Many statistical studies in international relations investigate the claim that democracies do not fight one another. Virtually all of these studies employ a single-equation design, where the dependent variable measures the presence or absence of a dyadic militarized interstate dispute (MID). A separate group of studies argues that conflict affects democracy and that its effect could be positive or negative. By and large, these two bodies of literature have not incorporated one another’s insights. We argue that democracy and dyadic conflict affect each other significantly and that statistical models that ignore the reciprocal nature of these effects may make incorrect inferences. To test this argument, we develop a simultaneous equations model of democracy and dyadic conflict. Our sample includes all the politically relevant dyads from 1950 to 1992. We find that dyadic military disputes reduce joint democracy and joint democracy reduces the probability of MIDs. Compared with the single-equation estimates in the literature, the absolute effect of joint democracy in our paper is smaller while in relative terms, the effect is similar in size. The effect of joint democracy on MID involvement is considerably smaller for noncontiguous countries than for contiguous ones. The effects of a number of control variables in the MID equation are also found to differ from those reported previously in single-equation–based studies.

The claim that democracies do not fight one another has received wide attention over the past decade. Statistical studies investigating this claim share similar designs, employing a dyadic level of analysis and estimating single-equation models. The dependent variable is typically dichotomous, measuring the presence or absence of a militarized interstate dispute (MID). The set of independent variables includes a measure of joint (dyadic) democracy and more or less the same collection of control variables. The vast majority of studies report that the probability of a MID occurring within a dyad declines as joint democracy increases. There are, however, a number of studies that reject this argument (see Section 2).1

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1 A smaller group of studies argues that democracies are more peaceful in general, not only toward other democracies. This claim has received less empirical support. In this paper, we focus on the dyadic version of the democratic peace argument.
There is also a growing body of literature in international relations arguing that conflict affects democracy. While the direction of the effect of conflict on democracy is hotly debated, scholars argue the effect should be statistically significant. Conceptually, these studies form a subset of the large monadic literature within comparative politics that studies the determinants of democracy.

Until now, the democratic peace literature and studies addressing the effect of conflict on democracy have basically ignored the insights offered by one another. In particular, the effect of joint democracy on conflict has been treated as unidirectional by international relations scholars even though it has been demonstrated elsewhere that conflict affects democracy. By taking the two bodies of literature into account, one can reasonably argue that conflict and democracy affect each other simultaneously.

Our goal is to address the simultaneity of conflict and democracy within a unified statistical framework. We need to stress at the outset that our agenda is not to prove or disprove the existence of democratic peace. Rather, we believe that democracy and dyadic conflict affect one another. Thus studies need to model the reciprocal effects explicitly. This is not an easy task, as it requires connecting monadic and dyadic levels of analysis. We develop a novel way to link the two levels of analysis while maintaining consistency with both the literature on democratic peace and the literature on the determinants of democracy. In our simultaneous equations model, the endogenous variables include dyadic conflict measured by the presence or absence of a MID, the higher level of democracy in a dyad, and the lower level of democracy in a dyad. As in Dixon (1994) and Oneal and Russett (1997), the higher level of democracy in a dyad is interpreted here as a measure of political regime dissimilarity and the lower level of democracy in a dyad is understood to be a measure of joint democracy.

Some may view the simultaneity of dyadic conflict and democracy merely as a methodological annoyance. In contrast, we consider it to be both a theoretical and a methodological issue. Several scholars share this view. For example, in his comprehensive review, Chan (1997) argues that the democratic peace literature needs to take more seriously the possibility of reverse causality from conflict to democracy. In the first study using a partial (in a sense discussed later) simultaneous set-up to study the reciprocal relationship between conflict and democracy, James, Solberg, and Wolfson (1999) argue that the effect of joint democracy on dyadic conflict is generally insignificant. Their study has led to a lively debate, but the conflict-democracy simultaneity issue remains unresolved.

We believe that further investigation of the relationship between dyadic conflict and democracy within a simultaneous framework is warranted. As noted by Alvarez and Glasgow (2000:165), “if there are theoretical reasons to suspect endogeneity in the model, it must be modeled. Ignoring endogeneity will lead to biased estimates.” Of course, the actual effect of simultaneity on the dyadic conflict–democracy nexus could be large or small, but unless one models the reciprocal interaction between democracy and conflict, one simply cannot evaluate the effect of ignoring the simultaneity, which is a common practice in the conflict community.

We assess empirically the question of simultaneity between democracy and dyadic conflict across the sample of politically relevant dyads from 1950 to 1992. Our findings can be summarized as follows. First, dyadic conflict reduces both the lower and higher levels of democracy in a dyad. Second, joint democracy reduces the probability of dyadic MID involvement. When compared with the estimate of Oneal

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2 Gleditsch and Ward (2000) also note briefly that democratization often is affected by conflict.
4 Politically relevant dyads are dyads involving at least one major power (U.S., U.K., France, USSR/Russia, and China) or geographically contiguous countries.
and Russett (1997), the absolute magnitude of the effect in our study is smaller, while in relative terms, the effect is similar in size. The single-equation effect of joint democracy on MID involvement is considerably smaller for noncontiguous countries than for contiguous countries. Third, democracy is affected by a number of economic and social variables that have commonly received attention in the literature on comparative politics. Fourth, several control variables in the MID equation that prior studies have found to be significant in the single-equation framework are shown to lack significance in our simultaneous design. Notably, we find that preference similarity, measured by United Nations voting patterns, does not have a statistically significant effect on dyadic MID involvement.

The paper is organized as follows. Section 2 reviews the literature on the effect of democracy on dyadic conflict as well as the literature on the effect of conflict on democracy. Section 3 discusses our theoretical expectations. Section 4 overviews the few empirical studies that have investigated aspects of the issue of democracy and conflict simultaneity. Section 5 presents our conceptual model. Section 6 discusses our data and measures, and Section 7 discusses our estimation approach. Section 8 presents the results, and Section 9 concludes and discusses the policy implications of our findings.

Two Literatures on Democracy and Military Conflict

The Effect of Democracy on Conflict

The democratic peace literature has been reviewed extensively. In this section, we briefly summarize this literature. Most scholars argue that democracies do not fight one another and are unlikely to engage in militarized disputes with one another. The monadic argument that democracies are less likely to be involved in MIDs with all countries also has been made, but is relatively more controversial. As noted, we focus on the dyadic version of the argument.

The democratic peace literature is based on the empirical observation that democracies have almost never fought wars against each other. While a few cases are said to disprove this empirical regularity, there are studies explaining why these cases are questionable. Given this empirical regularity, the thrust of the literature has focused on explaining why democracies do not fight each other, and whether this regularity can be attributed to democracy or other forces, or indeed whether it is simply due to random historical occurrence.

The proponents of the democratic peace proposition offer several explanations for their claims. The first, a so-called institutional explanation, can be traced to Kant (1795). The decision to wage war in democracies faces more checks and balances than in autocracies. Democratic governments also are more constrained by the rule of law. The slowing down of the decision-making process leaves more time for negotiation to take place and reduces the risk of errors and misunderstandings, both of which reduce the probability of war (Maoz and Russett, 1993). Bueno de Mesquita et al. (1999) offer yet another institutional explanation. Democracies do not fight each other because they are unattractive targets for other democracies. Since democratic leaders run for reelection, a military defeat may lead to an electoral defeat. Therefore, they prefer to mediate disputes, and in the event of war, choose their fights carefully to increase the likelihood of victory. When democracies fight, they

---


6 For example, see Bremer (1993), Maoz and Russett (1993), Dixon (1994), and Oneal and Russett (1997).

7 Rummel argues that “the more a nation is democratic, the less severe its overall foreign violence,” (1997:5). However, he admits that this argument is controversial.

8 For a discussion of these cases see, for example, Doyle (1997). Russett and Oneal (2001) emphasize that the effect of joint democracy on dyadic conflicts is probabilistic. Even if a few democratic dyads exhibit militarized disputes, these cases do not refute the claim that democratic dyads are generally less likely to exhibit militarized disputes than other dyads.
mobilize their resources and tend to win. Since all democracies behave in this manner and their leaders know it, democracies are less aggressive toward one another.

According to a second, so-called normative argument, democratic governments tend to tolerate their domestic opposition and resolve domestic conflicts peacefully. Developing this domestic analogy, it is argued that they also behave this way toward other countries (Weart, 1998). While these effects are monadic, they are said to be stronger when democracies interact with one another. Since the domestic politics of democracies is transparent, democracies can more readily trust each other (Maoz and Russett, 1993). It follows that conflicts among democracies are more likely to be mediated by third parties than they are to escalate (Dixon, 1994).

A number of studies reject the democratic peace proposition. Farber and Gowa (1995), for example, argue that the purported negative effect of joint democracy on conflict is an artifact of the interests shared by democracies facing the former USSR during the Cold War. Layne (1994) argues that the American Civil War is a strong disconfirming case of the democratic peace argument. Polacheck (1997) and Polacheck and Robst (1998) argue that democracies do not fight each other because of their extensive trade relations, since conflict reduces trade.9 Lemke and Reed (1996) account for this apparent regularity by arguing that democracies tend to be content with the status quo, whereas autocracies tend to be dissatisfied with the status quo, and therefore are more conflict prone. This explains both the lack of wars between democracies and the higher incidence of war between democracies and autocracies. From a different angle, Gartzke (1998) argues that democracies are less likely to disagree and thus have no need to fight each other. When a measure of affinity based on UN General Assembly voting is included in the typical model, the effect of joint democracy on the probability of MIDs becomes insignificant.10

The Effect of Conflict on Democracy

The effect of conflict on democracy is a subject of controversy. According to one view, conflict reduces democracy. This view has its origin in writings of Tocqueville (1835:650): “All those who seek to destroy the freedom of the democratic nations must know that war is the surest and the shortest means to accomplish this.” While war may not immediately result in a military government, it will eventually concentrate power in the government’s hands, leading to despotism and the decline of democracy. Elaborating on the negative effect of conflict on democracy, Lasswell (1977) argues that some groups may not want to join the war effort. In order to reassert power, the state may increasingly become autocratic. Moreover, conflict may require resources that the state does not have. When people do not agree to give up wealth for the war effort, the state may have to become oppressive in order to afford the war, and subsequently force them to do so.11 Layne (1994) and Thompson (1996) suggest a different mechanism. Building democracy requires peace. States facing external threats need to allocate resources to defense and maintain a large governmental apparatus; both factors reduce the level of resources available for the achievement of democratic consolidation.

A competing view posits that the effect of conflict on democracy is positive (Tilly, 1992). Historically, many leaders mobilizing their populations for war granted political rights or land in exchange for support of the war effort. Such redistribution of wealth enlarges the number of people that are able to affect

---

9 For additional discussion of the link between democratic peace and economic relations see Mousseau and Shi (1999).
10 Another argument that weakens the democratic peace proposition is offered by Mansfield and Snyder (1996). They argue that young democracies are more prone to engage in war with each other than established democracies.
governance, and thus facilitates democratization. Moreover, it is argued that wars unleash social reforms, including democratization (Higgs, 1988; Porter, 1994; Kasza, 1996). Demonstrating this effect in a case study, Skocpol et al. (2001) argue that the U.S. Civil War and the U.S. participation in World War I exerted a strong positive effect upon the U.S. democratic civil society.12

A third group of studies (e.g., Modelski and Perry, 1991; Bueno de Mesquita et al., 1999; Mitchell, Gates, and Hegre, 1999) offers a conditional argument for the effect of conflict on democracy. When a war ends in a victory by democracy, the winner often redesigns the loser’s regime, imposing democratization. However, when the winners are autocracies, the effect of conflict on democracy tends to work in the opposite direction, reducing the level of democracy in the losing country.13

Despite competing expectations about the sign of the effect, all three views agree that conflict does affect democracy. The overall or net effect of conflict on democracy thus appears to warrant empirical investigation. However, these studies do not take into account the converse possibility, that is, that democracy may affect conflict behaviors. Again, as noted, ignoring such reciprocal effects may lead to erroneous empirical findings.

Implications and Theoretical Expectations

We have reviewed two bodies of literature, one on the effect of democracy on conflict, and the other on the effect of conflict on democracy. Synthesizing the two, we hypothesize that the relationship between dyadic conflict and democracy is reciprocal; in other words, the two forces impact one another simultaneously. Again, some may dismiss the simultaneity as a methodological nuisance; however, we believe this issue has important theoretical, methodological, and policy implications.

The democratic peace literature builds on results from single-equation models. However, such results rely upon the regression of dyadic conflict on joint democracy—a technique that cannot distinguish whether MIDs are affected by joint democracy or joint democracy is affected by MIDs. In contrast, our simultaneous equations framework may yield one of three possible empirical outcomes. First, the effect of conflict on democracy is significant, while the effect of democracy on conflict is not significant. Second, the effect of conflict on democracy is not significant, while the effect of democracy on conflict is significant. Third, democracy and conflict significantly affect each other. We cannot evaluate the empirical validity of these three distinct possibilities for the interactions between joint democracy and dyadic conflict until we model the democracy–conflict simultaneity explicitly.

That said, we believe the arguments that attribute peace to joint democracy are theoretically plausible. Furthermore, we cannot ignore the fact that the democratic peace argument has received empirical support in many single-equation studies. We therefore state the following hypothesis:

H1: Joint democracy reduces the incidence of MIDs between two countries in a dyad.

In terms of the effect of conflict on democracy, while the arguments in the literature are made in the context of a monadic level of analysis, they can be readily applied at the dyadic level, as dyads are merely pairs of countries. If conflict affects the level of democracy of any of the two countries in a dyad, it also could, in principle, affect the joint democracy of that dyad.

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12 For other case studies demonstrating the positive effect of acute conflict on democracy forces see, e.g., Marwick (1988), Porter (1994), and Reuveny and Prakash (1999).

13 For example, compare the cases of Germany and Japan after World War II with the cases of some European countries under Nazi or Soviet control.
Building on our discussion in Section 2, we categorize the effects of conflict on democracy into four types. The absence of conflict involvement by a country enables the provision of resources for the nurturing of democratic institutions. In contrast, the presence of conflict reduces the level of resources available to support democratization. The preparation for conflict may increase autocracy as the state coerces the people to participate in, and contribute resources to, an unpopular war. This channel, however, may also promote democracy, as the state may grant political rights to groups in return for their support of the war. The occurrence of conflict generates a sense of crisis, which legitimizes power centralization. However, the state may also grant democratic rights during the conflict to win support for the war. The post effect of conflict comes in two variants. In one variant, conflict is a social shock stimulating reforms that increase democracy. A second variant involves the winners of a war imposing their own political regime on the losers. In summary, the existing theories in the literature on the effect of conflict on democracy offer conflicting expectations. This implies that the overall (net) effect of conflict on democracy is theoretically unclear, which is formulated into the following hypothesis:

H2: Conflict may raise or reduce the level of democracy.

Previous Empirical Studies of Conflict–Democracy Simultaneity

In general, the issue of conflict–democracy simultaneity has not received much attention in the empirical literature. Before we turn to our analysis, however, we believe it is beneficial to review the few studies that have dealt with some aspects of this simultaneity. Investigating the reverse causality, Mousseau and Shi (1999) focus on the proposition that democracy declines as countries prepare for war. However, they do not find statistical support for this claim. Crescenzi and Enterline (1999), on the other hand, argue that the relationship between war and democracy is reciprocal, as reflected by the portion of democratic states in the system and the frequencies of democratization and war in the system. Employing vector auto regression analysis, they find that these variables do indeed influence one another, but the strengths of their effects change across time and space. Rasler and Thompson (2000) argue both that states perceiving high external threats will be less democratic, and that democracies are less likely to have MIDs with one another. Focusing on nine major powers from 1816 to 1992, they estimate two equations separately. In one equation, the monadic level of democracy is regressed on the change in democracy, the level of external threat, the change in the level of external threat, a dummy variable measuring war participation, and the lagged level of democracy. In a second equation, a dyadic MID dummy variable is regressed on a joint democracy dummy, and the level of external threat. They conclude that a high level of external threat reduces democracy, and that democratic dyads are less likely to experience MIDs. None of these studies, however, has employed a simultaneous equations model.

To our knowledge, James et al. (1999) were the first to study the simultaneous relationship between joint democracy and dyadic conflict. They estimated the following structural equations model:

\[
\text{HOSTILITY} = F(\text{REGIME}, \text{GROWTH}, \text{PROXIMITY}, \text{ALLY})
\]

\[
\text{REGIME} = G(\text{HOSTILITY}, \text{GROWTH}, \text{STABILITY})
\]

14 Mousseau and Shi (1999) suggest a similar typology involving war’s anterior, concurrent, and posterior effects.
where HOSTILITY is the highest level of dyadic hostility in a year, coded as:
0 = no dispute, 1 = threat of force, 2 = display of force, 3 = use of force, 4 = war.

REGIME \[\frac{(r_H + r_L)}{(r_H - r_L + 1)}\] is a measure of joint democracy from Maoz and Russett (1993), where \(r_H\) and \(r_L\) are the higher and lower regime scores in a dyad, respectively; \(r = c(d - a)\) is the regime index of a country; ‘a’ measures autocracy; ‘d’ measures democracy; and ‘c’ measures concentration of power. GROWTH = \(\frac{\text{GROWTH}_A + \text{GROWTH}_B}{2}\), where \(\text{GROWTH}_A\) and \(\text{GROWTH}_B\) are the economic growth rates of countries A and B in dyad AB over three years, respectively. PROXIMITY = 1 if countries A and B are contiguous or if they can project force beyond their contiguous neighbors (i.e., US, UK, France, PRC, and USSR), and set to 0 otherwise. ALLY = 1 if A and B are allies, and set to 0 otherwise. STABILITY = \(\frac{(L_H + L_L)}{(L_H - L_L + 1)}\) is a measure of joint regime stability within a dyad, where \(L_H\) and \(L_L\) are the higher and lower regime longevity scores in a dyad, respectively.

In their estimation, James et al. (1999) ignore the simultaneity for Equation (I), estimating it as a single-equation model. Equation (II) is estimated from a two-stage procedure, taking into account the simultaneity of REGIME and HOSTILITY. The authors find that the effect of joint democracy on the probability of MIDs is generally not significant. The hypothesis that peace induces democracy receives stronger support.

Oneal and Russett (2000) criticize the study of James et al. (1999) on several grounds. First, they criticize James et al.’s use of a dated measure of joint democracy. Second, they argue that the multinomial approach to HOSTILITY is destined not to find significant effects for democracy on conflict since MIDs are rare events—within the five categories of MIDs representing even rarer events. Third, Equation (I) omits the capability ratio of the two countries in the dyad. Oneal and Russett obtained different results for Equation (II) than those of James et al. when this variable was included in Equation (I). Fourth, Equation (II) omits variables routinely used in the comparative politics literature on the determinants of democracy, such as GDP per capita, inflation, or economic growth (Gasiorowski, 1995). Fifth, Equation (II) assumes that dyadic conflict affects joint democracy. However, being a monadic quality, democracy ought to be affected by all the conflicts a country engages in, not only by dyadic conflict.

James et al. (2000) reply that it is not clear why one empirical measure of joint democracy is superior to others and that the results of Oneal and Russett are sensitive to the measure used. Second, they argue that the aggregation of all MID types into one measure can introduce a bias. Diplomatic protest, for example, is a different action from war. Third, they claim that capability ratio ought to be considered an endogenous variable, not an exogenous variable, as Oneal and Russett assume. Moreover, including capability ratio in the equation of HOSTILITY still produces a weak effect for REGIME on HOSTILITY. Fourth, the sensitivity of the results from Equation (II) to the inclusion of a capability ratio in Equation (I) could reflect the sensitivity of the model to the practice of aggregating temporally. In the end, James et al. argue that while their model is not meant to be the last word on the issue of conflict and democracy simultaneity, studies ignoring this issue cannot offer reliable guides for public policy.

Conceptual Model

We need to specify two types of equations, one for dyadic conflict and a second for democracy. The level of democracy of a country is a monadic attribute. Dyadic conflict, obviously, is a dyadic attribute. In the democratic peace literature, dyadic conflict is assumed to decline with joint democracy. In our conceptual framework, joint democracy and dyadic conflict depend on each other. But democracy does not only depend on dyadic conflict. It also depends on various monadic attributes,
including the conflict a country has with other third-party countries. These attributes are included in our model.

Our measure of joint democracy is based on the weak link assumption (Dixon, 1994). In this approach, joint democracy is given by the lower democracy score among two countries in a dyad. This assumption formalizes the expectation that the likelihood of a dyadic militarized dispute depends on the regime score of the politically less constrained dyad member (i.e., the country that is less democratic). The weak link assumption is employed by many statistical studies, including Dixon (1994), Oneal and Russett (1997), and Russett, Oneal, and Davis (1998).

Some studies also use the higher democracy score in a dyad as an independent variable in their single-equation model of MIDs. In fact, one would expect that the democracy scores of both countries in a dyad would interact with conflict. After all, it takes two states to engage in dyadic conflict. Therefore, if democracy affects conflict, each of the democracy scores in the dyad should affect its likelihood. Consequently, we also include the higher democracy score in the dyad in our analysis, treating it as a third endogenous variable. As suggested by Oneal and Russett (1997) and Russett et al. (1998), holding the other regime score in a dyad constant, the higher democracy score in a dyad can be interpreted as representing the regime dissimilarity between the two countries. These authors and others expect that conflict will decline with the lower democracy score in a dyad and rise with the higher democracy score in a dyad.

We present the conceptual model using the following notations. \(\text{DEML}_A\) is the lower democracy score in dyad AB, where A and B are the dyad-member countries. \(\text{DEMH}_A\) is the higher democracy score in dyad AB. \(\text{MID}_{ABU}\) is the propensity of dyad AB to engage in a militarized dispute—a variable that is unobserved. In the empirical test, the unobserved \(\text{MID}_{ABU}\) variable is replaced by its realization \(\text{MID}_{AB}\), which is the presence or absence of a MID in dyad AB (see Section 7).\(^{15}\) \(F\) denotes a functional dependency. \(\text{MA}\) is a vector of monadic attributes affecting the democracy of A (\(\text{DEMA}\)). \(\text{MB}\) is a similarly defined vector for B (\(\text{DEMB}\)).

Our measure of joint democracy (\(\text{DEML}\)) is defined by the lower democracy score between \(\text{DEMA}\) and \(\text{DEMB}\). \(\text{DEMA}\) is a function of three components: \(\text{MA}\), \(\text{MID}_{ABU}\), and \(\text{MID}_{AJU}\). Similarly, \(\text{DEMB}\) is a function of \(\text{MB}\), \(\text{MID}_{ABU}\), and \(\text{MID}_{BJU}\). The elements of the vectors \(\text{MA}\) and \(\text{MB}\) are based on the literature on the determinants of democracy in comparative politics, to be discussed later. The democracy score of country A is affected by any conflict that country A conducts with any country in its politically relevant international environment (PRIE), and not only by conflict with country B. The PRIE of country A includes all the countries that share a border with A, as well as the countries that are classified as major powers (Maoz, 2001a). We divide the PRIE of country A into two parts: country B and other third-party countries (denoted as \(J\), where \(J \neq B\)). The propensity of conflict between A and B has already been denoted as \(\text{MID}_{ABU}\). The unobserved aggregated propensity for conflict that country A has with all third-party countries \(J\) in its PRIE is denoted as \(\text{MID}_{AJU}\). Hence, in notation:

\[
\text{DEMA} = F(\text{MA}, \text{MID}_{ABU}, \text{MID}_{AJU})
\]

\[
\text{DEMB} = F(\text{MB}, \text{MID}_{ABU}, \text{MID}_{BJU})
\]

Combining the definition of \(\text{DEML}\) and Equation (1), we get:

\[
\text{DEML} = F(\text{MB}, \text{MID}_{ABU}, \text{MID}_{BJU}) \text{ if } \text{DEMA} > \text{DEMB};
\]

\[
\text{DEML} = F(\text{MA}, \text{MID}_{ABU}, \text{MID}_{AJU}) \text{ if } \text{DEMA} < \text{DEMB}.
\]

\(^{15}\) Another possibility is to replace \(\text{MID}_{ABU}\) by a multinomial representation, classifying several types of MIDs, as in James et al. (1999). We do not employ this method here because the estimation of simultaneous equations models involving continuous and multinomial variables is not well developed in the literature, and because we wish to compare our results to the bulk of the democratic peace literature, which employs the 1,0 notion of MIDs.
Similar to $\text{DEM}_L$, the derivation of $\text{DEM}_H$ is given by:

$$
\begin{align*}
\text{DEM}_H &= F(M_A, \text{MID}_{ABU}, \text{MID}_{AU}) \quad \text{if } \text{DEM}_A > \text{DEM}_B; \\
\text{DEM}_H &= F(M_B, \text{MID}_{ABU}, \text{MID}_{BU}) \quad \text{if } \text{DEM}_A < \text{DEM}_B .
\end{align*}
$$

(3)

Moving to the equation of dyadic conflict, $\text{MID}_{ABU}$ depends on the democracy scores of both countries in the dyad. Hence,

$$
\text{MID}_{ABU} = F(X_{AB}, \text{DEM}_L, \text{DEM}_H),
$$

(4)

where $X_{AB}$ is a vector of dyadic attributes that affect the likelihood of dyadic MID. The variables included in $X_{AB}$ are widely employed by studies within the conflict peace literature. As noted, the democratic peace literature expects that a rise in $\text{DEM}_L$ reduces $\text{MID}_{ABU}$, and that a rise in $\text{DEM}_H$ raises $\text{MID}_{ABU}$.

The full simultaneous equations model to be estimated is given by Equations (5)–(7):

$$
\begin{align*}
\text{DEM}_L &= F(M_L, \text{MID}_{ABU}, \text{MID}_{LRU}) \\
\text{DEM}_H &= F(M_H, \text{MID}_{ABU}, \text{MID}_{HRU}) \\
\text{MID}_{ABU} &= F(X_{AB}, \text{DEM}_L, \text{DEM}_H)
\end{align*}
$$

(5–7)

In Equations (5)–(7), $M_L$ is a vector that holds the monadic attributes explaining the level of democracy for country $\text{DEM}_L$. $M_H$ is the vector that holds the attributes that explain the level of democracy for country $\text{DEM}_H$. $\text{MID}_{LRU}$ is the (unobserved) propensity for militarized disputes in the PRIE of country $\text{DEM}_L$. $\text{MID}_{HRU}$ is a similar variable defined for country $\text{DEM}_H$. To estimate Equations (5)–(7), the data set needs to be constructed according to the logic in Equations (2)–(4). Additionally, all the unobserved propensities for conflict need to be replaced by observed conflict variables.

**Data, Measures, and Expected Signs**

Our empirical analysis is based upon yearly data for the sample of politically relevant dyads from 1950 to 1992. The model includes endogenous and exogenous (control) variables. The endogenous variables appear both as dependent and as independent variables (in different equations). The exogenous variables only appear as independent variables. To facilitate the presentation, we summarize the expected signs of effects in Table 1.

**Endogenous Variables**

The endogenous variables are the unobserved propensity for conflict in dyad AB, $\text{MID}_{ABU}$, the lower level of democracy in dyad AB, $\text{DEM}_L$, and the higher level of democracy in dyad AB, $\text{DEM}_H$. $\text{DEM}_L$ represents the joint level of democracy within dyad AB, while $\text{DEM}_H$ represents the extent of regime dissimilarity within the dyad. As noted, we expect that $\text{DEM}_L$ affects $\text{MID}_{ABU}$ negatively and $\text{DEM}_H$ affects $\text{MID}_{ABU}$ positively. The effect of $\text{MID}_{ABU}$ on $\text{DEM}_L$ and $\text{DEM}_H$ could be negative or positive.

In the empirical test, as usual, the unobserved $\text{MID}_{ABU}$ is replaced by an observed dichotomous variable, $\text{MID}_{AB}$. This variable is coded as 1 or 0, where 1 denotes the involvement of countries A and B in a dyadic militarized dispute, and 0 denotes no involvement in the dispute. Hence, when a dyadic militarized dispute

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16 The subscript LRU (HRU) denotes the propensity of the Low (High) democracy country in a dyad to engage in conflicts with third parties in its politically relevant international environment, a variable that is unobserved.

17 MIDs are coded for each country from the highest hostility level, ranging from threat of force [2], display of force [3], use of military force [4], or war [5]. The monadic data are converted to a dyadic data set by Zeev Maoz (2001b).
is observed (MIDAB = 1), we assume that the dyad has a propensity to engage in it, and vice versa, so that MIDAB = 1 when MIDABU > [z], and MIDAB = 0 when MIDABU ≤ [z], where [z] is a constant indicating the threshold of military conflict.

Each country’s democracy score is given by the difference between its democracy (DEMOC) and autocracy (AUTOC) scales from the Polity 98 data (Jaggers and Gurr, 1995; Gurr and Jaggers, 1999). These data register attributes for many countries on an annual basis from 1800 to 1998. The 10-point democracy index (DEMOC) measures the democratic characteristics of the regime. The 10-point autocracy index (AUTOC) measures the autocratic characteristics of the regime. Hence, the democracy score ranges from −10 (most autocratic) to 10 (most democratic). DEML and DEMH are then generated as the lower and higher democracy scores between the two countries in a dyad, respectively.

Table 1. Expectation of Direction of Effects in the Simultaneous Equations

<table>
<thead>
<tr>
<th>DEML Equation</th>
<th>Sign</th>
<th>DEMH Equation</th>
<th>Sign</th>
<th>MIDAB Equation</th>
<th>Sign</th>
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</thead>
<tbody>
<tr>
<td>Exogenous</td>
<td></td>
<td>Exogenous</td>
<td></td>
<td>Exogenous</td>
<td></td>
</tr>
<tr>
<td>MIDAB</td>
<td>+, −</td>
<td>MIDAB</td>
<td>+, −</td>
<td>DemL</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DemH</td>
<td>+</td>
</tr>
<tr>
<td>Prior DemocracyL</td>
<td>+</td>
<td>Prior DemocracyH</td>
<td>+</td>
<td>Contiguity</td>
<td>+</td>
</tr>
<tr>
<td>Year</td>
<td>+</td>
<td>Year</td>
<td>+</td>
<td>Alliance</td>
<td>−</td>
</tr>
<tr>
<td>InflationL</td>
<td>+, −</td>
<td>InflationH</td>
<td>+, −</td>
<td>Capability Ratio</td>
<td>−</td>
</tr>
<tr>
<td>InflationYear</td>
<td>+, −</td>
<td>InflationYear</td>
<td>+, −</td>
<td>Trade Dependence</td>
<td>−</td>
</tr>
<tr>
<td>GDP PCIL</td>
<td>+</td>
<td>GDP PCIH</td>
<td>+</td>
<td>Growth</td>
<td>−</td>
</tr>
<tr>
<td>GDP PCITYear</td>
<td>+, −</td>
<td>GDP PCITYear</td>
<td>+, −</td>
<td>Affinity</td>
<td>−</td>
</tr>
<tr>
<td>GrowthL</td>
<td>+, −</td>
<td>GrowthH</td>
<td>+, −</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TradeL</td>
<td>+, −</td>
<td>TradeH</td>
<td>+, −</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DiffusionL</td>
<td>+</td>
<td>DiffusionH</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third-Party MIDL</td>
<td>+, −</td>
<td>Third-Party MIDH</td>
<td>+, −</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

is observed (MIDAB = 1), we assume that the dyad has a propensity to engage in it, and vice versa, so that MIDAB = 1 when MIDABU > [z], and MIDAB = 0 when MIDABU ≤ [z], where [z] is a constant indicating the threshold of military conflict.

Each country’s democracy score is given by the difference between its democracy (DEMOC) and autocracy (AUTOC) scales from the Polity 98 data (Jaggers and Gurr, 1995; Gurr and Jaggers, 1999). These data register attributes for many countries on an annual basis from 1800 to 1998. The 10-point democracy index (DEMOC) measures the democratic characteristics of the regime. The 10-point autocracy index (AUTOC) measures the autocratic characteristics of the regime. Hence, the democracy score ranges from −10 (most autocratic) to 10 (most democratic). DEML and DEMH are then generated as the lower and higher democracy scores between the two countries in a dyad, respectively.

The Joint Democracy–Dyadic Conflict Nexus

Exogenous Variables in the Political Regime Equations

The elements of the vectors MA and MB are specified following the monadic literature on the determinants of democracy within comparative politics. GDPPCIL and GDPPCH are the logged real GDP per capita values for the low-democracy and the high-democracy countries in the dyad, respectively. These data are taken from the Penn World Tables 5.6. Many studies use GDP per capita as an indicator of economic development (e.g., Rueschemeyer, 1991; Diamond, 1992; Gasiorowski, 1995; Przeworski and Limongi, 1997). We expect the effects of GDPPCIL and GDPPCH on DEML and DEMH, respectively, to be positive, which is in line with the modernization theory—that economic development breeds democracy.

GROWTHL and GROWTHH are the yearly growth rates of real GDP, computed using data from the Penn World Tables 5.6, for the low-democracy and the high-democracy countries in a dyad, respectively. The democracy literature registers conflicting expectations regarding the effect of economic growth on democracy.

18 Mansfield and Snyder (1995), Londregan and Poole (1996), Oneal and Russett (1997, 1999a), and others also use this method to generate their democracy scores.
Some studies argue the effect is negative, while other studies argue the effect is positive (Gasiorowski, 1995).

INFLATION_L and INFLATION_H are the yearly inflation rates, based on the consumer price index, for the low-democracy and the high-democracy countries in a dyad, respectively. Several studies use inflation as a proxy for economic crisis, but its effect on democracy is debated (Gasiorowski, 1995; Drake, 1998; Huntington, 1991; Haggard and Kaufman, 1995). Data are taken from the International Financial Statistics CD-Rom (2000).

TRADE_L and TRADE_H are the trade openness ratios for the low-democracy and the high-democracy countries in a dyad, respectively. As is customary, trade openness is calculated as the sum of the values of imports and exports of a country divided by its GDP. Data are taken from the Penn World Table 5.6. As discussed in Gasiorowski (1995) and Li and Reuveny (2003), the effect of trade openness on democracy could be positive or negative.

YEAR tests whether democracy has a linear trend (Gasiorowski, 1995; Li and Reuveny, 2003). It is expected that this variable will have a positive effect upon democracy levels, capturing the observed tendency toward increasing levels of democracy during the sample period. In addition, the effects of inflation and economic development on democracy may change over time (Gasiorowski, 1995; Li and Reuveny, 2003). To capture this possibility, we include interaction terms between year and inflation, and year and GDP per capita, in the equations for DEM_L and DEM_H, respectively (Judge et al., 1988; Griffiths, Hill, and Judge, 1993).

Domestic structural variables such as Protestant population, institutional qualities of the regime, party fragmentation, as well as attributes of the international system, also may affect democracy. These factors are relatively stable over time, implying that democracy should exhibit inertia. With this in mind, we include the lagged levels of democracy for DEM_L and DEM_H, respectively, as independent variables. As argued by Burkhart and Lewis-Beck (1994), the inclusion of the lagged dependent variables also helps to capture the effects of variables omitted from the model. Accordingly, PRIOR DEMOCRACY_L and PRIOR DEMOCRACY_H are the prior democracy values for the low-democracy and the high-democracy countries in a dyad, respectively. These variables are expected to affect DEM_L and DEM_H positively.

DIFFUSION_L and DIFFUSION_H denote the average of democracy scores of the countries in the PRIE of the low-democracy country and the high-democracy country in a dyad, respectively. These variables capture the diffusion of democratic norms due to contact-based mechanisms such as economic relations and communication networks (Starr, 1991; Gasiorowski, 1995) and influence by major powers (Drake, 1998; Maoz, 2001a). These data are taken from Maoz (2001a). We expect the effect of diffusion on DEM_L and DEM_H to be positive.

THIRD-PARTY MID_L and THIRD-PARTY MID_H are dichotomous variables, each taking the value of 1 or 0. The value of 1 denotes a situation in which the low- or the high-democracy country in a dyad, respectively, is involved in conflict with at least one third-party country in its respective PRIE (Maoz, 2001a). These variables capture the notion that the democracy level of country A, for example, may be affected by its conflict with any third-party country, and not just by its conflict with country B. Drawing from Hypothesis 2, we expect that the sign of third-party conflict on democracy could be positive or negative.21

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19 This strategy also is used in Bollen (1979), Burkhart and Lewis-Beck (1994), Muller and Seligson (1994), Muller (1995), and Li and Reuveny (2003).

20 We thank Zeev Maoz for providing us with these data.

21 The third-party dummy variable has been coded based on Zeev Maoz’s data on third-party conflict in the PRIE of each country in a dyad.
The specification of the control variables in the MID equation follows the common approach of dyadic studies of democratic peace. Unless otherwise specified, we use data from Oneal and Russett (1999a). CONTIGUITY is a dichotomous variable, taking the value of 1 when the two states in a dyad are geographically contiguous (or are separated by up to 150 miles of water), and 0 otherwise. It is expected that contiguous states are more likely to experience conflict with one another.

ALLIANCE is a dichotomous variable that equals 1 when both states within a dyad are members in a common military alliance, and 0 otherwise. Alliance partners are expected to be less likely to experience conflict with one another.

CAPABILITY RATIO is the natural logarithm of the ratio of the more capable state’s composite national capabilities score to that of the less capable state in the dyad. For each country, this score rises as a state commands a larger resource base, comprising total population, urban population, energy consumption, iron and steel production, military manpower, and military expenditures. Dyads with an imbalance in capabilities are expected to be less likely to experience conflict with one another.

TRADE DEPENDENCE measures dyadic trade interdependence. Each state in a dyad has a bilateral-trade-over-GDP ratio, representing the relative importance of trade with a dyadic partner. Following Oneal and Russett, we use the lower of the two trade dependence variables to denote a common threshold level of dyadic trade dependence. Many studies in the literature expect that higher levels of dyadic TRADE DEPENDENCE reduce conflict involvement, but the issue is debated.

GROWTH is the lower of the two economic growth rates in a dyad, computed from the rate of change in the real GDP per capita for each state. The growth rates are obtained by using moving averages over a three-year period (or one- or two-year periods when required values are missing). The literature offers conflicting expectations about the direction of this variable’s effect. This variable is computed using data from Penn World Tables 5.6.

AFFINITY measures the level of preference similarity between two states in a dyad. This variable is based upon the similarity of their voting behavior in the United Nations General Assembly. Data are taken from Gartzke (1998). Several scholars debate whether it is AFFINITY or joint democracy that causes peace in a dyad. Gartzke (1998) argues that preference similarity accounts for the hypothesized effect of democratic peace, reporting that AFFINITY is statistically significant while joint democracy is not. In contrast, Oneal and Russett (1999b) argue that joint democracy indirectly contributes to preference similarity. Gartzke (2000) rejects this possibility.

Finally, the relationship between some of our exogenous and endogenous variables may be simultaneous. While this possibility applies to virtually all studies in the literature, we nevertheless believe we ought to address it. Of course, we cannot model all of the potential simultaneous effects between our variables, as our model is already quite complicated. To deal with the issue of simultaneity, we lag each of our exogenous variables by a single year (see, e.g., Muller and Seligson, 1994; Li and Reuveny, 2003).

**Estimation**

Our model includes equations for two observed continuous endogenous variables (DEML and DEMH) and one unobserved continuous endogenous variable (MIDABU). As noted, in such cases scholars replace the unobserved variable with an observed variable. Heckman (1978) considers the estimation of a simultaneous equations model in which an unobserved endogenous variable is replaced by an observed dichotomous variable. He states a consistency requirement for this case. If
this condition is not fulfilled, the estimation is not meaningful because the structural equations are not consistent with one another (Amemiya, 1978). In our case, the Heckman condition holds and we can proceed to the estimation.\(^{22}\)

We estimate our model using a variant of the two-stage least squares method suggested by Maddala (1983) and pooling the politically relevant dyad from 1950 to 1992.\(^{23}\) In the first stage, each endogenous variable is regressed on all the exogenous variables in the model. The \(MID_{AB}\) equation is estimated using probit, and the equations of \(DEM_L\) and \(DEM_H\) are estimated using OLS. In the second stage, the endogenous variables on the right-hand side of each equation are replaced by their predicted values from the first stage, respectively.\(^{24}\) Following the suggestions of Guilkey, Mroz, and Taylor (1992), Bollen, Guilkey, and Mroz (1995), and Alvarez (1997), we use the standard errors computed in the second stage of the procedure to test our hypotheses.\(^{25}\)

Finally, we need to consider the potential existence of heteroskedasticity and serial correlation in the model’s error terms.\(^{26}\) In the presence of heteroskedasticity and serial correlation, a model’s estimated coefficients are consistent, but their standard errors are inefficient and could be biased. To correct for these potential problems, we estimate our model using a variant of the White (1980) estimator of robust standard errors that adjusts for clustering over dyads. This estimator yields consistent estimation of the covariance matrix under very general conditions of heteroskedasticity and serial correlation (Wiggins, 1999). As Beck and Katz (1995a, 1995b) suggest, our inclusion of the lagged endogenous variables in the political regime equations also helps to deal with the potential problem of serial correlation.

### Results

Tables 2–4 present the empirical results. Each table includes two models. Model 1 does not include AFFINITY, whereas Model 2 does. The sample sizes for Models 1 and 2 are 11,644 and 11,022 observations, respectively. These samples are somewhat smaller than the samples used in some single-equation–based studies of

\(^{22}\) Heckman considers a model with two equations, one for the observed variable, and the other for the unobserved. The dichotomous realization of the unobserved variable is an independent variable in each equation. The coefficient of the endogenous variable in the equation of the unobserved variable is \(g_2\). The coefficients of the dichotomous variable (linked to the unobserved variable) are \(d_1\) and \(d_2\) in each equation, respectively. Heckman’s condition requires \(d_2 = g_2 d_1\). In our case, Heckman’s condition holds since the coefficients of \(MID_{AB}\) in all equations are zero. That is, the \(DEM_L\), \(DEM_H\), and \(MID_{AB}\) equations do not include \(MID_{AB}\) as an independent variable. In addition, \(g_2 \neq 0\) in our case, because the coefficients of \(DEM_L\) and \(DEM_H\) in the \(MID_{AB}\) equation are not zero.

\(^{23}\) As in other studies, we do not deal with the time series dynamics of democracy and conflict. In other words, our analysis is cross-sectional in spirit. Dealing with issues of dynamics would require time series techniques, which are still not well understood in the context of MIDs. We defer this issue to future research. We thank a reviewer for raising this issue.

\(^{24}\) In the MID equation, the linear predictor is used—not the predicted probability.

\(^{25}\) Maddala (1983) develops a two-stage least squares estimator for a case with one dichotomous and one continuous endogenous variable, assuming the error terms are white noise. He employs the coefficients from the second stage, as we do, but he applies a correction for their standard errors. Our model consists of one dichotomous and two continuous endogenous variables and we do not assume that the error terms are necessarily white noise. We do not use Maddala’s correction because, to the best of our knowledge, the literature has not extended it either to a model with more than two equations, or to a case with possible nonspherical errors. To assess the sensitivity of our results to Maddala’s method, we will estimate a sub-model with two endogenous variables (\(MID_{AB}\) and \(DEM_L\)) in two ways: one with the Maddala correction and the other with robust standard errors (that can control for potential nonspherical errors).

\(^{26}\) One reviewer suggests we examine the correlation structure of the error terms in the equations. To the best of our knowledge, so far the literature has not developed a diagnostic test that is appropriate for our case. Developing such a test is difficult for at least two reasons. First, one of the equations in our model has a dichotomous endogenous variable in a time series cross-sectional design. Second, we have a structural equations model with one dichotomous and two continuous endogenous variables. Conventional tests such as Durbin-Watson are not designed to diagnose such models. Hence, future research in this area is called for.
MIDs. This is due to the fact that our model includes more variables than does the typical single-equation design and the data on some of these variables are missing for periods of time. While this places a potential limitation upon our empirical analysis, we believe that our results are applicable to other samples, as our theoretical argument is not sample dependent and our sample is nevertheless large.

First, we begin with general observations on the performance of our model; the results support our expectation that the relationship between dyadic conflict and democracy is reciprocal. The model’s goodness of fit is high. The adjusted R square for the democracy equations is 0.94 or 0.95, the X² test in the MID equation is statistically significant, and the effects of dyadic conflict and democracy on each other are statistically significant. Hence, these results support our argument that models that ignore the simultaneity of conflict and democracy may well be missing something important on this structural relationship. Second, the results for the control variables in the model are generally consistent with our expectations. The results from Model 1 also remain robust when the AFFINITY variable is included in Model 2. Next, we discuss the results for each equation. We focus on Model 1 because the results from Model 2 (with AFFINITY) are similar to those from Model 1.27

**DEML and DEMH Equations**

Table 2 presents the results for the DEML equation. In column 1, the effect of MIDAB on DEML is shown to be statistically significant and negative. Hence, dyadic conflict reduces the lower level of democracy in a dyad.

Turning to the control variables, the effect of PRIOR DEMOCRACYL on DEML is significant and positive, demonstrating the importance of democratic inertia. The effect of YEAR is significant and positive, reflecting the tendency of democracy level to increase over time in our sample. The effect of DIFFUSIONL is positive: as the level of democracy in the less democratic country’s PRIE rises, so does its own democracy level.

The effect of INFLATIONL on DEML is significant and negative, and its interaction with YEAR is significant and positive. Hence, a rise in inflation level reduces a country’s level of democracy. This effect is not stable over time, however, as also reported in Gasiorowski (1995) and Li and Reuveny (2003). The effect of GDP per capita on DEML is significant and positive, while its interaction term with YEAR is significant and negative. This replicates a known result in the literature: namely, that democracy rises with economic development. We also find, however, that this effect declines over time.

The literature offers contradicting expectations regarding the effect of economic growth on democracy. We find that this effect is significant and negative. As in Li and Reuveny (2003) and Gasiorowski (1995), we also find that greater trade openness reduces the lower democracy score in a dyad. One interpretation is that trade widens the social cleavages between winners and losers, thus reducing democracy.

Table 3 presents the results for the DEMH equation. The effect of MIDAB on DEMH is negative and significant, or dyadic conflict reduces the higher level of democracy in a dyad. As expected, the results for the control variables in Table 3 are generally consistent with those in Table 2, adding justification to our modeling approach. The only exceptions are that the effects of INFLATION, GROWTH, and

---

27 As noted, to assess the sensitivity of our results to the Maddala correction of standard errors, we estimate a model with two endogenous variables (MIDAB and DEML) in two ways: using Maddala correction and using robust standard errors. We thank Omar Keshk for providing us with the Maddala stat program. See Keshk (2002). The results from these tests are very similar, which is consistent with the findings from Monte Carlo simulations reported by Guilkey, Mroz, and Taylor (1992) and Alvarez (1997). They find that the Maddala correction has little effect on statistical inferences. We therefore expect that had a Maddala correction been available and applied to our three equation set-up, it would not have changed the inferences reported here.
TRADE on DEMH, while having the same signs as in the DEML equation, are no longer significant. This is not surprising as the high-democracy countries in a sample of politically relevant dyads tend to be developed countries, for which the levels of democracy tend to be high and stable. On the other hand, the low-democracy countries are typically less developed, exhibiting larger changes in democracy over time.

In our sample, most of the militarized interstate disputes are purely dyadic. From this fact, we ought to expect that democracy levels would mostly be affected by the variable MIDAB. However, despite their relative rarity third-party disputes also could affect democracy. We find that the effects of THIRD-PARTY MID on DEMH and (less so) on DEML is positive and statistically significant. We can explain this empirical result by noting that the DEMH countries in a sample of politically relevant dyads tend to be countries such as the U.S., the U.K., France, Israel, and West Germany. Between 1950 and 1992 these countries were at times involved in multiple militarized disputes—a fact that has manifested itself in the positive correlation between DEMH and THIRD-PARTY MID. The DEML countries in the sample are typically less developed and tend to be involved in fewer MIDs with third parties. This also is demonstrated by a positive correlation between DEML and THIRD-PARTY MID.28

### Table 2. Results from the Equation of DEML

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior DemocracyL</td>
<td>0.9364***</td>
<td>0.9346***</td>
</tr>
<tr>
<td></td>
<td>(0.0053)</td>
<td>(0.0056)</td>
</tr>
<tr>
<td>Year</td>
<td>0.0619***</td>
<td>0.0615***</td>
</tr>
<tr>
<td></td>
<td>(0.0125)</td>
<td>(0.0131)</td>
</tr>
<tr>
<td>InflationL</td>
<td>-0.0385**</td>
<td>-0.0388**</td>
</tr>
<tr>
<td></td>
<td>(0.0150)</td>
<td>(0.0150)</td>
</tr>
<tr>
<td>InflationL*Year</td>
<td>0.00002**</td>
<td>0.00002**</td>
</tr>
<tr>
<td></td>
<td>(7.5206)</td>
<td>(7.5606)</td>
</tr>
<tr>
<td>GDP PC$_L$</td>
<td>13.4305***</td>
<td>13.1769***</td>
</tr>
<tr>
<td></td>
<td>(2.9239)</td>
<td>(3.0734)</td>
</tr>
<tr>
<td>GDP PC$_L$*Year</td>
<td>-0.0066***</td>
<td>-0.0065***</td>
</tr>
<tr>
<td></td>
<td>(0.0015)</td>
<td>(0.0016)</td>
</tr>
<tr>
<td>GrowthL</td>
<td>-0.0071**</td>
<td>-0.0066**</td>
</tr>
<tr>
<td></td>
<td>(0.0032)</td>
<td>(0.0033)</td>
</tr>
<tr>
<td>TradeL</td>
<td>-0.4276***</td>
<td>-0.4638***</td>
</tr>
<tr>
<td></td>
<td>(0.0844)</td>
<td>(0.0866)</td>
</tr>
<tr>
<td>DiffusionL</td>
<td>0.0091***</td>
<td>0.0096***</td>
</tr>
<tr>
<td></td>
<td>(0.0011)</td>
<td>(0.0012)</td>
</tr>
<tr>
<td>Third-Party MID$_L$</td>
<td>0.0845</td>
<td>0.0968*</td>
</tr>
<tr>
<td></td>
<td>(0.0535)</td>
<td>(0.0557)</td>
</tr>
<tr>
<td>MID$_{AB}$</td>
<td>-0.1597***</td>
<td>-0.1742***</td>
</tr>
<tr>
<td></td>
<td>(0.0418)</td>
<td>(0.0434)</td>
</tr>
<tr>
<td>Constant</td>
<td>-124.9735***</td>
<td>-124.3320***</td>
</tr>
<tr>
<td></td>
<td>(24.7767)</td>
<td>(25.9593)</td>
</tr>
<tr>
<td>N</td>
<td>11644</td>
<td>11022</td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>0.95</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses. Two-tail test: *significant at 10%; **significant at 5%; ***significant at 1%.

28 Bivariate correlation analysis also reveals that the correlations between DEM$_L$ and THIRD-PARTY MID, and between DEM$_H$ and THIRD-PARTY MID, are positive and significant. The correlations between THIRD-PARTY MID and DEM$_L$, and THIRD-PARTY MID and DEM$_H$ are 0.049 and 0.136, respectively, both of which are significant at 5%.
Table 4 presents the results for the MIDAB equation. Across the two models reported, the effect of DEML on the likelihood of MIDAB is statistically significant and negative. Hence, democratic countries are less likely to engage in MIDs against each other. This result agrees with those reported by many single-equation studies in support of the democratic peace. The effect of DEMH on MIDAB is not significant. Russett et al. (1998) and Oneal and Russett (1997) argue that DEMH is an important part of the link between political regimes and conflict. For example, interpreting DEMH as political distance, Russett et al. (1998:457) argue that “greater political distance makes a dyad more prone to conflict.” This statement is not supported here, however. We believe the difference can be attributed to the fact that we model DEMH-conflict simultaneity, whereas Oneal and Russett (1997) and Russett et al. (1998) do not.

Turning to the control variables, the effect of contiguity on the likelihood of MIDs is statistically significant and positive, as one would expect from the extant literature. The effect of GROWTH on MIDAB is statistically significant and negative, which also is consistent with prior results. The effects of ALLIANCE, CAPABILITY RATIO, and TRADE DEPENDENCE, however, are not statistically significant in our results, though they have the same sign as in comparable single-equation studies. We attribute these differences to the fact that our model accounts for the simultaneity of conflict and democracy, whereas previous studies have not.

Turning to AFFINITY, our results shed light on a recent debate in the single-equation MID literature. As noted, Gartzke (1998, 2000) argues that the democratic peace is driven by dyadic preference similarity. In his studies, when AFFINITY is
included in the model, the effect of joint democracy on the likelihood of MID is not statistically significant. Oneal and Russett criticize Gartzke’s approach and reject his findings. Our model facilitates a more accurate assessment of this debate by modeling the reciprocal relationship between joint democracy and dyadic conflict. In Model 2, we find that the effect of AFFINITY on the likelihood of dyadic MID involvement is negative but not statistically significant. On the other hand, the effect of joint democracy on the likelihood of MID involvement is negative and significant. Our results thus support the position of Oneal and Russett in this debate. However, it is worth noting that AFFINITY based on UN voting patterns may be a weak proxy for dyadic preference similarity. Hence, the question of whether preference similarity affects dyadic MID involvement would benefit from the development of better measures of this concept in future research.

Table 5 illustrates the size of the effects in the MID equation by computing the probabilities of MID for contiguous and noncontiguous politically relevant dyads. Scenario 1 sets all the continuous variables at their mean values, contiguity at 1 (contiguous countries), and alliance at zero (nonallied countries). Scenario 2 repeats the experiment but sets contiguity at 0 (noncontiguous countries). In Scenario 1, the baseline probability of dyadic MID involvement is 5.46%. When DEM_L rises by 1 standard deviation (6.48 units), the probability of MID drops by 1.44% to 4.02%. A similar experiment in Oneal and Russett (1997) resulted in a drop of 2.1% (from 7.8% to 5.7%). Compared with Oneal and Russett, we observe a smaller absolute effect of joint democracy on the likelihood of dyadic MIDs. One also can compute this effect relative to that of the base value. Such calculation results in a decline of 26.3% in the probability of MIDs, which is slightly smaller than that demonstrated by Oneal and Russett (26.9%).

In Scenario 2 (noncontiguous countries), the substantive effect of joint democracy on dyadic MID involvement is smaller by an order of magnitude.

Table 4. Results from the Equation of MID

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contiguity</td>
<td>0.7829***</td>
<td>0.8041***</td>
</tr>
<tr>
<td></td>
<td>(0.1375)</td>
<td>(0.1346)</td>
</tr>
<tr>
<td>Alliance</td>
<td>−0.0907</td>
<td>−0.0543</td>
</tr>
<tr>
<td></td>
<td>(0.1388)</td>
<td>(0.1377)</td>
</tr>
<tr>
<td>Capability Ratio</td>
<td>−0.0285</td>
<td>−0.0498</td>
</tr>
<tr>
<td></td>
<td>(0.0409)</td>
<td>(0.0445)</td>
</tr>
<tr>
<td>Trade Dependence</td>
<td>−20.3836</td>
<td>−17.0885</td>
</tr>
<tr>
<td></td>
<td>(14.5072)</td>
<td>(13.7160)</td>
</tr>
<tr>
<td>Growth</td>
<td>−0.0287**</td>
<td>−0.0261**</td>
</tr>
<tr>
<td></td>
<td>(0.0116)</td>
<td>(0.0123)</td>
</tr>
<tr>
<td>Dem_L</td>
<td>−0.0207***</td>
<td>−0.0188***</td>
</tr>
<tr>
<td></td>
<td>(0.0067)</td>
<td>(0.0065)</td>
</tr>
<tr>
<td>Dem_H</td>
<td>0.0027</td>
<td>−0.0018</td>
</tr>
<tr>
<td></td>
<td>(0.0106)</td>
<td>(0.0110)</td>
</tr>
<tr>
<td>Affinity</td>
<td></td>
<td>−0.2145</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.2127)</td>
</tr>
<tr>
<td>Constant</td>
<td>−2.1944***</td>
<td>−2.0699***</td>
</tr>
<tr>
<td></td>
<td>(0.1493)</td>
<td>(0.1777)</td>
</tr>
<tr>
<td>N</td>
<td>11644</td>
<td>11022</td>
</tr>
<tr>
<td>(\chi^2)</td>
<td>96.73***</td>
<td>82.75***</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses. Two-tail test: *significant at 10%; **significant at 5%; ***significant at 1%.

---

29 The substantive effect of a rise of one standard deviation in economic growth, while relatively small in Table 5, also is statistically significant, as shown in Oneal and Russett (1997).
A rise of one standard deviation in $\text{DEML}$ reduces the probability of dyadic MID involvement from 0.86% (in the baseline case) to 0.57%. The results of this experiment, which is not reported by Oneal and Russett (1997), lend support to the argument of James et al. (1999) that the effect of joint democracy on the probability of dyadic MID may be small. However, relative to the baseline (0.86%) the reduction of 0.29% amounts to a fall of 33.7% in the probability of MID involvement, which is more or less like that observed in Scenario 1.

Conclusions

Our simultaneous equations model of dyadic conflict and democracy is markedly distinct from the typical single-equation research designs in the literature on the democratic peace. In previous studies, MID$_{AB}$ is assumed to be the dependent variable and the simultaneity of conflict and democracy is ignored. We demonstrate that conflict and democracy do in fact affect one another. The novel feature of our study is thus our combination of the dyadic analysis of MID$_{AB}$ with the monadic determinants explaining $\text{DEML}$ and $\text{DEMH}$ in a dyad.

Our choice of a simultaneous modeling approach is supported by the empirical data. The goodness of fit of our model is high, the results are robust, and the endogenous variables significantly affect one another. The effects of the control variables in the democracy equations replicate the spirit of many studies in the comparative politics literature on democratization. Moreover, the results for the control variables in the equations of $\text{DEML}$ and $\text{DEMH}$ are mostly consistent. In sum, these results suggest that our model adds value to the study of democracy and dyadic conflict.

We find that dyadic MID involvement reduces both joint democracy and dyadic regime dissimilarity. The absolute effect of joint democracy on the likelihood of MID involvement in our model, while significant, is smaller than in the work of Oneal and Russett, while the effect of political regime dissimilarity on the likelihood of MID involvement is not significant. Economic growth reduces the likelihood of MIDs, while the effects of the alliance, capability ratio, and trade dependence variables are not significant, in contrast to some previous studies. Finally, the positive effect of contiguity on the likelihood of MID involvement is significant, as reported by other scholars. Our results also inform a recent salient debate in conflict studies. In our framework, the effect of preference similarity measured by

<table>
<thead>
<tr>
<th>Scenario 1: Contiguous, Nonallied, Politically Relevant Dyads</th>
<th>Model 1 Probability</th>
<th>Model 2 Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline: all continuous variables are set at mean values</td>
<td>0.0546</td>
<td>0.0544</td>
</tr>
<tr>
<td>Increase in $\text{DEML}$ by 1 standard deviation; other variables at baseline values</td>
<td>0.0402</td>
<td>0.0409</td>
</tr>
<tr>
<td>Increase in $\text{GROWTH}$ by 1 standard deviation; other variables at baseline values</td>
<td>0.0531</td>
<td>0.0528</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario 2: Noncontiguous, Nonallied, Politically Relevant Dyads</th>
<th>Model 1 Probability</th>
<th>Model 2 Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline: all continuous variables are set at their mean values</td>
<td>0.0086</td>
<td>0.0080</td>
</tr>
<tr>
<td>Increase in $\text{DEML}$ by 1 standard deviation; other variables at baseline values</td>
<td>0.0057</td>
<td>0.0055</td>
</tr>
<tr>
<td>Increase in $\text{GROWTH}$ by 1 standard deviation; other variables at baseline values</td>
<td>0.0082</td>
<td>0.0077</td>
</tr>
</tbody>
</table>

Based on coefficients in Models 1 and 2 of Table 4.

As noted, we know of one exception to this generalization, namely, James et al. (1999).
UN voting patterns on the likelihood of MID involvement has less credence than joint democracy as an explanation of dyadic MID involvement.

Our findings suggest two policy implications that single-equation studies of MID fail to uncover. First, there appears to be a negative relationship between dyadic conflict and joint democracy. Dyadic conflict reduces joint democracy, which makes future conflict more likely and moves the dyad away from peace. Hence, it would appear that the preservation of peace requires early intervention in disputes in order to stabilize the system. Second, there exists a positive relationship between dyadic peace and democracy. Peaceful dyads experience a rise in democracy for both nations. Thus, by brokering peace between adversaries, actors such as major powers or international organizations can help to facilitate the development of democracy, which in turn promotes peace. While these effects may not be large, they are statistically significant and could well be important tools in conflict resolution.

In conclusion, we need to stress that we regard this paper as representing the beginning of a research program, rather than a final analytic effort. We believe that the field of international relations could gain insights by repeating previous investigations of the relationship between conflict and democracy while using our simultaneous framework. In particular, we believe that the issue of the size of the effect of joint democracy on the likelihood of MIDs merits further investigation. For example, studies could use other control variables, other estimators, or other measures to gain additional insights. However, in our view, the simultaneity of conflict and democracy is too important to be ignored in future research.

References


