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# Evolution in Democracy-War Dynamics

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This article explores the evolutionary and endogenous relationship between democracy and war at the system level. Building on Kant, the authors argue that the rules and norms of behavior within and between democracies become more prevalent in international relations as the number of democracies in the system increases. The authors use Kalman filter analysis, which allows for the parameters in the models to vary over time. The results support the propositions that democratization tends to follow war, that democratization decreases the systemic amount of war, and that the substantive and pacific impact of democracy on war increases over time.

Kant's "Perpetual Peace" ([1795] 1991) and "The Metaphysics of Morals" ([1797] 1991) are well known for their presentation of the democratic peace proposition. The central idea of both works is that the development of international society is founded on individual reason and the evolution of norms. The democratic peace, in turn, is the product of the development of international society. These works shift the focus of international relations theory from the individual state to the state system. Moreover, international politics are seen to be dynamic and evolutionary rather than static. In this article, we adopt a Kantian perspective and examine the systemic and evolutionary relationship between democracy and war.[1]

Research on the relationship between regime type and international conflict has typically been conducted at one of three primary levels of analysis: (1) the monadic or nation-state level, (2) the dyadic or relational level, and (3) the systemic level.

1. See Oneal and Russett (1999) for a Kantian perspective at the dyadic level.

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Monadic-level research of the democratic peace proposition examines the relationship between a state's regime type and its foreign policy behavior. It poses the question, "Are democracies more likely to maintain peace overall?" Dyadic-level research examines the interactions between pairs of states, posing the question, "Do democracies usually keep the peace among themselves?" Finally, systemic-level research of the relationship between global democracy and systemic conflict focuses on the following question: "Is an international system with a high proportion of democratic states more peaceful?" (Gleditsch and Hegre 1997, 283). In other words, will an increase in the share of democracies in the system lead to a more peaceful world, or will the interstate system ever reach Kant's perpetual peace?

Support for peace between democracies is most clearly evident in dyadic-level research, that is, the finding that democracies do not fight each other.[2] It is not straightforward, however, to conclude that democratic peace at the dyadic level necessarily translates into peace at the systemic level as the number of democracies in the system increases.[3] First, the assertion that democracies get involved in wars as often as nondemocracies (the monadic finding) raises the question of whether the democratic peace means only that war is moved to the democratic/nondemocratic fault line.[4] Second, it has been argued that the democratic peace argument may have put the cart before the horse, or got the direction of causality wrong (Gates, Knutsen, and Moses 1996; Thompson 1996; James, Solberg, and Wolfson 1999; Oneal and Russett 2000). That is to say that democracy and peace are part of an endogenized system; not only are democracies less likely to fight one another, peace also serves to foster the development of democracies. Finally, dyadic studies of the democratic peace have not explored Kant's systemic idea of an emerging international "rule of law," which implies that the probability of war may change over time.[5]

This article explores the relationship between democracy and war at the systemic level. Such an analytical perspective allows us to judge whether an international rule of law (international society) is emerging, or whether the democratic peace is an insulated and separate peace—a dyadic phenomenon rather than a systemic one. A systemic analysis will also shed light on the effect of war on the systemic development of democracy. Building on Kant, we argue that the systemic relationship between war and democracy is endogenous and evolutionary (Huntley 1996; McLaughlin 1997). Indeed, in his "Idea for a Universal History with a Cosmopolitan Purpose," Kant ([1784] 1991) writes: "Although we are too short-sighted to perceive the hidden

2. For example, see Babst (1964), Rummel (1983), Doyle (1983a, 1983b, 1986), Maoz and Abdolali (1989), Bremer (1992, 1993), Bueno de Mesquita and Lalman (1992), Maoz and Russett (1992, 1993), Morgan and Schwebach (1992), Weede (1992), Russett (1993), Rousseau et al. (1996), Oneal et al. (1996), Gleditsch and Hegre (1997), Oneal and Russett (1997), and Raknerud and Hegre (1997).

3. It is often assumed that peace in the international system follows logically from peace at the dyadic level (Singer and Wildavsky 1993) or the monadic level (Small and Singer 1976), especially as the number of democracies increases over time (Starr 1992).

4. This research finding has been challenged recently (Ray 1995; Rummel 1995; Benoit 1996), but a significant portion of studies at the monadic level conclude that there is no difference in the war proneness of democracies and nondemocracies (Chan 1984; Weede 1984; Bueno de Mesquita and Lalman 1992; Maoz and Russett 1993; Gleditsch and Hegre 1997).

5. Although we use Kant's language here, Bull's (1977) term, "international society," is also applicable.

mechanisms of nature's scheme, this idea may yet serve as a guide to us in representing an otherwise planless *aggregate* of human actions as conforming, at least when considered as a whole, to a *system*" (p. 52). We explicitly draw on the systemic interplay between Kant's ([1798] 1991, 184) conceptualization of the natural "*evolution* of a constitution governed by *natural right*" among all nations and the resulting "perpetual peace."

Taking Kant's systemic and evolutionary perspective, we model the dynamics between democratization and war. Up to a certain threshold level, democratization may increase the amount of war in the system (Gleditsch and Hegre 1997). War again increases the rate of democratization in the system because democracies tend to win the wars they fight and are able to promote democratic regimes in the aftermath of war (Lake 1992; Reiter and Stam 1998). Beyond the threshold level, increased democratization decreases the amount of war in the system, and Kant's perpetual peace is eventually the only equilibrium of the model.

We demonstrate that the systemic relationship between democracy and war should change over time, with the democratic peace becoming stronger as the share of democracies in the system increases. Many conflict scholars have recognized the possible change over time in the substantive relationships between various factors that lead to war, but few have examined these changes empirically. Numerous publications employing Correlates of War (COW) data, for example, have attempted to identify differences between periods in empirical relationships of conflict since the Congress of Vienna. The comparison of theoretical relationships across various time periods often reveals interesting temporal changes.[6] Yet, all periodizations involve some arbitrariness. If theoretical models of international relations anticipate changes in relationships over time, then we might not want to impose artificial historical break points a priori; rather, we would use statistical estimation techniques that can account for changes more gradually over time. In this study, we apply an estimation technique, the Kalman filter, to an analysis of the systemic relationship between democracy and war. The Kalman filter is well suited to modeling this type of theoretically dynamic relationship. The analysis presented here provides some empirical justification for temporal distinctions and may help to identify different historical epochs in the international political system.

The remainder of this article is organized as follows. First, we discuss the dynamic relationship between democracy and war at the systemic level, presenting several testable propositions. Next, we discuss the estimation technique, Kalman filter analysis, which is ideally suited to the analysis of evolutionary or dynamic models with time-varying parameters. Third, we discuss the operational measures employed in our analysis, focusing also on the issue of stationarity. Finally, we present the empirical results of several Kalman filter models of the systemic democracy-war relationship.

6. Comparing the 19th and 20th centuries is common in empirical analysis in international relations research. Singer, Bremer, and Stuckey (1972) argue that the intercentury split is reasonable because "many historians [have] noted the transitional role of the 1890's" (p. 34). They also examine other potential break points such as 1871 and 1914 and determine that the 1890-1900 decade provides the clearest distinctions between epochs. The world wars have also been used as temporal break points (e.g., Farber and Gowa 1997).

Our model produces results that are robust across lag structures and different initial values. We find a strongly endogenized relationship between war and democracy. We find supporting evidence for the democratic peace proposition; that is, the proportion of democracies is inversely related to the level of war in the international system. We also find that war is *positively* related to the spread of democracy in the international system. We identify how the relationships between war and democracy change over time and can be broken down into easily identifiable historical periods. Our attention to this dynamic aspect of the systemic democratic peace is novel, and our empirical approach can certainly benefit other inquiries in international relations.

## DEMOCRACY-WAR DYNAMICS

Many theories in international relations posit dynamic or evolutionary relationships between variables of interest, yet few empirical tests of such theories account for these changing relationships over time. In this study, we model the changing systemic relationship between democracy and war, theoretically building on previous research by McLaughlin (1997) and Gleditsch and Hegre (1997). Drawing from the work of Kant's "Perpetual Peace" ([1795] 1991) and "The Metaphysics of Morals" ([1797] 1991) and Huntley (1996), McLaughlin argues that the systemic relationship between democracy and war is an endogenous and dynamic one. The basic democratic peace proposition at the systemic level is derived from Kant's notion of perpetual peace. Kant ([1795] 1991, 99-108) believes that perpetual peace depends on republican forms of government domestically, an international federation of free states, and a principle of cosmopolitanism, or universal hospitality. The categorical imperative to end warfare can only be reached through the spread of a domestic and international rule of law, whose principles are founded on individual freedom, legal equality, and separation of executive and legislative powers (Reiss 1991, 33-35; Kant [1797] 1991, 164-73). A republican form of government built on these principles creates the freedom to act morally. Kant concludes that democracy leads to peace in the international system by decreasing the uncertainty that arises in a state of anarchy (or state of war) (Reiss 1991).[7]

Clearly, Kant's ([1795] 1991) notion of perpetual peace operates across multiple levels of analysis. At the monadic level is the first article of the perpetual peace, republican forms of government, without which "despotism and violence will result" (p. 102). At the dyadic level is the concept of a federation of free states, whereby republican states sharing common values eschew war among themselves, forming a sort of security community (pp. 104-5). At the systems level is the third definitive arti-

7. Huntley (1996) describes this aspect of Kant's research well: "For realists, *uncertainty* defines the global motif. . . . The most important quality that republican governments bring to this climate is not a 'peaceful disposition', but rather a *capability to be trusted*. . . . In relations among liberal states . . . the uncertainty reduced by this openness proves a crucial asset, allaying suspicions and enabling a confidence in mutual expectations impossible in relations with closed societies. . . . Constraints on independent executive action, both institutional and political, paradoxically increase the relative capability of republics to commit to peace-building agreements" (p. 58).

cle of the perpetual peace, "cosmopolitan right," the creation of a set of universal international norms.[8] Together, these three articles across these three levels of analysis constitute the conditions governing Kant's democratic peace.

A system level of analysis offers special insights into the dynamic or evolutionary characteristics of world politics. To a certain extent, we can theorize exclusively at the level of the system. But eventually we are forced to deal with the nature of the characteristics and relationships between the units that constitute the system. As with macroeconomics or evolutionary game theory, the behavior of agents plays an important role in defining the nature of the international system. In the context of the democratic peace, this means that the dyadic and monadic aspects of the democratic peace need to be accounted for. Thus, we will distinguish between two aspects of the systemic relationship between democracy and war: (1) the aggregation of the nation-level and dyadic-level relationships to the system level and (2) a "purely systemic" effect. Kant does make this distinction when separating the needs for republican forms of domestic government on one hand and the federation of free states and international rule of law on the other.

The dyadic-level relationship between democracy and peace is well established. It is, therefore, useful to start with the aggregation aspect. According to the democratic peace hypothesis, democracies do not fight each other. From this dyadic statement, we would expect that a system with more democracies will have less war. However, Gleditsch and Hegre (1997) argue that this is not necessarily the case. If democracies fight nondemocracies more than nondemocracies fight themselves, then the amount of war in the system may be modeled as a parabola. The first democratizations in the system will create a larger number of politically mixed dyads than double-democratic dyads, and this will increase the amount of war in the system. Only when reaching a certain share of democratic states will the increase in the number of paired democracies (democratic dyads) outweigh the effect of an increasing number of mixed dyads such that systemic war proneness decreases.[9] Raknerud and Hegre (1997) provide empirical support for the contention that politically mixed dyads have more wars than any other regime combinations (see also Beck and Jackman 1998). We test this proposition accordingly:

*P1:* As the proportion of democracies increases from zero, the proportion of nations fighting war in the international system increases and then decreases after the share of democracies reaches a certain level.

To this aggregation aspect, we add McLaughlin's (1997) truly systemic expectation that the pacific impact of democracy on war will get stronger as the proportion of democracies in the world increases. The domestic rule of law that is characteristic of republican (i.e., democratic) forms of government will diffuse throughout the

8. Hinsley (1963) makes a similar point: "Like the Founding Fathers when they constructed the American Constitution, he [Kant] was envisaging the replacement of the existing imperfect, customary international law by a structure of international society based on a treaty between independent states" (p. 66). See also Huntley (1996).

9. See Gleditsch and Hegre (1997, 297-304) for a formal model of this relationship.

international system, moving the system closer to Kant's international rule of law and making the rules and norms of behavior between democracies more prevalent in international relations at large. The greater strength and success of democracies over time encourages other states to liberalize (economic competition), whereas the rule of law externalized by democracies in their relations with each other (socialization)[10] creates a more democratic rule of law (Huntley 1996). Also, the hegemon as a liberal, democratic state serves an important role in promoting democratic norms by creating and maintaining liberal regimes and institutions. Cooperation in economic and cultural spheres strengthens the peaceful and cooperative systemic norms of behavior that stem from the domestic and international rule of law. Thus, the substantive impact of democracy on war should be increasing as the proportion of democracies in the system increases:

*P2:* As the proportion of democracies increases from zero, the degree of the negative impact of democracy on war in the international system will become stronger.

An additional key feature of the theoretical relationship between democracy and war developed by McLaughlin (1997) is that the relationship between these variables is endogenous. Indeed, Kant ([1784] 1991) posits that the "*greatest problem for the human species, the solution of which nature compels him to seek, is that of attaining a civil society which can administer justice universally*" (p. 45); in turn, "*the problem of establishing a perfect civil constitution is subordinate to the problem of a law-governed* ***external relationship*** *with other states, and cannot be resolved unless the latter is also solved*" (p. 47). Kant thus proposes a long-term endogenized relationship between the establishment of "rights" (modern constitutional democracy) and international peace.

The relationship can also be seen in the short run. Gates, Knutsen, and Moses (1996) argue that "societies in war have often restricted citizen rights and freedoms; even democratic governments have postponed elections or declared martial laws during wartime" (p. 5). But this is a short-term effect. In the aftermath of war, most democracies will lift martial laws and hold elections immediately. Thompson (1996) points to a more long-term version of this argument: "Frequent participation in warfare, and especially intensive warfare, tends to concentrate political power within a state because war making encourages and often rewards more authoritarian approaches to resource mobilization and decision making" (p. 144). If a state's frequency of war participation is sufficiently high, then the short-term effect of war may be predominant. We do not think such states are very common in the interstate system but acknowledge that this argument runs counter to our main argument for the systemic effect of war on democracy.

Thompson (1996, 144-45) continues to argue that democratization requires a peaceful environment, or more precisely that either the potential democracy or its powerful neighbors abandon expansionist foreign policies: "States in such regions enjoy some insulation from the demands of external military competition" and may allow democratization to blossom.

10. Hinsley (1963) and Cederman (1998) refer to this process as learning, as does Kant.

We disagree that this necessarily is the dominant long-term effect. It is not obvious that geographic proximity to expansionist powers will hinder democratization in a country. As Thompson (1996) mentions, war preparation may have forced rulers to "surrender various degrees of political participation in exchange for the resources they needed to make and prepare for war" (p. 143). This means that proximity to expansionist powers may also work in the opposite direction. Moreover, democracies have historically had a tendency to align with each other in war (Mousseau 1997; Raknerud and Hegre 1997). This serves to enhance the security of democracies in a hostile environment. This may counter Thompson's argument that powerful neighbors abandon expansionist policies to allow democracy to flourish.

Consequently, we propose that the dominant systemic effect of war is to increase democratization. Bueno de Mesquita, Siverson, and Woller (1992) show that regime changes occur almost twice as often during and immediately after wars than in peacetime. Moreover, among the war participants, losing states are two to three times as likely to experience a violent regime change than winning states. The reason is straightforward: "Governments are likely to be held accountable for the success or failure of their foreign policies" (p. 638). For the sake of this argument, we will assume that regime changes have a completely random outcome: a certain fixed share lead to dictatorships, a certain share to liberal democracies, and so on. It is evident, then, that if states with a certain regime type seldom lose wars, the number of states having this regime type will increase in number in the system, and other regime types will be more likely to experience regime changes. Indeed, there is fairly strong evidence that democracies are more likely to win the wars they fight (Lake 1992; Stam 1996; Reiter and Stam 1998). Lake (1992), for example, finds that of the 26 wars fought since 1816 between democracies and nondemocracies, democracies have won 81% and lost 19%.[11] A pattern is thus established. Because nondemocracies are more likely to lose wars, they are more likely to risk a regime change, which in turn leads to a certain portion of nondemocracies changing to democracies as a consequence of losing wars.

Not only are democracies more likely to win wars, but when they lose wars, democracies have the mechanisms for replacing their leaders without changing the regime. Given democracies' greater propensity to win wars and greater propensity to emerge from defeat with the *regime* intact, war should lead to greater democratization. It is also possible that democracies are more liable to promote and even impose their form of government in the aftermath of war, which reinforces this dynamic.[12] But, keep in mind, the external imposition of a democracy by victorious democracies is

11. See also Stam (1996), Reiter and Stam (1998), and Bueno de Mesquita et al. (1998) for theoretical explanations of why democracies win wars more frequently than their nondemocratic counterparts.

12. Bueno de Mesquita et al. (1998) make a similar conjecture about nations changing the regime type of their defeated opponents in the aftermath of war. They find, however, that this assumption is not crucial in their simulation results: "The probability of war is relatively insensitive to differences in the rates at which various regime types engage in post-victory conversions" (p. 18). Werner's (1996) analysis of foreign-imposed regime changes suggests that there is little empirical support for the "crusading democracy" argument; that is, fighting against a democratic opponent in war does not increase the chances for an imposed regime change. Werner finds to the contrary that "the probability that a war participant endures a foreign imposed regime change *decreases* as its opponent becomes more democratic" (p. 81). Our argument avoids this issue by assuming only that war leads to regime changes more often in nondemocracies than in democracies. Such a change can be imposed by the victor in war or occur internally.

superfluous to the evolutionary dynamic. All that is necessary for getting this effect is for war to lead to regime changes more often in nondemocracies than in democracies. The effect of externally imposing democracies is not differentiable from the effect of democratic regimes being better able to "survive" war either by winning wars or in losing.[13] This reverse causal relationship is tested with the following proposition:

*P3:* An increase in the proportion of nations fighting war in the international system will increase the proportion of democracies.[14]

In conclusion, we expect the relationship between democracy and war at the systemic level to be both endogenous and evolutionary. Our argument has close affinities to Kant and 19th-century ideas of evolutionary history. The end point of this evolution is Kant's perpetual peace. In the first stage of the evolution, democratization may increase the amount of the war in the system. The increase in war, in turn, spurs the spread of democracy. In the second stage, the federation of free republics is so large that further expansion of it will reduce the amount of war, and finally make it obsolete. A commonly neglected aspect of Kant's argument is that war itself is an important part in the guarantee of the perpetual peace (see Kant [1795] 1991, First Supplement; Reiss 1991, 108-14).[15]

## METHOD

### KALMAN FILTER ANALYSIS

To test the propositions discussed above, we present an estimation procedure in this section, the Kalman filter, which is well suited to the analysis of models with time-varying parameters such as ours.[16] Beck (1983) discusses several techniques for iden-

13. We expect P3 to apply only to interstate conflicts that are sufficiently serious to increase the risk of domestic regime changes. The dynamic whereby nondemocratic regimes tend not to survive wars does not operate with lower level military conflict. Nondemocracies tend to persist despite losing such conflicts. As a result, lower level military conflicts will not generally shift the distribution of democracies and nondemocracies in the system. In a previous version of this article, we examined this systemic relationship between militarized disputes and democracy and found no significant relationship, as we expected.

14. One reviewer wondered why we did not discuss dynamics in the reverse war → democracy relationship. McLaughlin (1997) expected the substantive impact of war on democracy to decrease over time as the system moved closer to the federation of free states. Using moving regression analysis, she found no significant change over time in the war → democracy relationship.

15. One can see this clearly in Kant's ([1784] 1991) essay "Idea for a Universal History," where he argues that "nature has thus again employed the unsociableness of men, and even of the large societies and states which human beings construct, as a means of arriving at a condition of calm and security through their inevitable *antagonism*. Wars, tense and unremitting military preparations, and the resultant distress which every state must eventually feel within itself, even in the midst of peace—these are the means by which nature drives nations to . . . abandon[ing] a lawless state of savagery and enter[ing] a federation of peoples in which every state, even the smallest, could expect to derive its security and rights not from its own power or its own legal judgement, but solely from this great federation" (p. 47).

16. P1 and P2 specify that the systemic relationship between democracy and war depends on the proportion of democracies in the system. P1 predicts that an increase in the proportion of democracies will first increase and then decrease the amount of war in the system. P2 predicts that the substantive effect of the

tifying and estimating structural changes in regression models. These include Chow and Quandt tests, moving or sliding window regressions, conditional heteroscedasticity models, polynomial and trend methods, return to normalcy models, and Kalman filter models. Kalman filter techniques are useful for estimating time-varying parameters and analyzing an evolving system.[17]

The Kalman filter was developed in the engineering literature (Kalman 1960) to estimate state space models consisting of two key parts: (1) the transition equation, which describes the evolution of a set of state variables; and (2) the measurement equation, which describes how data are generated from the state variables.[18] More formally, the state space model can be written as follows:

$$y_t = Z_t\alpha_t + \varepsilon_t$$

$$\alpha_t = T\alpha_{t-1} + \eta_t$$

$$e_t \sim N(0, \sigma^2)$$

$$\eta_t \sim N(0, \sigma^2 Q_t)$$

$$\alpha_0 \sim N(a_0, \sigma^2 P_0),$$

where there are $m$ independent variables and $Z_t$ and $y_t$ are the dependent variables. The second equation is the transition equation that describes the evolution of the parameters. The parameters $\alpha_0$ and $P_0$ in the last equation represent the mean and variance of the initial state vector. Once a model has been placed in state space form, it can be estimated via the Kalman filter, which is "a recursive procedure for computing the optimal estimator of the state vector at time $t$, based on the information available at time $t$. This information consists of the observations up to and including $y_t$" (Harvey 1989, 104). The Kalman filter is similar to a sequential Bayesian estimator because it starts with initial values ($\alpha_0$, $P_0$) as its priors and then estimates the coefficients at each point in time using the posterior values at each stage as the prior values in the next step.[19] The

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democratic peace will become stronger as the proportion of democracies increases and as the system moves closer to the democratic international rule of law envisaged by Kant. Although these propositions are not derived with respect to time, they can be tested with a time-varying parameter model because the proportion of democracies in the system has followed an increasing trend over time. Given this trend, we expect the relationship between democracy and war to vary over time. P1 would be supported empirically if the effect of democracy on war in the system were positive in the early time period and negative in the later time period. P2 would be supported if the size of the democracy parameter were to grow over time as the proportion of democracies increases.

17. Beck (1983) provides a nice overview of Kalman filtering in the context of time-varying parameter models. He also considers several other applications of the Kalman filter in political science (Beck 1989), including the estimation of dynamic models with measurement error, estimation of models with missing data, and estimation of dynamic factor models.

18. The Kalman filter was first applied to the tracking of missiles, "where the system is governed by the laws of motion and new but imperfect information is constantly being received about the missile's position" (Beck 1989, 127).

19. Another way to think about the process of Kalman filtering is discussed by Beck (1983): "Kalman filtering treats each observation as the sum of two components: the optimal forecast based on all information prior to that observation and the part of the observation that cannot be forecasted, that is, the forecast

evolving state vectors are the estimates for each time point in the sample. They become based on greater information as one moves from the beginning to the end of the sample. It is sometimes useful to examine the smoothed Kalman filter estimates as well. These are estimated with a backwards recursive procedure, which also produces a set of coefficients for each point in the time series.[20] The Kalman filter is a powerful tool for estimation primarily because any of the parameters described above can be allowed to vary over time (including the parameters and the variance of the parameters). It is well suited to the analysis of time-varying parameter models, making it useful in the present context.

## OPERATIONALIZATION OF KEY CONCEPTS

The two primary endogenous time series variables analyzed in this study are the level of systemic war and the level of global democracy. Measuring these two series is challenging at the systemic level because they both depend to some degree on the total number of states in the system. To minimize this problem, we adopt proportional measures of war and democracy in the system that control for the total number of nations in the international system per year.

The level of war in the international system is measured as the total number of COW interstate war participants per year divided by the total number of system members. The COW project classifies a nation as a member of the interstate system if (1) its population exceeds 500,000 and it receives diplomats from any two major powers[21] or (2) the nation is a member of the League of Nations or the United Nations any time in its existence (Small and Singer 1982, 41). A COW interstate war is any violent conflict fought between two or more system members that exceeds a minimum battle death threshold of 1,000. A nation is counted as a participant in a war either if it incurs 100 battle deaths or commits at least 1,000 armed personnel to active combat (Small and Singer 1982, 55). The time series plot for the proportion of system members fighting interstate wars is presented in Figure 1. As expected, the proportion of system members fighting wars is highest during the Seven Weeks War, World War I, World War II, and the Korean War.

The other endogenous variable, systemic democracy, is more difficult to measure because of the wide variety of conceptualizations and measurements of democracy in the international relations and comparative politics literature. We adopt a measure of democracy derived from the Polity III data set (Jaggers and Gurr 1995). The Polity III project created an ordinal measure of democracy that combines information from sev-

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error. . . . Thus any given observation is made up of a predictable component and a nonpredictable innovation. The transition equation describes the evolution of this process over time" (p. 574).

20. In the analysis that follows, we present the evolving state vectors rather than the smoothed estimates, although these estimates are available from the authors upon request.

21. The COW project (Small and Singer 1982, 47-50) identifies nine major powers from 1816 to the present (1999) (United States 1899-present; United Kingdom 1816-present; France 1816-1940, 1945-present; Germany/Prussia 1816-1918, 1925-1945, 1991-present; Austria-Hungary 1816-1918; Italy 1860-1943; USSR/Russia 1816-1917, 1922-present; China 1950-present; Japan 1895-1945, 1991-present).

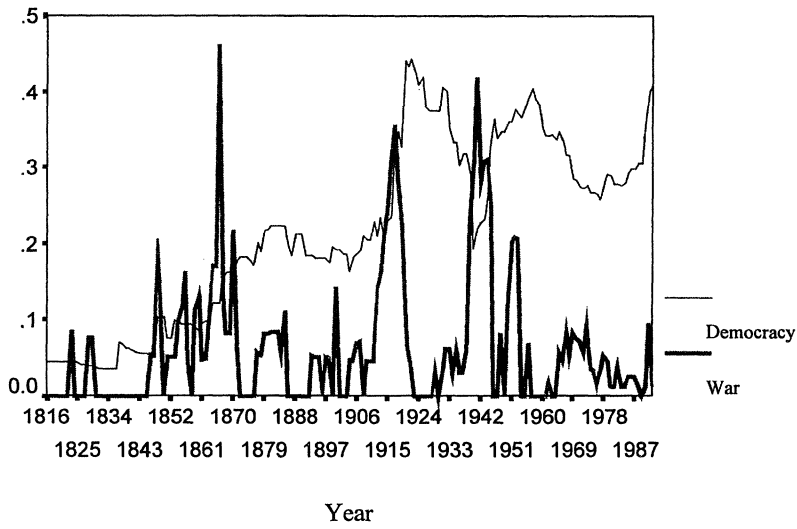


**Figure 1: The Systemic Proportion of War and Democracy, 1816-1992**

eral institutional characteristics of a polity: the competitiveness of political participation, the level of constraints on the chief executive, and the openness and competitiveness of chief executive recruitment (Jaggers and Gurr 1995, 471). We define a democracy as any nation whose democracy score is greater than or equal to 6.[22] For each year, we divide the number of democracies in the system by the total number of COW system members to produce a measure of the proportion of democracies in the system. This measure of the proportion of democracies is also plotted in Figure 1.[23]

## THE ISSUE OF STATIONARITY

The first step involved in any time series analysis is to determine the integrated order of each series to ensure that the data are stationary and each equation is balanced (i.e., both sides of an equation are I[0]). A stochastic process is stationary if the sample moments such as the mean and variance are invariant with respect to time. An example of nonstationarity in time series data is an upward-trending series that is characterized

22. The Polity III democracy measure ranges from 0 to 10, with 10 being the most democratic. Our cutoff value of 6 on the Polity III democracy scale is consistent with measures used by other international relations scholars (e.g., Dixon 1994).

23. The focus in this study is on the endogenous relationship between democracy and war, but we have also considered the impact of other control variables on this relationship in previous analyses (McLaughlin and Gates 1998), including capability concentration, systemic trade, and world production. The results for the democracy-war relationship presented below are not significantly altered by the inclusion (or exclusion) of these exogenous factors.

by an increasing mean over time. Inferences made from models with nonstationary data are usually invalid due to an increase in variance as the sample size increases.[24]

We use augmented Dickey Fuller (ADF) unit root tests to determine the integrated order of each variable.[25] A variable is said to be integrated of order $d$, or $I(d)$, where $d$ refers to the number of times a series must be differenced to become stationary. The augmented version of the Dickey-Fuller test accounts for the possible presence of serial correlation. The null hypothesis for the ADF test is that $\gamma$ equals zero in the following model:

$$\Delta y_t = \mu + \gamma y_{t-1} + \Sigma \phi_j \Delta y_{t-j} + \varepsilon_t.$$

Rejection of the null hypothesis implies that $y_t$ is stationary, or I(0). A failure to reject the null indicates the presence of a unit root, or that $\Delta y_t$ is stationary. The ADF tests indicate that the proportion of war measure is stationary, whereas the proportion of democracy is nonstationary.[26] Given that the proportion of democracies contains a unit root, this series is first differenced.[27]

## KALMAN FILTER MODEL

Using the stationary series, we estimate the most general three-lag model as follows:[28]

24. One is also more likely to encounter a spurious regression problem when two (or more) upward-trending series are regressed on each other. Thus, we will tend to find significant relationships between two nonstationary variables "even if the only thing they have in common is the upward trend. In fact, the $R^2$ for a regression of $y_t$ on $x_t$ and a constant will tend to unity as $n \to \infty$ whenever both series can be characterized by [nonstationarity] . . . even if there is no correlation at all between the stochastic part of $y_t$ and $x_t$" (Davidson and MacKinnon 1993, 671). The basic result is that we are unable to make valid inferences from models that use nonstationary data. Even in cases where we find significant results, they may be artifacts of the nonstochastic properties of the series.

25. Some scholars have asserted that unit root tests, such as the ADF test, may not be valid for the type of bounded measures that we employ because such series cannot be characterized by infinite variance (DeBoef and Granato 1997; Smith 1993; Williams 1993). These arguments are usually applied to time series data such as macropartisanship, where it is unlikely that all individuals in the United States will identify with one party. It would be possible for our measures of democracy and war to equal one if all countries became democratic or all nations became involved in a world war. Also, unit root tests still provide useful information even for bounded measures (Box-Steffensmeier and Smith 1998). We estimated the models presented in this article using stationary and nonstationary measures, and the results were virtually identical (both in terms of the trends of the parameters over time and their substantive levels). These results are available from the authors upon request.

26. The ADF tests are run with two lags of $\Delta y_{t-j}$. The critical values for the ADF test are –3.469 ($p$ = .01) and –2.878 ($p$ = .05). For the war measure, the calculated ADF values are –5.3048 (lag 0), –4.7090 (lag 1), and –4.4995 (lag 2). These are all greater than the critical values ($p < .01$), indicating that the null hypothesis of a unit root can be rejected. For the democracy measure, the calculated ADF values are –1.0446 (lag 0), –1.0971 (lag 1), and –1.184 (lag 2). These are all less than the critical values ($p > .05$), leading to an acceptance of the null hypothesis of a unit root.

27. The mean of the first differenced democracy series is .00208, with a minimum value of –.098759 and a maximum value of .114147. The mean of the war series is .0632, with a minimum value of 0 and a maximum value of .4634.

28. The Kalman filter has been applied to simultaneous equations time series analysis in economics. Bohara and Sauer (1992), for example, estimate a two-equation Kalman filter model of inflation and the growth rate of the money supply.

$$\begin{aligned}\text{Propwar}_t = {} & \delta_0 + \delta_1\text{Propwar}_{t-1} + \delta_2\text{Propwar}_{t-2} + \delta_3\text{Propwar}_{t-3} \\ & + \delta_4\Delta\text{Propdem}_{t-1} + \delta_5\Delta\text{Propdem}_{t-2} + \delta_6\Delta\text{Propdem}_{t-3} + \varepsilon_{1t}\end{aligned}$$

$$\begin{aligned}\Delta\text{Propdem}_t = {} & \beta_0 + \beta_1\text{Propwar}_{t-1} + \beta_2\text{Propwar}_{t-2} + \beta_3\text{Propwar}_{t-3} \\ & + \beta_4\Delta\text{Propdem}_{t-1} + \beta_5\Delta\text{Propdem}_{t-2} + \beta_6\Delta\text{Propdem}_{t-3} + \varepsilon_{2t}.\end{aligned}$$

The first equation models the relationship between the proportion of war in the interstate system as explained by changes in three lags of the proportion of democracies as well as three autoregressive lags. The second equation models changes in the proportion of democracies as a function of three lags of the proportion of war in the system and three endogenous lags. These two equations are estimated simultaneously in the Kalman filter.

We employ two principal modeling strategies to ensure that our estimates are robust. First, we vary the specification of the estimated model by varying the number of lags for each variable from one to three. Second, we compare nine separate sets of initial values estimated from the following time periods: 1824-1843, 1844-1863, 1864-1883, 1884-1903, 1904-1923, 1924-1943, 1944-1963, 1964-1983, and 1919-1938 (a post–World War I sample). Initial values are generated from single equation ordinary least squares estimates for each of these time periods. If the relationship between democracy and war is changing over time, the Kalman filter model might produce very different results depending on the initial values (Beck 1989, 151). We estimate a total of 54 different models based on varying lag structures and initial values.

## EMPIRICAL RESULTS

Our first results demonstrate robustness in model specification across different lag structures.[29] Figure 2 presents Kalman filter estimates of the impact of democracy on war for models with one lag, two lags, and three lags, and initial values calculated in 1919-1938. Figure 3 contains Kalman filter estimates of the impact of war on democracy for models with one, two, and three lags, and initial values calculated in 1919-1938. It is clear from both figures that the results are robust to model specification differences, with each parameter following the same overall trend.[30] Also, the parameters are extremely similar in terms of their substantive size, especially in Figure 2, where the impact of democracy on war is virtually identical across the one-, two-, and three-lag models. Although we present parameters across one-, two-, and three-lag models for only one set of initial starting values in the figures, we find a similar congruence across various model specifications using other initial values. These results

29. Figures 4 and 6 show the evolving parameters (state vectors) for all nine initial starting values, whereas Figures 5 and 7 present the parameters for the models estimated with 1919-1938 initial values. We picked one set of estimates to simplify the discussion and show the confidence intervals around these estimates, which are difficult to present graphically in the first set of figures.

30. The estimates in Figure 3 do vary in the early part of the time period depending on the number of lags in the model, but they converge in the late 1800s.

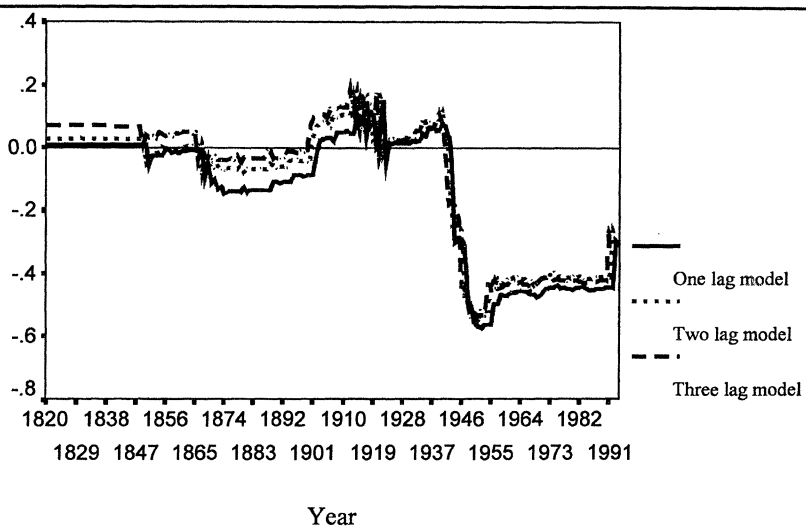


**Figure 2: The Impact of Democracy on War (lag 1) Varying the Model Specification**

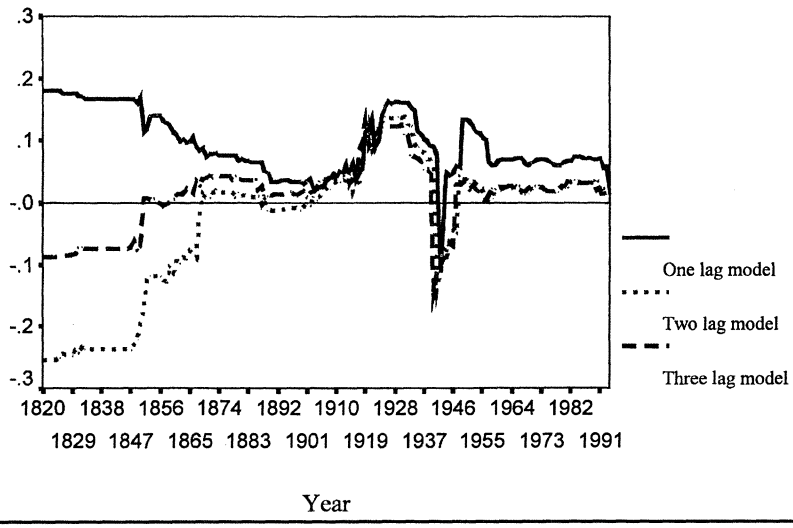


**Figure 3: The Impact of War on Democracy (lag 1) Varying the Model Specification**

demonstrate that the temporal changes in the parameters we estimate are robust to model specification.

Given that our model specification is robust, we present one-lag models in the remainder of the study. Figure 4 shows the impact of the change in the proportion of democracies on the proportion of war in the system for all nine starting values. Convergence across the series begins in the 1860s during the Seven Weeks War. After

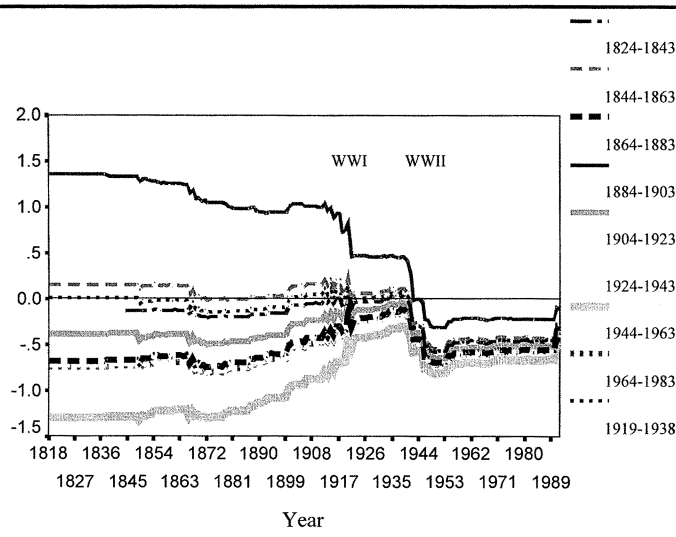


**Figure 4: The Impact of Democracy on War for All Starting Values**

World War I, convergence across the nine series is quite evident. World War II brings about another convergence. This level of convergence lasts for the rest of the period of analysis. In addition to this process of convergence, the general pattern at the beginning of the series is to converge toward some negative value. After World War I (around 1919), a shock to the system can be seen whereby all series jump up. This shock is also seen in Figure 1. The effects of this shock persist until after World War II. During this interwar period, the effect of democracy on war is negligible. We do not see the negative relationship between democracies and war again until after World War II. We speculate that the systemic instability that characterized the interwar years explains this result. Once convergence begins, we see a negative relationship between democracy and war. Thus, we can conclude that the share of democracies is negatively associated with the share of states involved in war. This provides evidence to support P1, which is elaborated on in the discussion section.

The impact of democracy on war in the international system is quite large substantively as well. The number of democracies in the last year of the series, 1992, was 74 (40.9% of system members). If the number of democracies in the world increased from 74 to 92 (10% increase), our model would predict 6.7 fewer war participants in the international system.[31] If the number of democracies increased to 110 (20% increase), there would be 13.4 fewer war participants. This is quite significant, considering that the maximum number of interstate war participants in any given year in the period from 1816 to 1992 was 23.

31. This is based on the median estimate in Figure 4 for 1992. Considering the entire range of parameter estimates, a 10% increase in the number of democracies in the world could decrease the number of war participants by 1.8 to 9 wars.

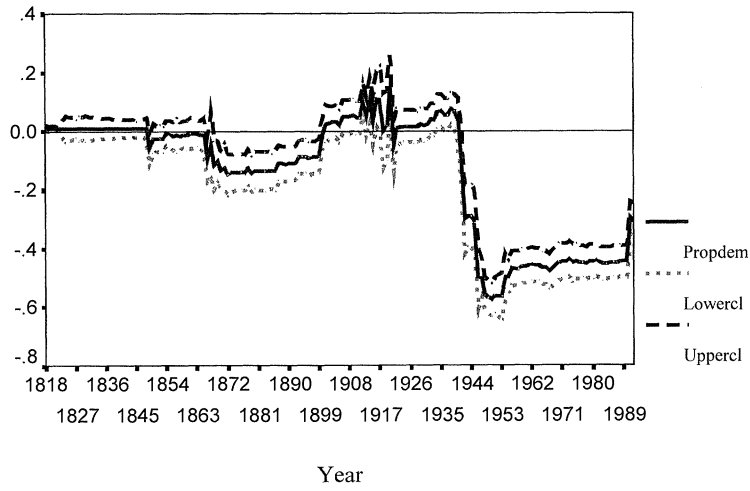


**Figure 5: The Impact of Democracy on War with 1919-1938 Starting Values**

Figure 5 presents the estimate of democracy for the initial value calculated from the period from 1919 to 1938 (post–World War I sample). The evolving state vector (time-varying parameter value) is presented as a solid line, and the dotted lines above and below this line represent the upper and lower 90% confidence intervals. If zero is contained within the confidence intervals, then we cannot reject the null hypothesis that the parameter is zero. We include a horizontal reference line at zero to help indicate when the value of the time-varying parameter is significantly different from zero.

The parameter for democracy starts out close to zero, which means that the impact of democracy on war was negligible in the early 1800s. This parameter becomes negative and significant in the mid to late 1800s. The impact of democracy becomes positive and insignificant around the turn of the century and then finally becomes strongly negative and significant during and after World War II. This provides some support for the argument that the democratic peace is a recent phenomenon.

Figure 6 shows the relationship between war in the system and changes in the proportion of democracies (for all starting values), thereby reversing the causal relationship usually examined. The estimate is positive for most of the sample period, which is what we expected. Note, however, that regardless of starting value, the series converge remarkably around 1865, and by World War I, all parameters are essentially identical. Figure 7 shows the 90% confidence bound around this estimate. The impact of war on democracy is positive and significant in most years, except during the late 1800s and early 1900s. Overall, the more war in the international system, the greater the growth in the proportion of democratic states.

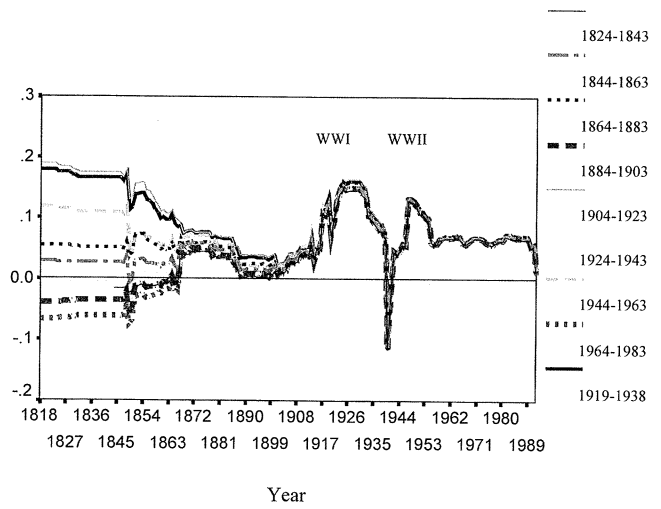


**Figure 6: The Impact of War on Democracy for All Starting Values**

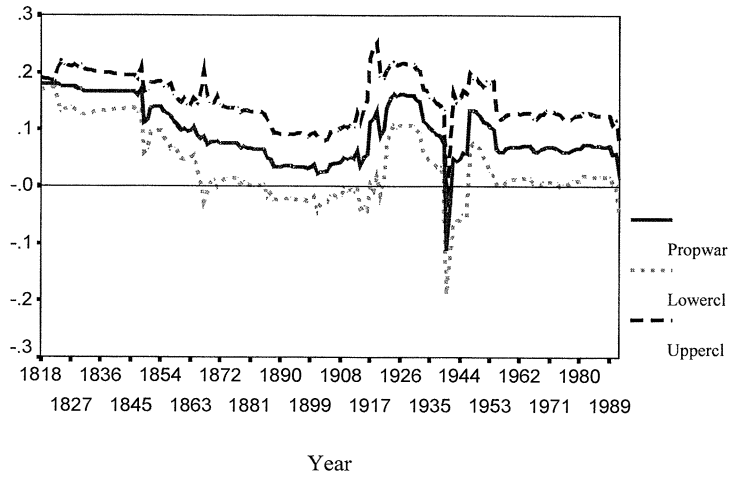


**Figure 7: The Impact of War on Democracy with 1919-1938 Starting Values**

## DISCUSSION AND CONCLUSION

Three propositions were presented in this study. The first proposition posits a parabolic relationship between democracy and war in the international system.[32] If there is a parabolic relationship between the proportion of democracies in the system and propensity for war in the system over time, there should be an early historical pattern of a positive relationship and a later negative relationship, reflecting the rise and fall of the parabola. Evidence supporting a positive relationship between democracies and war should be strongest during periods of large waves of democratization, or periods with the highest proportion of democracies in the system. Is there evidence to support this aspect of the parabolic relationship between democracies and war? Apparently not, because during the historical period with the greatest proportion of democracies (the interwar years), we see the lowest level of effect between democracies and warfare. Moreover, the period with the greatest expansion in share of democracy (1816-1880) is the period in which the relationship between democracy and war is not clear across different starting values. Given that this period shows the greatest increase in the proportion of democracies, we would expect from a hypothesis of a linear and negative relationship between democracies and warfare that the Kalman filter estimates would converge quickly at a negative value. This does not happen.

We offer two possible explanations. First, a lack of quick convergence is due to the nature of the updating process used in the Kalman filter analysis, making it difficult to ascertain whether there was a positive relationship between democracies and war. In other words, whereas there is no evidence to support a positive relationship, there is no evidence to the contrary either. The second explanation, however, is that there is a negative effect from democracy on war for all periods. Regardless of explanation, if there is a parabolic relationship, we should expect to see a positive relationship during some period. We conclude that this aspect of P1 is not confirmed.

Is there evidence of a negative relationship between the proportion of democracies in the system and the propensity for war that develops over time? There seems to be support for the democratic peace result in the later period of our analysis. The negative relationship is especially strong in the cold war era. The relationship between democracy and war shifts strongly in a negative direction in the 1940s, reflecting the pattern of post–World War II democratization. These patterns parallel the story that Kant portrays, with the federation of free states expanding over time, creating a more peaceful international system. The problem is that this evidence is not conclusive. In Figure 4, for example, the drop in the estimate might be due to factors other than the increase in the share of democracies. A similarly swift increase in the share of democracies occurs after World War I (see Figure 1), yet this change results in an *increase* in war participation. This is hardly the drop in war participation that is expected. Moreover, the proportion of democracies in 1915 is higher than in 1940. But it may be argued that it simply takes time for the relationship to take effect. This would mean that democratic

32. We did examine scatter plots of proportion of democracies by war participation rates. No parabolic relationship is evident.

norms were not established within the international system in the 1920s, but had been by the 1950s. (See the discussion with regard to P2 below.) Given these findings, there is little conclusive evidence to support the parabolic relationship between democracy and war posited in P1. Nevertheless, there is some evidence (albeit mixed) to support the development of a negative relationship over time.

In addition to testing the parabolic relationship between democracy and war, we anticipated that the degree of the impact of democracy on war would get stronger as the share of democracies grew (P2). It appears that Figures 4 and 5 support this proposition, with some of the parameters generally shifting from positive to negative across the time period estimated. Also, the democratic peace shows its strongest effect when there are more democracies in the system, which also supports the notion that as the international system moves closer to Kant's international rule of law, the rules and norms of behavior between democracies become more prevalent in international relations at large.[33]

P3 posits that an increase in the proportion of nations fighting war in the international system will increase the proportion of democracies based on the finding that nondemocracies are more likely to experience regime change than democracies as a result of war. This proposition is strongly supported (Figures 6 and 7) by the positive parameter across most of the time period from 1816 to 1992. The one exception is the decline in the parameter during World War II, where the parameter exceeds –0.1. This points to an interesting debate in the literature about whether war is a positive or negative force for the creation of democracy. Contrary to P3, Gates, Knutsen, and Moses (1996) and Thompson (1996) argue that war should hinder democratization or lead to decreases in levels of democracy. They point to examples of restricted freedom during wartime, for example, martial law. Both propositions may be correct in that war itself decreases democracy in the short run. In fact, the polity measure of regime scores does not even account for such short-term changes. Yet, the experience of warfare and outcomes of warfare (especially with democratic victors) does lead to long-term increases in the proportion of democracies in the system. One idea for future research would be to test the differences in the short-term and long-term effects of war on democratization at the national level or regional level using an alternative measure of regime type.[34]

One could conclude from this study that a policy of democratic jihad is supported. We, however, wish to distinguish ourselves from this conclusion. Keep in mind, the

33. Our tests examine this notion of evolving democratic norms indirectly through the proxy measure of the proportion of democracies in the system. It would be interesting to analyze one or more norms that stem from democratic institutions to see if nondemocratic states have become more likely to adopt such norms over time (which is what we would expect as the federation of free states expands). For example, Dixon (1993, 1994) and Raymond (1994, 1996) find that democracies are more likely to agree to third-party arbitration and mediation for dispute resolution. It would be interesting to see if there is a temporal trend over time in the propensity for nondemocratic states to agree to such dispute resolution tactics.

34. We control for the size of the international system by using proportional measures of war and democracy. It would be interesting to consider how the actual number of democracies in a given region affects the propensity for peace. For example, 1 country becoming democratic in a region of 10 countries with nine democracies might be different from 1 country becoming democratic in a region of 10 countries with four democracies.

evolution dynamics require only that democracies win wars more often than nondemocracies and that defeat in war often leads to some form of regime change. In Darwinian terms, the selection effect regards the differentiation between democracies and nondemocracies in their propensity to lose wars. Thus, war more often than not leads to democratization through the effects of both winning and losing wars. There is no need for a policy of imposing democracies in the wake of war. The system dynamics ensure democratization already.

Kant long ago stressed the dynamic characteristics of the international system. History was seen to be evolving and progressive, not static. Human reason and individual will operate as the building blocks of an international society in which norms of law and peace pervade. Our systemic analysis reflects the analytical perspective advocated by Kant. The Kalman filter analysis allows us to examine the dynamic aspects of international politics and the evolution of the democratic peace. Our empirical approach provides new insights into the evolution of the democracy-war relationship and offers great promise for the analysis of other dynamic and evolutionary relationships in international relations.

## REFERENCES


Babst, Dean V. 1964. Elected governments: A force for peace. *The Wisconsin Sociologist* 3:9-14.

Beck, Nathaniel. 1983. Time-varying parameter regression models. *American Journal of Political Science* 27:557-600.

———. 1989. Estimating dynamic models using Kalman filtering. *Political Analysis* 1:121-56.

Beck, Nathaniel, and Simon Jackman. 1998. Beyond linearity by default: Generalized additive models. *American Journal of Political Science* 42:596-627.

Benoit, Kenneth. 1996. Democracies really are more pacific (in general): Reexamining regime type and war involvement. *Journal of Conflict Resolution* 40:636-57.

Bohara, Alok K., and Christine Sauer. 1992. Competing macro-hypotheses in the United States: A Kalman filtering approach. *Applied Economics* 24:389-99.

Box-Steffensmeier, Janet M., and Renee M. Smith. 1998. Investigating political dynamics using fractional integration methods. *American Journal of Political Science* 42:661-89.

Bremer, Stuart A. 1992. Dangerous dyads. *Journal of Conflict Resolution* 36:309-41.

———. 1993. Democracy and militarized interstate conflict, 1816-1965. *International Interactions* 18:231-49.

Bueno de Mesquita, Bruce, and David Lalman. 1992. *War and reason: Domestic and international imperatives*. New Haven, CT: Yale University Press.

Bueno de Mesquita, Bruce, James Morrow, Randolph M. Siverson, and Alastair Smith. 1998. Peace through war? Evolutionary consequences of democratic war behavior. Paper presented at the annual meeting of the Midwest Political Science Association, April, Chicago.

Bueno de Mesquita, Bruce, Randolph M. Siverson, and Gary Woller. 1992. War and the fate of regimes: A comparative analysis. *American Political Science Review* 86:638-46.

Bull, Hedley. 1977. *The anarchical society: A study of order in world politics*. New York: Columbia University Press.

Cederman, Lars-Erik. 1998. Back to Kant: Reinterpreting the democratic peace as a collective learning process. Unpublished manuscript, Political Science Department, University of California, Los Angeles.

Chan, Steve. 1984. Mirror, mirror on the wall. . . . Are the freer countries more pacific? *Journal of Conflict Resolution* 28:617-48.

Davidson, Russell, and James G. MacKinnon. 1993. *Estimation and inference in econometrics*. Oxford, UK: Oxford University Press.

DeBoef, Suzanna, and Jim Granato. 1997. Near-integrated data and the analysis of political relationships. *American Journal of Political Science* 41:619-40.

Dixon, William J. 1993. Democracy and the management of international conflict. *Journal of Conflict Resolution* 37:42-68.

———. 1994. Democracy and the peaceful settlement of international conflict. *American Political Science Review* 88:14-32.

Doyle, Michael. 1983a. Kant, liberal legacies and foreign affairs (part I). *Philosophy and Public Affairs* 12:205-35.

———. 1983b. Kant, liberal legacies and foreign affairs (part II). *Philosophy and Public Affairs* 12:323-53.

———. 1986. Liberalism and world politics. *American Political Science Review* 80:1151-70.

Farber, H. S., and Joanne Gowa. 1997. Common interests or common polities? Reinterpreting the democratic peace. *Journal of Politics* 59:393-417.

Gates, Scott, Torbjorn Knutsen, and Jonathon Moses. 1996. Democracy and peace: A more skeptical view. *Journal of Peace Research* 33:1-10.

Gleditsch, Nils Petter, and Håvard Hegre. 1997. Peace and democracy: Three levels of analysis. *Journal of Conflict Resolution* 41:283-310.

Harvey, Andrew C. 1989. *Forecasting, structural time series models and the Kalman filter*. London: Cambridge University Press.

Hinsley, Francis H. 1963. *Power and the pursuit of peace: Theory and practice in the history of relations between states*. Cambridge, UK: Cambridge University Press.

Huntley, Wade L. 1996. Kant's third image: Systemic sources of the liberal peace. *International Studies Quarterly* 40:45-76.

Jaggers, Keith, and Ted R. Gurr. 1995. Tracking democracy's third wave with the Polity III data. *Journal of Peace Research* 32:469-82.

James, Patrick, Eric Solberg, and Murray Wolfson. 1999. An identified systemic model of the democracy-peace nexus. *Defence and Peace Economics* 10:1-37.

Kalman, Rudolf E. 1960. A new approach to linear filtering and prediction problems. *Journal of Basic Engineering, Transactions ASME, Series D* 82:34-45.

Kant, Immanuel. [1784] 1991. Idea for a universal history with a cosmopolitan purpose. In *Kant political writings*, edited by Hans Reiss, 41-53. Cambridge, UK: Cambridge University Press.

———. [1795] 1991. Perpetual peace: A philosophical sketch. In *Kant political writings*, edited by Hans Reiss, 93-130. Cambridge, UK: Cambridge University Press.

———. [1797] 1991. The metaphysics of morals. In *Kant political writings*, edited by Hans Reiss, 131-75. Cambridge, UK: Cambridge University Press.

———. [1798] 1991. The contest of faculties. In *Kant political writings*, edited by Hans Reiss, 176-90. Cambridge, UK: Cambridge University Press.

Lake, David A. 1992. Powerful pacifists: Democratic states and war. *American Political Science Review* 86:24-37.

Maoz, Zeev, and Nasrin Abdolali. 1989. Regime types and international conflict, 1816-1976. *Journal of Conflict Resolution* 33:3-35.

Maoz, Zeev, and Bruce Russett. 1992. Alliance, contiguity, wealth, and political stability: Is the lack of conflict among democracies a statistical artifact? *International Interactions* 17:245-67.

———. 1993. Normative and structural causes of democratic peace. *American Political Science Review* 87:624-38.

McLaughlin, Sara. 1997. The systemic democratic peace. Ph.D. diss., Michigan State University.

McLaughlin, Sara, and Scott Gates. 1998. Dynamic relationships in international relations: A Kalman filter analysis of the systemic relationship between democracy and war. Paper presented at the annual meeting of the International Studies Association, March, Minneapolis.

Morgan, T. Clifton, and Valerie L. Schwebach. 1992. Take two democracies and call me in the morning. *International Interactions* 17:305-20.

Mousseau, Michael. 1997. Democracy and militarized interstate collaboration. *Journal of Peace Research* 34:73-87.

Oneal, John R., Frances H. Oneal, Zeev Maoz, and Bruce M. Russett. 1996. The liberal peace: Interdependence, democracy, and international conflict, 1950-1985. *Journal of Peace Research* 33:11-28.

Oneal, John R., and Bruce M. Russett. 1997. The classical liberals were right: Democracy, interdependence, and conflict, 1950-1985. *International Studies Quarterly* 41:267-94.

———. 1999. The Kantian peace: The pacific benefits of democracy, interdependence, and international organizations. *World Politics* 52.

———. 2000. Why "An identified systemic model of the democracy-peace nexus" does not persuade. *Defence and Peace Economics* 11.

Raknerud, Arvid, and Håvard Hegre. 1997. The hazard of war: Reassessing the evidence of the democratic peace. *Journal of Peace Research* 34:385-404.

Ray, James Lee. 1995. *Democracy and international conflict: An evaluation of the democratic peace proposition.* Columbia: University of South Carolina Press.

Raymond, Gregory A. 1994. Democracies, disputes, and third-party intermediaries. *Journal of Conflict Resolution* 38:24-42.

———. 1996. Demosthenes and democracies: Regime type and arbitration outcomes. *International Interactions* 22:1-20.

Reiss, Hans S., ed. 1991. *Kant's political writings.* Cambridge, UK: Cambridge University Press.

Reiter, Dan, and Allan C. Stam III. 1998. Democracy and battlefield military effectiveness. *Journal of Conflict Resolution* 42:259-77.

Rousseau, David L., Christopher Gelpi, Dan Reiter, and Paul K. Huth. 1996. Assessing the dyadic nature of the democratic peace, 1918-88. *American Political Science Review* 90:512-33.

Rummel, R. J. 1983. Libertarianism and international violence. *Journal of Conflict Resolution* 27:27-71.

———. 1995. Democracies *are* less warlike than other regimes. *European Journal of International Relations* 1:457-79.

Russett, Bruce. 1993. *Grasping the democratic peace: Principles for a post–cold war world.* Princeton, NJ: Princeton University Press.

Singer, J. David, Stuart A. Bremer, and John Stuckey. 1972. Capability distribution, uncertainty, and major power war, 1820-1965. In *Peace, war, and numbers*, edited by Bruce M. Russett, 19-48. Beverly Hills, CA: Sage.

Singer, Max, and Aaron Wildavsky. 1993. *The real world order: Zones of peace/zones of turmoil.* Chatham: Chatham House.

Small, Melvin, and J. David Singer. 1976. The war-proneness of democratic regimes, 1816-1975. *Jerusalem Journal of International Relations* 1:50-69.

———. 1982. *Resort to arms: International and civil wars, 1816-1980.* Beverly Hills, CA: Sage.

Smith, Renee M. 1993. Error correction, attractors, and cointegration: Substantive and methodological issues. *Political Analysis* 4:249-54.

Stam, Allan C. III. 1996. *Win, lose, or draw: Domestic politics and the crucible of war.* Ann Arbor: University of Michigan Press.

Starr, Harvey. 1992. Why don't democracies fight one another—Evaluating the theory-findings feedback loop. *Jerusalem Journal of International Relations* 14:41-59.

Thompson, William R. 1996. Democracy and peace: Putting the cart before the horse? *International Organization* 50:141-74.

Weede, Erich. 1984. Democracy and war involvement. *Journal of Conflict Resolution* 28:649-64.

———. 1992. Some simple calculations on democracy and war involvement. *Journal of Peace Research* 29:377-83.

Werner, Suzanne. 1996. Absolute and limited war: The possibility of foreign-imposed regime change. *International Interactions* 22:67-88.

Williams, John. 1993. What comes around goes around: Unit root tests and cointegration. *Political Analysis* 4:229-36.