium.

For this range of parameters, two autocracies achieve a higher probability of peaceful resolution, by making concessions whenever their cost-benefit ratio is s_h . They do so even though they realize that it is equally likely that the other autocrat makes concessions or refrains from doing so. This equilibrium has the highest probability of peaceful resolution between two autocracies. It is also the most 'peaceful' for these parameters; as we show in the appendix, two autocracies also yield a higher probability of peaceful resolution compared to a mixed dyad.

The finding that two autocracies can be more peaceful than a mixed dyad, illustrates once again that one democracy is not enough; when a democracy is facing a non-democratic regime, the probability of a peaceful resolution may be lower than that achieved by two

non-democratic regimes.²² Our model provides therefore a theoretical explanation for the importance of the presence of democracies on both sides of the conflict.

REMARK 1 The nature of our results does not rely on equilibrium selection; no matter what equilibrium we choose, two democracies yield the highest probability of peaceful resolution when c is small enough or large enough. The equilibrium selection, i.e., choosing the equilibrium with the highest probability of a peaceful resolution²³, bites for intermediate values of c and allows us to show that in some cases two democracies dominate other dyads also for this range.

To summarize, our main result shows how symmetric information among the players - the public - in two democracies, allows them to coordinate on mutual concessions which lead to peaceful resolution of conflicts. The two countries can concede because each knows exactly when the other side will concede as well. Our results also imply that a conflict between two democracies induces coordinated actions. That is, either both make concessions, or neither does. On the other hand, when an autocracy is part of the dispute, we may observe unilateral concessions. These are never optimal for the conceding side, but arise due to asymmetric information and the ability of the autocrat to extract information rents from his rival, be it a democracy or another autocracy.

4 The choice of institutions

In the previous section we focused on the effect that domestic institutions might have on the resolution of conflicts while fixing the regimes of the different countries. In this section we are interested in the question of institutional choice. We therefore ask what regime a country would choose when faced with a particular conflict and rival. Interpreted narrowly, this analysis relies on the premise that countries can choose which procedure to employ when involved in a conflict. For example, whether to use a referendum to decide matters, or to endow leaders with the power to resolve the conflict.

On a broader scale, we can think of a constitution phase in which the founding fathers decide whether to form a democracy or an autocracy. Given their expectations about the conflicts that the country will face in the future, they can identify the optimal regime: the one that maximizes the expected payoff of the country from these conflicts.²⁴

In what follows, we fix the regime of the foreign country, and analyze which regime yields a higher expected utility for the home country.²⁵

²²The empirical literature is split on whether mixed dyads generate more peaceful outcomes than two autocracies. See Russett (1993).

²³As long as it is not Pareto dominated.

²⁴Here we provide the optimal regime given a particular conflict and rival. Obviously, it is possible then to compute the optimal regime given a distribution of conflicts.

²⁵Since all the citizens in the same country have the same utility function, the choice of regime maximizes

Proposition 3 *When the foreign country is an autocracy, the home country is (weakly) better off being an autocracy. When the foreign country is a democracy, the home country is better off as a democracy only when the cost of concession is high. Otherwise, it is better off being an autocracy.*

The intuition for this result is as follows. Typically, when a democracy and an autocracy interact, the autocracy manages to capture some gains at the expense of the democracy, since it can use its information advantage in its favor. However, when the cost of concession is high, the democracy will not yield and the only possible equilibrium is “no-concession”.

Therefore, if the foreign country is a democracy, being an autocracy is an optimal choice only if the cost of concession is low. When the cost is high, being a democracy is better since two democracies can share information and can make concessions when it is beneficial for both. Choosing an autocratic procedure is therefore not a dominant action.

When the foreign country is an autocracy, the home country does not wish to be exploited by it. When the cost of concession is low this implies a choice of an autocratic regime. When the cost of concession is high, neither a democracy nor an autocracy would risk making concessions for a better informed rival. Both institutions provide therefore the same utility.

REMARK 2 The result reported in Proposition 3 implies that if two countries were to choose their regimes simultaneously, given a particular conflict, then either both choose to be democracies (when cost of concession is high enough), or that both choose to be autocracies. This suggests that we should observe clusters; neighboring countries, who are likely to be involved in conflicts, should have the same type of regimes.

5 Discussion of assumptions and extensions

In this section we discuss some of the implications of the assumptions we make in the model.

Heterogenous preferences

It is common wisdom that decisions of leaders need to be ratified via referendum because the leader may not adequately represent the preferences of the people. However, our model shows that even if preferences are homogenous, i.e., the leader represents the preferences of the public, there is still room for a ratification requirement.

It is important to check that our results are maintained in the case in which there is preference heterogeneity. Assume that in country $i \in \{1, 2\}$, the cost-benefit ratio for citizen j is $s_i + x_{ij}$, where $x_{ij} \in [-v, v]$ for some v . Denote by x_{im} the preference parameter of the median voter m in country i and by x_{il} that of the leader L_i .

Clearly, under autocratic regimes, the preferences of the public do not matter since the public has no role. Consider democratic regimes. The public is the decision maker who the expected utility of any citizen in this country. We discuss heterogenous preferences in section 5.

decides between a_l and a_h in the conflict game Γ . In a simple vote between two actions, the median voter is the decisive voter. This means that the equilibria in the conflict game Γ are according to the preference parameter $s_i + x_{im}$. On the other hand, the preference parameter of the leader, $s_i + x_{il}$, determines whether democracies are able to transmit credible information or not. It is easy to show then (see Levy and Razin (2002a)) that our results hold for small enough $|x_{im} - x_{il}|$, i.e., the more similar are the preferences of the median and the leader in each country.

Endogenous leadership

Another interesting extension explored in Levy and Razin (2002a), is the endogenous determination of leadership in the context of international conflicts. In particular, the distance between x_{im} and x_{il} , mentioned above, may be endogenous. The public - or the median voter - may actually *determine the identity of the leader*, both in the case in which he would be endowed with decision making power (as in an autocratic regime) or only with the power to transmit information (a democratic regime). Our model yields a novel reason for delegation when the regime is democratic. In this case the median may delegate authority to a citizen with different preferences in order to facilitate information transmission to the rival country when it is desirable.

Other conflicts- Strategic substitutes

In this model we focus on peaceful resolution of military conflicts and so we have assumed that the conflict game exhibits strategic complementarities. But it is reasonable to expect that the issues highlighted in this paper are important in other conflicts, like trade wars, environmental disputes and others. In Levy and Razin (2002a) we explore a more general family of conflict games. In particular we allow the conflict game to exhibit strategic substitution in the benefit function. We show that the trade-off between information transmission and control of information still exists in this specification of the model. We also provide normative analysis for regime choice for the different countries.

Richer state space and game form

For simplicity and due to expositional purposes, we restrict our attention to a game with two actions and two states of the world. It is important to note that these assumptions can be generalized. In particular the two state structure of the model is not important. In Levy and Razin (2002b) we analyze a similar model with a continuum of states which yields the same qualitative results. Extending the set of actions in the conflict game will also not change the nature of the results.

6 Conclusion

In this paper we provide a new explanation to the democratic peace phenomenon. We identify peaceful resolutions with high level of concessions. We assume that concessions are strategic complements and that countries have asymmetric information regarding the benefits from making concessions. This allows us to show that peaceful resolution of conflicts demand, for most parameters, that the two countries involved in a conflict would be democracies. It is not a trait or a norm of a democracy, and it is not a direct result of the institutions of a democratic country, but the democratic peace is a consequence of both institutional features and strategic considerations that arise when each country knows that it faces a democracy.

References

- [1] Brown M. E., S. M. Lynn-Jones, and S. E. Miller (1996), *Debating the Democratic Peace*, The MIT Press, Cambridge Massachusetts.
- [2] Bueno de Mesquita, B. and D. Lalman (1992), *War and Reason: Domestic and International Imperatives*, New Haven: Yale University Press.
- [3] Bueno de Mesquita, B., J. D. Morrow, R. M. Siverson and A. Smith (1999), “An Institutional Explanation of the Democratic Peace”, *American Political Science Review*, Vol. 93, No. 4, 791-807.
- [4] Crawford, V. and J. Sobel (1982), “Strategic Information Transmission”, *Econometrica* 50, 1431-51.
- [5] Dixon, W. (1993), “Democracy and the Management of International Conflict”, *Journal of Conflict Resolution*, 37, 1:42-68.
- [6] Downs, G. and D. M. Rocke (1995), *Optimal Imperfection? Domestic Uncertainty and Institutions in International Relations*, Princeton University Press.
- [7] Farrell, J. and R. Gibbons (1989), “Cheap Talk with Two Audiences”, *American Economic Review* 79, 1214-1223.
- [8] Fearon, J. D. (1994), “Domestic Political Audiences and the Escalation of International Disputes”, *American Political Science Review* 88, 577-592.
- [9] Leeds, A. B. (1999), “Domestic Political Institutions, Credible Commitments, and International Cooperation”, *American Journal Of Political Science* 43, 979-1002.
- [10] Levy G. and R. Razin (2002a), “Who Should Decide on Foreign Affairs?”, mimeo, LSE, TAU, CEPR and NYU.
- [11] Levy G. and R. Razin (2002b), “What Makes Democracies Credible?”, mimeo, LSE, TAU, CEPR and NYU.
- [12] Maoz, Z. and B. Russett (1993), “Normative and Structural Causes of the Decentralized Peace, 1946-1986”, *American Political Science Review* 89, 914-924.
- [13] Russett, B. (1993), *Grasping the Democratic Peace: Principles for a Post-Cold War World*, Princeton University Press, Princeton, NJ.
- [14] Schultz, K. (1998), “Domestic Opposition and Signalling in International crises”, *American Political Science Review* 92, 829-44.
- [15] Smith, L. and E. Stacchetti (2002), “Aspirational Bargaining”, working paper, University of Michigan.
- [16] Tangeras, T. (2003), “Democracy, autocracy and the likelihood of international conflict”, mimeo, IUI, Sweden.
- [17] Underdal, A. (1998), “Explaining Compliance and Defection: Three Models”, *European Journal of International Relations*, 5-30.

Appendix

Proof of Proposition 1. To see that no autocratic leader can transmit credible information and influence the rival country's actions, assume to the contrary that upon a message of an autocrat m_h the rival country plays a_h with a higher probability, relative to another message m_l . But then there is an optimal deviation of the autocratic leader to send m_h disregarding his information and his play in the conflict game, due to positive externalities. Thus, such messages cannot be credible. To show that democracies may transmit information in equilibrium and that any information in equilibrium must come from a democracy, we refer the reader to the next section that characterizes all pure strategy equilibria in the game. ■

Characterization of equilibria. For the proofs of Propositions 2 and 3, as well as Proposition 1, we now characterize the equilibria in the whole game for each dyad and their probability of a peaceful resolution.

Let p^{jk} be the probability of a peaceful resolution when one of the countries takes action a_j and the other takes action a_k , where $j, k \in \{l, h\}$. By assumption, $p^{hh} > p^{lh} > p^{ll}$. Let $\bar{s} = \frac{s_l + s_h}{2}$ and denote

$$\begin{aligned} D_h &= f(a_h, a_h) - f(a_l, a_h), \\ D_l &= f(a_h, a_l) - f(a_l, a_l) \end{aligned}$$

and

$$\bar{D} = f(a_h, a_h) - f(a_l, a_l).$$

Note that, by strategic complementarity and positive externalities, $\bar{D} > D_h > D_l$.

Let us start by analyzing two autocracies. For all parameters, (a_l, a_l) is an equilibrium, with utility

$$\bar{s}f(a_l, a_l).$$

The probability of peace is p^{ll} . Also, if

$$c < \frac{s_h}{2}(D_h + D_l) \tag{1}$$

then there exists an equilibrium in which each plays according to his information (i.e., $a_i = s_i$). The condition insures that a player is willing to make concessions whereas he knows that the other player is equally likely to make concessions or not. The utility for each autocracy is then:

$$\frac{s_l}{4}(f(a_l, a_l) + f(a_l, a_h)) + \frac{s_h}{4}(f(a_h, a_h) + f(a_h, a_l)) - \frac{c}{2}$$

and the probability of peace is $\frac{1}{2}p^{lh} + \frac{1}{4}p^{ll} + \frac{1}{4}p^{hh}$.

We now consider two democracies. If no information is transmitted, then (a_l, a_l) is always an equilibrium with utility $\bar{s}f(a_l, a_l)$ and the probability of peace is p^{ll} . (a_h, a_h) is an equilibrium if

$$\bar{s}D_h > c \tag{2}$$

and then the expected utility is

$$\bar{s}f(a_h, a_h) - c$$

with probability of peace p^{hh} .

Other equilibria exist, with information transmission. Suppose that one country transmits information while the other is not. The only possible equilibrium is that they coordinate on (a_l, a_l) when $s_l = s_l$ and otherwise they coordinate on (a_h, a_h) . This can happen only if both (2) is satisfied and:

$$c > s_l \bar{D} \tag{3}$$

is satisfied, which is the incentive of the leader to transmit information in the low state. In the high state, the leader's incentives to transmit truthful information follow from the parameter restrictions of the model. The utility of the informed country is:

$$\frac{1}{2}s_l f(a_l, a_l) + \frac{1}{2}(s_h f(a_h, a_h) - c)$$

and of the uninformed is:

$$\frac{1}{2}\bar{s}f(a_l, a_l) + \frac{1}{2}(\bar{s}f(a_h, a_h) - c)$$

where the probability of peaceful resolution is

$$\frac{1}{2}p^{ll} + \frac{1}{2}p^{hh}$$

Finally, there exists an equilibrium with two sided information transmission. Both countries play a_l when one of them sends the low message and otherwise a_h . The equilibrium is satisfied when (3) is satisfied and the utility for each country is

$$\frac{1}{2}\bar{s}f(a_l, a_l) + \frac{1}{4}(s_h f(a_h, a_h) - c) + \frac{1}{4}s_l f(a_l, a_l),$$

whereas the probability of peace is

$$\frac{3}{4}p^{ll} + \frac{1}{4}p^{hh}$$

Consider now mixed regimes. As above, (a_l, a_l) is an equilibrium for all parameters. Also, if

$$c < \frac{\bar{s}}{2}(D_h + D_l) \tag{4}$$

then the democracy plays a_h and the autocrat plays according to his information. The utility of the autocrat is

$$\frac{1}{2}s_l f(a_l, a_h) + \frac{1}{2}(s_h f(a_h, a_h) - c),$$

the utility of the democracy is

$$\bar{s}\left(\frac{1}{2}f(a_h, a_h) + \frac{1}{2}f(a_h, a_l)\right) - c,$$

and the probability of a peaceful resolution is

$$\frac{1}{2}p^{lh} + \frac{1}{2}p^{hh}$$

An additional equilibrium exists in which the democratic leader transmits information: whenever the democratic leader says a_l then they both play a_l and otherwise the democracy plays a_h and the autocrat plays according to his information. For the democratic leader to transmit credible information it has to be that:

$$c > \frac{s_l}{2}(D_l + \bar{D}),$$

$$c < \frac{s_h}{2}(D_l + \bar{D}).$$

The second condition is redundant since it is implied by (1) which has to be satisfied for the public to play a_h when the autocratic rival is equally likely to play a_h or a_l . The utility of democracy is

$$\frac{s_l}{2}f(a_l, a_l) + \frac{s_h}{4}(f(a_h, a_l) + f(a_h, a_h)) - \frac{c}{2},$$

the utility of the autocrat is

$$\frac{\bar{s}}{2}f(a_l, a_l) + \frac{s_l}{4}f(a_l, a_h) + \frac{s_h}{4}f(a_h, a_h) - \frac{c}{4},$$

and the probability of a peaceful agreement is

$$\frac{1}{2}p^{ll} + \frac{1}{4}p^{lh} + \frac{1}{4}p^{hh}$$

Proof of Proposition 2. Consider first the case of two democracies. Whenever

$$c < \bar{s}D_h \tag{5}$$

then the (a_h, a_h) equilibrium exists, and the probability of peace is p^{hh} . This is the highest probability achieved in any equilibrium for any dyad and it is not mimicked by any other dyad. Also, if

$$c > \frac{s_h}{2}(D_h + D_l),$$

the only equilibrium for two autocracies or mixed regime is the no concession one whereas two democracies can transmit information for high values of c and coordinate on mutual concessions. Thus, two democracies always dominate when c is low enough or high enough. Moreover, if

$$\frac{s_h}{2}(D_h + D_l) < \bar{s}D_h \iff \gamma > \frac{s_h}{s_l},$$

democracies dominate for all parameters. If on the other hand

$$\frac{s_h}{2}(D_h + D_l) > \bar{s}D_h,$$

then for values of c in the interval

$$[\bar{s}D_h, \frac{s_h}{2}(D_h + D_l)]$$

two autocracies achieve a probability of peaceful resolution which is:

$$\frac{1}{4}p^{ll} + \frac{1}{2}p^{lh} + \frac{1}{4}p^{hh},$$

which is higher from a mixed dyad, which in this interval has a unique equilibrium in which the democratic leader transmits information, and its probability of a peaceful resolution is:

$$\frac{1}{2}p^{ll} + \frac{1}{4}p^{lh} + \frac{1}{4}p^{hh}.$$

Moreover, for the two democracies, it is either the case that they play the no concession equilibrium (with peace with probability p^{ll}) or the two sided information transmission equilibrium (with peace with probability $\frac{3}{4}p^{ll} + \frac{1}{4}p^{hh}$). Two autocracies dominate therefore in this interval. ■

Proof of Proposition 3. Comparing the utilities specified in the section that characterizes the equilibria, we can see that whenever

$$c < \frac{s_h}{2}(D_h + D_l),$$

then when the rival country is an autocracy, it is strictly better to be an autocracy, no matter what equilibrium is played in the mixed regimes. When the condition is not satisfied, both dyads yield (a_l, a_l) as the unique equilibrium outcome. On the other hand, when the other country is a democracy, again, when the above condition is satisfied, an autocrat may receive a higher utility from any equilibrium compared to any equilibrium when two democracies play. Thus, it is optimal to respond with autocratic regime. On the other hand, when the condition is not satisfied, then two democracies can transmit information and increase their utility, compared to a mixed regime in which they play the no concession equilibrium. Thus, a democracy is a best response. ■